ELEMENTARY
CORE Academy
UTAH STATE OFFICE OF EDUCATION & UTAH STATE UNIVERSITY

ELEMENTARY CORE ACADEMY • ELEMENTARY CORE ACADEMY •

1ST GRADE

2005

PARTICIPANT HANDBOOK

UTAH STATE OFFICE OF EDUCATION

UtahState UNIVERSITY

ELEMENTARY CORE ACADEMY

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ISBN: 1-890563-92-7

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Acknowledgements

These materials have been produced by and for the teachers of the State of Utah. Appreciation is expressed to the numerous individuals who provided input and effort into the creation of this curriculum. Delivery of the Elementary CORE Academy, including the development and delivery of content, coordination of sessions, distribution of materials, and participant interaction, has been a collaborative effort of many educational groups across Utah. The following organizations, Utah teachers, and educational leaders contributed ideas and activities as part of this professional development project:

Organizations:

Utah State Office of Education (USOE)
Utah State University (USU)
State Science Education Coordination Committee (SSECC)
State Mathematics Education Coordination Committee (SMECC)
Special Education Services Unit (USOE)
WestEd Eisenhower Regional Consortium

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Credits for editing, compiling, formatting, and assisting with the materials and delivery of the Elementary CORE Academy are given to Jennifer Downs, James Evans, Andrae Ferguson, and Eric Rowley.

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Steven O. Laing, Ed.D. State Superintendent of Public Instruction
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Dear CORE Academy Teachers:

Thank you for your investment in children and in building your own expertise as you participate in the CORE Academy. I hope your involvement helps you to sustain a laser-like focus on student achievement.

Teachers in Utah are superb. By participating in the Academy, you join a host of teachers throughout the state who understand that teaching targeted on the core curricula, across a spectrum of subjects, will produce results of excellence. The research is quite clear: the closer the match of explicit instruction to core standards, the better the outcome on core assessments.

I personally appreciate your excellence and your desire to create wonderful classrooms of learning for students. Thank you for your dedication. I feel honored to associate with you and pledge my support to lead education in ways that benefit all of our children.

Sincerely,

Patti Harrington, Ed.D.
State Superintendent
of Public Instruction

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Funding Sources

Appreciation is expressed for the tremendous educational input and monetary commitment of several organizations for the successful delivery of the Elementary CORE Academy. This year's Elementary CORE Academy was developed and funded through a variety of sources. The Utah State Office of Education (USOE), in collaboration with Utah State University (USU) and local school districts of Utah, have supported kindergarten through sixth grade teachers with professional development experiences that will enhance the educational experience for Utah children.

Major funding for the Academy comes from the following sources:

Federal/State Funds:

Utah State Office of Education
Staff Development Funds
Special Education Services Unit

ESEA Title II

Utah Math Science Partnership

WestED Eisenhower Regional Consortium

District Funds:

Various sources including Quality Teacher Block, Federal ESEA Title II, and District Professional Development Funds

School Funds:

Trust land, ESEA Title II, and other school funds
Utah State Office of Education Special Education Services

The state and district funds are allocations from the state legislature. ESEA is part of the "No Child Left Behind" funding that comes to Utah.

Additionally, numerous school districts, individual schools, and principals in Utah have sponsored teachers to attend the Academy. Other educational groups such as the Utah Division of Water Resources, National Energy Foundation, Utah Energy Office, and the Utah Mining Association have assisted in the development and delivery of resources in the Academy.

Most important is the thousands of teachers who take time from their summer to attend these professional development workshops. It is these teachers who make this program possible.

Goals of the Elementary CORE Academy

Overall

The purpose of the Elementary CORE Academy is to create high quality teacher instruction and improve student achievement through the delivery of professional development opportunities and experiences for teachers across Utah.

The Academy will provide elementary teachers in Utah with:

1. Models of exemplary and innovative instructional strategies, tools, and resources to meet newly adopted Core Curriculum standards, objectives, and indicators.
2. Practical models and diverse methods of meeting the learning needs of all children, with instruction implementation aligned to the Core Curriculum.
3. Meaningful opportunities for collaboration, self-reflection, and peer discussion specific to innovative and effective instructional techniques, materials, teaching strategies, and professional practices in order to improve classroom instruction.

Learning a limited set of facts will no longer prepare a student for real experiences encountered in today's world. It is imperative that educators have continued opportunities to obtain instructional skills and strategies that provide methods of meeting the needs of all students. Participants of the Academy experience will be better equipped to meet the challenges faced in today's classrooms.

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First Grade
Core Curriculum

K-2 Core Curriculum

Introduction

Most students enter school confident in their own abilities; they are curious and eager to learn more. They make sense of the world by reasoning and problem solving. Young students are active, resourceful individuals who construct, modify, and integrate ideas by interacting with the physical world as well as with peers and adults. They learn by doing, collaborating, and sharing their ideas. Students' abilities to communicate through language, pictures, sound, movement, and other symbolic means develop rapidly during these years.

- **Young children learn by doing, collaborating, and sharing their ideas.**

Literacy requires an understanding of listening, speaking, reading, writing, and viewing in many forms including print and electronic images. Today, more than ever, students must have the ability to think critically while applying new information to existing knowledge. Therefore, school literacy programs need to involve students in learning to read and write in situations that foster critical thinking and the use of literacy for independent learning in all content areas.

Young students are building beliefs about what mathematics is, about what it means to know and do mathematics, and about themselves as mathematical learners. Mathematics instruction needs to include more than short-term learning of rote procedures. Students must use technology and other mathematical tools, such as manipulative materials, to develop conceptual understanding and solve problems as they do mathematics. Students, as mathematicians, learn best with hands-on, active experiences throughout the instruction of the mathematics curriculum.

Language Arts and Mathematics are the tools for doing work in other areas. These content areas need to be integrated into other curriculum areas to provide students with optimal learning. The curriculum becomes more relevant when content areas are connected rather than taught in strict isolation. For this reason, the content areas of the Fine Arts, Health Education, Physical Education, Science, and Social Studies have been combined to enable teachers to teach more efficiently and students to learn in a real-life context that enhances lifelong learning.

The Kindergarten through Second Grade Core describes what students should know and be able to do at the end of each of the kindergarten, first, and second grade levels. It has been developed, critiqued, and revised by a community of Utah teachers, university

educators, State Office of Education specialists, and an advisory committee representing a wide variety of people from the community. The Core reflects the current philosophy of education that is expressed in national documents developed by the International Reading Association, National Council of the Teachers of Mathematics, National Standards for Arts Education, Information Power, National Association for Sport and Physical Education, American Association for the Advancement of Science, National Council for the Social Studies, International Society for Technology and Education, and Early Childhood Standards.

Organization of the K-2 Core:

- **Intended Learning Outcomes**
- **Standard**
- **Objective**
- **Indicator**

Organization of the K-2 Core

The Core is designed to help teachers organize and deliver instruction.

- Each grade level begins with a brief course description.
- The Kindergarten, First, and Second Grade INTENDED LEARNING OUTCOMES describe the goals for students to gain knowledge and understand their world. They are found at the beginning of each grade level, are an integral part of the Core, and should be included as part of instruction.
- The first Core area consists of the Language Arts curriculum.
- The second Core area consists of the Mathematics curriculum.
- The third Core area consists of the subject areas of the Fine Arts, Health Education, Physical Education, Science, and Social Studies.
- A STANDARD is a broad statement of what students are expected to understand. Several Objectives are listed under each Standard.
- An OBJECTIVE is a more focused description of what students need to know and be able to do at the completion of instruction. If students have mastered the Objectives associated with a given Standard, they have mastered that Standard at that grade level. Several Indicators are described for each Objective.
- An INDICATOR is a measurable or observable student action that enables one to assess whether a student has mastered a particular Objective. Indicators are not meant to be classroom activities, but they can help guide classroom instruction.

Guidelines Used in Developing the K-2 Core

The Core is:

Consistent With the Nature of Learning

The main intent in the early grades is for students to value learning and develop the skills to gain knowledge and understand their world. The Core is designed to produce an integrated set of Kindergarten, First, and Second Grade Intended Learning Outcomes for students, with specific goals in all content areas.

Coherent

The Core has been designed so that, wherever possible, the ideas taught within a particular grade level have a logical and natural connection with each other and with those of earlier grades. Efforts have also been made to select topics and skills that integrate well with one another appropriate to grade level. In addition, there is an upward articulation of concepts, skills, and content. This spiraling is intended to prepare students to understand and use more complex concepts and skills as they advance through the learning process.

Developmentally Appropriate

The Core takes into account the psychological and social readiness of students. It builds from concrete experiences to more abstract understandings. The Core focuses on providing experiences with concepts that students can explore and understand in depth to build the foundation for future learning experiences.

Reflective of Successful Teaching Practices

Learning through play, movement, and adventure is critical to the early development of the mind and body. The Core emphasizes student exploration. The Kindergarten, First, and Second Grade Intended Learning Outcomes are central in each standard. The Core is designed to encourage instruction with students working in cooperative groups. Instruction should recognize the importance of each Core area in the classroom, school, and community.

Comprehensive

The Kindergarten, First, and Second Grade Core does not cover all topics that have traditionally been in the Kindergarten, First, and Second Grade curriculum; however, it provides a basic foundation of knowledge and skills in all content areas. By emphasizing depth rather than breadth, the Core seeks to empower students rather than intimidate them with a collection of

- **By emphasizing depth rather than breadth, the Core seeks to empower students.**

isolated and eminently forgettable facts. Teachers are free to add related concepts and skills, but they are expected to teach all the standards and objectives specified in the Core for their grade level.

Feasible

Teachers and others who are familiar with Utah students, classrooms, teachers, and schools have designed the Core. It can be taught with easily obtained resources and materials. A Teacher Handbook is also available for teachers and has sample lessons on each topic for each grade level. The Teacher Handbook is a document that will grow as teachers add exemplary lessons aligned with the new Core.

- **Student achievement of the standards and objectives in this Core is best assessed using a variety of assessment instruments.**

Useful and Relevant

This curriculum relates directly to student needs and interests. Relevance of content areas to other endeavors enables students to transfer skills gained from one area of instruction into their other school subjects and into their lives outside the classroom.

Reliant Upon Effective Assessment Practices

Student achievement of the standards and objectives in this Core is best assessed using a variety of assessment instruments. Performance tests are particularly appropriate to evaluate student mastery of thinking processes and problem-solving skills. A variety of classroom assessment approaches should be used by teachers in conjunction with the Criterion Referenced Tests (CRT) that are administered to first and second grade students in Language Arts and Mathematics, and with the pre- and post-tests administered in kindergarten. Observation of students engaged in instructional activities is highly recommended as a way to assess students' skills as well as attitudes toward learning. The nature of the questions posed by students provides important evidence of their understanding.

Engaging

In the early grades, children are forming attitudes and habits for learning. It is important that instruction maximizes students' potential and gives them understanding of the intertwined nature of learning. Effective elementary instruction engages students actively in enjoyable learning experiences. Instruction should be as thrilling an experience for a child as seeing a rainbow, growing a flower, or describing a toad. In a world of rapidly expanding knowledge and technology, all students must gain the skills they will need to understand and function responsibly and successfully in the world. The Core provides skills in a context that enables students to experience the joy of learning.

The First Grade Core Curriculum

First grade core concepts should be integrated across all curriculum areas. Reading, writing, and mathematical skills should be emphasized as integral to the instruction in all other areas. Personal relevance of content is always an important part of helping students to value learning and should be emphasized.

In first grade, students are immersed in a literature-rich environment to develop an awareness of phonemes and print materials as sources of information and enjoyment. They listen and speak to participate in classroom discussions and use a variety of strategies to read new words and familiar selections aloud with fluency and expression. Understanding the main idea and sequence of events in a story are important comprehension skills that are applied in all other content areas.

- **Reading, writing, and mathematical skills should be emphasized as integral to the instruction in all other areas.**

First graders continue their development of number sense. They learn basic addition and subtraction facts through joining and separating sets with twelve or fewer objects. Students draw and describe specified two-dimensional figures and use nonstandard units to measure length and weight. They are introduced to the idea of fractions and continue the development of sorting and patterning skills. While learning mathematics, students will be actively engaged, using concrete materials and appropriate technologies such as calculators and computers.

In first grade, students learn about themselves and their relationship to the classroom, school, family, and community. Students develop the skills of questioning, gathering information, making measurements using nonstandard units, constructing explanations, and drawing conclusions. Students learn about their bodies and the behaviors necessary to protect them and keep them healthy. They learn basic body control while beginning to develop motor skills and moving in a variety of settings. Students become aware of strength, endurance, and flexibility in different parts of their bodies. They express their thoughts and ideas creatively, while challenging their imagination, fostering reflective thinking, and developing disciplined effort and problem-solving skills.

K-2 Intended Learning Outcomes

- **Intended learning outcomes provide a direction for general classroom instruction, management, culture, environment, and inclusion.**

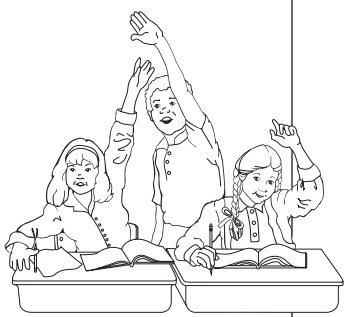
The main intent at the early grades is for students to value learning and develop the skills to gain knowledge and understand their world.

The Intended Learning Outcomes described below reflect the belief that kindergarten, first, and second grade education should address the intellectual, social, emotional, physical, and ethical development of children. While the Kindergarten, First, and Second Grade Core Curriculum focuses primarily on content and the intellectual development of children, it is important to create a classroom culture that fosters development of many aspects of a person. By nurturing development in these interrelated human domains, young people will be healthy and discover varied and exciting talents and dreams. They will be socially and civically competent and able to express themselves effectively.

The outcomes identified below are to provide a direction for general classroom instruction, management, culture, environment, and inclusion. These outcomes should be interwoven throughout the Kindergarten, First, and Second Grade Core Curriculum, which offers more specific and measurable standards for instruction.

Beginning in kindergarten and by the end of second grade students will be able to:

1. **Demonstrate a positive learning attitude.**
   a. Display a sense of curiosity.
   b. Practice personal responsibility for learning.
   c. Demonstrate persistence in completing tasks.
   d. Apply prior knowledge and processes to construct new knowledge.
   e. Voluntarily use a variety of resources to investigate topics of interest.
2. **Develop social skills and ethical responsibility.**
   a. Respect similarities and differences in others.
   b. Treat others with kindness and fairness.
   c. Follow classroom and school rules.
   d. Include others in learning and play activities.
   e. Participate with others when making decisions and solving problems.
   f. Function positively as a member of a family, class, school, and community.



3. **Demonstrate responsible emotional and cognitive behaviors.**
   a. Recognize own values, talents, and skills.
   b. Express self in positive ways.
   c. Demonstrate aesthetic awareness.
   d. Demonstrate appropriate behavior.
   e. Express feelings appropriately.
   f. Meet and respect needs of self and others.
4. **Develop physical skills and personal hygiene.**
   a. Respect physical similarities and differences in self and others.
   b. Learn proper care of the body for health and fitness.
   c. Develop knowledge that enhances participation in physical activities.
   d. Display persistence in learning motor skills and developing fitness.
   e. Use physical activity for self-expression.
5. **Understand and use basic concepts and skills.**
   a. Develop phonological and phonemic awareness.
   b. Decode, read, and comprehend written text and symbols.
   c. Develop vocabulary.
   d. Develop reasoning and sequencing skills.
   e. Demonstrate problem-solving skills.
   f. Observe, sort, and classify objects.
   g. Make and interpret representations, graphs, and models.
   h. Recognize how content ideas interconnect.
   i. Make connections from content areas to application in real life.
6. **Communicate clearly in oral, artistic, written, and nonverbal form.**
   a. Share ideas using communication skills.
   b. Predict an event or outcome based on evidence.
   c. Use appropriate language to describe events, objects, people, ideas, and emotions.
   d. Listen attentively and respond to communication.
   e. Use mathematical concepts to communicate ideas.
   f. Use visual art, dance, drama, and music to communicate.

First Grade Language Arts Core Curriculum

Standard I:
***Oral Language*—Students develop language for the purpose of effectively communicating through listening, speaking, viewing, and presenting.**

Standard I: ***Oral Language*—Students develop language for the purpose of effectively communicating through listening, speaking, viewing, and presenting.**

Objective 1: Develop language through listening and speaking.

a. Identify specific purpose(s) for listening (e.g., to gain information, to be entertained).

b. Listen and demonstrate understanding by responding appropriately (e.g., follow multiple-step directions, restate, clarify, question).

c. Speak clearly and audibly with expression in communicating ideas.

d. Speak in complete sentences.

Objective 2: Develop language through viewing media and presenting.

a. Identify specific purpose(s) for viewing media (i.e., to identify main idea and details, to gain information, distinguish between fiction/nonfiction).

b. Use a variety of formats (e.g., show and tell, drama, sharing of books and personal writings, choral readings, informational reports, retelling experiences and stories in sequence) in presenting with various forms of media.

Standard II: ***Concepts of Print*—Students develop an understanding of how printed language works.**

Objective 1: Demonstrate an understanding that print carries "the" message.

a. Recognize that print carries different messages.

b. Identify messages in common environmental print (e.g., signs, boxes, wrappers).

Objective 2: Demonstrate knowledge of elements of print within a text.

a. Discriminate between letters, words, and sentences in text.

b. Match oral words to printed words while reading.

c. Identify punctuation in text (i.e., periods, question marks, and exclamation points).

Standard II: ***Concepts of Print*—Students develop an understanding of how printed language works.**

Standard III: ***Phonological and Phonemic Awareness*—Students develop phonological and phonemic awareness.**

Objective 1: Demonstrate phonological awareness.

a. Count the number of syllables in words.

b. Count the number of syllables in a first name.

Objective 2: Recognize like and unlike word parts (oddity tasks).

a. Identify words with same beginning consonant sounds (e.g., man, sat, sick) and ending consonant sounds (e.g., man, sat, ten) in a series of words.

b. Identify words with same medial sounds in a series of words (e.g., long vowel sound: take, late, feet; short vowel sound: top, cat, pan; middle consonant sound: kitten, missing, lesson).

Objective 3: Orally blend word parts (blending).

a. Blend syllables to make words (e.g., /ta/…/ble/, table).

b. Blend onset and rime to make words (e.g., /p/…/an/, pan).

c. Blend individual phonemes to make words (e.g., /s/ /a/ /t/, sat).

Objective 4: Orally segment words into word parts (segmenting).

a. Segment words into syllables (e.g., table, /ta/…/ble/).

b. Segment words into onset and rime (e.g., pan, /p/…/an/).

c. Segment words into individual phonemes (e.g., sat, /s/…/a/…/t/).

Objective 5: Orally manipulate phonemes in words and syllables (manipulation).

a. Substitute initial and final sound (e.g., replace first sound in mat to /s/, say sat; replace last sound in mat with /p/, say map).

b. Substitute vowel in words (e.g., replace middle sound in map to /o/, say mop).

c. Delete syllable in words (e.g., say baker without the /ba/, say ker).

d. Deletes initial and final sounds in words (e.g., say sun without the /s/, say un; say hit without the /t/, say hi).

e. Delete initial phoneme and final phoneme in blends (e.g., say step without the /s/, say tep; say best without the /t/, say bes).

Standard III: ***Phonological and Phonemic Awareness*— Students develop phonological and phonemic awareness.**

Standard IV: ***Phonics and Spelling*—Students use phonics and other strategies to decode and spell unfamiliar words while reading and writing.**

Objective 1: Demonstrate an understanding of the relationship between letters and sounds.

a. Write letters to represent spoken sounds of all letters of the alphabet in random order.

b. Identify and pronounce sounds for consonants, consonant blends (e.g., br, st, fl) and consonant digraphs (e.g., ch, sh, wh, th) accurately in words.

c. Identify and pronounce sounds for short and long vowels, using patterns (e.g., vc, vcv, cvc, cvvc, cvcv, cvc-silent e), and vowel digraphs (e.g., ea, ee, ie, oa, ai, ay, oo, ow) accurately in words.

d. Identify and pronounce sounds for r–controlled vowels accurately in one-syllable words (e.g., ar, or, er).

e. Identify and blend initial letter sounds with common vowel patterns to pronounce one-syllable words (e.g., /g/…/oa/…/t/, goat).

Objective 2: Use knowledge of structural analysis to decode words.

a. Identify and read grade level contractions and compound words.

b. Identify sound patterns and apply knowledge to decode one-syllable words (e.g., blends, digraphs, vowel patterns, r-controlled vowels).

c. Demonstrate an understanding of representing same sound with different patterns by decoding these patterns accurately in one-syllable words (e.g., ee, ie, ea, e).

d. Use knowledge of root words and suffixes to decode words (i.e., -ful, -ly, -er).

e. Use letter patterns to decode words (e.g., phonograms/word families/onset and rime: -ack, -ail, -ake).

Objective 3: Spell words correctly.

a. Write sounds heard in words in the correct order.

b. Hear and write beginning, middle, and ending consonant sounds to spell one-syllable words.

c. Spell short vowel words with consonant blends and digraphs (e.g., bl, st, nt, sh, wh, th).

Standard IV: ***Phonics and Spelling*—Students use phonics and other strategies to decode and spell unfamiliar words while reading and writing.**

d. Spell an increasing number of grade level high-frequency and irregular words correctly (e.g., bear, gone, could).

e. Learn the spellings of irregular and difficult words (e.g., river, house, animal).

Objective 4: Use spelling strategies to achieve accuracy (e.g., prediction, visualization, association).

a. Use knowledge about spelling to predict the spelling of new words.

b. Associate the spelling of new words with that of known words and word patterns.

c. Use spelling generalities to assist spelling of new words (e.g., one vowel between two consonants, silent "e" on the end of a word, two vowels together).

Standard V: ***Fluency*—Students develop reading fluency to read aloud grade level text effortlessly without hesitation.**

Objective 1: Read aloud grade level text with appropriate speed and accuracy.

a. Read grade level text at a rate of approximately 60 wpm.

b. Read grade level text with an accuracy rate of 95-100%.

Objective 2: Read aloud grade level text effortlessly with clarity.

a. Read grade level text in three- to four-word phrases using intonation, expression, and punctuation cues.

b. Read with automaticity 100 first grade high-frequency/sight words.

Standard V: ***Fluency*—Students develop reading fluency to read aloud grade level text effortlessly without hesitation.**

Standard VI: ***Vocabulary*—Students learn and use grade level vocabulary to increase understanding and read fluently.**

Objective 1: Learn new words through listening and reading widely.

a. Use new vocabulary learned by listening, reading, and discussing a variety of genres.

b. Learn the meanings of a variety of grade level words (e.g., words from literature, social studies, science, math).

c. Use resources to learn new words by relating them to known words (e.g., books, charts, word walls, simple dictionaries).

Objective 2: Use multiple resources to learn new words by relating them to known words and/or concepts. See second, third, fourth, fifth, and sixth grades.

Objective 3: Use structural analysis and context clues to determine meanings of words.

a. Identify meanings of words using the root word and known endings (e.g., car, cars; jump, jumped, jumping).

b. Use context to determine meanings of unknown key words (e.g., The gigantic dog couldn't fit in his new doghouse.).

Standard VI: ***Vocabulary*—Students learn and use grade level vocabulary to increase understanding and read fluently.**

Standard VII: ***Comprehension*—Students understand, interpret, and analyze narrative and informational grade level text.**

Objective 1: Identify purposes of text.

a. Discuss purpose for reading.

b. Discuss author's purpose.

Objective 2: Apply strategies to comprehend text.

a. Relate prior knowledge to make connections to text (e.g., text to text, text to self, text to world).

b. Ask questions about text read aloud and independently.

c. Make predictions using picture clues, title, text, and/or prior knowledge.

d. Make inferences and draw conclusions from text.

e. Identify topic/main idea from text noting details.

f. Retell using important ideas/events and supporting details in sequence.

g. Compile information from text.

Objective 3: Recognize and use features of narrative and informational text.

a. Identify beginning, middle, and end; characters; setting; problem/resolution.

b. Identify different genres: nursery rhymes, fairy tales, poems, realistic fiction, fantasy, fables.

c. Identify information from pictures, captions, and diagrams.

d. Identify multiple facts in grade level informational text.

e. Locate facts from informational texts (e.g., picture books, grade level informational books).

Standard VII: ***Comprehension*—Students understand, interpret, and analyze narrative and informational grade level text.**

Standard VIII: ***Writing*—Students write daily to communicate effectively for a variety of purposes and audiences.**

Objective 1: Prepare to write by gathering and organizing information and ideas (pre-writing).

a. Generate ideas for writing by reading, discussing literature and informational text, drawing, looking at books, being read to, and reflecting on personal experiences.

b. Select topics from generated ideas.

c. Identify audience for writing.

Standard VIII: ***Writing*—Students write daily to communicate effectively for a variety of purposes and audiences.**

Objective 2: Compose a written draft.

a. Draft ideas on paper in an organized manner (e.g., beginning, middle, end) utilizing words and sentences.

b. elect appropriate words to convey meaning.

Objective 3: Revise by elaborating and clarifying a written draft.

a. Revise draft to add details.

b. Revise draft using descriptive words.

c. Write in complete sentences.

Objective 4: Edit written draft for conventions.

a. Edit writing for capitals in names, first word of a sentence, and the pronoun "I" and correct ending punctuation (i.e., periods, question marks).

b. Edit for spelling of grade level-appropriate words (e.g., would, down, made, write).

c. Edit for standard grammar (i.e., complete sentences).

d. Edit for appropriate formatting features (i.e., spacing, margins, titles).

Objective 5: Use fluent and legible handwriting to communicate.

a. Print all upper- and lower-case letters of the alphabet and numerals 0-9 using proper form, proportions, and spacing.

b. Write with increasing fluency in forming manuscript letters and numerals.

c. Produce legible documents with manuscript handwriting.

Objective 6: Write in different forms and genres.

a. Produce personal writing (e.g., journals, lists, friendly notes and letters, personal experiences, family stories, literature responses).

b. Produce traditional and imaginative stories, narrative and formula poetry as a shared writing activity.

c. Produce functional text (e.g., ABC books, lists, labels, signs, how-to books, observations).

d. Share writing with others using illustrations to add meaning to published works.

e. Publish group and individual products.

First Grade Mathematics Core Curriculum

Standard I:
Students will acquire number sense and perform simple operations with whole numbers.

Standard I: **Students will acquire number sense and perform simple operations with whole numbers.**

Objective 1: Represent whole numbers in a variety of ways.

a. Relate number words to the *numerals* that represent the quantities 0 to 10.

b. Sort objects into groups of tens and ones and write the numeral representing the set.

c. Represent *whole numbers* up to 100 in groups of tens and ones using objects.

d. Write a numeral when given the number of tens and ones.

e. Write a numeral to 99 in *expanded form* (e.g., 39 is 3 tens and 9 ones or 30+9).

f. Use zero to represent the number of elements in the empty set or as a placeholder in a two-digit numeral.

Objective 2: Identify simple relationships among whole numbers.

a. Identify the number that is one more or one less than any *whole number* from 1 to 99.

b. Use the vocabulary "greater than," "less than," and "equal to" when comparing sets of objects or numbers.

c. Order sets of objects and numbers from 0 to 20.

d. Use *ordinal numbers* 1st through 5th (i.e., 1st, 2nd, 3rd, 4th, 5th).

Objective 3: Model and illustrate meanings of the operations addition and subtraction and describe how they relate.

a. Demonstrate the joining and separating of sets with twelve or fewer objects and record the results with pictures or symbols.

b. Model two meanings of subtraction: separating of sets ("take away") and comparison of sets ("how many more/fewer") using objects, pictorial representations, and symbols.

c. Use correct vocabulary and symbols to describe addition (i.e., add, "and," plus, +, sum), subtraction (i.e., subtract, minus, -, take away, how many more/fewer), and equals (i.e., =, same as).

d. Use zero in addition and subtraction sentences.

Objective 4: Use fractions to identify parts of the whole.

a. Share sets of up to ten objects between two students and identify each part as half.

b. Divide geometric shapes into equal parts, identifying halves and fourths.

Objective 5: Solve whole number problems using addition and subtraction in horizontal and vertical notation.

a. Compute addition and subtraction facts to twelve.

b. Add three whole numbers with sums to twelve.

Standard II: **Students will identify and use patterns and relations to represent mathematical situations.**

Objective 1: Recognize and represent patterns with one or two attributes.

a. Sort and classify objects by one or two *attributes*.

b. Identify, create, and label simple patterns using manipulatives, pictures, and symbolic notation (e.g., ABAB . . ., □ ○ △ □ ○ △ . . .).

c. Identify patterns in the environment.

d. Identify horizontal and vertical patterns on hundreds charts.

e. Use patterns to establish skip counting by twos to 20 and by fives and tens to 100.

f. Count backward from 10 to 0 and identify the pattern.

Objective 2: Recognize and represent relations using mathematical symbols.

a. Recognize that "=" indicates a relationship in which the quantities on each side of an equation are equal.

b. Recognize that symbols such as □, △, or ◇ in an addition or subtraction equation represent a missing value that will make the statement true (e.g., □ + 3 = 6, 5 +7 = △, 4 = 5 – ◇).

c. Demonstrate that changing the order of *addends* does not change the *sum* (e.g., 3+2=5 and 2+3=5).

Standard II:
Students will identify and use patterns and relations to represent mathematical situations.

Standard III: Students will describe, identify, and create simple geometric shapes and describe spatial relationships.

Objective 1: Describe, identify, and create simple geometric shapes.

a. Identify, name, draw, create, and sort circles, triangles, rectangles, and squares.

b. Identify circles, triangles, rectangles, and squares in the students' environment.

c. Recognize that combining simple geometric shapes can create more complex geometric shapes.

Objective 2: Describe simple spatial relationships.

a. Use and demonstrate words to describe position (i.e., between, before, after, middle, left, right).

b. Use and demonstrate words to describe distance (i.e., closer, farther).

Standard III: Students will describe, identify, and create simple geometric shapes and describe spatial relationships.

Standard IV:
Students will understand and use simple measurement tools and techniques.

Standard IV: Students will understand and use simple measurement tools and techniques.

Objective 1: Identify measurable attributes of objects and units of measurement.

a. Identify the appropriate tools for measuring length, weight, volume, temperature, and time.

b. Identify the values of a penny, nickel, dime, and quarter.

c. Estimate the length of an object by comparing to a nonstandard unit (e.g., How many new pencils wide is your desk?).

Objective 2: Use appropriate techniques and tools to determine measurements.

a. Compare objects, using nonstandard units, according to their length, weight, or capacity (e.g., pencils/length, books/weight, boxes/volume).

b. Read and tell time to the nearest hour.

c. Name the days of the week, months of the year, and seasons in order.

d. Determine the value of a set of the same coins that total 25¢ or less (e.g., a set of 14 pennies equals 14¢, a set of 5 nickels equals 25¢, a set of 2 dimes equals 20¢).

Standard V: Students will collect and draw conclusions from data and understand basic concepts of probability.

Objective 1: Collect, organize, and display simple data.

a. Collect physical objects to use as data.

b. Collect, represent, and interpret data using tables, tally marks, *pictographs*, and bar graphs.

Objective 2: Determine the likelihood of an event.

a. Compare events to decide which are more likely, less likely, and equally likely.

b. Relate past events to future events (e.g., The sun set about 6:00 last night, so it will set about the same time tonight).

Standard V: Students will collect and draw conclusions from data and understand basic concepts of probability.

First Grade Fine Arts, Health, Physical Education, Science, and Social Studies Core Curriculum

Standard I: Students will develop a sense of self.

Objective 1: Describe and practice responsible behaviors for health and safety.

a. Practice appropriate personal hygiene (e.g., bathe, wash hands, clean clothes).

b. Describe the benefits of eating a variety of nutritious foods.

c. Describe the benefits of physical activity.

d. Describe substances that are helpful and harmful to the body.

e. Practice basic safety and identify hazards.

Objective 2: Develop and demonstrate skills in gross and fine motor movement.

a. Participate daily in short periods of physical activity that require exertion (e.g., one to three* minutes of walking, jogging, jump roping).

b. Perform fundamental locomotor (e.g., skip, gallop, run) and nonlocomotor (twist, stretch, balance) skills with mature form.

c. Develop manipulative skills (e.g., cut, glue, throw, catch, kick, strike).

d. Create and perform unique dance movements and sequences that strengthen skills while demonstrating personal and spatial awareness.

Objective 3: Develop and use skills to communicate ideas, information, and feelings.

a. Recognize and express feelings in a variety of ways (e.g., draw, paint, tell stories, dance, sing).

b. Express how colors, values, and sizes have been controlled in artworks to create mood, tell stories, or celebrate events.

c. Sing a melody independently, with developing accuracy and a natural voice that is free from strain.

d. Create simple rhythm, movement, and melody patterns with body percussion and instruments.

* Some students may not be able to sustain activity for one minute due to various medical concerns.

Standard I: Students will develop a sense of self.

Standard II:
Students will develop a sense of self in relation to families and community.

Standard II: Students will develop a sense of self in relation to families and community.

Objective 1: Describe behaviors that influence relationships with family and friends.

a. Explain how family members support each other.

b. Describe tasks at home and school.

c. Explain how families change over time.

d. Recognize that choices have consequences which affect self, peers, and family.

e. Describe behaviors that initiate and maintain friendships.

Objective 2: Describe important aspects of the community and culture that strengthen relationships.

a. Practice democratic processes (e.g., follow family and classroom rules, take turns, listen to others, share ideas).

b. Describe physical features surrounding the home, school, and community.

c. Identify changes in the school and neighborhood over time.

d. Identify and use technology in your home, school, and community (e.g., computer, TV, radio).

e. Show respect for state and national symbols and patriotic traditions; recite the Pledge of Allegiance.

Objective 3: Express relationships in a variety of ways.

a. Describe traditions, music, dances, artwork, poems, rhymes, and stories that distinguish cultures.

b. Develop dramatic storytelling skills through flexibility in movement and voice, accurate sequencing, and listening and responding to others.

c. Create and perform/exhibit dances, visual art, music, and dramatic stories from a variety of cultures expressing the relationship between people and their culture.

Standard III: Students will develop an understanding of their environment.

Objective 1: Investigate plants and plant growth.

a. Observe and draw pictures of plants.

b. Compare seeds of plants and describe ways they may be carried through the environment (e.g., wind, water, animals).

c. Observe and describe plants as they grow from seeds.

d. Identify how people use plants (e.g., food, clothing, paper, shelter).

e. Investigate and report conditions that affect plant growth.

Objective 2: Investigate water and interactions with water.

a. Observe and measure characteristics of water as a solid and liquid.

b. Compare objects that float and sink in water.

c. Measure and predict the motion of objects in water.

d. Describe how plants and people need, use, and receive water.

Objective 3: Demonstrate how symbols and models are used to represent features of the environment.

a. Use map skills to identify features of the neighborhood and community.

b. Create representations that show size relationships among objects of the home, classroom, school, or playground.

c. Identify map and globe symbols (e.g., cardinal directions, compass rose, mountains, rivers, lakes).

d. Locate continents and oceans on a map or globe (i.e., North America, Antarctica, Australia, Pacific Ocean, Atlantic Ocean).

Standard III: Students will develop an understanding of their environment.

K-6 Elementary Mathematics Core Curriculum in Table Format

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Standard I: **Students will understand simple number concepts and relationships.**	**Standard I:** **Students will acquire number sense and perform simple operations with whole numbers.**	**Standard I:** **Students will acquire number sense and perform operations with whole numbers.**	**Standard I:** **Students will acquire number sense and perform operations with whole numbers and simple fractions.**	**Standard I:** **Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.**	**Standard I:** **Students will acquire number sense and perform operations with whole numbers, simple fractions, and decimals.**	**Standard I:** **Students will acquire number sense and perform operations with rational numbers.**
Objective 1: **Identify and use whole numbers.** a. Relate a *numeral* to the number of objects in a set (e.g., ☐ ☐ ☐ = 3). b. Construct models of numbers to 10 with physical objects or manipulatives. c. Make pictorial representations of numbers to 10 (e.g., draw four circles, draw six squares). d. Recognize and write numerals from 0 to 10. e. Manipulate objects to demonstrate and describe multiple ways of representing a number (e.g., 5 can be 3 and 2 more, 5 can also be 2 and 2 and 1).	**Objective 1:** **Represent whole numbers in a variety of ways.** a. Relate number words to the *numerals* that represent the quantities 0 to 10. b. Sort objects into groups of tens and ones and write the numeral representing the set. c. Represent *whole numbers* up to 100 in groups of tens and ones using objects. d. Write a numeral when given the number of tens and ones. e. Write a numeral to 99 in *expanded form* (e.g., 39 is 3 tens and 9 ones or 30+9). f. Use zero to represent the number of elements in the empty set or as a placeholder in a two-digit numeral.	**Objective 1:** **Represent whole numbers in a variety of ways.** a. Relate number words to the *numerals* that represent the quantities 0-100. b. Represent *whole numbers* up to 1,000 in groups of hundreds, tens, and ones using base ten models, and write the numeral representing the set. c. Read and write a three-digit numeral, relating it to a set of objects and a pictorial representation. d. Write a numeral to 999 in *expanded form* (e.g., 539 is 5 hundreds, 3 tens, 9 ones or 500+30+9). e. Identify the place and the value of a given digit in a three-digit numeral (e.g., the two in 281 means 2 hundreds or 200). f. Demonstrate multiple ways to represent numbers using symbolic representations (e.g., thirty is the same as two groups of 15, the number of pennies in three dimes, or 58-28).	**Objective 1:** **Represent whole numbers in a variety of ways.** a. Model, read, and write *whole numbers* up to 10,000 using base ten models, pictures, and symbols. b. Write a *numeral* when given the number of thousands, hundreds, tens, and ones. c. Write a number up to 9,999 in expanded form (e.g., 6,539 is 6 thousands, 5 hundreds, 3 tens, 9 ones or 6000+500+30+9). d. Identify the place and the value of a given digit in a four-digit numeral. e. Demonstrate multiple ways to represent numbers using models and symbolic representations (e.g., fifty is the same as two groups of 25, the number of pennies in five dimes, or 75-25).	**Objective 1:** **Represent whole numbers and decimals in a variety of ways.** a. Model, read, and write numerals from tenths to 100,000. b. Write a *whole number* up to 99,999 in *expanded form* (e.g., 76,539 is 7 ten-thousands, 6 one-thousands, 5 hundreds, 3 tens, 9 ones or 70,000+6,000+500+30+9). c. Identify the place and the value of a given digit in a five-digit numeral, including decimals to tenths. d. Demonstrate multiple ways to represent numbers by using models and symbolic representations (e.g., 36 is the same as the square of six, three dozen, or 9x4). e. Identify *square numbers* using models.	**Objective 1:** **Represent whole numbers and decimals in a variety of ways.** a. Model, read, and write numerals from hundredths to one millions. b. Write a *whole number* up to 999,999 in *expanded form* (e.g., 876,539 = 8 hundred-thousands, 7 ten-thousands, 6 thousands, 5 hundreds, 3 tens, 9 ones or 8x100,000 + 7x10,000 + 6x1,000 + 5x100 + 3x10 + 9). c. Demonstrate multiple ways to represent whole numbers by using models and symbolic representations (e.g., $108=2x50+8$; $108=10^2+8$). d. Classify whole numbers from 2 to 20 as *prime* or *composite* and 0 and 1 as neither prime nor composite, using models. e. Represent repeated factors using *exponents* up to three (e.g., $8=2x2x2=2^3$).	**Objective 1:** **Represent whole numbers and decimals in a variety of ways.** a. Change *whole numbers* with *exponents* to *standard form* (e.g., $2^4 = 2\text{^}4=16$) and recognize that $10^0 = 1$. b. Read and write *numerals* from thousandths to one billion. c. Write a whole number to 999,999 in *expanded form* using *exponents* (e.g., $876,539 = 8 \times 10^5 + 7 \times 10^4 + 6 \times 10^3 + 5 \times 10^2 + 3 \times 10^1 + 9 \times 10^0$). d. Express numbers in *scientific notation* using positive powers of ten. e. Classify whole numbers to 100 as *prime*, *composite*, or neither. f. Determine the *prime factorization* for a whole number up to 50.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 2: Identify simple relationships among whole numbers. a. Develop strategies for *one-to-one* correspondence and keeping track of quantities. b. Compare two sets of objects to determine whether they have the same, fewer, or more elements. c. Order sets of objects from 1 to 9. d. Estimate quantities less than 10.	**Objective 2: Identify simple relationships among whole numbers.** a. Identify the number that is one more or one less than any *whole number* from 1 to 99. b. Use the vocabulary "greater than," "less than," and "equal to" when comparing sets of objects or numbers. c. Order sets of objects and numbers from 0 to 20. d. Use ordinal numbers 1st through 5th (i.e., 1st, 2nd, 3rd, 4th, 5th).	**Objective 2: Identify simple relationships among whole numbers.** a. Identify the number that is one more, one less, ten more, or ten less than any *whole number* up to 100. b. Write number sentences using the terms "greater than," "less than," or "equal to," to compare numbers. c. Order four whole numbers less than 100 from least to greatest and from greatest to least. d. Use *ordinal numbers* 1st through 10th.	**Objective 2: Identify relationships among whole numbers.** a. Use a variety of strategies to determine whether a number is even or odd. b. Identify the number that is ten more, ten less, 100 more, or 100 less than any *whole number* up to 1,000. c. Compare the relative size of numbers (e.g., 31 is large compared to 4, about half as big as 60, close to 27). d. Compare whole numbers up to four digits using the symbols <, >, and =. e. Order and compare whole numbers on a number line.	**Objective 2: Identify relationships among whole numbers and decimals.** a. Identify the number that is 100 more, 100 less, 1,000 more, or 1,000 less than any *whole number* up to 10,000. b. Compare the relative size of numbers (e.g., 100 is small compared to a million, but large compared to 5). c. Compare whole numbers up to five digits using the symbols <, >, and =. d. Identify a whole number that is between two given whole numbers. e. Order and compare whole numbers and decimals to tenths on a number line.	**Objective 2: Identify relationships among whole numbers, fractions, decimals, and percents.** a. Order and compare *whole numbers*, fractions (including mixed numbers), and decimals using a variety of methods and symbols. b. Rewrite mixed numbers and improper fractions from one form to the other. c. Find the least common denominator for two fractions. d. Represent commonly used fractions as decimals and percents in various ways (e.g., objects, pictures, calculators).	**Objective 2: Identify relationships among whole numbers, fractions (rational numbers), decimals, and percents.** a. Find the *greatest common factor* and *least common multiple* for two numbers using a variety of methods (e.g., list of multiples, prime factorization). b. Order and compare *rational numbers*, including mixed numbers, using a variety of methods and symbols. c. Locate positive rational numbers on a number line. d. Convert common fractions, decimals, and percents from one form to another (e.g., 3/4= 0.75 = 75%).

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 3: **Model and illustrate meanings of the operations of addition and subtraction and describe how they relate.** a. Demonstrate the joining and separating of sets of objects to solve problems. b. Describe the joining or separating of sets with informal language when using models. c. Record pictorially the results from the joining or separating of sets.	**Objective 3:** **Model and illustrate meanings of the operations of addition and subtraction and describe how they relate.** a. Demonstrate the joining and separating of sets with twelve or fewer objects and record the results with pictures or symbols. b. Model two meanings of subtraction: separating of sets ("take away") and comparison of sets ("how many more/fewer") using objects, pictorial representations, and symbols. c. Use correct vocabulary and symbols to describe addition (i.e., add, "and," plus, +, sum), subtraction (i.e., subtract, minus, -, take away, how many more/fewer), and equals (i.e., =, same as). d. Use zero in addition and subtraction sentences.	**Objective 3:** **Model and illustrate meanings of the operations of addition and subtraction and describe how they relate.** a. Demonstrate the joining and separating of sets with eighteen or fewer objects and record the results with pictures or symbols. b. Model three meanings of subtraction: separating of sets ("take away"), comparison of sets ("how many more/fewer"), and missing addends using objects, pictorial representations, and symbols. c. Separate a given set of objects into two, three, five, or ten groups of equal size. d. Model addition and subtraction of two-digit whole numbers in a variety of ways. e. Select an addition or subtraction sentence to solve a problem involving joining or separating of sets with eighteen or fewer objects. f. Recognize that addition number sentences have related subtraction sentences (e.g., 8-5=3, 3+5=8).	**Objective 3:** **Model and illustrate meanings of the operations of addition, subtraction, multiplication, and division and describe how they relate.** a. Model addition and subtraction of two- and three-digit *whole numbers* in a variety of ways. b. Model multiplication of a one-digit *factor* by a one-digit factor using various methods (e.g., repeated addition, rectangular *arrays*, manipulatives, pictures) and connect the representation to an *algorithm*. c. Model division as sharing equally and as repeated subtraction using various methods (e.g., rectangular arrays, manipulatives, number lines, pictorial representations). d. Demonstrate, using objects, that multiplication and division are inverse operations (e.g., 3x4=12; thus, 12÷4=3 and 12÷3=4). e. Select and write an addition, subtraction, or multiplication sentence to solve a problem related to the students' environment, and write a story problem that relates to a given equation. f. Demonstrate the effects of place value when multiplying whole numbers by 10.	**Objective 3:** **Model and illustrate meanings of the four operations and describe how they relate.** a. Use models to represent multiplication of a one- or two-digit *factor* by a two-digit factor (up to 30) using a variety of methods (e.g., rectangular *arrays*, manipulatives, pictures) and connect the representation to an *algorithm*. b. Recognize that division by zero is not possible (e.g., 6÷0 is undefined). c. Select and write a multiplication or division sentence to solve a problem related to the students' environment and write a story problem that relates to a given equation. d. Represent division of a two-digit *dividend* by a one-digit *divisor*, including whole number remainders, using various methods (e.g., rectangular arrays, manipulatives, pictures) and connect the representation to an algorithm. e. Demonstrate that multiplication and division are inverse operations (e.g., 3x4=12; thus, 12÷4=3 and 12÷3=4). f. Describe the effect of place value when multiplying whole numbers by 10 and 100.	**Objective 3:** **Model and illustrate meanings of operations and describe how they relate.** a. Identify the *dividend*, *divisor*, and *quotient* regardless of the division symbol used. b. Determine whether a whole number is divisible by 2, 3, 5, 9, and/or 10, using the *rules of divisibility*. c. Represent remainders as *whole numbers*, decimals, or fractions and describe the meaning of remainders as they apply to problems from the students' environment (e.g., If there are 53 people, how many vans are needed if each van holds 8 people?). d. Model addition, subtraction, and multiplication of fractions and decimals in a variety of ways (e.g., using objects and a number line). e Select or write the number sentences that can be used to solve a two-step problem. f. Model different strategies for whole number multiplication (e.g., partial product, lattice) and division (e.g., partial quotient). g. Describe the effect on place value when multiplying and dividing whole numbers and decimals by 10, 100, and 1,000.	**Objective 3:** **Model and illustrate meanings of operations and describe how they relate.** a. Represent division of a multi-digit *dividend* by two-digit *divisors*, including decimals, using models, pictures, and symbols. b. Model addition, subtraction, multiplication, and division of fractions and decimals in a variety of ways (e.g., objects, a number line). c. Apply *rules of divisibility*. d. Select or write a number sentence that can be used to solve a multi-step problem and write a word problem when given a two-step expression or equation.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
	Objective 4: **Use fractions to identify parts of the whole.** a. Share sets of up to ten objects between two students and identify each part as half. b. Divide geometric shapes into equal parts, identifying halves and fourths.	**Objective 4:** **Use fractions to identify parts of the whole.** a. Separate geometric shapes and sets of objects into halves, thirds, and fourths using a variety of models and illustrations. b. Specify a region of a geometric shape (e.g., as "___ out of ___ equal parts" when given four or fewer equal parts. c. Represent the unit fractions 1/2, 1/3, and 1/4 with objects, pictures, and symbols.	**Objective 4:** **Use fractions to communicate parts of the whole.** a. Identify the denominator of a fraction as the number of equal parts in the whole region or set. b. Identify the numerator of a fraction as the number of equal parts being considered. c. Divide *regions* and sets of objects into equal parts using a variety of models and illustrations. d. Name and write a fraction to represent a portion of a unit whole for halves, thirds, fourths, sixths, and eighths. e. Determine which of two fractions is greater using models or illustrations.	**Objective 4:** **Use fractions to communicate parts of the whole.** a. Divide regions and sets of objects into equal parts using a variety of models and illustrations. b. Name and write a fraction to represent a portion of a unit whole for halves, thirds, fourths, fifths, sixths, eighths, and tenths. c. Relate fractions to decimals that represent tenths. d. Determine which of two fractions is greater using models or illustrations. e. Find equivalent fractions for one-half, one-third, and one-fourth using manipulatives and pictorial representations.	**Objective 4:** **Use fractions to communicate parts of the whole.** a. Divide regions, sets of objects, and line segments into equal parts using a variety of models and illustrations. b. Name and write a fraction to represent a portion of a unit whole for halves, thirds, fourths, fifths, sixths, eighths, tenths, and twelfths. c. Represent the simplest form of a fraction in various ways (e.g., objects, pictorial representations, symbols). d. Represent mixed numbers and improper fractions in various ways (e.g., rulers, objects, number lines, symbols). e. Rename *whole numbers* as fractions with different denominators (e.g., 5=5/1, 3=6/2, 1=7/7). f. Model and calculate equivalent forms of a fraction and describe the process used.	**Objective 4:** **Use fractions and percents to communicate parts of the whole.** a. Divide regions, sets of objects, and *line segments* into equal parts using a variety of models and illustrations. b. Name and write a fraction to represent a portion of a unit whole for halves, thirds, fourths, fifths, sixths, eighths, tenths, twelfths, and sixteenths. c. Write a fraction or ratio in simplest form. d. Name equivalent forms for fractions (halves, thirds, fourths, fifths, tenths), ratios, percents, and decimals, including repeating or terminating decimals. e. Relate percents less than 1% or greater than 100% to equivalent fractions, decimals, *whole numbers*, and mixed numbers.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
	Objective 5: **Solve whole number problems using addition and subtraction in horizontal and vertical notation.** a. Compute addition and subtraction facts to twelve. b. Add three whole numbers with sums to twelve.	**Objective 5:** **Solve whole number problems using addition and subtraction in vertical and horizontal notation.** a. Use a variety of methods and tools to facilitate computation (e.g., estimation, mental math strategies, paper and pencil, calculator). b. Compute accurately with basic number combinations for addition and subtraction facts to eighteen. c. Add three *whole numbers* with *sums* to eighteen. d. Find the sum of two-digit whole numbers and describe the process used.	**Objective 5:** **Solve whole number problems using addition, subtraction, multiplication, and division in vertical and horizontal notation.** a. Use a variety of methods and tools to facilitate computation (e.g., estimation, mental math strategies, paper and pencil, calculator). b. Find the sum of any two *addends* with three or fewer digits, including monetary amounts, and describe the process used. c. Find the *difference* of two-digit *whole numbers* and describe the process used. d. Find the *product* for multiplication facts through ten times ten and describe the process used.	**Objective 5:** **Solve whole number problems using addition, subtraction, multiplication, and division in vertical and horizontal notation.** a. Determine when it is appropriate to use estimation, mental math strategies, paper and pencil, or a calculator. b. Find the sum and difference of four-digit numbers, including monetary amounts, and describe the process used. c. Multiply two- and three-digit *factors* by a one-digit factor and describe the process used. d. Divide a two-digit *whole number dividend* by a one-digit *divisor*, with a *remainder* of zero and describe the process used.	**Objective 5:** **Solve problems using the four operations with whole numbers, decimals, and fractions.** a. Determine when it is appropriate to use estimation, mental math strategies, paper and pencil, or a calculator. b. Use estimation strategies to determine whether results obtained using a calculator are reasonable. c. Multiply up to a three-digit *whole number* by a one- or two-digit whole number. d. Divide up to a three-digit whole number *dividend* by a one-digit *divisor*. e. Add and subtract decimals with digits to the hundredths place (e.g., 35.42+7.2; 75.2–13.45). f. Add, subtract, and multiply fractions. g. Simplify *expressions*, without *exponents*, using the *order of operations*.	**Objective 5:** **Solve problems using the four operations with whole numbers, decimals, and fractions.** a. Determine when it is appropriate to use estimation, mental math strategies, paper and pencil, or a calculator. b. Use estimation strategies to determine whether results obtained using a calculator are reasonable. c. Multiply up to a three-digit *factor* by a one- or two-digit factor including decimals. d. Divide up to a three-digit *dividend* by a one- or two-digit *divisor* including decimals. e. Add and subtract decimals to the thousandths place (e.g., 34.567+3.45; 65.3-5.987). f. Add, subtract, multiply, and divide fractions and mixed numbers. g. Solve problems using ratios and proportions. h. Simplify *expressions*, with *exponents*, using the *order of operations*.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
					Objective 6: **Model and illustrate integers.** a. Identify, read, and locate *integers* on a number line. b. Describe situations where integers are used in the students' environment.	**Objective 6:** **Model, illustrate, and perform the operations of addition and subtraction of integers.** a. Recognize that the sum of an *integer* and its opposite is zero. b. Model addition and subtraction of integers using manipulatives and a number line. c. Add and subtract integers.
Standard II: **Students will identify and use patterns to represent mathematical situations.**	**Standard II:** **Students will identify and use patterns and relations to represent mathematical situations.**	**Standard II:** **Students will identify and use patterns and relations to represent mathematical situations.**	**Standard II:** **Students will use patterns and relations to represent mathematical situations.**	**Standard II:** **Students will use patterns and relations to represent mathematical situations.**	**Standard II:** **Students will use patterns and relations to represent and analyze mathematical situations using algebraic symbols.**	**Standard II:** **Students will use patterns, relations, and functions to represent and analyze mathematical situations using algebraic symbols.**
Objective 1: **Identify and sort objects according to common attributes.** a. Sort objects into groups by color, shape, size, number, or other *attributes*. b. Identify which attribute was used to sort objects into a group. c. Find multiple ways to sort and classify a group of objects.	**Objective 1:** **Recognize and represent patterns with one or two attributes.** a. Sort and classify objects by one or two *attributes*. b. Identify, create, and label simple patterns using manipulatives, pictures, and symbolic notation (e.g., ABAB. . ., □ ○ △ □ ○ △ . . .). c. Identify patterns in the environment. d. Identify horizontal and vertical patterns on hundreds charts. e. Use patterns to establish skip counting by twos to 20 and by fives and tens to 100. f. Count backward from 10 to 0 and identify the pattern.	**Objective 1:** **Recognize and represent patterns having multiple attributes.** a. Sort, classify, and label objects by three or more *attributes*. b. Identify and label repeating and *growing patterns* using objects, pictures, and symbolic notation (e.g., ABAABBAAABBB...). c. Identify repeating and growing patterns in the environment. d. Construct models and skip count by twos, threes, fives, and tens and relate to repeated addition.	**Objective 1:** **Recognize and create patterns with given attributes.** a. Create and extend *repeating* and *growing* patterns using objects, numbers, and tables. b. Record results of patterns created using manipulatives, pictures, and numeric representations and describe how they are extended.	**Objective 1:** **Recognize, describe, and use patterns and identify the attributes.** a. Represent and analyze repeating and growing patterns using objects, pictures, numbers, and tables. b. Recognize and extend multiples and other number patterns using a variety of methods.	**Objective 1:** **Recognize, analyze, and use patterns and describe their attributes.** a. Analyze and make predictions about patterns involving *whole numbers*, decimals, and fractions using a variety of tools including organized lists, tables, objects, and variables. b. Extend patterns and describe a rule for predicting the next element.	**Objective 1:** **Recognize, analyze, and use multiple representations of patterns and functions and describe their attributes.** a. Analyze patterns on graphs and tables and write a generalization to predict how the patterns will continue. b. Create tables and graphs to represent given patterns and algebraic *expressions*. c. Draw a graph from a table of values or to represent an equation. d. Write an algebraic expression from a graph or a table of values.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 2: **Identify and use patterns to describe numbers or objects.** a. Use patterns to count orally from 1 to 20 and backward from 10 to 0. b. Identify simple patterns in the environment. c. Predict what comes next in an established pattern and justify thinking. d. Duplicate, extend, and create simple patterns using objects and pictorial representations.	**Objective 2:** **Recognize and represent relations using mathematical symbols.** a. Recognize that "=" indicates a relationship in which the quantities on each side of an equation are equal. b. Recognize that symbols such as □, △, or ◇ in an addition or subtraction equation represent a missing value that will make the statement true (e.g., □ + 3 = 6, 5 +7 = △, 4 = 5 – ◇). c. Demonstrate that changing the order of *addends* does not change the *sum* (e.g., 3+2=5 and 2+3=5).	**Objective 2:** **Recognize and represent relations using mathematical symbols.** a. Recognize that "≠" indicates a relationship in which the quantities on each side are not of equal value. b. Recognize that symbols such as □, △, or ◇ in an addition or subtraction equation represent a value that will make the statement true (e.g., □ +3=6, 5+7=△, 7=9-◇). c. Demonstrate that changing the order of *addends* does not change the *sum* (e.g., 3+2+7=12, 7+3+2=12) and that changing the grouping of three or more addends does not change the sum (e.g., (2+3)+7=12, 2+(3+7)=12).	**Objective 2:** **Recognize and represent mathematical situations using patterns and symbols.** a. Recognize that symbols such as □, △, or ◇ in an addition, subtraction, or multiplication equation, represent a value that will make the statement true (e.g., 5+7=△, □-3=6, ◇=2x4). b. Solve equations involving equivalent expressions (e.g., 6+4 = □+7). c. Use the >, <, and = symbols to compare two *expressions* involving addition and subtraction (e.g., 4+6 □ 3+2; 3+5 ◇ 16-9). d. Demonstrate that grouping three or more *addends* does not change the *sum* (e.g., 3+(2+7)=12, (7+3)+2=12) and changing the order of *factors* does not change the *product* (e.g., 3x7=21, 7x3=21). e. Use a variety of manipulatives to model the *identity property of addition* (e.g., 3+0=3), the *identity property of multiplication* (e.g., 7x1=7), and the *zero property of multiplication* (e.g., 6x0=0).	**Objective 2:** **Recognize, represent, and solve mathematical situations using patterns and symbols.** a. Solve equations involving equivalent expressions (e.g., 6x2= □x3 or 6x□=9+9). b. Use the <, >, = symbols to compare two expressions involving addition, subtraction, multiplication, and division (e.g., 5x4◇9÷3). c. Recognize that a given variable maintains the same value throughout an equation or expression (e.g., □+□=8; □=4). d. Demonstrate that changing the order of *factors* does not change the *product* (e.g., 2x3=6, 3x2=6) and that the grouping of three or more factors does not change the product (e.g., (2x3)x1=6; 2x(3x1)=6). e. Demonstrate the distribution of multiplication over addition using a rectangular *array* (e.g., 8x14=8 rows of 10 plus 8 rows of 4).	**Objective 2:** **Represent, solve, and analyze mathematical situations using algebraic symbols.** a. Recognize a variety of symbols for multiplication and division including x, •, and * as symbols for multiplication and ÷, ⌐, and a fraction bar (/ or -) as division symbols. b. Recognize that a variable (◇, n, x) represents an unknown quantity. c. Solve one-step equations involving *whole numbers* and a single variable (e.g., n÷7=3). d. Recognize that the answer to a multiplication problem involving a factor of zero is equal to zero (e.g., 0x45=0). e. Use expressions or one-step equations to represent real-world situations. f. Use the *associative*, *commutative*, and *distributive properties* to compute with whole numbers.	**Objective 2:** **Represent, solve, and analyze mathematical situations using algebraic symbols.** a. Recognize that a number in front of a variable indicates multiplication (e.g., 3y means 3 times the quantity y). b. Solve two-step equations involving *whole numbers* and a single variable (e.g., 3x+4=19). c. Recognize that "≈" indicates a relationship in which the quantities on each side are approximately of equal value (e.g., π ≈3.14). d. Recognize that an *exponent* can be represented in the following ways: 4^3 or 4^3. e. Evaluate *expressions* and formulas, substituting given values for the variables (e.g., 2x+4; x=2; therefore, 2(2)+4=8). f. Recognize that if the *product* is zero, then one or more *factors* equal zero (i.e., if ab=0 then either a=0 or b=0 or a and b=0).

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Standard III: **Students will identify and create simple geometric shapes and describe spatial relationships.**	**Standard III:** **Students will describe, identify, and create and simple geometric shapes and describe spatial relationships.**	**Standard III:** **Students will describe, identify, and create geometric shapes and describe spatial relationships.**	**Standard III:** **Students will use spatial reasoning to describe, identify, and create geometric shapes.**	**Standard III:** **Students will use spatial reasoning to recognize, describe, and identify geometric shapes.**	**Standard III:** **Students will use spatial reasoning to recognize, describe, and identify geometric shapes and principles.**	**Standard III:** **Students will use spatial and logical reasoning to recognize, describe, and identify geometric shapes and principles.**
Objective 1: **Identify and create simple geometric shapes.** a. Identify circles, triangles, rectangles, and squares. b. Combine shapes to create *two-dimensional* objects. c. Draw circles, triangles, rectangles, and squares. d. Recognize circles, triangles, rectangles, and squares in the students' environment.	**Objective 1:** **Describe, identify, and create simple geometric shapes.** a. Identify, name, draw, create, and sort circles, triangles, rectangles, and squares. b. Identify circles, triangles, rectangles, and squares in the students' environment. c. Recognize that combining simple geometric shapes can create more complex geometric shapes.	**Objective 1:** **Describe, identify, and create geometric shapes.** a. Identify, name, draw, sort, and compare circles, triangles, and *parallelograms*. b. Identify and name spheres, cones, and cylinders. c. Find and identify familiar geometric shapes in the students' environment. d. Determine whether a circle, triangle, square, or rectangle has a *line of symmetry*.	**Objective 1:** **Describe, identify, and create geometric shapes.** a. Identify and draw *points*, *lines*, *line segments*, and *endpoints*. b. Identify and draw *lines of symmetry* on triangles, squares, circles, and rectangles. c. Determine whether an angle is *right*, *obtuse*, or *acute* by comparing the angle to the corner of a rectangle. d. Classify polygons (e.g., *quadrilaterals*, pentagons, hexagons, octagons) by the number of sides and corners. e. Identify, make, and describe cubes (e.g., a cube has 6 square *faces*, 8 *vertices*, and 12 *edges*).	**Objective 1:** **Describe, identify, and analyze characteristics and properties of geometric shapes.** a. Identify and draw *parallel lines* and *intersecting lines*. b. Identify and draw lines of symmetry on a variety of *polygons*. c. Identify and describe *quadrilaterals* (i.e., rectangles, squares, *rhombuses*, *trapezoids*, kites). d. Identify *right*, *obtuse*, and *acute* angles. e. Compare two polygons to determine whether they are *congruent* or *similar*. f. Identify and describe *cylinders* and *rectangular prisms*.	**Objective 1:** **Describe, identify, and analyze characteristics and properties of geometric shapes.** a. Identify and draw *perpendicular* lines. b. Draw, label, and describe rays and describe an angle as two rays sharing a common endpoint. c. Label an angle as acute, *obtuse*, *right*, or *straight*. d. Identify and describe *equilateral*, *isosceles*, *scalene*, *right*, *acute*, and *obtuse* triangles. e. Identify the *vertex* of an angle or the *vertices* of a polygon. f. Compare *corresponding angles* of two triangles and determine whether the triangles are *similar*. g. Identify and describe *pyramids* and *prisms*.	**Objective 1:** **Identify and analyze characteristics and properties of geometric shapes.** a. Identify the *midpoint* of a *line segment*. b. Identify concave and *convex polygons*. c. Identify the center, *radius*, *diameter*, and *circumference* of a circle. d. Identify the number of *faces*, *edges*, and *vertices* of *pyramids* and *prisms*.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 2: Describe simple spatial relationships. a. Visualize how to fit a shape into a design. b. Use and demonstrate words to describe position with objects (i.e., on, over, under, above, below, top, bottom, up, down, in front of, behind, next to, beside). c. Use and demonstrate words to describe distance with objects (i.e., far, near).	**Objective 2: Describe simple spatial relationships.** a. Use and demonstrate words to describe position (i.e., between, before, after, middle, left, right). b. Use and demonstrate words to describe distance (i.e., closer, farther).	**Objective 2: Describe spatial relationships.** a. Create and use verbal or written instructions to move within the environment. b. Find and name locations using coordinates (A, 1). c. Identify shapes in various orientations (e.g., △ and ▽).	**Objective 2: Describe spatial relationships.** a. Give directions to reach a location. b. Use coordinates (A, 1) or regions to locate positions on a map. c. Demonstrate and use horizontal and vertical lines.	**Objective 2: Specify locations and describe spatial relationships using grids and maps.** a. Locate positions on a map of Utah using coordinates or regions. b. Give the *coordinates* or *regions* of a position on a map of Utah.	**Objective 2: Specify locations and describe spatial relationships using coordinate geometry.** a. Locate points defined by ordered pairs in the first *quadrant*. b. Write an ordered pair for a point in the first quadrant. c. Specify possible paths between locations on a *coordinate grid* and compare distances of the various paths.	**Objective 2: Specify locations and describe spatial relationships using coordinate geometry.** a. Graph points defined by ordered pairs in all four quadrants. b. Write the ordered pair for a point in any quadrant.
			Objective 3: Visualize and identify geometric shapes after applying transformations. a. Demonstrate the effect of a slide (translation) or flip (reflection) on a figure, using manipulatives. b. Determine whether two polygons are *congruent* by sliding, flipping, or turning to physically fit one object on top of the other. c. Identify *two-dimensional* shapes (*nets*) that will fold to make a cube. d. Create a *polygon* that results from combining other polygons.	**Objective 3: Visualize and identify geometric shapes after applying transformations.** a. Identify a *slide* (*translation*) or *flip* (*reflection*) on a figure using manipulatives. b. Relate *cubes*, *cylinders*, *cones*, and *rectangular prisms* to the *two-dimensional* shapes (*nets*) from which they were created.	**Objective 3: Visualize and identify geometric shapes after applying transformations.** a. Identify a *slide* (*translation*) or *flip* (*reflection*) on a figure across a line. b. Demonstrate the effect of a *turn* (*rotation*) on a figure using manipulatives. c. Relate *pyramids* and *prisms* to the *two-dimensional* shapes (*nets*) from which they were created.	**Objective 3: Visualize and identify geometric shapes after applying transformations.** a. *Turn* (*rotate*) a shape around a point and identify the location of the new vertices. b. *Slide* (*translate*) a polygon either horizontally or vertically on a coordinate grid and identify the location of the new vertices. c. *Flip* (*reflect*) a shape across either the x- or y-axis and identify the location of the new vertices.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Standard IV: **Students will understand and use simple measurement tools and techniques.**	**Standard IV:** **Students will understand and use simple measurement tools and techniques.**	**Standard IV:** **Students will understand and use measurement tools and techniques.**	**Standard IV:** **Students will understand and use measurement tools and techniques.**	**Standard IV:** **Students will understand and use measurement tools and techniques.**	**Standard IV:** **Students will understand and apply measurement tools and techniques.**	**Standard IV:** **Students will understand and apply measurement tools and techniques.**
Objective 1: **Identify measurable attributes of objects and units of measurement.** a. Identify clocks and calendars as tools that measure time. b. Identify a day, week, and month on a calendar. c. Identify pennies, nickels, dimes, and quarters as units of money.	**Objective 1:** **Identify measurable attributes of objects and units of measurement.** a. Identify the appropriate tools for measuring length, weight, capacity, temperature, and time. b. Identify the values of a penny, nickel, dime, and quarter. c. Estimate the length of an object by comparing to a nonstandard unit (e.g., How many new pencils wide is your desk?).	**Objective 1:** **Identify measurable attributes of objects and units of measurement.** a. Sequence a series of events of a day in order by time (e.g., breakfast at 7:00, school begins at 9:00). b. Identify the name and value of a penny, nickel, dime, quarter, and dollar. c. Estimate length, *capacity*, and weight using customary units.	**Objective 1:** **Identify and describe measurable attributes of objects and units of measurement.** a. Recognize the two systems of measurement: *metric* and *customary*. b. Describe the relationship between metric units of length (i.e., centimeter, meter). c. Describe the relationship among customary units of length (i.e., inch, foot, yard) and the relationship between customary units of *capacity* (i.e., cup, quart). d. Estimate length, capacity, and weight using metric and customary units.	**Objective 1:** **Identify and describe measurable attributes of objects and units of measurement.** a. Describe the relationship among *metric* units of length (i.e., millimeter, centimeter, meter), between metric units of capacity (i.e., milliliter, liter), and between metric units of weight (i.e., gram, kilogram). b. Identify a mile as a measure of distance and its relationship to other *customary* units of length. c. Describe the relationship among customary units of *capacity* (i.e., cup, pint, quart, gallon). d. Estimate length, capacity, and weight using metric and customary units.	**Objective 1:** **Identify and describe measurable attributes of objects and units of measurement.** a. Describe the relationship among *metric* units of length (i.e., millimeter, centimeter, meter, kilometer). b. Describe the relationship among *customary* units of weight (i.e., ounce, pound). c. Identify the correct units of measurement for *volume*, *area*, and *perimeter* in both metric and customary systems. d. Estimate length, volume, weight, and area using metric and customary units. e. Convert units of measurement within the metric system and convert units of measurement within the customary system.	**Objective 1:** **Identify and describe measurable attributes of objects and units of measurement.** a. Compare a meter to a yard, a liter to a quart, and a kilometer to a mile. b. Identify *pi* as the ratio of the *circumference* to *diameter* of a circle. c. Explain how the size of the unit used in measuring affects the precision. d. Estimate length, volume, weight, and area using *metric* and customary units.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 2: **Use appropriate techniques and tools to determine measurements.** a. Compare two objects (e.g., shorter/longer, heavier/lighter, larger/smaller, more/less). b. Find the length of an object using nonstandard units (e.g., pencils, paper clips). c. Name the days of the week in order. d. Sort pennies, nickels, dimes, and quarters.	**Objective 2:** **Use appropriate techniques and tools to determine measurements.** a. Compare objects, using nonstandard units, according to their length, weight, or volume (e.g., pencils/length, books/weight, boxes/volume). b. Read and tell time to the nearest hour. c. Name the days of the week, months of the year, and seasons in order. d. Determine the value of a set of the same coins that total 25¢ or less (e.g., a set of 14 pennies equals 14¢, a set of 5 nickels equals 25¢, a set of 2 dimes equals 20¢).	**Objective 2:** **Use appropriate techniques and tools to determine measurements.** a. Compare and order objects, using nonstandard units, according to their length, weight, or capacity. b. Measure length using inches and feet, weight using pounds, and *capacity* using cups. c. Determine the value of a set of up to five coins that total $1.00 or less (e.g., two quarters and one dime equals 60¢; three dimes, one nickel, and one penny equals 36¢). d. Read, tell, and write time to the hour and half-hour. e. Use a calendar to determine the day of the week and date. f. Determine the *perimeter* of a square, triangle, and rectangle by measuring with nonstandard units.	**Objective 2:** **Use appropriate techniques and tools to determine measurements.** a. Measure the length of objects to the nearest centimeter, meter, half-inch, foot, and yard. b. Measure *capacity* using cups and quarts, and measure weight using pounds. c. Determine the value of a combination of coins and bills that total $5.00 or less and write the monetary amounts using the dollar sign and decimal notation. d. Identify the number of hours in a day, the number of days in a year, and the number of weeks in a year. e. Read, tell, and write time to the quarter-hour. f. Identify any given day of the month (e.g., the third Wednesday of the month is the 18th). g. Read and record the temperature to the nearest ten degrees using a Fahrenheit thermometer. h. Estimate and measure the *perimeter* and area of rectangles by measuring with nonstandard units.	**Objective 2:** **Determine measurements using appropriate tools and formulas.** a. Measure the length of objects to the nearest centimeter, meter, quarter-inch, foot, and yard. b. Measure *capacity* using milliliters, liters, cups, pints, quarts, and gallons and measure weight using grams, kilograms, and pounds. c. Read, tell, and write time to the nearest minute, identifying a.m. and p.m. d. Read and record the temperature to the nearest degree, in Fahrenheit, using a thermometer. e. Determine the value of a combination of coins and bills that total $20.00 or less. f. Count back change for a single-item purchase and determine the amount of change to be received from a multiple-item purchase. g. Determine possible *perimeters*, in whole units, for a rectangle with a fixed *area* and determine possible areas when given a rectangle with a fixed perimeter.	**Objective 2:** **Determine measurements using appropriate tools and formulas.** a. Measure length to the nearest 1/8 of an inch and to the nearest centimeter. b. Measure *volume* and weight using *metric* and *customary* units. c. Measure angles using a protractor. d. Calculate *elapsed time* within a.m. or p.m. time periods. e. Read and record the temperature to the nearest degree (above and below zero) when using a thermometer with a Celsius or Fahrenheit scale. f. Calculate the *perimeter* of rectangles and triangles. g. Calculate the *area* of squares and rectangles using a formula.	**Objective 2:** **Determine measurements using appropriate tools and formulas.** a. Measure length to the nearest one-sixteenth of an inch and to the nearest millimeter. b. Estimate and measure an angle to the nearest degree. c. Calculate the *circumference* of a circle using a given formula. d. Calculate *elapsed time* across a.m. and p.m. time periods. e. Calculate the *areas* of triangles, rectangles, and *parallelograms* using given formulas. f. Calculate the *surface area* and *volume* of right, rectangular prisms using given formulas.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Standard V: **Students will collect and draw conclusions from data and understand basic concepts of probability.**	**Standard V:** **Students will collect and draw conclusions from data and understand basic concepts of probability.**	**Standard V:** **Students will collect and draw conclusions from data and understand basic concepts of probability.**	**Standard V:** **Students will collect and organize data to make predictions and identify basic concepts of probability.**	**Standard V:** **Students will collect and organize data to make predictions and use basic concepts of probability.**	**Standard V:** **Students will collect, analyze, and draw conclusions from data and apply basic concepts of probability.**	**Standard V:** **Students will collect, analyze, and draw conclusions from data and apply basic concepts of probability.**
Objective 1: **Collect, organize, and display simple data.** a. Collect, organize, and record data using objects and pictures. b. Represent data in a variety of ways (e.g., graphs made from people, *pictographs*, bar graphs) and interpret the data (e.g., more people like red than blue).	**Objective 1:** **Collect, organize, and display simple data.** a. Collect physical objects to use as data. b. Collect, represent, and interpret data using tables, tally marks, *pictographs*, and bar graphs.	**Objective 1:** **Collect, organize, and display simple data.** a. Gather data by vote or survey. b. Sort, classify, and organize data in a variety of ways. c. Use a variety of methods to organize, display, and label information, including keys, using *pictographs*, tallies, bar graphs, and organized tables. d. Report information from a data display.	**Objective 1:** **Collect, organize, and display data to make predictions.** a. Collect, read, represent, and interpret data using tables, graphs, and charts, including keys (e.g., pictographs, bar graphs). b. Make predictions based on a data display.	**Objective 1:** **Collect, organize, and display data to make predictions and answer questions.** a. Identify a question that can be answered by collecting data. b. Collect, read, and interpret data from tables, graphs, charts, surveys, and observations. c. Represent data using tables, line plots, line graphs, and bar graphs. d. Identify and distinguish between *clusters* and *outliers* of a data set.	**Objective 1:** **Formulate and answer questions using statistical methods to compare data.** a. Formulate a question that can be answered by collecting data. b. Collect, compare, and display data using an appropriate format (i.e., *line plots*, bar graphs, pictographs, circle graphs, line graphs). c. Identify minimum and *maximum* values for a set of data. d. Identify or calculate the *mean*, *mode*, and *range*. e. Propose and justify inferences based on data.	**Objective 1:** **Design investigations to reach conclusions using statistical methods to make inferences based on data.** a. Design investigations to answer questions by collecting and organizing data in a variety of ways (e.g., bar graphs, line graphs, frequency tables, stem and leaf plots). b. Collect, compare, and display data using an appropriate format (i.e., *line plots*, circle graphs, scatter plots). c. Compare two similar sets of data on the same graph and compare two graphs representing the same set of data. d. Recognize that changing the scale influences the appearance of a display of data. e. Develop and evaluate inferences and predictions based on data.

Kindergarten	1st Grade	2nd Grade	3rd Grade	4th Grade	5th Grade	6th Grade
Objective 2: **Determine the likelihood of events.** a. Describe events encountered in books read as possible or not possible. b. Describe events as likely or unlikely (e.g., It is likely to snow today. It is unlikely an elephant will be in school).	**Objective 2:** **Determine the likelihood of an event.** a. Compare events to decide which are more likely, less likely, and equally likely. b. Relate past events to future events (e.g., The sun set about 6:00 last night, so it will set about the same time tonight).	**Objective 2:** **Determine the likelihood of an event.** a. Predict events that will be the same in one day or one week. b. Predict the outcome when there are only two possible outcomes (e.g., tossing a coin).	**Objective 2:** **Identify basic concepts of probability.** a. Describe the results of events using the terms "certain," "equally likely," and "impossible." b. Predict outcomes of simple activities (e.g., a bag contains three red marbles and five blue marbles. If one marble is selected, is it more likely to be red or blue?).	**Objective 2:** **Use basic concepts of probability.** a. Describe the results of investigations involving random outcomes as simple ratios (e.g., 4 out of 9, 4/9). b. Predict outcomes of simple experiments, including with and without replacement, and test the predictions.	**Objective 2:** **Apply basic concepts of probability.** a. Describe the results of investigations involving random outcomes using a variety of notations (e.g., 4 out of 9, 4/9, 4:9). b. Recognize that outcomes of experiments and samples are fractions between 0 and 1. c. Predict the probability of an outcome in a simple experiment.	**Objective 2:** **Apply basic concepts of probability.** a. Write the results of a probability experiment as a fraction, ratio, or percent between zero and one. b. Compare experimental results with anticipated results (e.g., experimental: 7 out of 10 tails; whereas, anticipated 5 out of 10 tails). c. Compare individual, small group, and large group results for a probability experiment.

K-2 Mathematics Glossary

addend	Any number being added. In 32+4=36, 32 and 4 are *addends*.
capacity	The maximum amount that can be contained by an object. Often refers to measurement of a liquid.
cylinder	A three-dimensional figure with two circular bases that are *parallel* and *congruent*.
difference	The amount that remains after one quantity is subtracted from another.
e.g.	This abbreviation means "for example." When used in the Core, *e.g.* is not limited to the examples given.
expanded form	A way to write numbers that shows the place value of each digit. 263 = 200 + 60 + 3 or 263 is 2 hundreds, 60 tens, and 3 ones.
growing pattern	A pattern that grows or increases.
i.e.	This abbreviation means "that is to say." When used in the Core, *i.e.* is limited to the specific examples given.
line of symmetry	A line that divides a figure into two *congruent* halves that are mirror images of each other.
numeral	A symbol used to represent a number.
obtuse angle	An angle with a measure greater than 90^{o} and less than 180^{o}.
obtuse triangle	A triangle with one *obtuse angle*.
one-to-one correspondence	The relationship between the spoken word and the written symbol.
ordinal number	A *whole number* that names the position of an object in sequence. First, second, and third are *ordinal numbers*.
parallelogram	A *quadrilateral* with two pairs of *parallel* and *congruent* sides.
perimeter	The distance around a figure.
pictograph	A graph that uses pictures to show data.

repeating pattern	A pattern of a group of items that repeats over and over.
sum	The answer to an addition problem. In 32+4=36, 36 is the *sum*.
two-dimensional	A figure that has length and width, but not height. Having *area*, but not *volume*. The image on a movie screen is *two-dimensional*.
whole number	Any of the numbers 0, 1, 2, 3, 4, 5, and so on.

Facilitated Activities

Word Sort

Background Information

Word Sorts are small group categorizing and classifying activities. *Word Sorts* help students activate and use their knowledge, as well as provide them an opportunity to learn from and with each other.

Words and phrases from materials that students will read (or have read) may be selected for use with word sorts. Twelve to 20 words or phrases (depending on the grade level of the students) should be selected; only a few words or phrases that are unfamiliar to students should be included. (Rasinski & Padak, 2004)

An open word sort is a divergent thinking activity. There is no "right" way to sort words; instead, the focus is on the process students undergo as they complete the activity and on their reasons for creating groups of words. In a closed word sort, the teacher provides categories for students. (Gillet & Kita, 1979)

Research Basis

Word Matters, by Gay Su Pinnell & Irene C. Fountas; ISBN 0-325-00051-4

An effective word study system is part of a strong literacy program. When using the word study system with core words or personal words, students spend their time learning how to think about words and applying what they learn in many different contexts.

Words Their Way, by Donald R. Bear, Marci Invernizzi, Shane Templeton, & Francine Johnston; ISBN 0-13-111338-0

Word study mimics basic cognitive learning processes, comparing and contrasting categories of word features and discovering similarities and differences within and between categories. During word study, words and pictures are sorted in routines that require students to examine, discriminate and make critical judgments about speech sounds, word structures, spelling patterns, and meanings.

Materials

- ❑ *Word Sort* worksheet
- ❑ Scissors
- ❑ Glue
- ❑ Plain paper or journals
- ❑ Envelope (optional)

Instructional Procedures

1. Give background information on *Word Sorts*.

   "This is a closed word sort activity to reinforce our previous discussions about the Core Curriculum. Cut and sort the words to match the definitions, then arrange those according to the organization of the Utah K-2 Core Curriculum. Check with your neighbors for accuracy, then glue the words/definitions in your journal (or on the plain paper)." (Or save in an envelope for later use.)

2. Review the organization and components of the core when all papers are completed.

Resources

Articles

Gillet, J. & Kita, M.J. (1979). Words, Kids, and Categories. *The Reading Teacher, 32*, 538-542.

Rasinski, T., & Padak, N. (2004). Beyond Consensus–Beyond Balance: Toward a Comprehensive Literacy Curriculum. *Reading & Writing Quarterly, 20*(1), 91-103.

Word Sort

Objective	K-2 Core	3rd Core Area	Standards
1st Core Area	**Indicator**	**ILO's**	**2nd Core Area**
A measurable or observable student action that enables one to assess whether a student has mastered a particular Objective.		Consists of the Language Arts curriculum.	
A broad statement of what students are expected to understand.		A more focused description of what students need to know and be able to do at the completion of instruction.	
Consists of the Mathematics curriculum.		Describes the goals for students to gain knowledge and understand their world.	
Is designed to help teachers organize and deliver instruction.		Consists of the subject areas of the Fine Arts, Health and Physical Education, Science, and Social Studies.	

Math Standard I-3 Activities

Addition and Subtraction in Center Time

Standard I:
Students will acquire number sense and perform simple operations with whole numbers.

Objective 3:
Model and illustrate meanings of the operations of addition and subtraction and describe how they relate.

Intended Learning Outcomes:
2. Develop social skills and ethical responsibility.
5. Understand and use basic concepts and skills.

Content Connections:
Language Arts VIII-6

Math Standard I

Objective 3

Connections

Background Information

This lesson is designed to give the teacher effective activities for students to do during center time, stations, workshop time, etc. During center time, students work in small groups on various tasks. Each center has a different task for the students to complete. Students rotate through centers in a pattern set up by the teacher. Center time is great for cooperative learning, exploration, and small group instruction. Each teacher will run center time differently depending on his/her students, classroom, special needs, and teaching style. This lesson does not tell you how to organize centers; that is left up to the teacher. However, this lesson provides activities that can be used during center time. Many of these activities may also be done as whole class activities.

Research Basis

Stahl, R.J. (1994). The Essential Elements of Cooperative Learning in the Classroom. ERIC Digest, ED370881.

This article supports cooperative learning and gives 14 essential elements for a successful cooperative learning framework. Teachers report academic gains when cooperative learning is implemented.

Marzano, R.J., Pickering, D.J., Pollock, J.E. (2001). *Classroom Instruction That Works*.

This book supports many different teaching methods that are successful in today's classroom. Cooperative Learning, hands on activities, and multiple intelligences are among the things covered in this book.

Assessment Suggestions

- Assessments vary with each activity. The majority of the activities require students to record their findings or thoughts in journals. Reviewing students' journal entries is an effective assessment strategy.
- Some of the activities also will have a final outcome or project. This is also a main source of assessment, as student understanding affects the outcome of the final result or project.
- Some of the activities also have worksheets that students complete while working on the activity. These worksheets are also excellent sources of assessment.
- Observing student behavior and dialogue throughout the activities is an effective informal assessment for teachers.

Invitation to Learn

Materials

- ❑ *How Many, How Many How Many*

Begin by reading *How Many, How Many, How Many*. This book helps students think about numbers. While you are reading the book, stop and draw attention to the illustrations. Have students create addition and subtraction sentences that go along with the pictures.

Because these activities are designed to be used during center time, any of them could be used as an invitation to learn on a different day prior to a specific math lesson. Also, the activity discussed above could be used as a center activity where the teacher or other adult helper is available to guide the group's learning.

Instructional Procedures

Ship, Captain, Crew

Materials

- ❑ 2 dice
- ❑ Scratch paper/math journal

This game is played in pairs.

Each student may have up to four rolls per turn. The winner is the player who has the largest "crew." You must roll a "ship" and a "captain" before you can roll for your crew. To get the "ship," you must roll a 6 (It cannot be a combination of two or more dice. It must be a six on one die.). To get the "captain," you must roll a 5 (Again, not a combination of two or more dice. It must be a 5 on one die.).

1. Player one rolls all four dice. If the player rolls a 5 or 6 on one die, then s/he sets the die aside and rolls the remaining dice.
2. After both a 5 and 6 have been rolled, the player adds the remaining two dice to get the number of his/her "crew." The

player can only roll four times total. If the player does not roll a "ship" or a "captain" in four rolls, then his/her score is zero.

3. Player two goes after player one has finished rolling. The player with the largest "crew" wins. Players do not have to roll four times. They may stop after one or two rolls if they feel they are finished and satisfied with the number of their "crew."

   Example

   Player one rolls all four dice and gets 2, 4, 6, 2. The 6 counts as the "ship," so it is set aside and s/he rolls the remaining three dice and gets 3, 6, 2. Player one still needs a "captain" (5), so all three dice are rolled again. This time the player one gets 5,1,6. The 5 is set aside, because it is the "captain," and the player then adds the remaining two dice (6 + 1 = 7). Player one has only rolled three times, so there is the option to stay with 7 or take the two dice and roll again in hopes of getting something higher. Player one chooses to roll again. (Both dice must be rolled again even though one die was a 6.) Player one rolls a 2 and 3 (2 + 3 = 5). Even though 7 is greater than 5, player one must stay with 5 because it was the last roll.

   It is now player two's turn. All four dice are rolled and s/he gets 1, 3, 5, 5. Player two takes one 5 and sets it aside (it is the "captain"). The three remaining dice are rolled again to get 5, 2, 4. Still no "ship," so all three are rolled again to get 1, 1, 3. Still no "ship," so the dice are rolled for a final time to get 2, 4, 5. Player two has rolled four times and didn't get a "ship," so his/her score is 0.

   Player one wins the first round. Players record their wins using tally marks on scratch paper or their math journal. The number of rounds the students play may be determined by the teacher. As an extension, students write about their experiences or strategies in their journals.

Read My Mind

Materials

- ❑ *Read My Mind Number Cards*

1. Mix up the *Read My Mind Number Cards* and place them face down in one pile. Three students sit in a small circle so they can all see each other. One player hands the other two players one card each. No one may look at the cards at this time.
2. At the same time, the two players with cards hold their card on their forehead so the other players can see it, but they can't see their own card.

3. The player with no card then silently adds the two numbers together and says the sum aloud.
4. The first player to figure out what the number on his/her forehead is, wins. Students figure this out because they know the sum and they can see one of the addends on the other player's forehead.
5. The winner trades places with the player who dealt the cards and found the sum.

Example

Player one is given the number 3 and holds it on his/her forehead (s/he has not seen the card, but the other players can see it). Player two is given the number 4 and holds it on his/her forehead (s/he has not seen his/her card, but s/he can see the 3). Player three can see both of the cards and so he silently adds them in his head and says, "The sum is 7." Player one can see that the player two has a 4 and s/he knows the sum is 7, so s/he determines s/he has a 3. Player one says, "Three." S/he is correct and the winner, so s/he switches places with player three and another round continues.

Bull's-eye Bean Bag

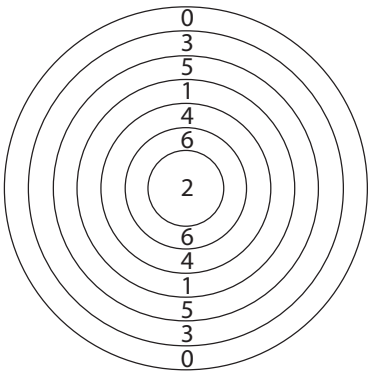
Materials

For each group:

- ❑ 2 bean bags
- ❑ Poster board

For each student:

- ❑ *Bean Bag Toss Record Sheet*



1. For this activity, take the poster board and with a marker, draw a Bull's-eye with seven circles going from smallest to largest. Using the numbers 0-6, write one number in each circle.
2. Students take turns tossing both bean bags onto the poster board.
3. Use the numbers that the bean bags land on in an addition or subtraction sentence.
4. Students must write the correct addition or subtraction sentence and the answer on the *Bean Bag Toss Record Sheet*. Math journals may be used instead.

Example

Player one tosses both bean bags onto the poster board. One bean bag lands on the circle with the number 2 and the other lands on the circle with the number 5. The student then writes the addition sentence and solves the problem (2+5=7). The next player takes his/her turn.

Domino Addition/Subtraction Sentences

1. For addition, students choose one domino at a time and write the addition sentence that matches the dots using numbers and symbols or words.
2. For subtraction, students choose one domino at a time and write the subtraction sentence that matches the dots, making sure they write the larger number first, using numbers and symbols or words.
3. Students record their number sentences on scratch paper or a math journal.

Materials

For each group:

- ❑ Handful of dominos

Dominos in All

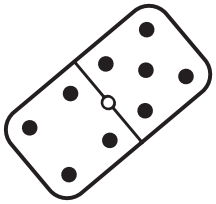
1. This activity is designed to help students see different number combinations. The teacher or adult helper would say, "5 dots in all." Students would then look for dominos with a total of 5. Students may find a domino with a combination of 1 dot and 4 dots, one with a combination of 0 dots and 5 dots, or one with a combination of 2 dots and 3 dots.
2. Students write the different number sentence combinations on chart paper, white boards, or in math journals.
3. The adult helper then chooses a different sum and the activity starts all over again.

Materials

For each group:

- ❑ Set of dominos
- ❑ Teacher/adult helper

Domino Directions



This activity helps students see that addition and subtraction sentences can be written horizontally or vertically.

1. Students take one domino at a time and write the addition or subtraction sentence vertically and horizontally.
2. Students must draw the dots on the dominos to match their equations.
3. To help identify the larger number for subtraction sentences, students circle the domino side with the most dots.
4. The dots and addition and subtraction sentences are recorded on the *Domino Directions Addition* or *Subtraction Sheet*.

Materials

For each group:

- ❑ Handful of dominos

For each student:

- ❑ *Domino Directions Addition Sheet* or
- ❑ *Domino Directions Subtraction Sheet*

Matching Addition and Subtraction

1. Students match numerals, number words, or addition and subtraction sentences that represent the same amount.
2. These cards can be used to play a matching memory game where all cards are placed face down, and students alternate turning over two cards.

Materials

For each group:

- ❑ Set of *Matching Addition and Subtraction* cards

3. If a match is found, then the player gets to keep the cards, and the turn is over. If no match is found, then the player turns the cards face down again.
4. These cards can also be used to play a card game like "Go Fish" where students ask another student for a particular number and then match pairs, or find all four cards that represent the same amount.
5. The winner of the card game is the student with the most matches.

Number Trains

Materials

- ❑ *Number Train Number Sentence* worksheet
- ❑ *Number Train Plus/Minus Spinner*
- ❑ Number cube or die
- ❑ 20 Unifix® cubes
- ❑ Paper clip

This game is played in pairs.

1. The players start by putting 20 cubes together to make a tower, then lay the tower horizontally on their desk so that it looks like a train.
2. The goal is to get rid of all the cubes. The players work as a team to accomplish this.
3. Players start by spinning the *Number Train Plus/Minus Spinner* to determine if they will add or subtract and roll the dice or number cube to see how many. If a spin or roll combination calls for adding more cubes than twenty, or taking away more cubes than are left, the players need to spin and roll again until they can make a move on the train.
4. In order to begin the game, students must spin a subtraction sign on the spinner because they cannot add any more cubes to their train.
5. Each student should record the number sentence for every turn on the *Number Train Number Sentence* worksheet.
6. To win the game, the partners should have a final equation listed on their record sheet that equals zero. Point out that the next equation on the worksheet will always start with the answer from the equation above, because the beginning train for each turn is the same as the ending train of the previous turn.

   A math journal may be used in place of the *Number Train Number Sentence* record sheet.

Break the Tower

Materials

- ❑ Unifix® cubes
- ❑ *Break the Tower Record Sheet*

1. Give each student a specific number of Unifix® cubes and a *Break the Tower Record Sheet*.
2. Have the students put their cubes together to make a tower and place the tower behind their back. Either leave it whole or break it into two groups so there are cubes in each hand.

3. Students count the number of cubes in each hand and write the equation on the *Break the Tower Record Sheet*.
4. Students put the tower back together, place it behind their back, and break it again for a different equation.
5. This is a great way for students to see all different number combinations that have the same answer.

   A math journal may be used in place of the *Break the Tower Record Sheet*.

Ten Frame Addition and Subtraction

Materials
- ❑ 10 counters
- ❑ *Ten Frame* worksheet

This activity requires either the teacher or an adult helper.

1. Give each student a *Ten Frame* worksheet and 10 counters. The teacher or adult helper starts the game with a specified number.
2. Students place one counter in each square for each number they count until they reach the specified number.
3. Model how to fill the *Ten Frame,* starting with the upper left square and filling across the top row before moving to the lower left hand corner.
4. After students have the specified number on their *Ten Frame*, the adult helper or teacher says a new number and the students must decide if they need to add or subtract.

   Example

   The first number was 6, so the *Ten Frame* showed six counters. The teacher then called out 9. Students respond verbally, "Add three," and place 3 more counters on their *Ten Frame*. The teacher might then call out 4, students respond, "Minus five," and take 5 counters off their *Ten Frame*.
5. Equations may be recorded on chart paper or in math journals.

How Many in the Cave?

Materials
- ❑ Paper cup (opaque)
- ❑ Counters

This game works well in pairs.

1. Give each pair of students a specific number of counters and one cup.
2. While one student covers his/her eyes, the other student takes some of the counters and places them in the "cave" (under the cup).
3. The student who was covering his/her eyes then tries to guess the number of counters in the cave.

4. Students determine this out because they know the number they started with and they can see the number that is not in the cave.
5. Players switch places and the game continues.

Number sentences may be recorded in a math journal.

Red/Yellow Toss

Materials
- ❑ Plastic or paper cup
- ❑ 12 2-sided counters
- ❑ *Red/Yellow Toss* record sheet

This game works well in pairs.

1. Students take a specific number of 2-sided counters and place them in the paper cup.
2. Shake it and dump the counters onto the table.
3. Sort the counters according to the color of the side they landed on and record the toss on the *Red/Yellow Toss* record sheet.
4. One student writes the addition sentence using the number of red counters first, the other student writes the addition sentence using the number of yellow counters first. Point out that no matter the order of the addends, the sum is still the same. This helps teach the order property of addition.

Bowling Alley Subtraction

Materials
- ❑ 10 2-liter soda bottles
- ❑ Kick ball
- ❑ *Subtraction Bowling Alley* worksheet

1. Fill the 2-liter soda bottles about half full of water. Set them up on the floor in a triangle bowling pin formation. Mark off a line with tape about 6 feet away.
2. Students take turns rolling the kick ball to knock down the pins. After each turn, students must write down the subtraction sentence on their record sheet and set the pins back up for the next person.

   This game is also fun as a class competition. You can divide the class into teams and have several lanes going at one time. The winning team is the one who knocks down the most pins overall. A math journal may be used in place of the *Subtraction Bowling Alley* worksheet.

Elevator Addition and Subtraction

Materials

For each group:
- ❑ *Elevator Game Board*
- ❑ 2 *Elevator Spinners*

For each student:
- ❑ Paperclips
- ❑ 4 counters (each a different color)

Each player starts on the first floor.

1. Players take turns spinning both *Elevator Spinners* and moving their game piece accordingly up and down the *Elevator Game Board*.
2. If a player spins a move that may not be taken, s/he must spin again.
3. The first player to make it to the top floor and back down to the bottom floor wins.

Players write addition and subtraction sentences for each turn in their math journals.

Catching Fireflies

Addition or subtraction may be the focus of this activity, depending on the students' needs. The teacher or adult helper reads *Ten Flashing Fireflies* aloud.

1. As the story is read, students use the jars and beads (fireflies) to represent what is taking place in the story.
2. After each page in the story, the teacher or adult helper stops and has the students write the addition or subtraction sentence that was just modeled using the beads and cups.

   Chart paper, math journals, or white boards may be used to record the addition or subtraction sentences.

Materials

For the class:

- ❑ *Ten Flashing Fireflies*

For each student:

- ❑ Small jar or paper cup
- ❑ 10 small beads, popcorn kernels, or counters

Curriculum Extensions/Adaptations/Integration

- Many of these activities are easy to integrate into writing activities. Students could write about the activities, make predictions, and write about the outcomes. Even though these activities are all addition and subtraction based, it is easy to take the same concept and adapt it to time, money, measurement, etc.
- These activities are also great for early finishers, transition time, and even whole class activities.
- The activities in this lesson are written in a way that all students should be able to participate and receive the educational benefit from doing so. These activities will reach a variety of learning styles and can be easily adapted for students with special needs.
- Each activity in this lesson is different and will require unique accommodations for children with special needs or ELL students. Here are a few suggestions:
  - Assign peer partners to students who need extra help.
  - For activities that already require partners, an additional student could be added to groups to help and assist in any way.
  - Worksheets may be enlarged for students who have difficulty seeing well.
  - Students who have difficulty writing may give their answers orally.

- Pictures may be added to worksheets to help illustrate the meaning for ELL students.
- Special needs students may need fewer problems.

Resources

Books

How Many, How Many, How Many, by Rick Walton; ISBN 1-56402-656-6

Ten Flashing Fireflies, by Philemon Sturges; ISBN 1-55858-674-1

Web site

http://www.discoveryschool.com

Family Connections

- All of these activities would be excellent homework assignments for students to do with their families. Copy the description of the activity and send it home with the students along with any necessary supplies. This is a fun way to involve family members in math education.

Read My Mind Number Cards

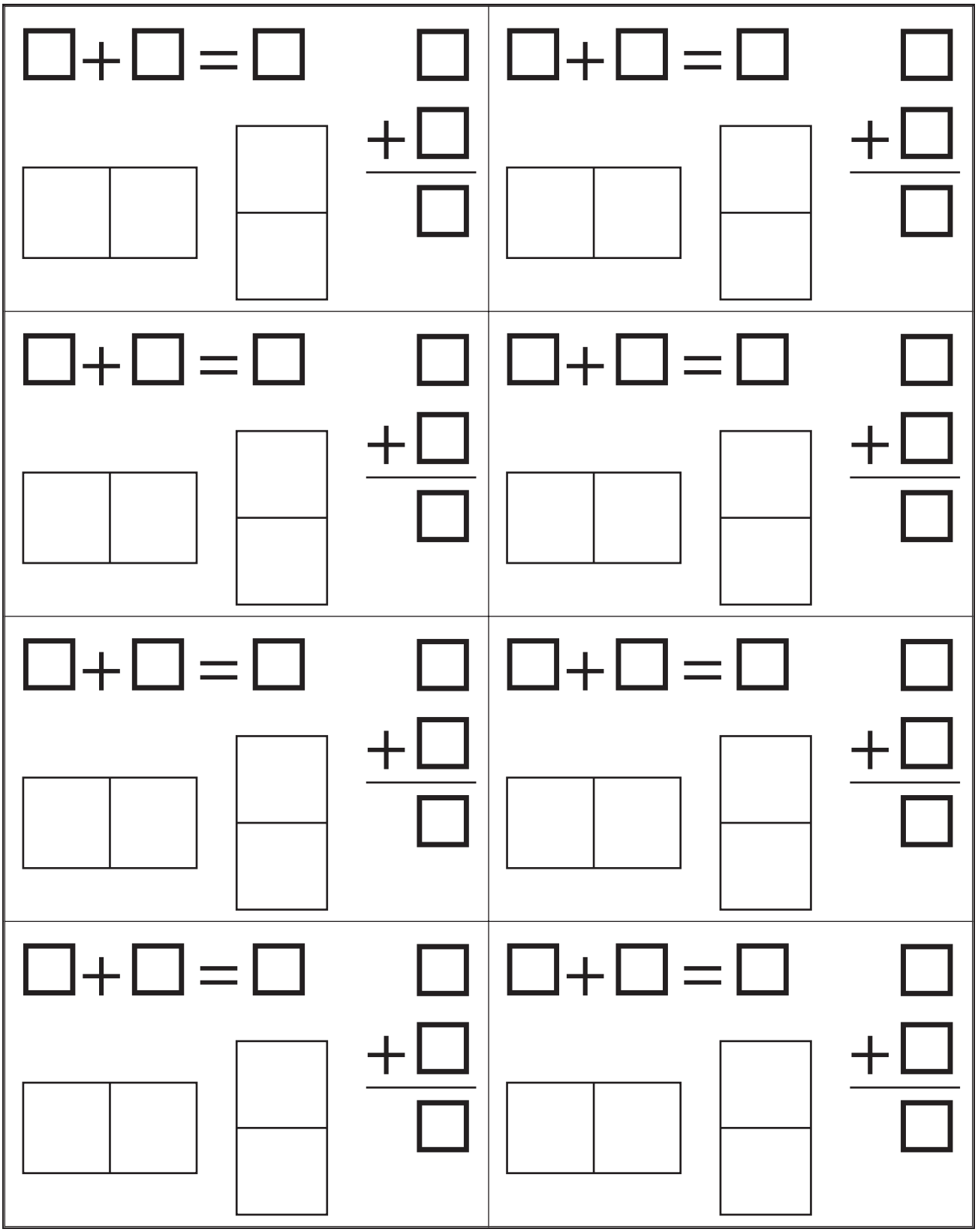
2	4	6
2	4	6
1	3	5
1	3	5

Name _____

Bean Bag Toss Record Sheet

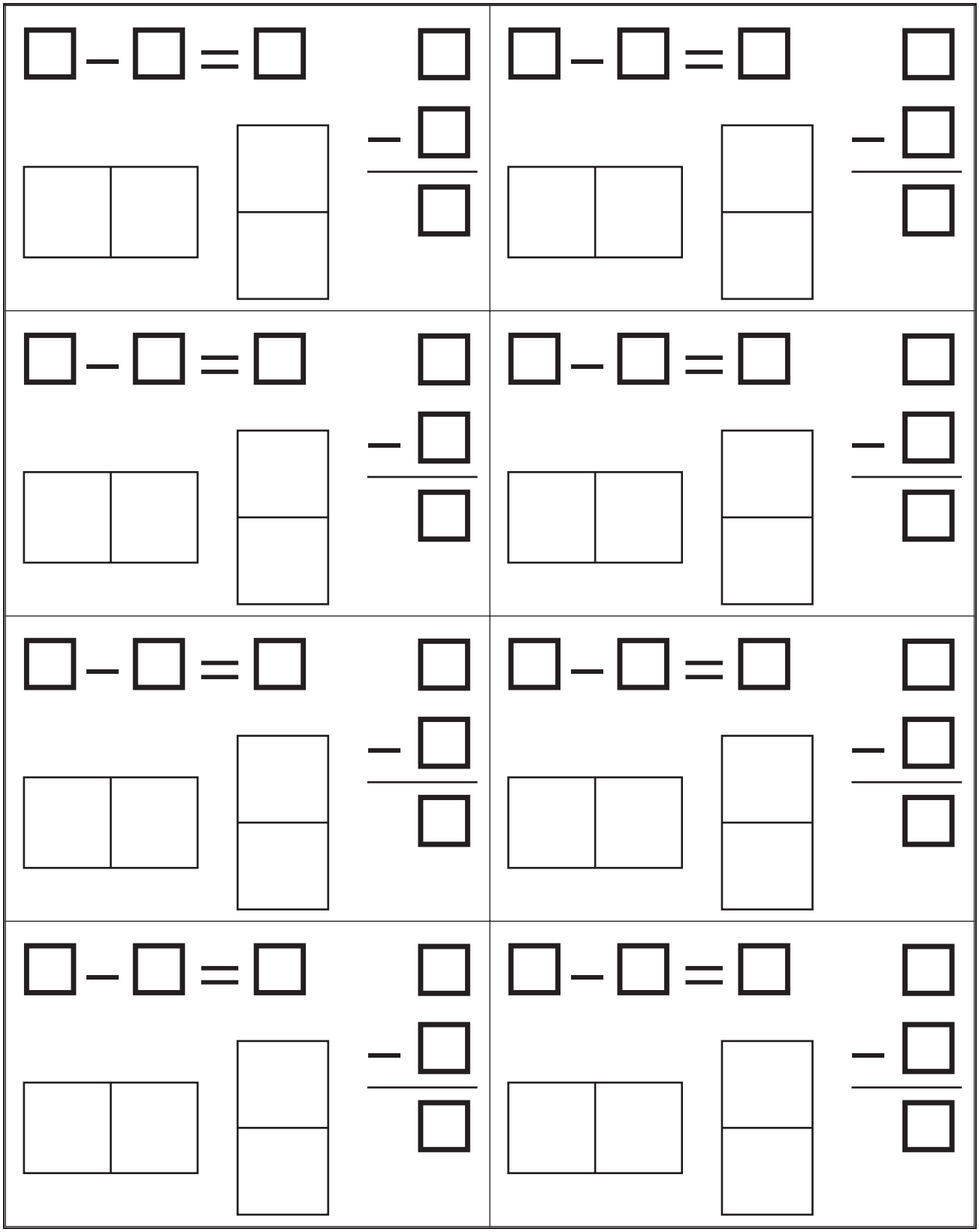
Name _____

Domino Directions Addition Sheet



Name _____

Domino Directions Subtraction Sheet



Matching Addition and Subtraction Cards

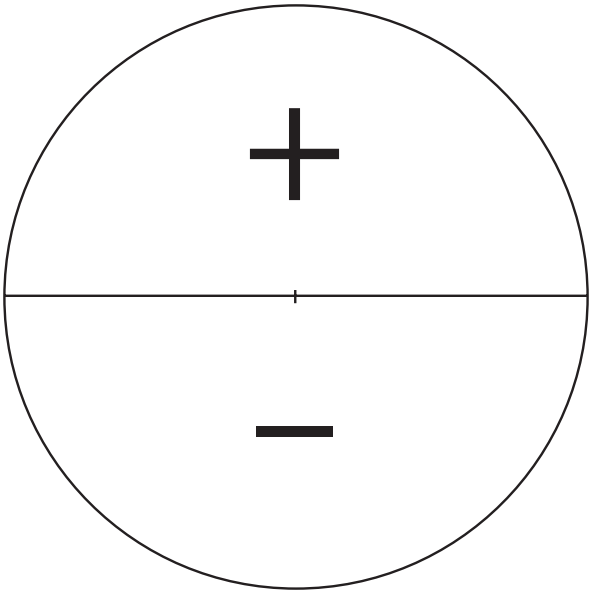
5 – 4 =	2 – 0 =	5 – 2 =
1 + 0 =	1 + 1 =	2 + 1
one	two	three
1	2	3

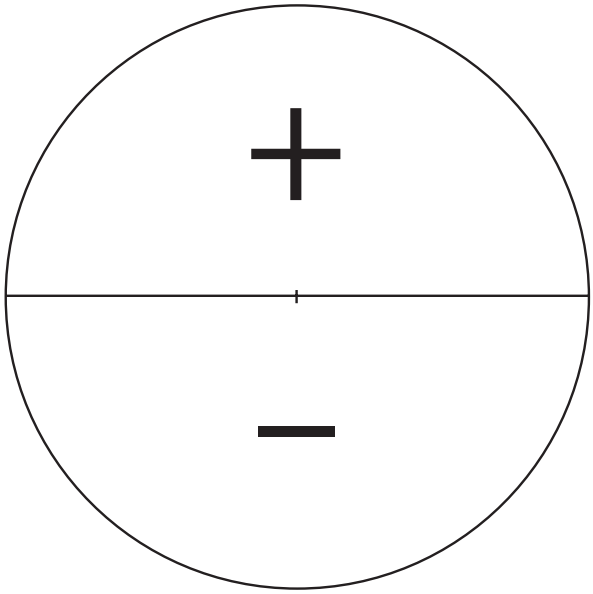
6−2=	6−1=	10−4=
1+3=	2+3=	3+3
four	five	six
4	5	6

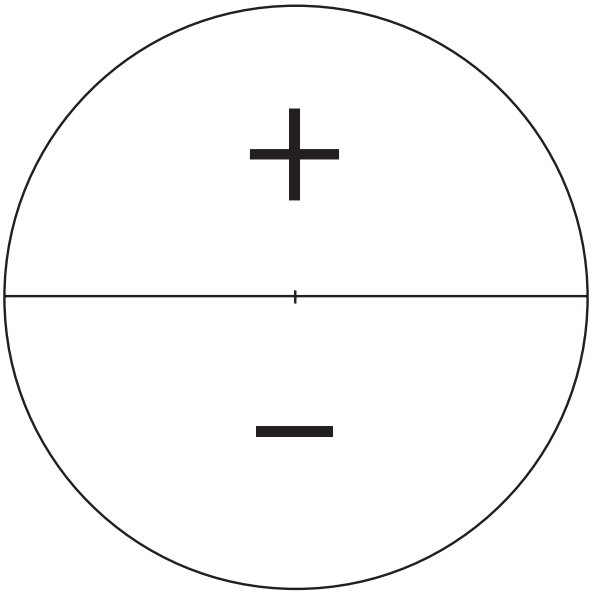
Name _____

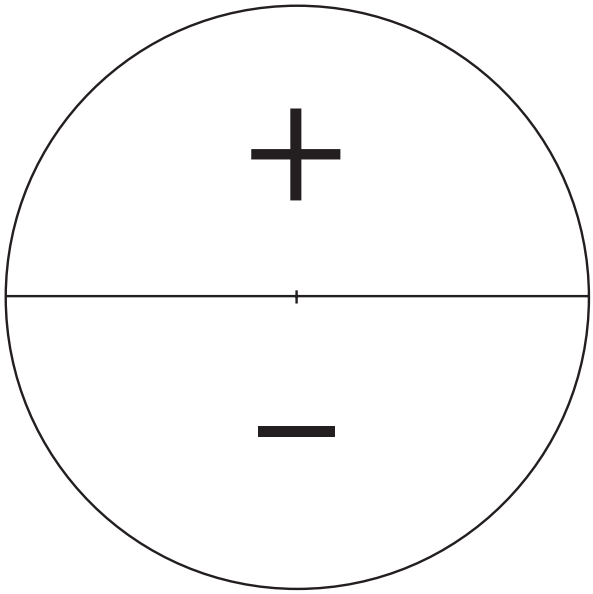
Number Train Number Sentences

Number Train Plus/Minus Spinner









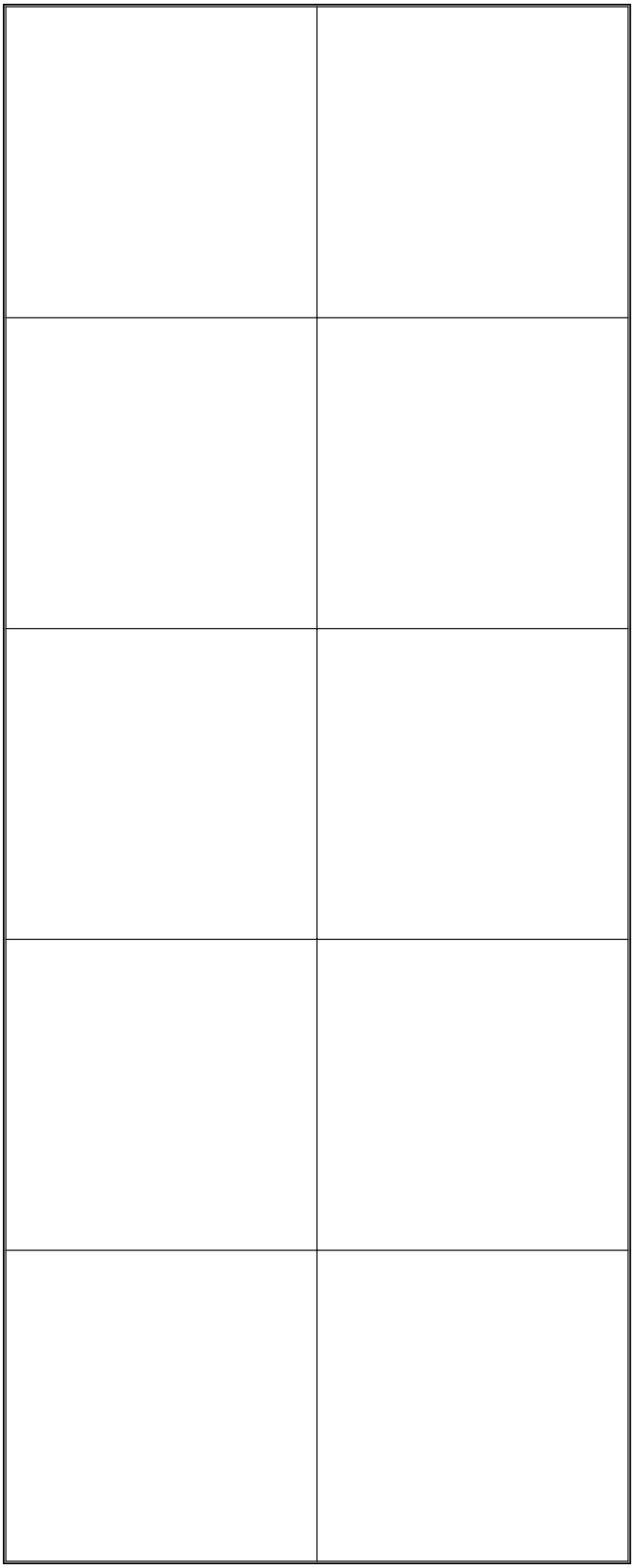
Name _____

Break the Tower Record Sheet

_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Name _____

Ten Frame



Name _____

Red/Yellow Toss

Red First	Yellow First
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

Name _____

Subtraction Bowling Alley

10 – ____ = ____

10 – ____ = ____

10 – ____ = ____

10 – ____ = ____

10 – ____ = ____

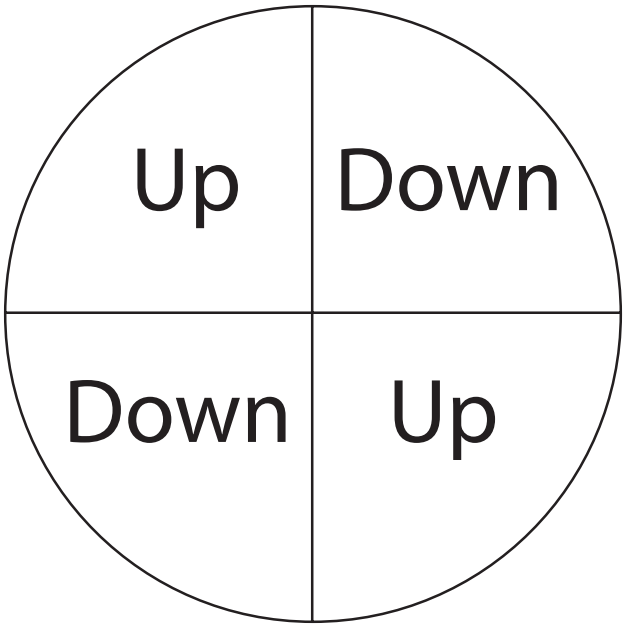
10 – ____ = ____

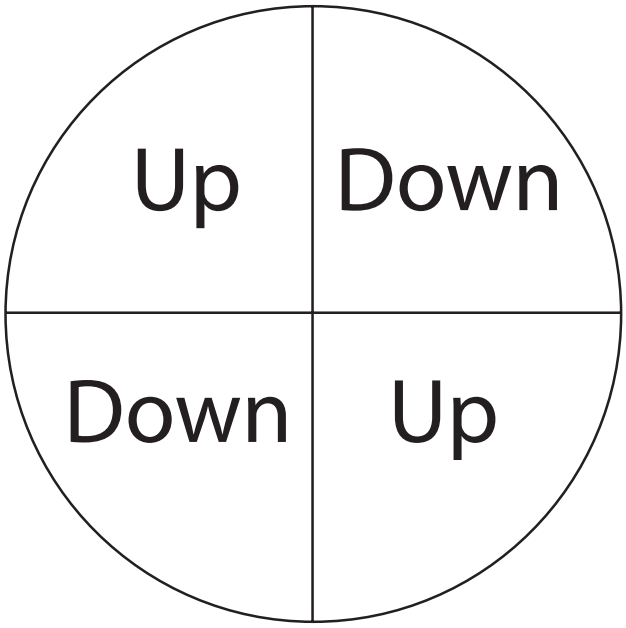
Name _____

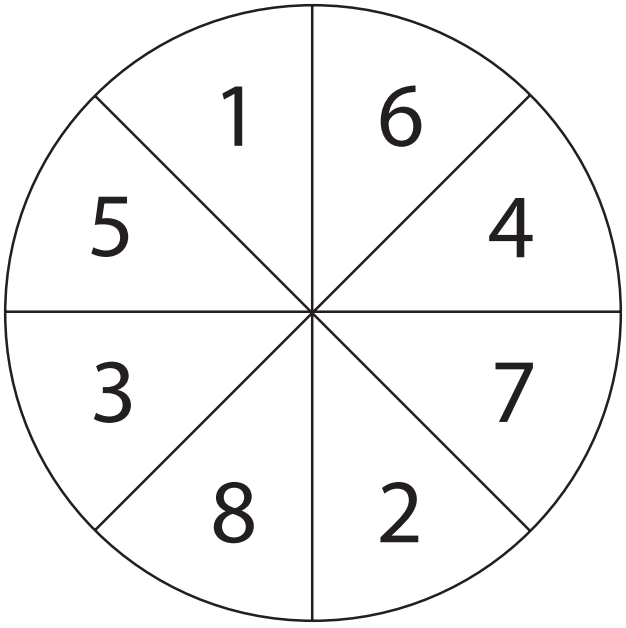
Elevator Game Board

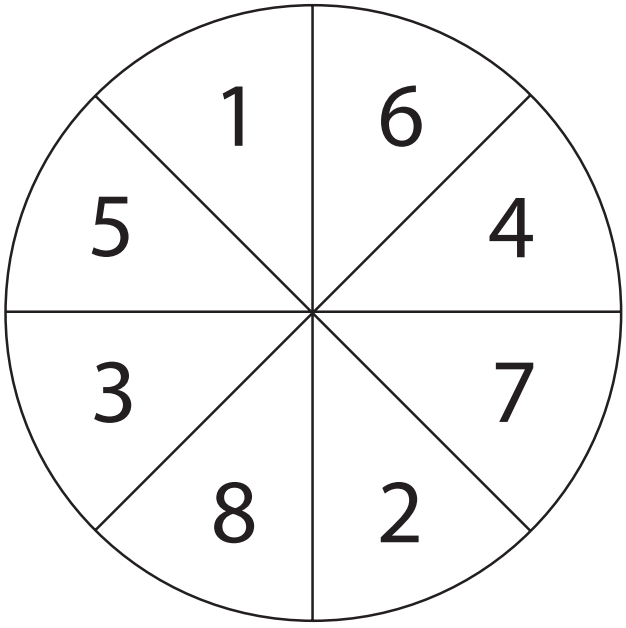
Floor 8
Floor 7
Floor 6
Floor 5
Floor 4
Floor 3
Floor 2
Floor 1

Elevator Spinners









Math and Music

Standard I:
Students will acquire number sense and perform simple operations with whole numbers.

Objective 3:
Model and illustrate meanings of the operations of addition and subtraction and describe how they relate.

Intended Learning Outcomes:
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Content I-3

Math Standard I

Objective 3

Connections

Background Information

All the activities in this lesson are addition and subtraction based. It is not designed to introduce addition and subtraction, rather, to supplement and enrich lessons already being taught. This lesson is not designed to be completed in one sitting. It may be done throughout an entire addition and subtraction unit. These activities may be used as starter activities when introducing new math concepts, particularly those that relate to addition and subtraction.

Research Basis

Gardner, H. (1983). *Frames of Mind: The Theory of Multiple Intelligences*. Basic Books, New York.

Howard Gardner suggests that intelligence is not unitary. There are several ways to be smart. He identified eight intelligences: Verbal/Linguistic, Bodily/Kinesthetic, Logical/Mathematical, Naturalist, Visual/Spatial, Interpersonal, Intrapersonal, and Musical/Rhythmic. Students who are "music smart" like to hum, sing, enjoy listening to music, and learn through lyrics and music.

Kestrom, J.M. (1998). The Untrapped Power of Music: It's Role in the Curriculum and It's Effect on Academic Achievement. *NASSP Bulletin, 82*(597), 34-43.

Music instruction is a powerful tool that can be used to help promote academic achievement.

Assessment Suggestions

- The best way for teachers to assess the following activities is through observation. Teachers observe the way students work with manipulatives, participate in the activities, and sing the songs.
- Use the worksheets that accompany the activities as a means to assess student's understanding.
- Students record their understanding in journals or orally explain the math concepts to the teacher.

Invitation to Learn

Use this invitation to review addition with doubles. Begin by clapping a set number of times and the students respond by clapping back the same number of times. The teacher and students then respond by saying the addition sentence for the double they just clapped. For example, the teacher begins by clapping four times, each time the teacher claps s/he counts, "One, two, three, four." The students respond by clapping four times and saying, "Five, six, seven, eight." The students and teacher then together say, "Four plus four is eight."

Instructional Procedures

Add Up the Beat

Materials

- ❑ A drum or tambourine
- ❑ Counters (any kind)
- ❑ *Two-Sided Counting Mat*

1. Students listen as the teacher taps a drum or tambourine 6 times.
2. Ask students how many times the teacher tapped (6 times). Have students place that many counters on the left side of the *Two-Sided Counting Mat*.
3. Students listen as the teacher taps 3 more times, then place 3 counters on the right side of the *Two-Sided Counting Mat*.
4. Ask students to identify the addition sentence represented by their counters. Addition sentences may be recorded in math journals, on chart paper, or white boards.
5. Students clear their counting mats before repeating this activity with new number combinations.

   This activity could be modified for subtraction sentences. The first number the teacher taps is the total amount of counters students use. The second number tapped is how many they subtract, minus, or take away. The answer is how many counters are left.

Addition and Subtraction Musical Chairs

Materials
- ❑ Music
- ❑ *Addition and Subtraction Sign*
- ❑ Popsicle sticks

Play musical chairs with a small group of students. Start out with the same number of chairs as students. Each student needs an *Addition and Subtraction Sign*. This is made by taking a popsicle stick and gluing the addition sign on one side and the subtraction sign on the other side.

1. Place the chairs in a circle and have students walk around the circle while music is playing. While the music is playing, the teacher removes one or two chairs.
2. When the music stops, have students quickly find a seat (if they can!). All students should hold their *Addition and Subtraction Sign* with the subtraction sign facing out, because the teacher took chairs away. As a class, students should then identify the subtraction sentence about the chairs. For example, if there were 7 chairs in the beginning and 2 were taken away, the subtraction sentence would be 7 – 2 = 5. The teacher may select one student to record addition and subtraction sentences on chart paper, the overhead, or the chalk board.
3. Continue adding and subtracting chairs as the game is played. Write the corresponding number sentence after each time.

   In this version of musical chairs, no one is "out" because sometimes chairs are added and sometimes they are taken away. Students who do not find a chair to sit on should remain standing outside the circle of chairs and use their *Addition and Subtraction Sign* like the other students.

Add Them Up

Materials
- ❑ *Addition Unplugged* CD
- ❑ *Addition Word Cards*
- ❑ Pocket chart
- ❑ 10 blank pocket chart word strips
- ❑ *Addition Word Match* worksheet

Start this activity by teaching students the song, "Add Them Up," from the *Addition Unplugged* CD.

1. While you are teaching students this song, discuss the math terms used. The first term is ***add***. Ask students to tell you what ***add*** or ***addition*** means.
2. Record their responses on the board, overhead, or chart paper. Following the discussion on ***add***, place the ***add*** word card in a pocket chart. The second math term is ***answer***. Again, ask students to tell you what an ***answer*** is. Record their responses on the board, overhead, or chart paper. Following the discussion, place the ***answer*** word card in the pocket chart. Continue the same pattern with the following math terms found in the song: ***sum, addend,*** and ***total***.

3. After all the words have been introduced, sing the song again. Using the same pattern as above, introduce the following addition terms that are not used in the song: ***and, plus, is, equals,*** and ***same as***.
4. Have students participate in a group pocket chart activity. Write ten different addition sentences on ten blank pocket chart work strips. Write the addition sentences using numbers and symbols (3 + 7 = 10). Place the addition sentence in the pocket chart, and give a student one of the addition word cards. The student must place the addition word card under the appropriate place on the addition sentence. For example, if the addition sentence is 4 + 2 = 6, and the student had the word card ***addend***. The student should place the word card under the 4 or 2. Continue with the rest of the number sentences and word cards.
5. Following the pocket chart activity, students complete the *Addition Word Match* worksheet independently. For this, students cut apart the addition words and paste them under the appropriate place on the addition sentences.

Basic Facts to 6

Materials
- ❑ *Addition Unplugged* CD
- ❑ *Addition Sentence Cards*

Before singing this song, students should be introduced to the concept of the order property of addition, where the order of the addends can be reversed.

1. After students are familiar with the concept, sing the song, "Basic Facts to 6," from the *Addition Unplugged* CD.
2. To sing the song, divide the class into two groups. Choose a volunteer from each group to place the appropriate *Addition Sentence Cards* on a pocket chart as the class is singing the song. (*Addition Sentence Cards—Group A & B* may be used in various combinations to introduce students to the order property of addition.)
3. During each chorus, two new volunteers may be selected.

Adding 0 or 1

Materials
- ❑ *Addition Unplugged* CD
- ❑ Counters (any kind)
- ❑ Number Line

This song helps students understand the value of zero in addition.

1. For this song, students should be seated at their desks with one counter (any kind) and the *Number Line*.
2. Sing the song, "Adding 0 or 1" from the *Addition Unplugged* CD. As students are singing the song, have them move their counters on their number line according to the words of the song. Help students see that when a zero is added, the number stays the same. This song could also be done on the floor and students could use their fingers to illustrate the math problems.

Curriculum Extensions/Adaptations/Integration

- Many of these activities may be integrated into other curriculum areas. Writing about each activity is a great way to extend these activities to a higher level of thinking. Students could write a story using number sentences. For example, "There were children playing at the park. Three children were playing on the swings and seven children were playing on the jungle gym. All ten children were having a wonderful time!"
- Modify activities that use addition to use subtraction. These activities may be done in small groups or used as activities for center time.
- For students with special needs, make sure that the words to the music are written clearly and are visible at all times. Illustrations may need to be included with the words for ELL students or others with special needs. For some activities, students with special needs may need to be paired up with another student or adult for assistance.

Resources

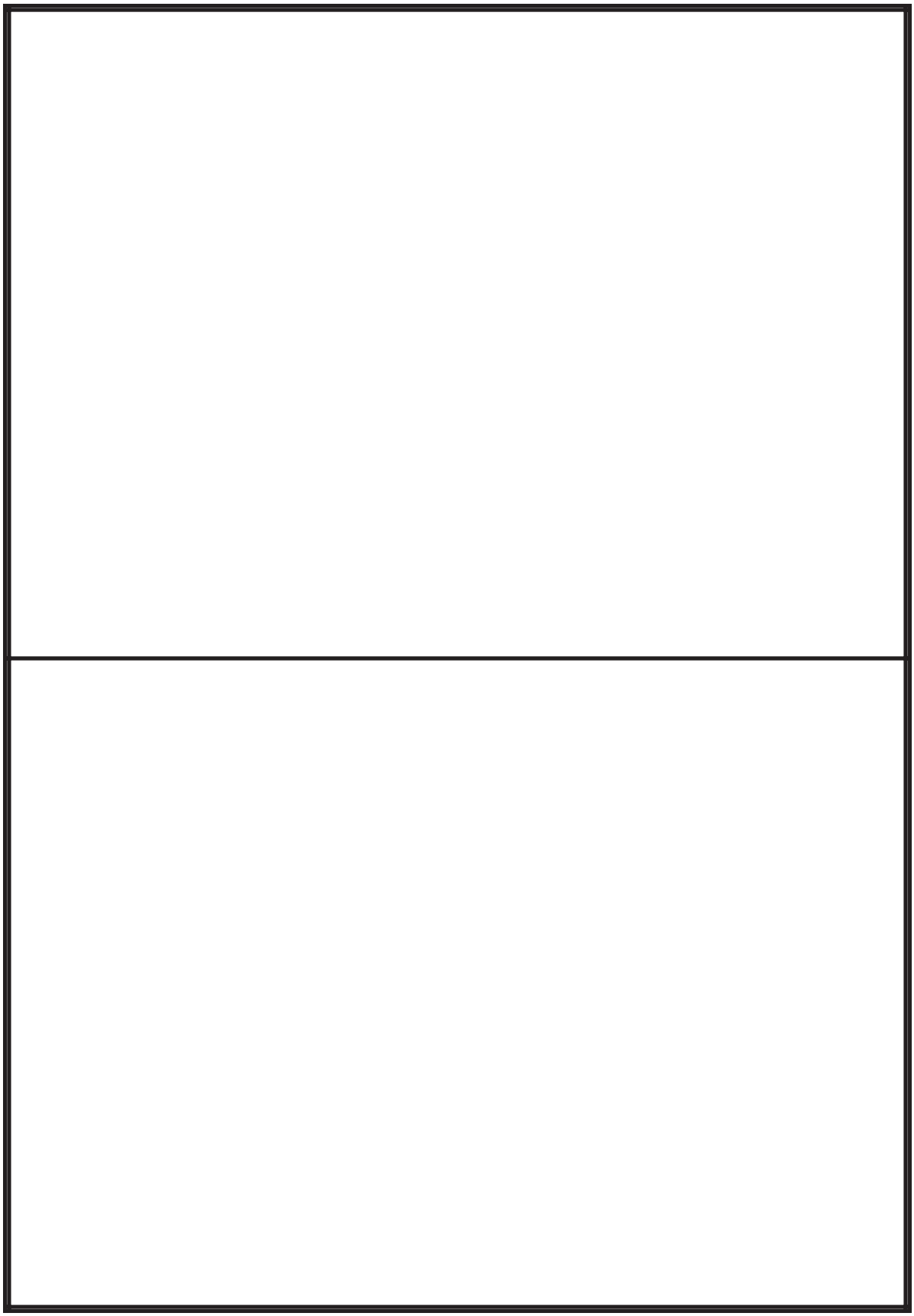
CD

Addition Unplugged, by Sara Jordan (1-800-567-7733, http://www.sara-jordan.com); Item #JMP112CDK; ISBN 1-895523-67-2

Family Connections

- For *Add Up the Beat*, students could take the place of the teacher while family members act as the students and model the addition problems using cereal, beans, or macaroni.
- *Addition and Subtraction Musical Chairs* may also be played with family members. One player would act as the leader and run the music, move the chairs, and write the addition or subtraction sentence. Players rotate so that all family members have a turn to be the leader.

Two-Sided Counting Mat



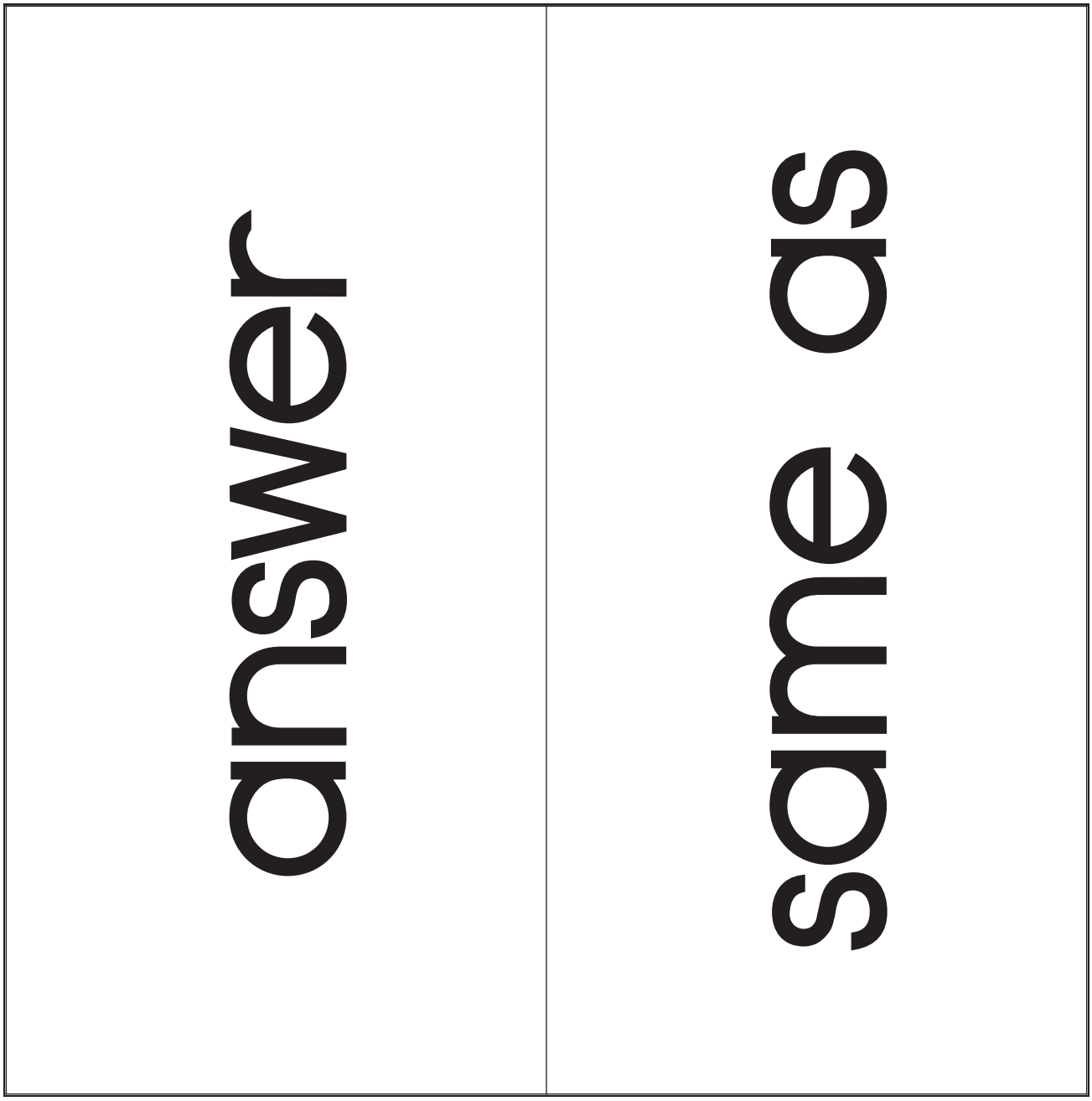
Addition and Subtraction Sign

+	+	+
+	+	+
−	−	−
−	−	−

Addition Word Cards

add	is
and	sum

plus	total
equals	addend


answer
same as

Name _____

Addition Word Match

Cut out the wordstrips at the bottom of the page and place one word below the correct part of the number sentence. Use only one word for each number sentence.

3 + 1 = 4	5 + 2 = 7
0 + 6 = 6	8 + 1 = 9
4 + 3 = 7	6 + 2 = 8
9 + 0 = 9	5 + 3 = 8
2 + 1 = 3	4 + 6 = 10

add	sum	plus	equals	answer
is	and	total	addend	same as

Addition Sentence Cards–Group A

0 + 1 is 1
0 + 2 is 2
0 + 3 is 3
0 + 4 is 4

0 + 5 is 5
0 + 6 is 6
1 + 1 is 2
1 + 2 is 3

1 + 3 is 4
1 + 4 is 5
1 + 5 is 6
2 + 2 is 4

2 + 3 is 5
2 + 4 is 6
3 + 3 is 6

Addition Sentence Cards–Group B

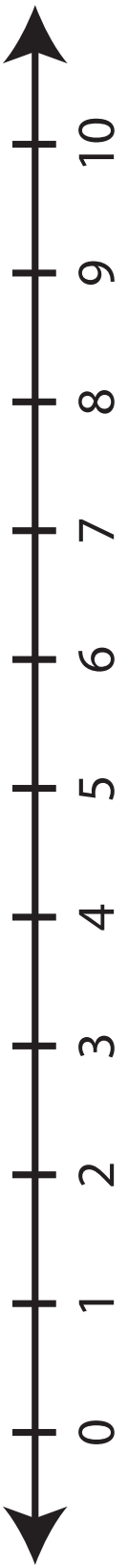
1 + 0 is 1
2 + 0 is 2
3 + 0 is 3
4 + 0 is 4

5 + 0 is 5
6 + 0 is 6
1 + 1 is 2
2 + 1 is 3

3 + 1 is 4
4 + 1 is 5
5 + 1 is 6
2 + 2 is 4

3 + 2 is 5
4 + 2 is 6
3 + 3 is 6

Number Line



Content Standard II-2 Activities

Doing Our Jobs

Standard II:
Students will develop a sense of self in relation to families and community.

Objective 2:
Describe important aspects of the community and culture that strengthen relationships.

Intended Learning Outcomes:
2. Develop social skills and ethical responsibility.
3. Demonstrate responsible emotional and cognitive behaviors.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Language Arts I-1, VIII-6

Content Standard I

Objective 2

Connections

Background Information

In a democratic society, citizens are expected to be responsible for their own actions by following and obeying the laws (rules) of the land. The purpose of this lesson is to teach the students there are rules to be followed or jobs to be done in the classroom. If students choose to follow rules or do their job, there are positive consequences. If students choose to not follow the rules, there are negative consequences. In this lesson, students also learn how to listen and speak to others. This lesson is best taught at the beginning of the year.

Research Basis

Faye, J. & Funk, D. (1995). *Teaching with Love and Logic. Taking Control of the Classroom*. Love and Logic Press.

Research shows that when children are taught responsibility for their behavior, they are prepared to function more readily in the real world. It also helps develop independent thinking.

Young, K.R., West, R.P., Marchant, M., Morgan, C.J., & Mitchem, K. (1997). *Prevention Plus: A comprehensive school program approach for the prevention of antisocial behavior*. Logan: Utah State University, Institute for the Study of Children, Youth, and Families at Risk.

This study states that modeling is the most effective way to communicate specific positive student behaviors. Further more, it is essential that we have the students practice behaviors themselves through role play situations.

Assessment Suggestions

- While students role play good listening and speaking skills, the teacher should monitor and assess student progress.
- Use information to assess who really understands their job and when they are correctly performing it by recording or observing as students self-reflect.
- Use the writing assignment as an informal assessment.

Invitation to Learn

Materials
- ❑ *Stellaluna*

Before reading *Stellaluna* to the class, ask students to pay close attention to how Stellaluna behaves or acts with the birds. Also ask them to be thinking about why Stellaluna acts like she does. After reading the story, lead a discussion using the previous questions. Explain that throughout the day or week, students will be learning about important life skills. Some skills they will need to know at school, while many will be used outside of school, just as Stellaluna used different skills in different situations in the story. Help students understand how this is similar to Stellaluna.

Instructional Procedures

A and B Listening

Materials
- ❑ Die cuts of the letters A and B
- ❑ *Looks Like/Sounds Like Chart*

1. Teach students how to be good listeners (make eye contact, lean forward, nod in acknowledgement) and speakers (speak loud and clear, make eye contact with audience). Talk about what a good listener does and list ideas on a *Looks Like/Sounds Like Chart*. Then complete another *Looks Like/Sounds Like Chart* chart about what a good speaker does.
2. Model for the class what it looks like and sounds like to be a good speaker and a good listener. Have a few students role play these skills.
3. Give half the class a paper die cut of the letter A and half the class a paper die cut of the letter B. Have students partner with someone with the opposite letter. Students with an A will listen, and students with a B will speak. The teacher assigns a topic for "B" students to discuss for 20-30 seconds.

   Then have "A" students be speakers and "B" students be listeners and assign a new topic.
4. Have students find a new partner with the opposite letter and repeat the previous step. Repeat as necessary.

Green Light-Go Behaviors and Red Light-Stop Behaviors

Materials
- ❑ 4" x 5" paper
- ❑ Crayons (red and green)

1. Discuss what happens when you are in a car and come to a green or red light.
2. Explain there are red and green lights at school. Appropriate behavior is called "Green Light-Go Behavior," such as sharing, taking turns, etc. "Red Light-Stop Behaviors" are kicking, name-calling, etc.
3. Give students a 4" x 5" piece of paper. Have them draw a circle on each side. Color one circle green and one circle red. Have them practice their listening and speaking skills by coming to the front and giving an example of either a "Red Light-Stop Behavior" or a "Green Light-Go Behavior." As they give examples, have students hold up the correct stoplight to identify which kind of behavior was just demonstrated.

Doing Our Jobs

Materials
- ❑ Briefcase or bag
- ❑ Cards listing jobs in your classroom
- ❑ *Self-Reflection Log*

Now that the students understand how to be good listeners and speakers, as well as what behaviors are acceptable and unacceptable, they are ready to learn what their jobs are as first graders.

1. Talk about the different jobs the students' parents do. Discuss the value of these jobs.
2. Tell the students that everyone has a job to do at school, too, just like their parents. Explain that the teacher's job is to prepare the lessons each day, to teach students what they need to know, grade papers, etc. Students also have many jobs at school.
3. At this point the teacher will pull out a briefcase or bag with picture cards giving job descriptions inside (the rules of your classroom). Tell students the pictures represent student jobs.
4. Have a student choose a card out of the briefcase, read it to the class, and discuss what it means. Have the class help you act out correct and incorrect ways to do that job. Repeat this process with each job card.
5. Discuss why it is important for each student to do his/her job. Talk about what would happen if no one did his/her job, verses what would happen if everyone did his/her job.
6. Explain that, as part of the teacher's job, you are willing to support students with reminders, practice, and self reflection to help them do their jobs.

7. Teach students how to self reflect. Have them give you a thumbs up or down, depending on whether or not they did their jobs. Another method is to have them show you 1, 2, or 3 finger(s) rating themselves on how well they preformed their jobs. Or each student may complete a *Self-Reflection Log* (p. 4-13) using smiley/frowny faces.

Curriculum Extensions/Adaptations/Integration

- Students write in a journal and reflect on how they performed their job and how it made them feel.

Resources

Book

Stellaluna, by Janell Cannon; ISBN 05904837X

Family Connections

- Students interview a family member about their job at work and record what their jobs are, as well as any consequences they may have at work.
- Discuss with a parent their jobs at home.
- Report to class similarities of home and school.

Name _____

Looks Like/Sounds Like Chart

Looks Like	Sounds Like

Time Capsule

Content Standard II

Objective 2

Connections

Standard II:
Students will develop a sense of self in relation to families and community.

Objective 2:
Describe important aspects of the community and culture that strengthen relationships.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Language Arts VIII-6, 5; Math IV-1, V-1, Content III-1

Background Information

This lesson allows students to collect data in the fall and again in the spring. Students use the data collected in both seasons to compare and contrast changes over time. Students need an understanding of the five senses.

Research Basis

Gardner, H., & Walters, J. (1993). *Multiple Intelligences: The Theory In Practice*. (New York: Basic Books)

This research states that children learn through eight different intelligences. By using these intelligences, a child's strongest learning style can be accessed. Given many opportunities, students will develop weaker intelligences.

Gallavan, N.P., Putney, L.G., & Brantley, D. (2002). The Influences of Modeling: Gaining the Competence and Confidence To Teach. *Social Studies and The Young Learner. 14*(3), 28-30.

This research indicates that effective teachers integrate social studies across the curriculum, thus helping all learning to blend together.

Assessment Suggestions

- Discuss changes students observed. Let each student share a change s/he observed.
- Have each student draw a picture of a change s/he observed and write about the changes.

Invitation to Learn

Materials
- ❑ *An Egg is An Egg*

Ask the class what they think it means for something to change. Brainstorm many different examples of change. Prepare them to listen as you read *An Egg is An Egg* by asking them to look and listen for changes they notice in the story. Read the story and discuss all the changes they observed.

Instructional Procedures

Materials
- ❑ Chest, bag, or box to be used as a time capsule
- ❑ *A lst Graders Profile* worksheet
- ❑ Writing paper/journal
- ❑ Drawing paper

1. Show the class a box that will act as a time capsule. Explain that, as a class, you are going to be using a time capsule to observe changes that take place during first grade. Changes may be individual or in the community.
2. Collect data on each student by having them complete *A 1st Grader's Profile*, which will then be placed in the time capsule.
3. Collect data from around the school by taking the class for a walk inside the school. Students look for characteristics of the school. Upon returning to the class, students draw pictures of what they observed and write a sentence describing the pictures. On this writing piece, there should be as little teacher instruction as possible. This particular piece will be used to compare how much students have developed as writers by the end of the year. Once completed, place the writing samples inside the time capsule.
4. Go on a walking fieldtrip around the outside of the school and community. Students write what they see, hear, smell, and feel.

   Sight—Students draw pictures of what they see, or take a camera to take pictures.

   Sound—Students write down what they hear, or take a small tape recorder and record the sounds.

   Smell—Make a list of things they smell.

   Touch—Have students feel several things in nature, such as leaves, trees bark, grass, etc., and record what they touched and how it felt.

   Place all of the data from your walking fieldtrip in the time capsule.
5. In the spring, repeat steps 2, 3, and 4. Explain to the class that they will be doing some of the same activities they did at the beginning of the year. Remind them to look for how things have changed.

6. Open the time capsule and compare and contrast the data collected. The following questions may help you in leading a discussion as to what was found. What changed? How did it change? What did not change? Why?

Curriculum Extensions/Adaptations/Integration

- In the fall, graph the class data compiled on *A 1st Grader's Profile*. Use different graphs for each question. Record the information from those graphs, or take pictures of what you found, and place them in the time capsule.
- In the spring place the students in small groups. After copying the student's *A 1st Grader's Profile*, cut up each profile and divide the strips of paper by question. Give each group a stack of common questions. Have each group graph their assigned question, using the graphing format assigned (e.g., bar graph, picture graph, tally mark, clothes pin, paper doll, etc.). Compare their graphs to the class graphs you did in the fall.
- As a class interactively write about the students' observation from the class walk. Encourage students to write independently about one other observation you did not write about as a class. Place both writing samples in the time capsule.
- During the walking field trip around the school or community, focus in on a tree that changes with the seasons. Have students draw a picture of that tree or take a picture of it to compare and contrast the seasons.
- When the time capsule is opened in the spring, students write about the changes observed using the five senses as a guide. This helps students write descriptively about changes that took place.
- Make the needed adaptations for special needs within your class. Small groups may be assigned to a sense to investigate changes.

Resources

Book

An Egg is An Egg, by Nicki Wiess; ISBN 0021811091

Articles

Social Studies and The Young Learner, Volume 15, Issue #4, "Eight Ways of Learning: Multiple Intelligence Strategies"

Educational Leadership, September 97, " Variations on a Theme: How Teachers Interpret MI Theory"

Web site

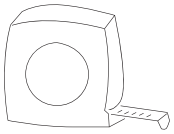
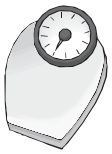
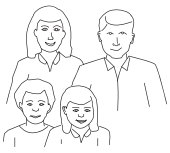
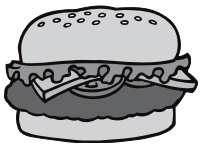
http://www.lessonplans.com

Family Connections

- Students collect data, put it in a family time capsule, and compare changes in the spring.
- Interview a parent or grandparent about their school experience. If the parent or grandparent grew up in the same community, they could share some long-term changes they have seen over the years. This would be great to do in the spring to show the students that even though there were not a lot of changes in the school in one year, changes can take place over a longer period of time.

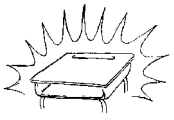
Name _____

A 1st Grader's Profile

Draw a picture of yourself.	
	**How tall are you?**
	**How much do you weigh?**
	How many teeth have you lost?
	**How many people are in your family?**
	What is your favorite color?
	**What is your favorite food?**
	How long is your foot?

Name_____

Self-Reflection Log

My Jobs	Monday	Tuesday	Wednesday	Thursday	Friday
I raised my hand.					
I worked quietly.					
I listened.					
I did my best.					
I put my things away. 					

Math Standard II-2 Activities

Add It Up

Standard II:
Students will identify and use patterns and relations to represent mathematical situations.

Objective 2:
Recognize and represent relations using mathematical symbols.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math: I-1 & 3; Language Arts VIII-6

Math Standard II

Objective 2

Connections

Background Information

This activity is designed to teach students to use manipulatives to solve addition problems while recognizing the symbols of addition and equal value (i.e., add, "and," plus, +, sum, equals, =, same as). Students will be able to recognize that the equal sign indicates a relationship in which the quantities on each side of an equation are equal. They will also be able to change the order of addends and still come up with the same sum. Identify students who need accommodations and extensions before beginning this lesson. This activity should be taught after many hands-on activities, but before you introduce the concept with paper and pencil.

Research Basis

National Research Council Mathematics Learning Study Committee. (2001). *Adding It Up: Helping Children Learn Mathematics*. Chapter 9, Teaching for Mathematical Proficiency, Instruction as Interaction. ISBN 0309069955

This text focuses not just on what teachers do, but also on the interactions among teachers and students around content. They view the teaching and learning of mathematics as the product of interactions among the teacher, the students, and the mathematics.

Assessment Suggestions

- Have each student demonstrate one addition problem using manipulatives and explain what the "=" sign and "+" sign mean.
- Use the *Bean Addition* worksheet as an informal assessment.
- Let students use the 2-color bean counters, cubes, or other manipulatives to demonstrate an addition sentence.

Invitation to Learn

Materials

- ❑ *Mission Addition*

Draw an equal sign and an addition sign on the board and ask students to identify what each symbol represents and what they mean. Read *Mission Addition* to the class. As the book is read, discuss the math symbols (+ and =). While reading pages 6 and 7, discuss how the animals used objects placed above the numerals to add. Continue reading the book.

Instructional Procedures

Materials

For the class:

- ❑ *Mission Addition*
- ❑ Overhead projector and overhead markers
- ❑ Overhead manipulatives—counting beans or clear overhead manipulatives
- ❑ A bag of small dried beans

For each student:

- ❑ *Add It Up* worksheet
- ❑ *Bean Addition* worksheet
- ❑ 2-color bean counters
- ❑ Pencils
- ❑ White school glue
- ❑ Small cup filled with 44 beans
- ❑ *Numeral Cards*

1. Refer back to pages 6 and 7 of *Mission Addition*. Remind the children of how the animals used actual objects to solve the addition problems. Write an addition problem on the overhead. Use overhead manipulatives to solve the problem and write the answer. Write a different addition problem on the overhead and ask for a volunteer to demonstrate how to solve the problem with manipulatives. Explain that on each side of the equal sign there is the exact same amount of manipulatives. Make sure the students are aware that the equal sign means we have the same amount of objects on each side.
2. Tell students that they will solve addition problems using 2-colored counting beans.
3. Give each student a cup with a specific number of 2-colored counting beans inside, for example, 4, 5, or 6. The number of beans in the cup depends on the desired sum. Have students shake their cup, covering it with their hand, and empty the counting beans onto their desks. Have students reveal how many "red" and "white" beans they have. Do a "museum" walk around the classroom to see all of the different combinations of that sum on each person's desk. (A "museum" walk is where every student walks around the classroom to see what their peers have done with the items on their desks.)
4. The next day, pass out *Numeral Cards* for students to use in creating the number sentences that were made using the 2-color bean counters.
5. Demonstrate writing a number sentence with a student's sample on the *Add It Up* worksheet. You may want to make an overhead copy of the worksheet to complete with the students. This activity demonstrates that changing the order of addends does not change the sum.

6. Give each student the *Bean Addition* worksheet and a small cup containing 44 beans. Instruct students to glue the correct amount of beans above each numeral and write the answer after the equal symbol.
7. After the students have completed their sheets, have volunteers go up to the board and demonstrate how they solved one of the problems. Students write the addition problem and draw the amount of beans that they have represented on their paper. Then explain how they arrived at their answer and record the sum after the equation. After beans dry, allow several students to share. End the lesson by collecting the papers and using them as a means of informal assessment.

Curriculum Extensions/Adaptations/Integration

- This lesson may be integrated with any of the seed lessons from the 2003 Elementary CORE Academy, which includes Standard I (11-15 and 11-2: Seed Exploration tubs) and Standard III (13-1, 13-3, and 13-15).
- Students who are struggling with this lesson may need additional practice with matching number to set. If necessary, allow these students to write the numbers one through ten on a sheet of paper and glue that amount of beans on their sheets in order to link the actual amounts with the numerals.
- The activity with the 2-colored counting beans may be put into a math center. Students pick the number of beans they want to use for their sum and then come up with all of the different combinations of math facts for that sum.
- Place a deck of cards in a center for students to choose one card and make all the combinations of that number.
- Read the book *Quack and Count* and make a "Ways to make Number Facts" book.
- Using dominoes, students record facts showing that the order of addends does not change the sum in a math journal. Copy the domino and then turn it around to copy the related fact.

Resources

Books

Mission Addition, by Loreen Leedy; ISBN 0823414124

Quack and Count, by Keith Baker; ISBN 0152050256

M&M's Counting Book, by Barbara Barbieri McGrath; ISBN 0-88106-853-5

Hershey's Kisses Addition Book, by Jerry Pallotta; ISBN 0-439-24179-1

Spunky Monkey on Parade, by Stuart J. Murphy; ISBN 0064467279

Web sites

www.lessonplanet.com

www.aaamath.com/B/gwpg.htm

www.janbrett.com/

www.joshgott.com/gottliebmath/equal_sign.html

http://members.aol.com/jeff570/operation.html

http://www.edhelper.com

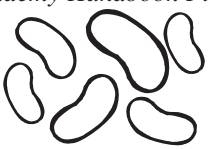
Family Connections

- Have students find objects such as noodles, cereal, or other objects around the house and teach family members the addend rule. Have each student share an example using objects from home with the class the next day.

Name _____

Add It Up

Red Beans on top	White Beans on top	Red Beans on top	White Beans on top
Red Beans on top	White Beans on top	Red Beans on top	White Beans on top
Red Beans on top	White Beans on top	Red Beans on top	White Beans on top



Name _____

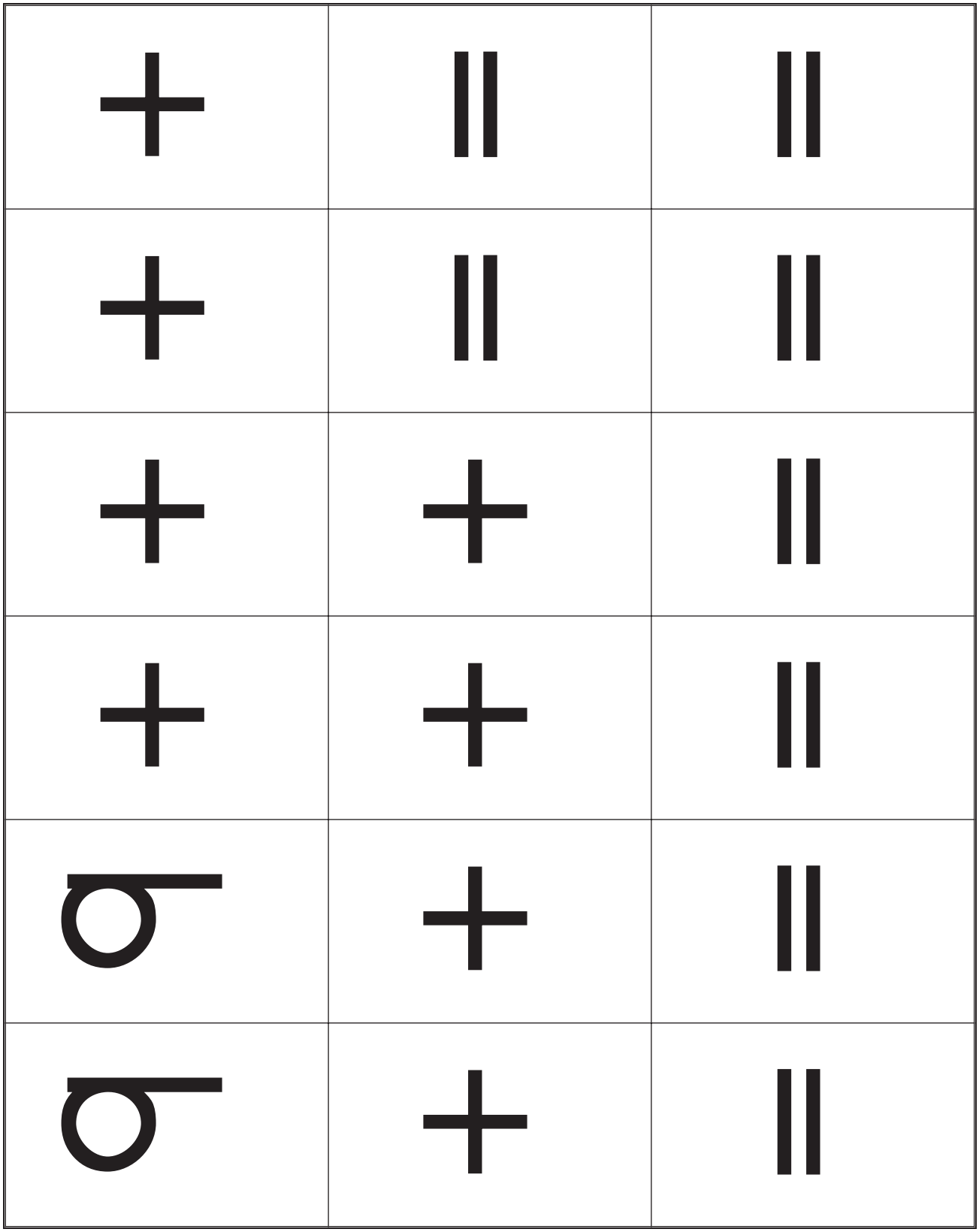
Bean Addition

Glue the correct number of beans inside each box to solve the addition number sentence.

2+1 = _____		4+3 = _____	
2+0 = _____		4+5 = _____	
4+4 = _____		1+3 = _____	
1+4 = _____		1+5 = _____	

Numeral Cards

2	5	8
2	5	8
1	4	7
1	4	7
0	3	6
0	3	6



Out of Sight Missing Addends

Standard II:
Students will identify and use patterns and relations to represent mathematical situations.

Objective 2:
Recognize and represent relations using mathematical symbols.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math: I-1 & 3; Language Arts VIII-6

Math Standard II

Objective 2

Connections

Background Information

These activities are designed to teach students to use manipulatives to solve addition problems while recognizing that symbols such as a square, triangle, or circle in an addition or subtraction equation represents a missing value that will make the statement true.

Research Basis

Marzano, R.J., Pickering, D.J., & Pollock, J.E. (2001). *Classroom Instruction that Works*. Research and Theory Related to Practice, pg 66-71.

This section of the book states the importance of practice and how it is necessary for learning knowledge of any type. The two generalizations from the research on practice are that mastering a skill requires a fair amount of focused practice and while practicing, students should adapt and shape what they have learned using manipulatives and hands on activities.

Assessment Suggestions

- Observe how students count the manipulatives being used.
- Does one partner seem to dominate the activity?
- Do they count on?
- Use student work pages.

Invitation to Learn

How many of you like to play games? Everyone take off your shoes. Close your eyes and imagine you are walking through warm sand at the beach and the ocean waves are crashing along the shore. You suddenly walk too close to the shoreline and a wave hits you. Open your eyes and see if the wave swept away any of your possessions. (Teacher walks around while their eyes are shut and take one shoe from several students. You can have the students in a circle or sitting at their desks.) Today we will be talking about missing addends in math problems and how to use manipulatives to solve the math problems.

Instructional Procedures

Materials

For each pair:

- ❑ Paper cup
- ❑ 20 dried beans

For each student:

- ❑ Sheet of paper/journal

Out of Sight

1. Give each student a sheet of paper.
2. Pair students and provide each pair with a paper cup and a bag of 12 dried beans.
3. Teacher chooses the sum. Students place that number of beans on their desk.
4. The first student closes his/her eyes. The second student places a random number of beans under the cup. The student announces the total number of beans not covered underneath the cup, signaling his/her partner to open her eyes.
5. The partner writes a corresponding addition sentence, using a box for the missing addend (the number of covered beans). The student then completes the addition sentence and lifts the cup to check the answer.
6. Both students record their problem in their math journals.
7. The partners switch roles and repeat the activity as time allows.

What's Inside?

1. Prepare a laminated picnic-themed poster with a space for a math problem.
2. Have each student make a picnic basket-shaped math journal. To do this, staple several 5 1/2" x 8 1/2" sheets of paper between two 6" x 9" pieces of brown construction paper. Cut through the thicknesses to round the bottom corners. Draw desired details to make it look like a picnic basket.
3. Have each student sign the inside front cover of his/her book.

4. Use a third piece of brown paper to cut out a handle for the top of the basket.
5. Open the journal and glue the handle to the top of the back cover.
6. On each of several days, place a missing addend problem on the poster related to foods that could be inside a picnic basket.
7. Provide time during the day for each student to write and solve the problem in his/her math journal. Announce the correct answer at the end of the day.

   Example: (written on the picnic-themed poster and in each student's journal)

   What's in the Picnic Basket?

   6 ham sandwiches

   + ___ tuna sandwiches

   9 sandwiches

Materials

- ❏ Picnic-themed poster laminated
- ❏ Several sheets of paper (number depends on how many pages you want in the journal)
- ❏ 3 6" x 9" pieces of brown construction paper
- ❏ Markers

What's Missing?

1. Write an addition or subtraction sentence on the board, substituting a box for one of the first two numbers in the sentence.

   Example: 4 + ☐ = 10
2. Have each student write the number sentence in his/her math journal exactly the way you wrote it on the board.
3. Encourage students to study the equation silently and guess what is missing.
4. Have each student write his/her guess below the box in his/her math journal.
5. Have each student use a calculator to test his/her guess. If their guess is correct, they give a thumbs-up sign. If it is not correct, they try another guess. Have students put an "x" through the incorrect answer and make another guess.
6. After an appropriate amount of time, ask a volunteer to complete the number sentence on the board. Have each student write the correct number sentence below the first one in his/her math journal.
7. Present a desired number of additional problems for students to solve in a similar manner.
8. For an easier activity, display complete number sentences on the board, some with correct answers and some with incorrect answers. Guide students in using their calculators to check them.

Materials

- ❏ Calculator

Materials

For each pair:

- ❑ 8” yellow construction paper circle
- ❑ Unifix® cubes or links

For each student:

- ❑ Writing paper/journal

Sunny Solutions

1. Prepare several 8” yellow construction paper circles to represent the sun.
2. Along the edge of each circle, write six basic facts, each with a missing addend.
3. Have each pair of students select a prepared circle.
4. One student reads a problem, the other student writes it on his/her paper.
5. Students use the manipulatives to determine the solution, arranging the final quantity of manipulatives beside the problem to resemble a ray of sunshine.
6. After each student writes the answer on his/her paper, the pair solves the remaining problems in a similar manner.

Curriculum Extensions/Adaptations/Integration

- Any of these activities can be completed as whole group or adapted to a math center for additional practice after the activity has been completed all together.

Resources

Books

Counting Crocodiles, by Jody Sierra and Will Hillenbrand; ISBN 0-15-200192-1

My Little Sister Ate One Hare, by Bill Grossman; ISBN 051788576X

Ten Flashing Fireflies, by Philemon Sturges; ISBN 1558586741

Seven Blind Mice, by Ed Young; ISBN 0698118952

Web sites

www.lessonplanspage.com

www.americanteachers.com

www.atozteacherstuff.com

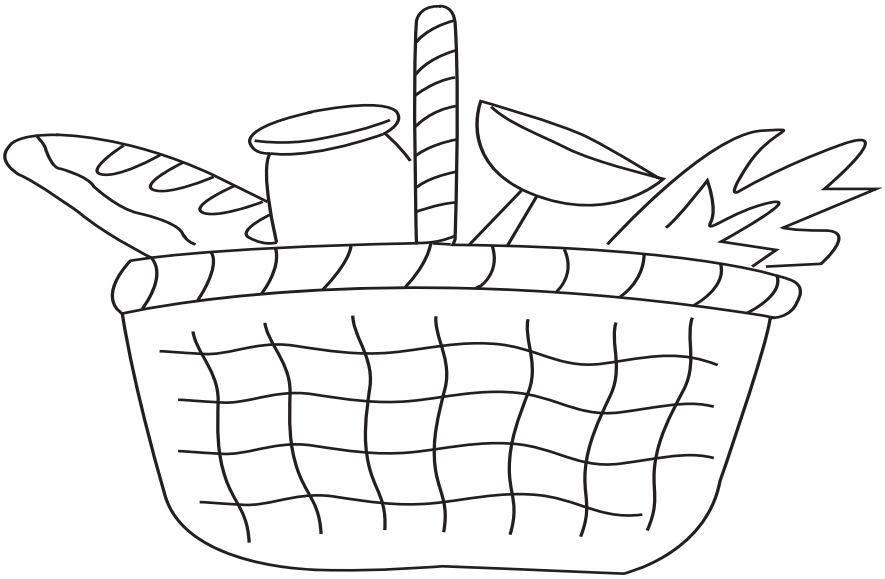
www.abcteach.com

www.sitesforteachers.com

Family Connections

- Have students teach their families the different activities used in class to reinforce each lesson.
- Students find items around the house they can count and use to practice missing addends.

What's in the Picnic Basket?



Content Standard I-3 Activities

Rhythm and Rhyming

Standard I:
Students will develop a sense of self.

Objective 3:
Develop and use skills to communicate ideas, information, and feelings.

Intended Learning Outcomes:
1. Demonstrate a positive learning attitude.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Language Arts III-4; Content II-3

Content Standard I

Objective 3

Connections

Background Information

Be familiar with the musical definition of "rhythm" as defined on the UEN *The Music Factory* video segment on rhythm. Definition: Rhythm is the oldest form of music. It encompasses the elements of beat or pulse, accent, pattern and tempo.

Option: Teach this lesson as a follow up to a previous lesson on rhythm in which you show the UEN video segment on rhythm.

Note: Use the syllables to create different rhythms of a name, e.g., Q=quick; S=slow

```
 QQ   S   S S   S Q  Q   S S
/ /   /   / /   / /   /   / /
Riley Mercado Riley Mercado
```

Research Basis

Rogers, N. (2003). *Improving Students' Literacy through the Use of Rhythm and Rhyme*. Illinois. (ERIC Document Reproduction Service No. ED 479865)

This research study focuses on first grade students who read below grade level. It focuses on rhythm and rhyme to increase reading skills. The students' knowledge of letters and sounds improved, which increased confidence in their reading ability.

Assessment Suggestions

- An informal observation assessment can be done during the lesson as the students practice the rhythm of the poem and read the notations.

- Students notate the rhythm of their own name and perform the rhythm using body percussion and/or instruments.

Invitation to Learn

Write the teacher's name (Mrs./Ms./Mr. _____) on the board. Clap a rhythm for the name. Model various ways to hear the rhythm using body percussion (snapping, clapping, or stomping).

Instructional Procedures

Materials

- ❑ Name cards
- ❑ Monthly poem written on chart paper and laminated
- ❑ Rhythm sticks
- ❑ Dry erase marker
- ❑ *The Music Factory* video segment on rhythm

1. Teach your choice of a monthly poem to the students by having them read and clap with you the natural rhythm of the words.

Hall-o-ween, Hall-o-ween
HALL-O-WEEN!
Witch-es, pump-kins,
Scary things are seen.
Soon it will be
HALL-O-WEEN!

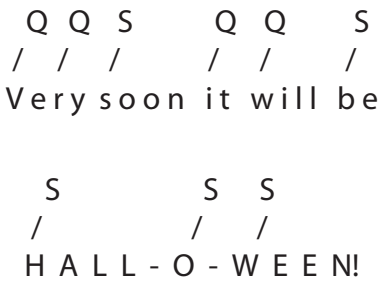
2. Teach students how rhythm is notated using 'sticks' rather than notes (see example). Using the dry erase marker, draw the notation for each word on the laminated poem by clapping the rhythm one line at a time, then notating using 'S=slow' and 'Q=quick' notations.

```
 Q    Q S       Q    Q S
 /    / /       /    / /
Hall-o-ween, Hall-o-ween

 S         S   S
 /         /   /
HALL-O-WEEN!

 S   S     S     S
 /   /     /     /
Witches, pumpkins,

 Q   Q  Q       Q    S
 /   /  /       /    /
Scary things are seen.
```



3. Demonstrate how to read and perform by clapping the rhythm of the 'sticks' notation. Teach the students the rhythm one line at a time by clapping the rhythm, then have students repeat it.
4. After you have informally assessed the students' ability and understanding based on their clapping performance, provide them with rhythm sticks.
5. Demonstrate the correct way to use the sticks, then ask for a student volunteer to demonstrate to the whole class. Pass out the sticks to a small group of students who will demonstrate as well. While the students with the rhythm sticks are demonstrating, allow the rest of the class to clap the rhythm to ensure participation from all students.
6. Continue with a series of demonstrations using small groups of students until all students have experienced the rhythm sticks.
7. Pass out rhythm sticks to all students. Under your direction, have them practice the poem. Monitor each student's performance. You may want to have students perform for the class in small groups, or have a performance contest between the groups.
8. Refer again to the teacher's name. Model the rhythmic notation of the name by clapping the rhythm. Choose some random names (not names of your students). Model how to notate and perform the various rhythms several more times.
9. Instruct students to write their own name, notate the rhythm, then practice a way to perform it using snapping, clapping, or stomping.
10. Pass out paper. Monitor the students as they write, notate, and practice.

Curriculum Extensions/Adaptations/Integration

Language Arts

- Introduce a shared writing activity using the poem to replace certain words with other words that rhyme. Let the students come up with the words, even if they are nonsense words.

Content Core

- Teach the same lesson using a different poem and a new rhythm instrument.

  Hint: Only introduce one new instrument at a time, modeling specific rules and procedures for using that instrument.

- Students draw pictures of items in the poem. Glue illustrations on popsicle sticks or paint sticks to use in a performance.
- Students act out the parts/characters in the poem as a whole class or in small groups. They could also create an action or rhythmic pattern for each word or phrase.
- Teach a nursery rhyme song and perform using instruments.

Resources

Books

Month-by-Month Poetry: September, October & November, Grades PreK-2, by Marian Reiner; ISBN 0-590-37898-8

Month-by-Month Poetry: December, January & February, Grades PreK-2, by Marian Reiner; ISBN 0-590-37900-3

Month-by-Month Poetry: March, April, May & June, Grades PreK-2, by Marian Reiner; ISBN 0-590-37903-8

Mother Goose Phonics, Grades K-2, by Deborah Schecter; ISBN 0-439-12927-3

Article

Learning From Poems & Rhymes. *Parent & Child, Vol. 12 No. 3,* 32. Neuman, S. B. (2004, November/December).

Additional Media

Play Music, by Notation Technologies (1-215-794-5886, www.notationtechnologies.com) This is a computer program for notating music.

Family Connections

- Have students teach family members about rhythm using pots, pans, and spoons as instruments.
- As students are listening to music at home or in a car, encourage them to use their hands as rhythm instruments. Listen for and find the beat in the music and/or the rhythm for the syllables in the words.

Monthly Poems

September

1st Grade Rap

We're 1st graders and we're here to say…
Reading is fun and we do it everyday.
We learn how to add and subtract it's true…
'Cause we've got brains and we're extra smart, too.

We've grown a lot in many a way.
Telling time and jumping rope—we work and play.
We're taller and smarter and we'll tell you how…
We're in 1st grade and WE'RE BIG KIDS NOW!!!

(At the end of the school year, change the last line to…
We've finished 1st grade and WE'RE BIG KIDS NOW!!!)

Back To School

Here we are
Back at School
Happy children go.

Read a book
Sing a song
We learn and we grow.

Watch us play
Teach us things
See what we know.

October

Halloween

Halloween, Halloween
HALL-O-WEEN!
Witches, pumpkins,
Scary things are seen.
Very soon it will be
HALL-O-WEEN!

November

Thanksgiving Turkey

Turkey, turkey,
Gobble, Gobble goo
Strutting around the barn
Away from you.
Turkey, turkey,
See the farmer sing…
'I'll eat you for
Thanks-giv-ing'

December

Christmas Bells

Ding, Dong, Ding, Ding, Ding
Christmas bells are ringing.
Ding, Dong, Ding, Ding, Ding
Happy children singing.

(Variation: Change the beginning consonant of the –ing and –ong words.
Example: Bing and bong, ging and gong, fing and fong, etc.)

January

Snowman

1, 2 Stack the balls
3, 4 Make it tall
5, 6 Create a face
7, 8 All in place
9, 10 The snowman's done
Uh Oh, Here comes the sun!

February

U-R-A-Q-T

'U R A Q T'
Valentines say.
'Please be my valentine'
And some say 'Okay!'
'Will you be my friend
On Valentine's Day…
So we can share a treat
And then we can play?'

March

Green

GREEN, GREEN shamrocks
Leprechauns wear.
ORANGE, ORANGE
Beard and hair.
GOLD, GOLD money
In a black dish.
If I catch a leprechaun,
I get my wish!

April

Rain

Pitter, patter, pitter, patter
Hear the raindrops fall.

Pitter, patter, pitter, patter
'Here we are,' they call.

Splish, splash, splish, splash
Little feet stomp!

Splish, splash, splish, splash
All the children romp!

Music Magic

Standard I:
Students will develop a sense of self.

Objective 3:
Develop and use skills to communicate ideas, information, and feelings.

Intended Learning Outcomes:
3. Demonstrate responsible emotional and cognitive behaviors.
4. Develop physical skills and personal hygiene.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math II-1; Content I-2, II-3

Content Standard I

Objective 3

Connections

Background Information

Teach the comprehension strategy of retelling. Use storyboarding frequently during writing time so students become familiar with the format and understand the process of sequencing in storytelling (Benson and Cummins). It will be helpful to understand the research on how using music and drama increases comprehension and enhances learning.

Research Basis

Biegler, L. (1998). *Implementing Dramatization as an Effective Storytelling Method to Increase Comprehension*. (ERIC Document Reproduction Service No. ED 417377)

This research study shows that students who used dramatization had greater comprehension. The findings suggest that children who reenact a story become more emotionally involved, and therefore more motivated and interested.

Campabello, N, DeCarlo, M.J., O'Nell, J., Vacek, M.J. (2002). *Music Enhances Learning*. (ERIC Document Reproduction Service No. ED 471580)

This research study uses musical techniques for increasing student recall in phonemic training, mnemonics, setting skills to familiar tunes, and linking connection to cultural themes. Students' memory recall, emotional involvement, and motivation increased.

Assessment Suggestions

- Assess students as they participate in their group performance. (Make anecdotal notes on individual students, noting those who may need more practice working in small groups.)
- *My Music Magic Performance* self assessment.

Invitation to Learn

"We're going to play a listening game to help your ears be ready for our lesson today. I will hum (or play) a part of a song and you will raise your hand if you know what song it is."

Hum (or play) the melody of *This Old Man*. Call on a student to give a response. If it is not correct, hum it again and see if another student can guess correctly. Write the title of *This Old Man* on the board when someone has guessed correctly. Play the listening game again with a new song, e.g., *Wheels on the Bus* or a nursery rhyme song. Continue playing several more times.

Instructional Procedures

Materials

- ❑ Several familiar songs that can be hummed without music, e.g., *Wheels on the Bus*, *This Old Man*, etc.
- ❑ *Let's Make Music! An Interactive Musical Trip Around The World* CD
- ❑ *My Music Magic Performance* self assessment
- ❑ *Musical Storyboard*
- ❑ *Boomerang Clapper*
- ❑ *Animal Props*

1. "Now that your listening ears are ready, you will get to *hear* the words of a song. When the song is over, raise your hand if you can tell me the story you heard in the music." Have students listen to the recording *We'll Go A-Walking About In The Bush*. Call on students to respond to what they heard. List the students' responses. They might include things about the animals, walking in the bush, parts that repeat, etc. They may or may not be in sequence, but list them anyway.
2. "We're going to listen again, but this time we will be mapping the sequence of the story using a storyboard." Put up the blank storyboard.
3. "I will point to each box as the song is playing, pointing to a new box when we hear a different part of the song. You will show me when you hear the *"we'll go a-walking"* part by patting your knees. I will write the words "walking" and "hush" in those boxes." Demonstrate the desired behavior.
4. Turn on the music. When the students pat their knees, write the words (walking, hush) in the corresponding boxes (1, 3, 5, and 7).

1 Walking Hush	2
3 Walking Hush	4
5 Walking Hush	6
7 Walking Hush	8

5. Listen to the music again. Map boxes 2, 4, and 6, writing the words "where's koala," "where's kanga," and "where's kookaburra." Check the map to make sure it is accurate (see diagram that follows). Put an "X" in box 8 since it is not being used.

1 Walking Hush	2 Where's Koala
3 Walking Hush	4 Where's Kanga
5 Walking Hush	6 Where's Kokaburra
7 Walking Hush	8 X

6. Tell students that they will be acting out a section of the story. List the characters in each part of the storyboard and give students some suggestions of what they can do to act out the parts.
7. Divide the class into four groups according to your map and assign each group a part.

   Group one—"walking/hush" parts

   Group two—"where's koala" part

   Group three—"where's kanga" part

   Group four—"where's kookaburra" part
8. Give each group a bag of props and instruments (appropriate for that group and predetermined by the teacher) to use in the performance. Make sure there are enough props for each person in the group.
9. Allow students time to decide and practice what their group will do. Turn on the music and let each group do a practice performance.
10. After they feel confident, do a class performance.

Options:

- You may want to perform the story everyday for several days then perform it for another class or parents.
- Record the students on video. As they watch their performance, have them self assess using the *My Music Magic Performance* self assessment.

Curriculum Extensions/Adaptations/Integration

Language Arts

- Use a nursery rhyme chart to find and highlight rhyming words.
- Change the words by replacing traditional characters with silly characters.
- Have students complete a reflective writing activity after watching the performance video.

Technology

- Students create their own musical story and act it out using the interactive Web site www.philtulga.com.

Content Core

- Adapt this lesson using any musical recording that tells a story in the lyrics, e.g., *Lion Sleeps Tonight, Teddy Bear's Picnic, Three Little Fishies, The Little Blue Man*, etc..
- Students make their own *Boomerang Clappers* (see instructions in *Let's Make Music!*).

Resources

Books

The Power of Retelling – Developmental Steps for Building Comprehension, by Vicki Benson and Carrice Cummins; ISBN 0-322-01541-3

Piggyback Songs for School, by Jean Warren; ISBN 0-911019-44-8

Web sites

www.stinalisa.com (great musical stories to use from your PC)

www.philtulga.com (interactive Web site to use as a teacher resource or learning center for students)

Additional Media

Let's Make Music! An Interactive Musical Trip Around The World, by Jessica Baron Turner (available from KIDiddles, http://www.kididdles.com/); Item HL00815057-CD.

Family Connections

- Invite parents to watch the performance.
- Encourage students to listen for stories in music and act them out at home.
- Give the students a blank storyboard. With family members, listen to a music selection, storyboard it, then act it out. Bring the completed storyboard to school to share with the class.

Name _____

My Music Magic Performance

I helped my group decide what to do:

I helped by:

_____

_____

_____

I did my performance part:

My part was:

_____

_____

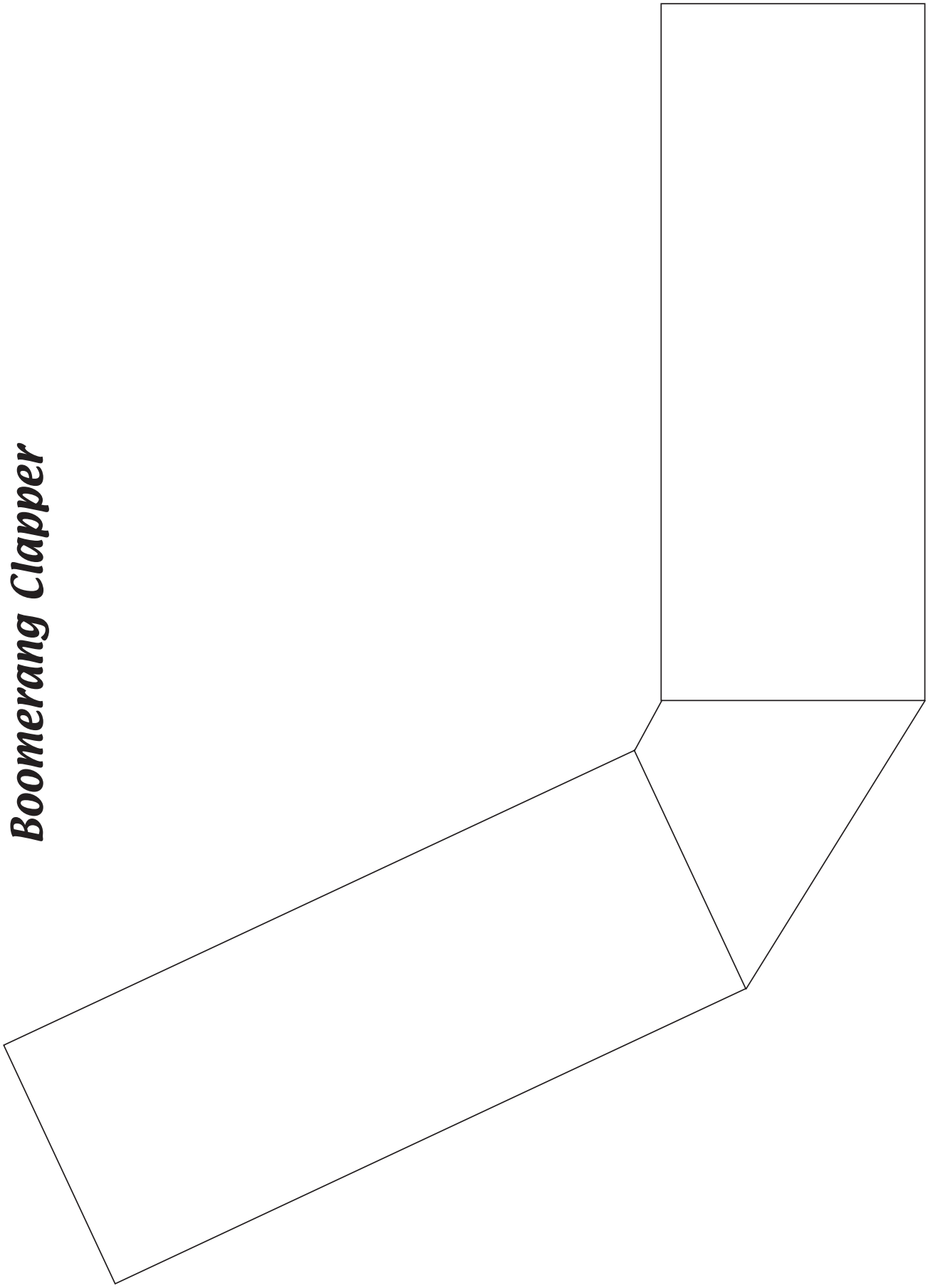
_____

Name _____

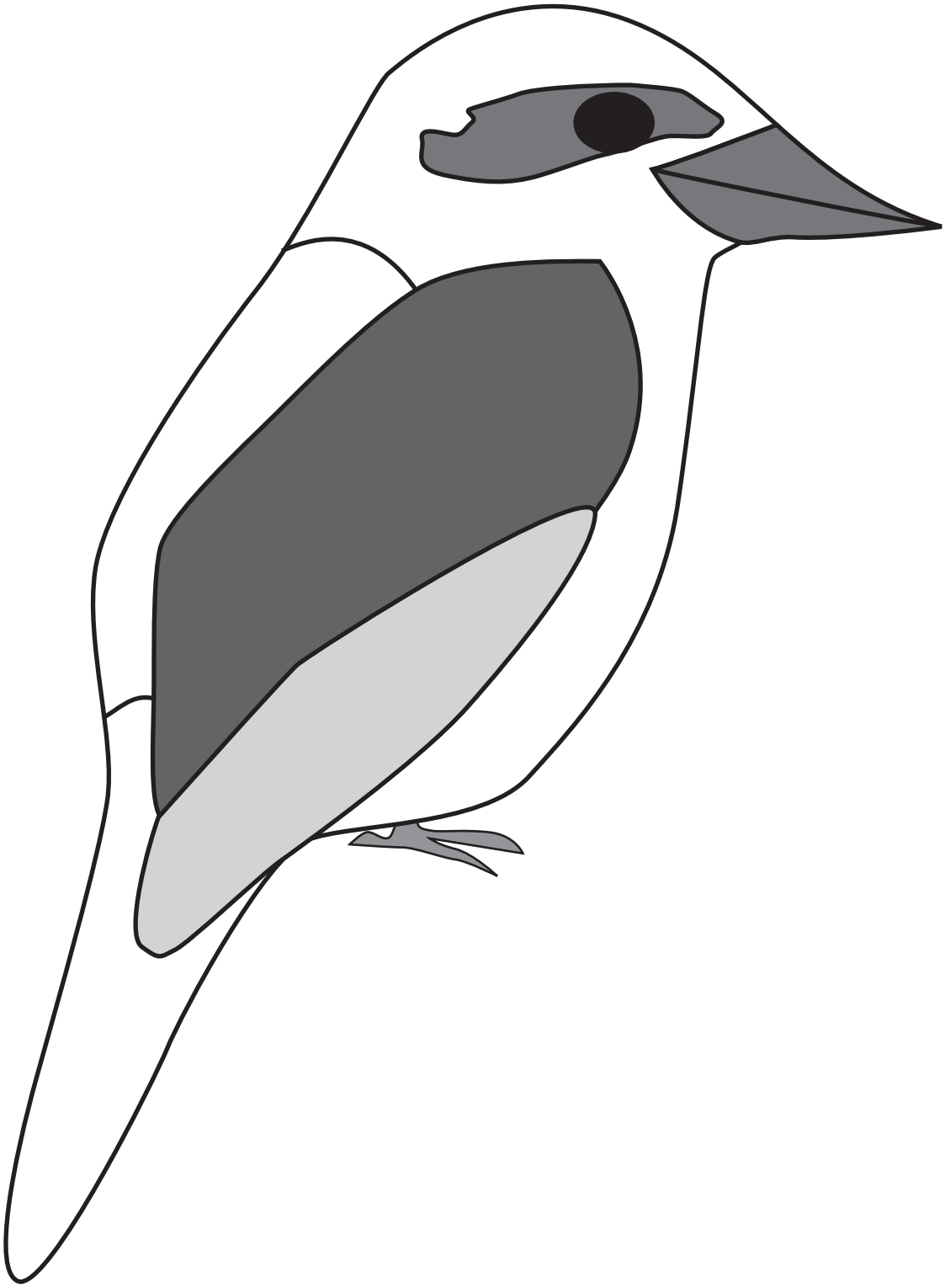
Musical Storyboard

1	2
3	4
5	6
7	8

Boomerang Clapper



Animal Props



Art Smart

Content Standard I

Objective 3

Connections

Standard I:
Students will develop a sense of self.

Objective 3:
Develop and use skills to communicate ideas, information, and feelings.

Intended Learning Outcomes:
3. Demonstrate responsible emotional and cognitive behaviors.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Language Arts I-2; Content II-3

Background Information

Eric Carle is a famous children's author/illustrator. He was born in Syracuse, New York, in 1929. When he was six years old, he moved to Germany, attended and graduated from art school there. In 1952, he moved back to New York and worked as a graphic designer for *The New York Times*. He also worked as the art director of an advertising agency for many years. One day, author Bill Martin Jr., asked Eric Carle to illustrate a story he had written. The story was *Brown Bear, Brown Bear, What Do You See?* This was the beginning of Eric Carle's new career. He has written and illustrated many books, including *1, 2, 3 to the Zoo*, *The Very Hungry Caterpillar, The Very Lonely Firefly,* and *The Very Quiet Cricket*. He uses collage illustrations that are a unique form of paper art. The *Eric Carle: Picture Writer* video demonstrates this technique. He writes his books for children with a theme in mind. On the video, Carle said,

> "With many of my books I attempt to bridge the gap between the home and school. To me home represents, or should represent; warmth, security, toys, holding hands, being held. School is a strange and new place for a child. Will it be a happy place? There are new people, a teacher, classmates—will they be friendly? I believe the passage from home to school is the second biggest trauma of childhood; the first is, of course, being born. Indeed, in both cases we leave a place of warmth and protection for one that is unknown. The unknown often brings fear with it. In my books I try to counteract this fear, to replace it with a positive message. I believe that children are naturally creative and eager to learn. I want to show them that learning is really both fascinating and fun."

In order for students to understand the idea that colors show emotion, compare and contrast colors with mood and emotion (e.g., red-anger, yellow-glad, blue-sad, pink-loving, orange-worry, purple-silly, green-scared, brown-somber, black-mad, etc.).

Research Basis

Schiller, M. (1995). The Importance of Conversations about Art with Young Children. *Visual Arts Research, 21*, 31-40. (ERIC Document Reproduction Service No. 413252)

This research study uses the five developmental stages of Parson's Theory in understanding art to help children look at, discuss, and create artwork. The five stages are: 1-favoritism, 2-beauty and realism, 3-expressiveness, 4-style and form, 5-automony. The study shows evidence that young children can enjoy and engage in meaningful discussions about artwork.

Assessment Suggestions

- Tape record the student's responses to a piece of artwork before and/or after the lesson. Have students listen to their own recordings, comparing the similarities and contrasting the differences of their ability to interpret a piece of artwork.
- Ask students to self assess their artwork by sharing the colors they chose to depict the mood or emotion.

Invitation to Learn

Show and discuss the art print *Starry Night* by Vincent Van Gogh or other print you may have available. Ask students to think about the colors in the picture and tell how the picture makes them feel. Tape record the responses. The purpose is to assess student knowledge and ability to see an art print and interpret it in terms of their feelings.

Note: If you have questions about the legality of tape recording your students, consult your principal about FERPA guidelines.

Instructional Procedures

1. Read *Glad Monster Sad Monster—A Book About Feelings*. Discuss the colors and emotions in the book. Introduce the idea of using color to depict emotion.
2. Show and post several examples of Eric Carle's art using several of his books (see Background Information). Discuss Eric Carle's use of color to depict mood or emotion.
3. Have students think of an animal, object, or scene they would like to draw. Demonstrate how to draw a simple animal, object, or scene using most of the space on the paper (see *Drawing Instructions: Ladybug*).

Materials

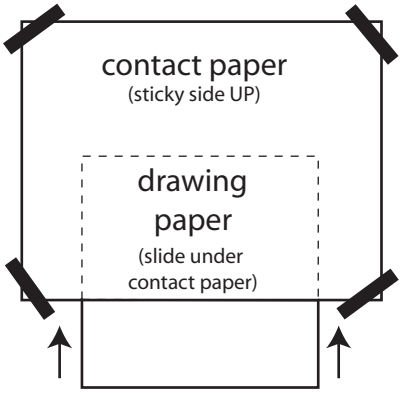
- ❑ Art print(s), e.g., *Starry Night* by Vincent Van Gogh or *Sunflowers* by Claude Monet, etc.
- ❑ Information about the artist(s) and/or artwork
- ❑ *Drawing Instructions: Ladybug*
- ❑ *Tissue Art Instruction Sheet*

For each student:

- ❑ 8 1/2" x 11" white copy paper
- ❑ 9" x 12" colored construction paper
- ❑ Clear contact paper cut to 9" x 12" size
- ❑ Colored tissue paper (a variety of colors, including black)
- ❑ Black or colored permanent markers

4. Peel off the backing of the contact paper. Lay the contact paper, sticky side **up**, on top of a desk. Tape the corners to the top of the desk.
5. Slide the drawing **under** the contact paper. Use a permanent marker and model how to trace the outline of the drawing on the sticky side of the contact paper. Tear small pieces of tissue paper and place onto the sticky side of the contact paper, filling in the spaces of the drawing. Refer to the *Tissue Art Instruction Sheet* as you model and demonstrate.
6. After demonstrating the process, give each student a piece of 8 1/2" x 11" white paper to draw an animal, object, or scene on. They may choose to use one that Eric Carle used in his art. As they finish their drawings, position the contact paper as previously demonstrated.

   Hint: Depending on how many students you have, it is highly suggested that you prepare the contact paper during a recess or lunch break.
7. Have students tear pieces of colored tissue paper and place them on the contact paper.



8. When this is complete, students place a second piece of plain white or colored 9" x 12" paper on the sticky side of the contact paper, covering the tissue paper. Turn over the completed project and rub out any air bubbles. Display completed project!
9. Have students share their artwork, describing how colors show moods or emotions. Tape record their presentations.

Curriculum Extensions/Adaptations/Integration

Language Arts

- Students write in a journal about their artwork.
- Show a different piece of artwork. Tape record the students discussing what they have learned about color, mood, and emotion in art. Allow them to compare and contrast the recordings.

Content Core

- Take a field trip to an art museum to find examples of how color affects the mood in artwork.
- Invite a guest artist to show and tell about their artwork. Have them discuss how they use color to depict mood or emotion.
- Adapt this lesson using different artists. Be sure to research the artists and their artwork, include interesting information about the artists and what mediums they used.

Resources

Books

Glad Monster Sad Monster—A Book About Feelings, by Ed Emberley & Anne Miranda; ISBN 0-316-57395-7

Go Away, Big Green Monster!, by Ed Emberley; ISBN 0-590-34118-9

My Many Colored Days, by Dr. Seuss; ISBN 0-679-87597-2

The Art of Eric Carle, by Eric Carle; ISBN 0-399-24002-0

The Very Hungry Caterpillar, by Eric Carle; ISBN 0-590-03029-9

The Tiny Seed, by Eric Carle; ISBN 0-590-42566-8

Brown Bear, Brown Bear, What Do You See?, by Eric Carle; ISBN 0805047905

1, 2, 3 to the Zoo, by Eric Carle; ISBN 0399230130

The Very Lonely Firefly, by Eric Carle; ISBN 0399234276

The Very Quiet Cricket, by Eric Carle; ISBN 0399226842

The Grouchy Ladybug, by Eric Carle; ISBN 0-590-31227-8

I Can Draw People, by Ray Gibson; ISBN 0-439-31640-5

I Can Draw Animals, by Ray Gibson; ISBN 0-590-63173-X

Video

Eric Carle: Picture Writer (800-847-5515, www.eric-carle.com); ISBN 0-399-22624-9

Article

Church, E. B. (2004). Playing With Paper. *Parent & Child, 11*(4), 53-54.

Web site

http://www.eric-carle.com (Eric Carle's Web site)

Additional Media

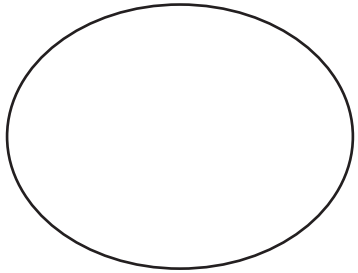
If you would like to have your students write to Eric Carle, his address is: P.O. Box 485, Northampton, MA 01060.

Family Connections

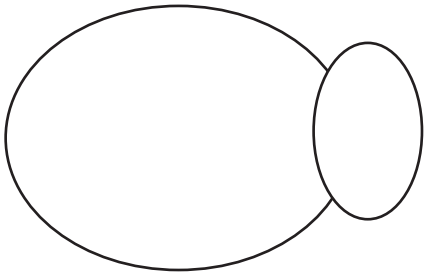
- Allow students to take their artwork home and explain to family members why certain colors were used and how mood plays a part in color choice.
- Encourage the students to visit an art museum with their family.
- Ask students to report on a favorite piece of artwork they have at home.

Drawing Instructions: Ladybug

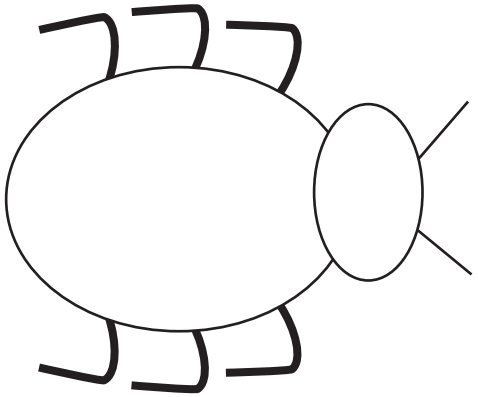
1. Draw a large oval for the body.



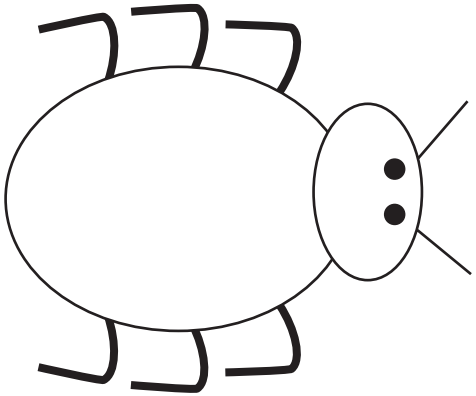
2. Add a small oval on the right side of the large oval for the head.



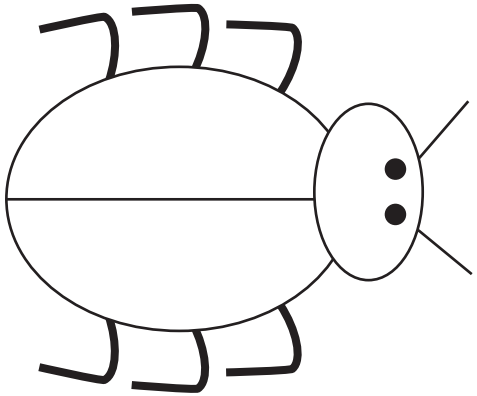
3. Draw six legs, three on each side (top and bottom) of the body. Draw two antennas on the head.



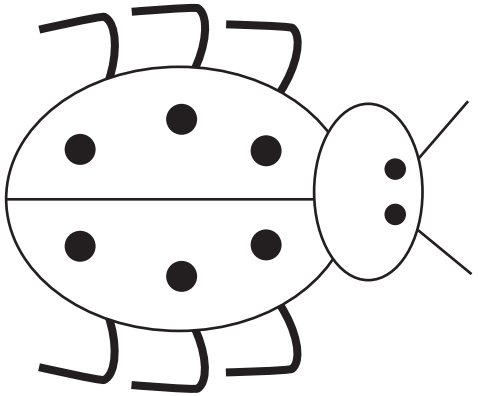
4. Draw two small circles on the head for eyes.



5. Draw a horizontal line through the middle of the body.



6. Draw three circles symmetrically on each side of the line on the body.



Tissue Art Instruction Sheet

1. Draw an animal, object, or scene on 8 1/2” x 11” white copy paper.

2. Tape the corners of a 9” x 12” sheet of clear contact paper, sticky side UP, to a desk.

3. Slide the drawing UNDER the contact paper.

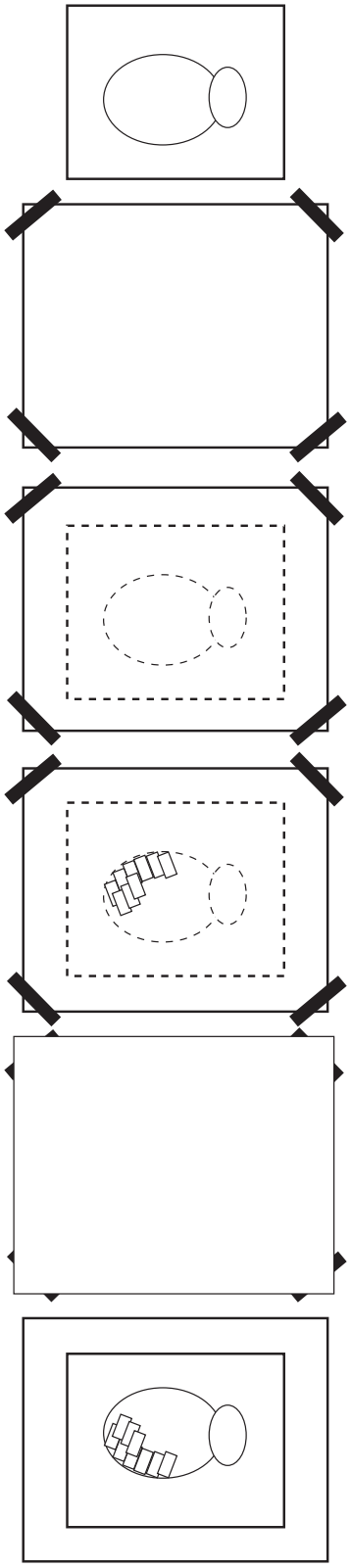
4. Trace the drawing onto the sticky side of the contact paper with colored permanent markers.

5. Tear small pieces of colored tissue paper. Place them on the contact paper, filling the spaces.

6. Place a 9” x 12” piece of colored construction paper on TOP of the contact paper, matching corners.

7. Turn the project over and remove the tape from the contact paper. Rub out any air bubbles.

8. Display art.



Math Standard V-1 & 2 Activities

Bodacious Buttons

Standard V:
Students will collect and draw conclusions from data and understand basic concepts of probability.

Objective 1:
Collect, organize, and display simple data.

Intended Learning Outcomes:
1. Demonstrate a positive learning attitude.
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math I-1 & 2, II-1; Language Arts VIII-6

Math Standard V

Objective 1

Connections

Background Information

Sorting objects by attributes and describing the similarities and differences are important first steps before a student can represent and make sense of the data. Before teaching this lesson, give students the opportunity to sort with a Venn Diagram. For this lesson, try to have most of the supplies ready before the students go to their desks. Take pictures of their discoveries and activities and mount them so they can be reviewed later. It is important to model how to complete the *Bull's Eye Graph*.

Research Basis

Fennell, F. (1990). Implementing the Standards—Probability. *Arithmetic Teacher*, 18-22.

Fennell emphasizes that classroom activities should involve physical materials and provide opportunities for questioning, problem solving, and discussion.

Chen, A. (1999). Schema Induction in Children's Analogical Problem Solving. *Journal of Educational Psychology, 91*(4), 703-715.

One of the more powerful findings of instructional strategies is that graphic and symbolic representations of similarities and differences enhance students' understanding of content.

Assessment Suggestions

- As the students make individual *Button Up Graph*s with the probability dice, ask each student to interpret his/her own graph. They should be able to verbally state relationships, such as one column is two more than another column, a certain button is the least or most, etc.
- During the button sorting with the Venn Diagram, check with each student to see if sorting is done correctly.
- Observe students as they form tens and ones with the Unifix® cubes to see if they understand the regrouping concept.

Invitation to Learn

Who has the Bodacious Button?

Materials
- ❑ A set of 48 attribute buttons with attribute cards

Pass out all 48 attribute buttons, some students may have 2 and some may have 1. (Tell the students that beforehand to avoid problems.) Ask students to tell about the attributes of the buttons (*2-holes, 4-holes, large, small, triangle, square, circle, red, yellow, blue, and green*). Have cards for each of the attributes and keep them upside down in groups of holes, size, shape, and color. The color cards should be last. Ask the class to stand up. Turn over an attribute card for each group. Students look at their button(s) to see if they are still in the running for Bodacious Button. If not, the student sits down. The last person standing has the bodacious button! (Clap) Check it and play again with different card combinations.

Instructional Procedures

Graph

It is important to get all of the 48 buttons back from the first game. Students can bring them up to a graph that has two columns: "I am wearing buttons today." "I am *not* wearing buttons today." Place the buttons on the graph to show the data. Talk about the data and compare the columns. (If some students had 2 or more buttons, they put the extra ones in a basket.)

Collect Data—Button Week

Materials
- ❑ Unifix® cubes & elastics to group into hundred flats
- ❑ Button Week Table

1. Each day, pass out Unifix® cubes to each table.
2. Students take a cube for each button they are wearing that day.

3. Call for one student at each table to collect all the cubes and put them into tens and ones.
4. As each table captain brings them up, guide the class to regroup when it is possible to make more tens.
5. Count them and stack the Unifix® cubes on the chalk tray each day. (Leave them there all week.) Record the data on a class table.
6. On Friday, combine all the Unifix® cubes into hundreds (by wrapping 10 tens with two rubber bands to make a flat), tens, and ones to see how many buttons the class wore for the whole week.

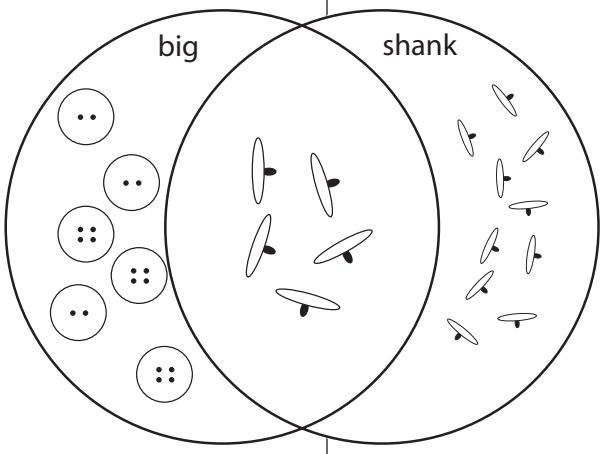
How Many Buttons Worn?	
Monday	55
Tuesday	86
Wednesday	116
Thursday	179
Friday	287

Venn Diagram

Materials

- ❑ *The Button Box*
- ❑ Venn Diagrams for each table
- ❑ Boxes of buttons with attribute cards/*Button Weekly Table*

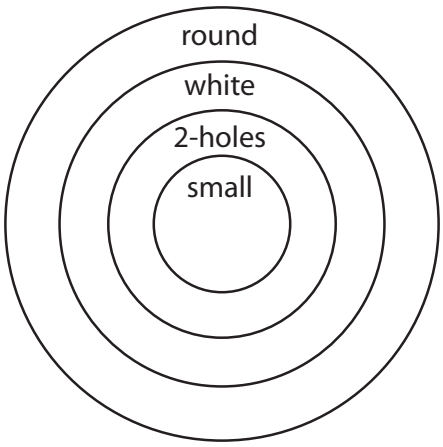
1. Read *The Button Box*.
2. Distribute a box of buttons to each table.
3. Have the students look at the buttons and describe their attributes. Write down the list of attributes.
4. Pass out two cards to each table with attributes like: little/gold, black/small, white/4-holes, 2-holes/plastic, shiny/textured, big/shank.
5. Pass out the 12" x 18" Venn Diagrams or sorting hoops to each table and put an attribute card in each of the two circles.
6. Students put the buttons in the correct spaces. (Some may go in the intersecting space.)
7. After a few minutes, stop and have the class walk around and see everyone's Venn Diagrams. (Cards may be taken away to see if others can tell how the diagram was sorted.)



Materials

- ❑ *Bull's Eye Graphs*
- ❑ Box of buttons

Bull's Eye Graph



1. Students put the buttons back into the boxes.
2. Pass out a large poster-sized *Bull's Eye Graph*. Model how to find all the buttons in the box that are *round* and put them on the outside ring of the graph. (All buttons that are not round should be left in the box.)
3. After the students have seen you model the first step, they can go to their desks and follow directions as a table group.
4. Take the *white* buttons from the round ring and slide them to the next ring, leaving all the round buttons that are not white in the outer ring.
5. Move the *2-holed* buttons from the white ring to the next smallest ring, and from that ring, move the very *smallest* button(s) to the center ring. This is a different way to graph data.
6. Model how to carefully pick up the poster board and pour the buttons into the box again.

Materials

- ❑ *Button Up* worksheet
- ❑ Button die
- ❑ Box of buttons

Probability

1. Using a permanent marker, make button dice on blank cubes with 6 attributes: 2-holed, 4-holed, shank, metal, white, textured.
2. With your *Button Up* worksheet, place an x at the top of the column (with a crayon) to predict which button will reach the top first.
3. Put buttons on the graph to correspond to what is rolled on the die. This is a real graph.
4. When one column is filled up, you stop and record with a pencil what your graph looked like. See if your prediction is correct.
5. Describe the graph to someone else. Use comparative words.

Curriculum Extensions/Adaptations/Integration

- Make a journal about Button Week by recording your activities. Students should include the results of the activity. If you do this activity in February or March, the students are capable of describing in writing what the class did. Gifted and talented students love to extend their learning by creating a class book with cooperative learning groups.
- Act out *Frog and Toad are Friends*. Use real buttons to match the text. ESL and special needs students benefit from acting out a story. Visual and kinesthetic activities increase their understanding of the vocabulary and main idea.

Resources

Books

The Button Box, by Margarette Reid; ISBN 0-525-44590

Grandma's Button Box, by Linda Williams Aber; ISBN 1-57565-110-6

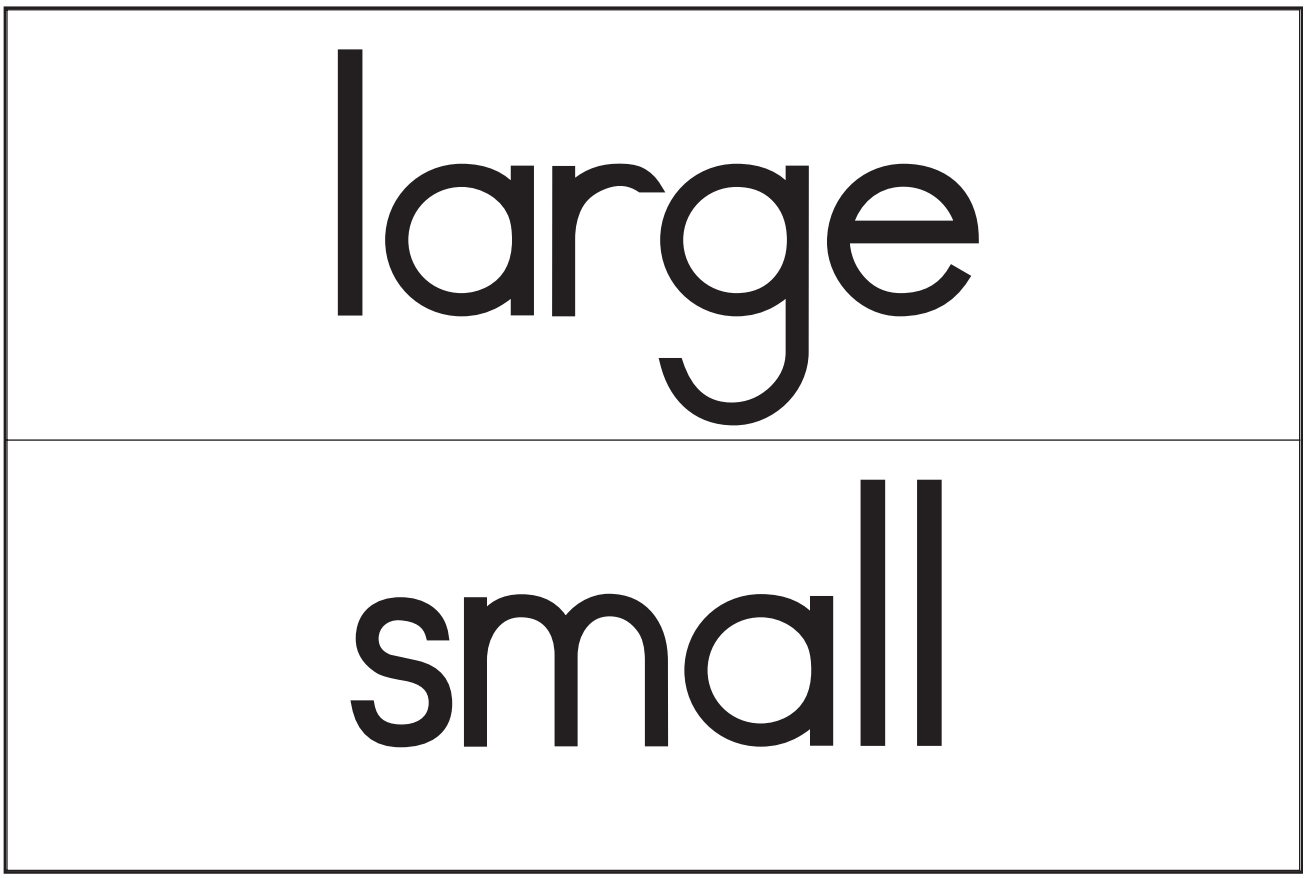
Frog and Toad Are Friends, by Arnold Lobel; ISBN 0-06-444020-6

Family Connections

- Have students create a graph about their family's buttons worn on one day.
- Graph how many pockets each family member has. Bring the graph back to school and let each student interpret his/her graph for the class.

Bodacious Button Cards

Copy each page on a different color of cardstock.

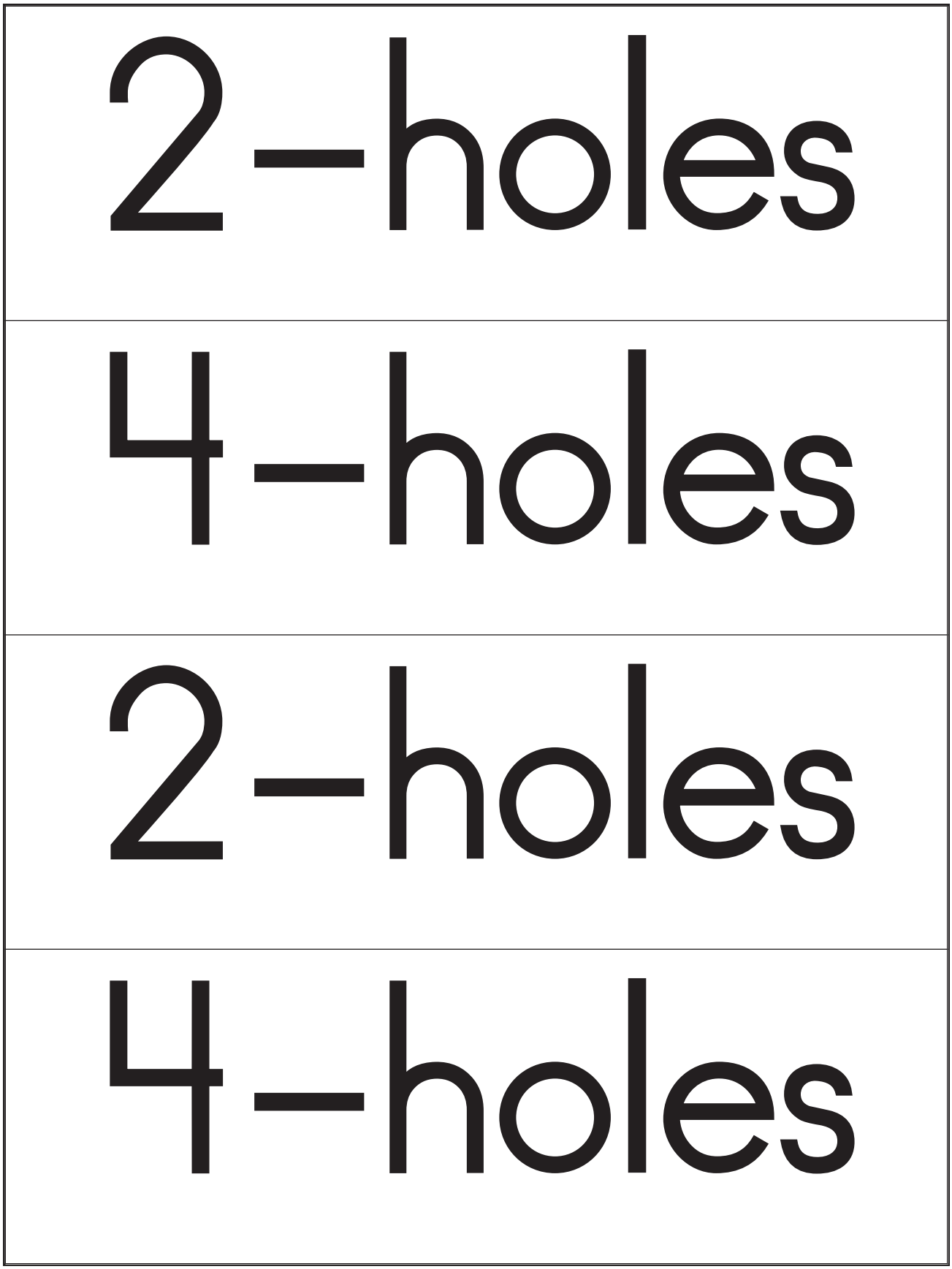


red

blue

yellow

green


2-holes
4-holes
2-holes
4-holes

triangle

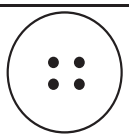
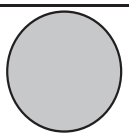
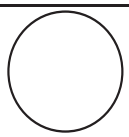
circle

square

Name _____

Button Up

Predict which button will make it to the top first by marking an x in one top box. Roll the button die. Put a corresponding real button in the space above the picture. Continue until one column reaches the top. Record by drawing buttons in each square that had a real button in it.

2-holed	 4-holed	shank	 metal	 white	texture

Laundromat Lessons in Probability

Standard V:
Students will collect and draw conclusions from data and understand basic concepts of probability.

Objective 1:
Collect, organize, and display simple data.

Objective 2:
Determine the likelihood of an event.

Intended Learning Outcomes:
2. Develop social skills and ethical responsibility.
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math I-2, II-1, IV-1; Language Arts VII-6

Math Standard V

Objectives 1 & 2

Connections

Background Information

First graders have an innate sense of fairness for games, but most have not had enough experience with equal chance, unlikely, or likely outcomes. We need to give them ample opportunities to predict outcomes and develop their understanding of probability. For this lesson, it is good to read a story about a laundromat and describe what it's like to wash your clothes there.

Research Basis

Konold, C. (1991). *Belief in Equally-Likely vs. Less-Likely Events*.

Konold looks at the possibility of reforming childrens' (often incorrect) preconceptions about chance into accurate understanding.

Gerlic, I., & Jausovec, N. (1994). Multimedia: differences in cognitive processes observed with EEG. *Educational Technology Research and Development, 47*(3), 5-14.

Studies show that explicitly engaging students in the creation of nonlinguistic representations stimulates and increases activity in the brain.

Burns, M. (2004). Marilyn Burns: 10 Big Math Ideas. *Instructor*.

Real-world contexts can give students access to otherwise abstract mathematical ideas.

Assessment Suggestions

- Check the tally sheets for socks and pattern blocks to see if the students understand how to make tallies and if the marks correspond to the number of pattern blocks they glued to their page.
- Check the *Spoonful of Money* worksheets to see if students could interpret their graph with three corresponding sentences.

Invitation to Learn

Materials
- ❑ Small basket
- ❑ Different colored socks
- ❑ Sorting hoops
- ❑ *Sorting All Sorts of Socks*
- ❑ *A Pocket for Corduroy*
- ❑ *The Laundromat*

Read a book about a laundromat, such as *A Pocket for Corduroy* or *The Laundromat*. Bring in a small laundry basket and tell the class that you are going to the laundromat to do a load of socks. "I'm prepared with my socks, coins for the machines, some games to play while I pass the time, and a book to read." Read *Sorting All Sorts of Socks*. Ask the students, "How could I sort these socks?" Sort by color, size, thickness, stripes, etc. Sort them on the rug or a table with sorting hoops.

Instructional Procedures

Sock Tally

Materials
- ❑ Small basket
- ❑ Different colored socks
- ❑ *Sock Tally Sheet*

1. Put three socks (red, blue, green) in a small basket. Have students predict which color of sock will be pulled out of the basket the most by circling the color word on the *Sock Tally Sheet*.
2. Pass the basket of socks around the room. As each student has a turn to pull out one sock (without looking), the class makes tally marks on the *Sock Tally Sheet*. Which sock color was tallied the most? How many got their prediction correct?
3. Repeat the activity with four socks (two blue, one red, one green). Predict first. Which one will be likely chosen the most? Ask the same questions. Have students explain/justify their answers.

Money Match

Materials
- ❑ Different colored socks
- ❑ Plastic or real coins

1. Start with two socks per pair of students. Each of the two socks has a penny, nickel, dime, and quarter inside.
2. One student pulls out a coin and the other person feels in the other sock and pulls out the same coin.
3. Keep a tally of how many correct matches are made. This could be a demonstration activity or a center activity.

Spoonful of Money

1. Using a tablespoon, scoop as many plastic coins out of a cup as you can. (About 25 pennies, nickels, and dimes for four students.)
2. Place the coins onto the *Spoonful of Money* graphing sheet.
3. Write three sentences to interpret the graph.
4. Draw circles to represent the coins on the graph as you take off the coins.

Materials

- ❏ Tablespoon
- ❏ Plastic or real coins
- ❏ Cup
- ❏ *Spoonful of Money* graphing sheet

Pattern Block Tally Picture

1. Pass out the *Pattern Block Tally Sheets*, pattern blocks, paper pattern blocks, and glue.
2. Roll the overhead pattern block die (or spinner) as the students tally inside the shape at the bottom of their tally sheets.
2. Students take that pattern block and place it in the middle of the paper. Do this activity 12 times.
3. Discuss the tallies and compare the amounts.
4. Students make a design with the pattern blocks that they put on their page. Record it by gluing the paper pattern block shapes to the sheet. Many designs are possible.

Materials

- ❏ Pattern blocks
- ❏ Paper pattern blocks
- ❏ Glue
- ❏ *Pattern Block Tally Sheet*
- ❏ Pattern blocks overhead die or spinner

Curriculum Extensions/Adaptations/Integration

- Extend the sock sorting lesson by asking students if there is a match for each sock and teach about odd and even numbers.
- Read *Fortunately, Unfortunately*. Brainstorm some likely events and some unlikely events. Use the ideas for a class book called *Likely, Unlikely*. Gifted and talented students love to create books in cooperative groups.
- ESL and special needs students usually have a high interest in coins. Handling the real coins, pattern blocks, and socks are good strategies for these children. Working with partners and discussing the key words also work well.
- Place three pennies and one nickel in a sock (or different amounts or coins) and tally 15 times. Describe the probability of picking a penny.

- As a get-acquainted activity, students reach into a clean sock and get a red, gold, or silver candy kiss (or other candy). If they got a red one, they have to tell something good about another person in the room. If it is silver, they have to tell about themselves. If it is gold, they tell about their family. Tally each color as it is drawn from the sock. Describe the probability of the red kisses.

Resources

Books

Fortunately, Unfortunately, by Remy Charlip; ISBN 0-689-71660-5

A Pocket for Corduroy, by Don Freeman; ISBN 0-670-56172-x

Sorting All Sorts of Socks, by Betsy Franco; ISBN 0-7622-0621-7

The Laundromat, by Jillian Cutting; ISBN 0-7802-3913-X

Family Connections

- Have students go home and create a graph with the coins in a family member's pocket, then interpret the graph for their family.
- Have students do the same activities at home as done in class with Money Match.
- Have students help with the laundry by sorting the clothes or matching the socks, then tell how it was sorted.

Name _____

Sock Tally Sheet

Predict which sock color you think will be pulled out of the basket the most. Circle the color name. Everyone in the class can have a turn to pull out a sock as the students make tallies in the socks.

blue	red	green

Repeat the activity with 2 blue socks this time.

2 blue socks	red	green

Name _____

Spoonful of Money

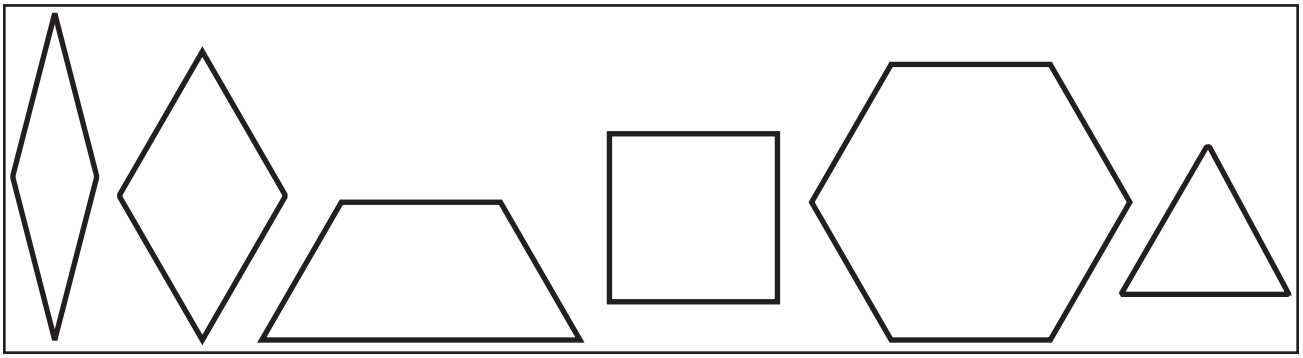
Dimes										
Nickels										
Pennies										

Write 3 sentences about the graph.

Name _____

Pattern Block Tally Sheet

Roll a pattern block die or spin a spinner 12 times. Draw out that pattern block and place in the middle. Record by placing tally marks in the shapes below. Arrange blocks into a design. Replace the blocks with paper shapes and glue.



Let the Probability Games Begin

Math Standard V

Objectives 1 & 2

Connections

Standard V:
Students will collect and draw conclusions from data and understand basic concepts of probability.

Objective 1:
Collect, organize, and display simple data.

Objective 2:
Determine the likelihood of an event.

Intended Learning Outcomes:
1. Demonstrate a positive learning attitude.
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Content V-3; Math I-2 & 5

Background Information

After the students have experienced several class probability activities, it is good to let them have some independent study (e.g., rotating games in tote trays). Explain all eight activities in a demonstration circle. Some games have already been played as a whole group. Model each game and show how to record it. Students need to check with the teacher before moving to another game. It is better to let the students free roam, because they all get finished at different times. Some games may be on the floor and other games set up on tables or students' desks. In each tote tray, have a recording sheet in a sheet protector so they can find it in their packet easily. Taking pictures of students (from previous years) playing the game may help them visualize the activity.

Research Basis

Fennell, F. (1990). Implementing the Standards, Probability. *Arithmetic Teacher*, p. 18-22.

Francis Fennell emphasizes that classroom activities should involve physical material and provide opportunities for questioning, problem solving, and discussion.

Newton, D.P. (1995). Pictorial support for discourse comprehension. *British Journal of Educational Psychology, 64*(2), 221-229.

Drawing pictures and pictographs enhances the students' understanding of that content.

Cathcart, D. & Horseman, T. (1998). Journeys of Transformation. A Mathematical Modeling course for Elementary Education Majors.

Cathcart states that prediction and experimentation are key components of probability.

Assessment Suggestions

- Each game in the tote tray needs to be checked by the teacher before the students move on to another center. Students raise their hands when finished for teacher review. Ask questions before letting them go to another game to assess their level of understanding.

Invitation to Learn

Materials
- ❑ *Graph It!*

Refer to an assortment of graphs around the room. They represent a variety of ways to collect and record data (e.g., real objects, pictures, tables, tally marks, bar graphs, etc.). Read *Graph It!* Ask the students about their favorite board or card game. Discuss games that have an element of chance. Why does that make it fun?

Instructional Procedures

Double Dice Addition Facts

Materials
- ❑ 8 number cubes 1-6
- ❑ *Double Dice Addition Facts* worksheet
- ❑ *Class Tally Table*

1. Using the *Double Dice Addition Facts* worksheet, predict which column will fill up first. Put an x in the box at the top of that column.
2. Roll two number cubes (1-6). Record the number sentence in the box above the sum.
3. Continue until one column reaches the top.
4. Make a tally on the *Class Tally Table* to show your winning number.

Ten Beans

Materials
- ❑ Bowl of beans (small)
- ❑ *Ten Beans* worksheet

1. From a bowl of small red beans, try to pick up 10 beans with one hand.
2. Put the beans in the ten frame section of the *Ten Beans* worksheet. If you get less than ten, put a tally mark in that space. If you get more than ten, put a tally mark in that space. If you get exactly ten, mark it in that space.
3. Do the activity ten times and record results.

Exactly Ten

Materials
- ❑ *Exactly Ten Cards*
- ❑ *Exactly Ten* worksheet

This game is played in pairs.

1. Place a shuffled deck of *Exactly Ten Cards* face down on the draw pile.
2. The first player picks a card and puts it face up by his/her desk. Then pick a second card to see if the two numbers add up to exactly 10. If they do, the player keeps those two cards in a stack. If not, discard both cards face up on the discard pile.
3. The second player picks a card from the draw pile. If the top card of the discard pile adds up to 10 with the first card, then the player may keep both cards. If not, the player takes a second card from the draw pile to see if that will combine with the first card to add up to 10. As you collect sets of two cards that add up to 10, keep them in separate piles on your desk.

   If a "happy" card is drawn, it is wild and may be used for the number needed to add to another card to make 10.
4. Play continues until all the cards from the draw pile are gone.
5. Players count their sets of two cards that add up to exactly 10.
6. Record all of those number sentences on the *Exactly Ten* worksheet. Be sure to substitute the "happy" card number for the number needed to make 10.
7. The person with the most sets wins.

Runts Race

Materials
- ❑ *Runts Race* worksheet
- ❑ *Runts Spinner*
- ❑ Crayons

1. Color the fruits on the *Runts Race* worksheet.
2. Put an x in the box you predict will be selected most.
3. Spin the *Runts Spinner*. Draw and color a fruit in the corresponding row each time you spin. (This is a picture graph.)
4. Continue spinning and recording pictures until one row is filled.

Bear Race

Materials
- ❑ *Runts Race* worksheet
- ❑ *Spinner 1*
- ❑ *Spinner 2*
- ❑ *Spinner 3*
- ❑ *Spinner 4*

1. Pick one of the four spinners and record which number you use.
2. Mark the row you predict will fill first with an x.
3. Build the graph with teddy bear counters as you spin. Stop when one row gets filled.
4. Color the squares as you take off the bears.
5. Play the game once more with a different spinner.
6. Compare your results with the rest of the group at your table.

Traveling the World

This game is played in pairs.

1. Each player places a different colored bead in one of the two starred middle squares.
2. The first player spins the NESW spinner and rolls the 1-2-3 die.
3. Move your bead in the direction indicated by the spinner the number of spaces indicated by the die.
4. Take turns moving your bead around the map, until one person gets to the edge of the grid.
5. Which direction(s) are most likely to be the winning directions?

Materials

- ❑ *Traveling the World* worksheet
- ❑ NESW spinner
- ❑ 123 die
- ❑ 2 small beads

Pattern Block Tally

1. Roll the pattern block die or spinner and tally inside the shapes on the bottom of the *Pattern Block Tally* worksheet.
2. Take that pattern block to place in the middle of the paper.
3. Do the activity 12 times.
4. Discuss the tallies and compare the amounts.
5. Students make a design with the pattern block shapes and glue the paper shapes to the sheet. (Many different designs are possible.)

Materials

- ❑ *Pattern Block Tally* worksheet (p. 7-19)
- ❑ Pattern block die or spinner
- ❑ Paper pattern block shapes
- ❑ Glue

Button Up

1. With your *Button Up* worksheet, place a check in the box at the top of the column to predict which button will "win."
2. Put buttons on the graph to correspond to what you roll on the die.
3. When one row is filled up, stop and record with a pencil what your graph looked like. See if your prediction is correct.
4. Describe the graph to someone else. Use comparative words.

Materials

- ❑ *Button Up* worksheet (p. 7-12)
- ❑ Button die
- ❑ Box of buttons

Curriculum Extensions/Adaptations/Integration

- Do a graph of the students' favorite probability game. Ask them why it was their favorite.
- As a class, make up a new game using some of the fun elements that they liked from these other games. Gifted students love the challenge to make up a new game.
- ESL and special needs students benefit from these hands-on games played together on tables where the others can clarify directions or show what to do. They can watch others and learn. These games are high interest to the students because of the element of chance.

Resources

Books

Graph It!, by Jennifer Osborne; ISBN 1-58273-186-1

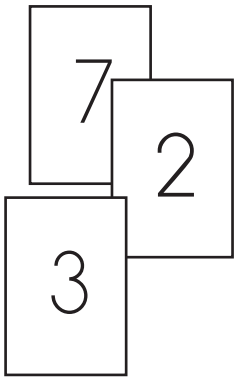
Math By All Means, Probability Grades 1-2, by Bonnie Tank; ISBN 0-941355-15-2

Survey Questions and Secret Rules, by Tracey Wright & Jan Mokros; ISBN 0-201-37811-6

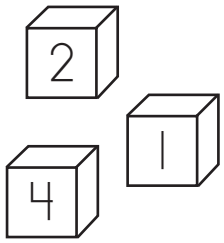
Family Connections

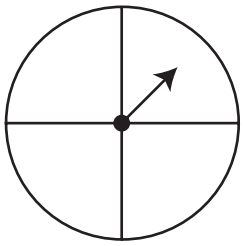
- Since the directions are on most of the sheets in the probability packet, they could be played at home with each student's family. Get feedback on which game the family enjoyed most.

Name _____



Probability Games





Activity Packet

- ❑ Double Dice Addition Facts
- ❑ Ten Beans
- ❑ Exactly Ten
- ❑ Runts Race
- ❑ Bear Race
- ❑ Traveling the World
- ❑ Pattern Block Tally
- ❑ Button Up

Double Dice Addition Facts

Make a prediction by marking an x in one box at the top. Roll 2 number cubes (1-6). Record the number sentence in the box above the sum. Continue until one column reaches the top. When you are finished, make a tally on the class chart to show your winning number.

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Class Tally Table

for Double Dice Addition Facts

2	
3	
4	
5	
6	
7	
8	
9	
10	
11	
12	

Ten Beans

From a bowl of beans, try to pull out 10 beans. Put the beans in the ten frame. Tally the results below. Do it 10 times.

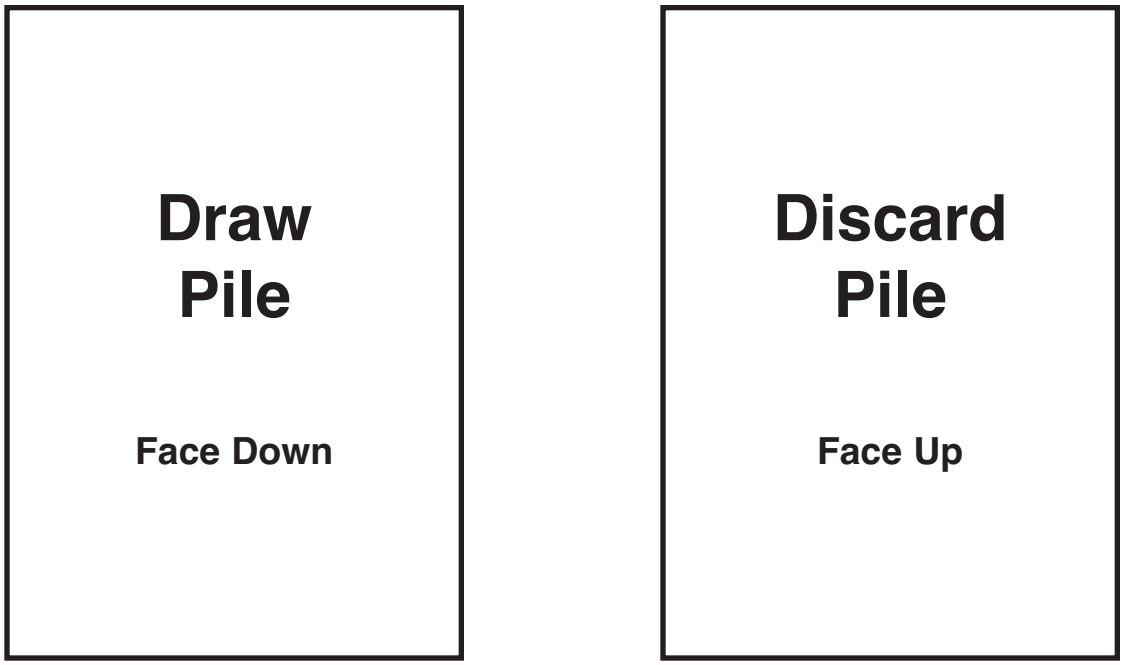
Ten Frame				

Results		
Less than 10	Exactly 10	More than 10

Exactly Ten

This game is played in pairs.

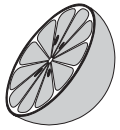
Place a shuffled deck of *Exactly Ten Cards* face down on the draw pile. The first player picks a card and puts it face up by his/her desk. Then pick a second card to see if the two numbers add up to exactly 10. If they do, the player keeps those two cards in a stack. If not, discard both cards face up on the discard pile. The second player picks a card from the draw pile. If the top card of the discard pile adds up to 10 with the first card, then the player may keep both cards. If not, the player takes a second card from the draw pile to see if that will combine with the first card to add up to 10. As you collect sets of two cards that add up to 10, keep them in separate piles on your desk. If a "happy" card is drawn, it is wild and may be used for the number needed to add to another card to make 10. Play continues until all the cards from the draw pile are gone. Players count their sets of two cards that add up to exactly 10. Record all of those number sentences on the *Exactly Ten* worksheet. Be sure to substitute the "happy" card number for the number needed to make 10. The person with the most sets wins.



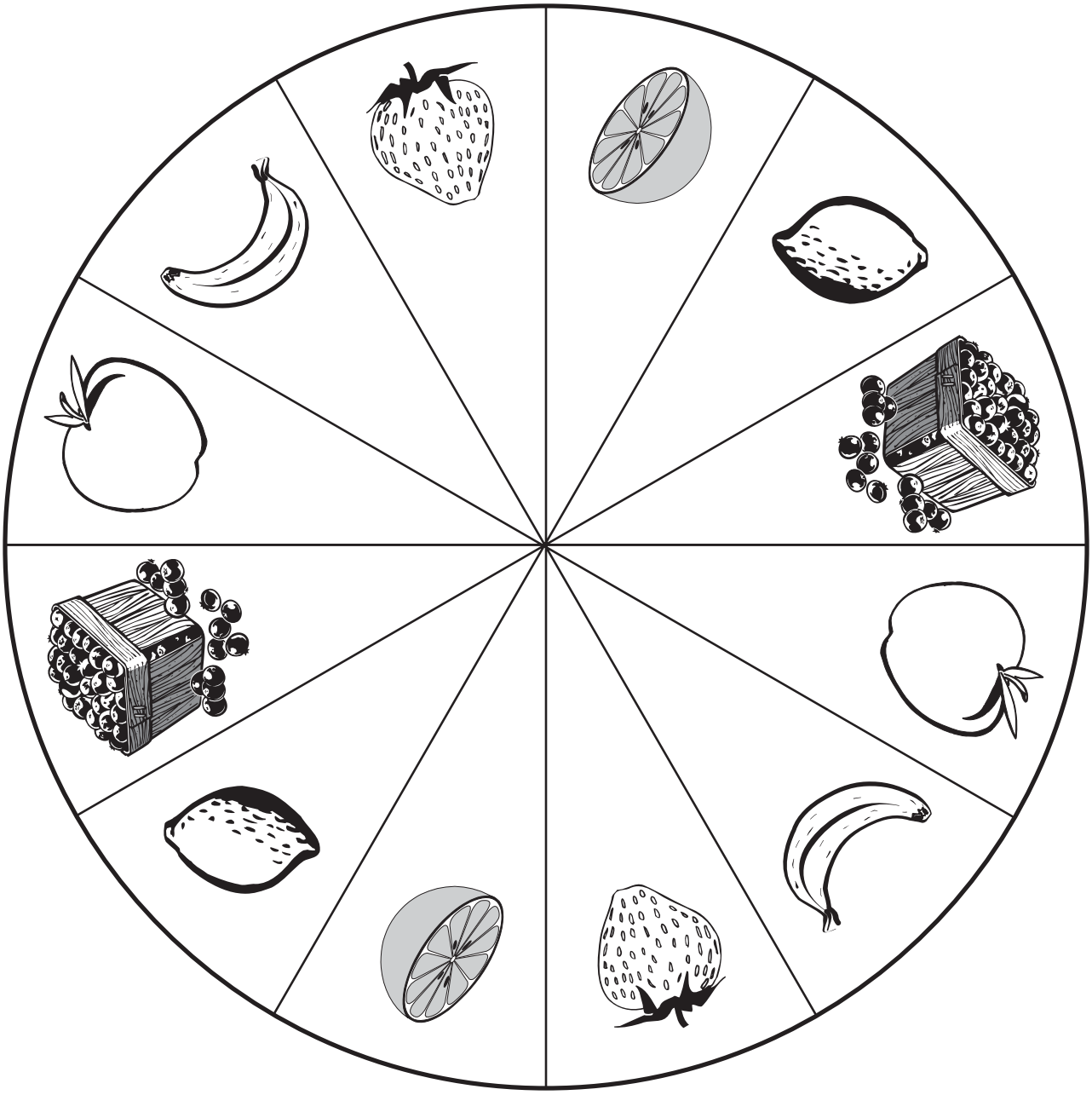
These are my sets that add to exactly 10.

Runts Race

Predict by marking an x in one box to the far right. Spin the Runts spinner. Draw and color a fruit in the correct space. Continue until one of the fruits reaches the end of the row.

pink														☐
green														☐
 orange														☐
yellow														☐
red														☐
blue														☐

Runts Spinner

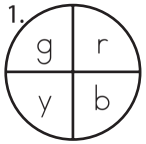


Bear Race

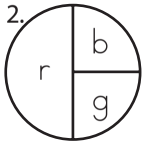
Put an x in the box to the right for your prediction. Build each graph with bears as you spin. Color the squares.

I used spinner #_____								
red								☐
blue								☐
yellow								☐
green								☐

1.

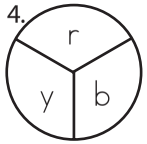


2.



3.

4.



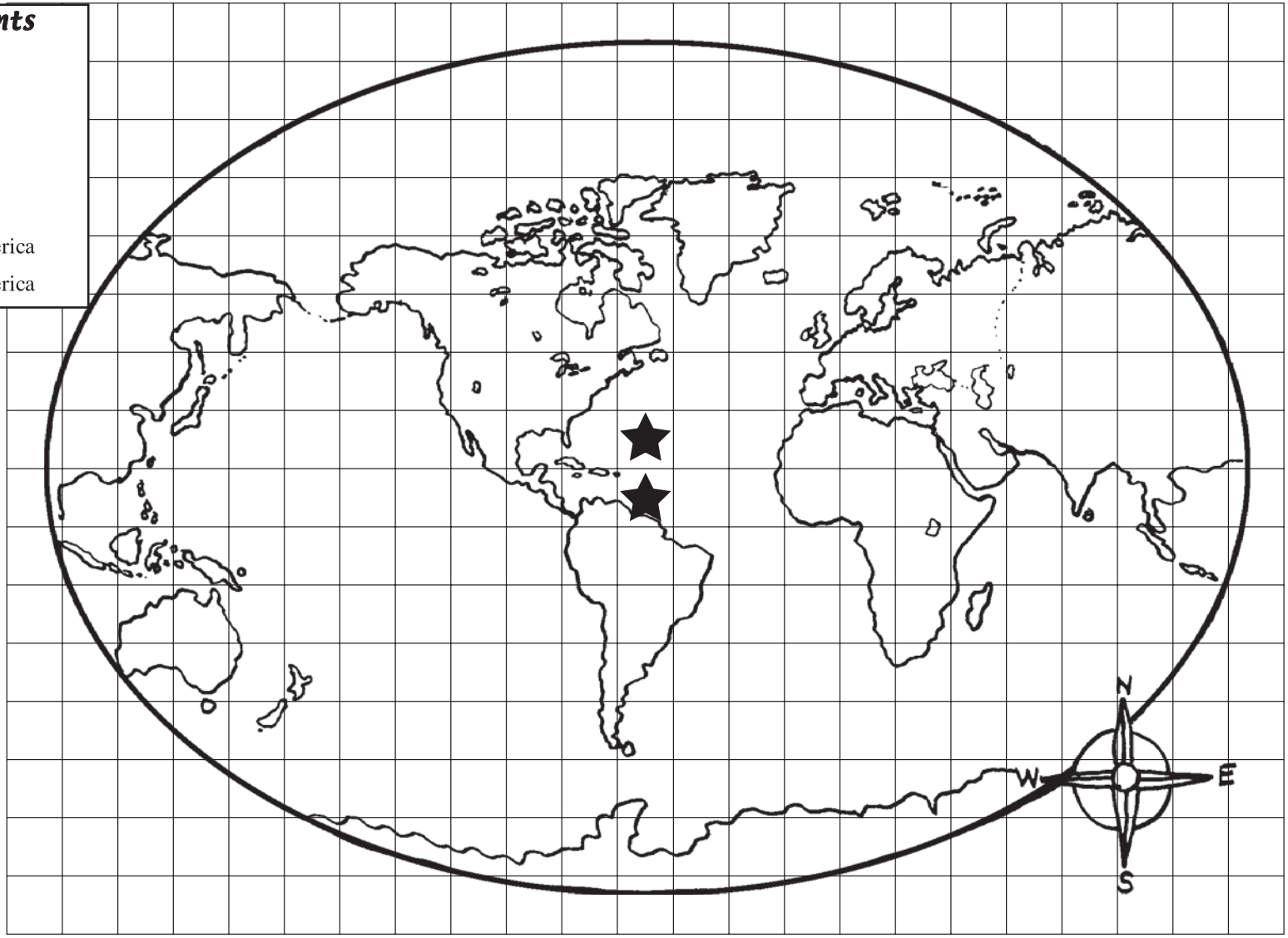
I used spinner #_____ Use a different spinner than before. Compare your results with the rest of your group.								
red								☐
blue								☐
yellow								☐
green								☐

Traveling the World

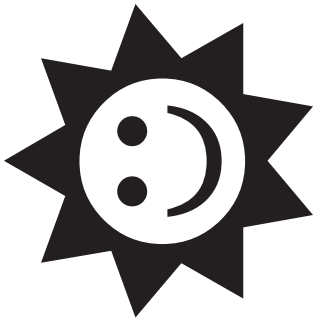
Each partner places a bead on either one of the stars in the middle of the map. Spin the NESW spinner for the direction to move, and roll the 1-2-3 die for the number of spaces. The first player to get his/her bead to the edge of the grid wins.

7 Continents

- ❑ Africa
- ❑ Antarctica
- ❑ Asia
- ❑ Australia
- ❑ Europe
- ❑ North America
- ❑ South America



Exactly Ten Cards

5	 Happy Card
4	9
3	8
2	7
1	6

Content Standard III-1 Activities

All Sorts of Seeds!

Standard III:
Students will develop an understanding of their environment.

Objective 1:
Investigate plants and plant growth.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math V-1; Language Arts VII, VIII

Content Standard III

Objective 1

Connections

Background Information

This activity is designed to give students the opportunity to compare seeds and describe the ways that they are carried through the environment. Prior to teaching this lesson, make sure students have experienced identifying attributes and sorting various objects.

Before you begin this unit, complete a K-W-L chart as a class showing what students already know and would like to know about seeds and plants. Use this information to help plan mini-lessons for extending the activities provided in the CORE Academy Handbook.

As this is an inquiry-based activity, notice that questions, investigations, tools for data collection, and journaling response opportunities are included.

Research Basis

Shymansky, J. A., Hedges, L.V., & Woodworth, G. (1990). A Reassessment of the Effects of Inquiry-Based Science Curricula of the 60's on Student Performance. *Journal of Research In Science Teaching, 27*(2), 127-144.

The evidence reveals that inquiry-oriented curricula positively impacts teaching and learning in many areas.

Friel, S. N., Curcio, F. R., & Bright, G. W. (2001). Making Sense of Graphs: Critical Factors Influencing Comprehension and Instructional Implications. *Journal for Research in Mathematics Education, 32*(2), 124-158.

To be functionally literate, students need to be able to read and understand graphs. Comprehension of graphs includes translation, interpretation, and extrapolation.

Assessment Suggestions

- Use sketches and journal entries to assess student understanding of:
  - comparisons between seeds
  - ways in which seeds travel
  - graph comprehension and application
- Use oral discussion and reflection as an informal assessment. Interview students to determine their perceptions of seeds and what knowledge they have constructed.
- Give students an opportunity to record their understandings of how seeds are carried through the environment. This may be done in their journals or as a separate assessment piece. Invite students to "show and tell" their journal writing with each other.
- Use the *Sorting Seeds!* worksheet to assess students' ability to compare seeds. For an even deeper understanding of their thinking, ask the students to explain their sorting process to you.

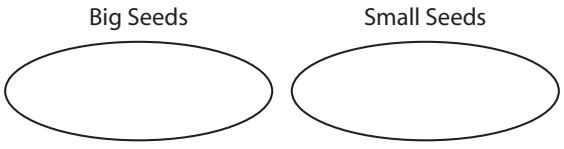
Invitation to Learn

Display a variety of fruits and vegetables for students to see and touch. Ask the question, "What would happen if we cut open these fruits/vegetables and looked inside? What would we find?" Students will give their predictions. Follow up by asking questions such as, "Why do you think that? How do you know?" These types of questions help you understand their previously constructed knowledge. Cut open the fruits/vegetables and allow students to freely explore the contents. Provide them with cups, plates, or Ziploc® bags for collecting their findings (seeds).

Instructional Procedures

1. Using the seeds gathered during the Invitation to Learn, help students make a real graph to represent their findings (e.g., graph fruits/vegetables by number of seeds, size of seeds, color of seeds, etc.).
2. Ask, "What do you observe by looking at the graph?" Use questions to guide the extraction of information from the graph.
3. Have students record their observations about the graph in their journals.

4. Take students on a seed walk. Each student needs at least one sock to wear over his/her shoe. Students may also use socks on their hands. Take a walk around the school grounds, being sure to pass through grassy areas and under/next to trees and bushes.
5. Upon returning to the classroom, students examine the seeds they gathered. Encourage them to share their "treasures" in groups of two or three. You may choose to make another real graph, depicting the data collected from student observations about their seeds (e.g., size, color, shape, location). Discuss the graph by asking questions to guide understanding. Allow the students to write about their interpretations of the data.
6. Discuss how seeds travel. Ask, "How did this 'helicopter' seed end up on the playground?" As a focus/validation for the discussion, share books like *How and Why Seeds Travel*, *The Tiny Seed,* and *Seeds Get Around*.
7. Create a class book that describes the different ways the students' seeds might have been carried through the environment.
8. Provide students time to freely explore all of the attributes of the seeds themselves, using hand lenses to observe and nonstandard measuring tools to measure/compare. Give each student an assortment of the seeds collected from the Invitation to Learn and the seed walk and/or supplement their collections with seeds from packets purchased at the store. Once they have had ample time to observe the seeds carefully, ask the students to name various attributes about the seeds (e.g., size, color, texture, method of travel, etc.). Create a Seed/Plant Word Wall using poster board to record these attributes on.
9. As a class, use the Sorting Circles side of a "Graph-it" vinyl mat to sort seeds, using attributes listed on the Seed Word Wall. Allow the students to sort the seeds in at least three different ways.



10. Allow students to practice comparing the seeds by having them complete the *Sorting Seeds!* worksheet three times and record their final sort.

Materials

- ❏ Fruit and vegetables
- ❏ Paper cups
- ❏ Old socks (at least one for each student)
- ❏ Posterboard for a "Seeds" word wall
- ❏ Hand lenses
- ❏ Non-standard measuring units (e.g., plastic worms)
- ❏ *Sorting Seeds!* worksheet
- ❏ *How and Why Seeds Travel*
- ❏ *Seeds Get Around*
- ❏ Journals

11. Return to the K-W-L chart and ask students to dictate what they have learned and what they still want to know about seeds and plants.

Curriculum Extensions/Adaptations/Integration

- Read *A Dandelion's Life* aloud. Invite students to creatively write a story about the travels of a seed.
- Share the poetry book, *Silver Seeds*. Encourage the students to use the pattern established in the book to write poems about their knowledge of seeds.
- Introduce students to *Plant Fruits and Seeds*.
- Students create a graph depicting edible seeds and nonedible seeds.
- For students who are emerging writers, adapt the journaling from independent to interactive or shared writing by meeting with them in small groups or one-on-one while the independent writers are working.
- Many first grade students will be frustrated if they do not know how to spell the scientific words they want to use to express themselves. Offer your students a "Have-a-go" page and teach them the strategy of writing the sounds that they know. Encourage them to circle the words they are not sure about and keep writing, instead of waiting for an adult to spell the word so that they can continue their sentences.
- As a challenge, invite advanced learners to use the poetry pattern in Paolilli and Brewer's *Silver Seeds* to create their own poetry books about plants and seeds.

Resources

Books

Integrated Curriculum and Developmentally Appropriate Practice Birth to Age Eight, by Craig H. Hart, Diane C. Burts, & Rosalind Charlesworth; ISBN 0-7914-3360-9

How and Why Seeds Travel, by Elaine Pascoe; ISBN 1-5741-658-1

A Dandelion's Life, by John Himmelman; ISBN 0-516-26402

Silver Seeds, by Paul Paolilli and Dan Brewer, ISBN 0-14-250010-0

Plant Fruits and Seeds, by David M. Schwartz; ISBN 1-57471-330-2

Seeds Gets Around, by Nancy White; ISBN 1-56784-031-0

The Tiny Seed, by Eric Carle; ISBN 0-590-42566-8

Family Connections

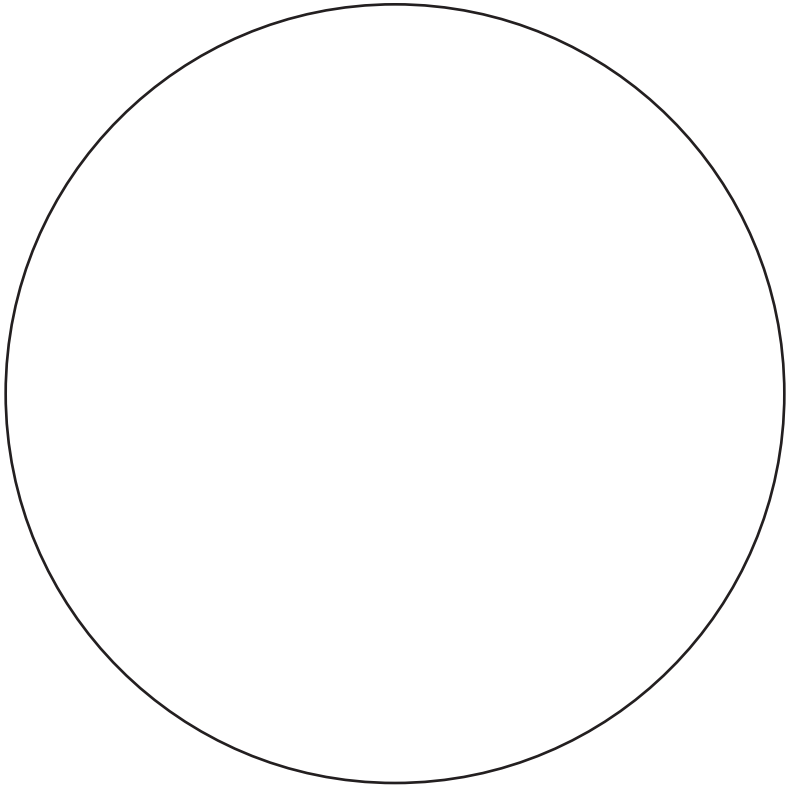
- Encourage students to add seeds they find at home to the classroom collection. Students may want to make their own collection at home.
- Have students take a writing log home for a week to keep track of how many times they eat seeds or foods that contain seeds.
- Allow students to take home seeds and a copy of the *Sorting Seeds at Home!* worksheet. Invite family members to take turns sorting the seeds by different attributes. Have the student record the different sorting strategies on the back of the page and glue an example of each. Family members sign their names next to their ideas.

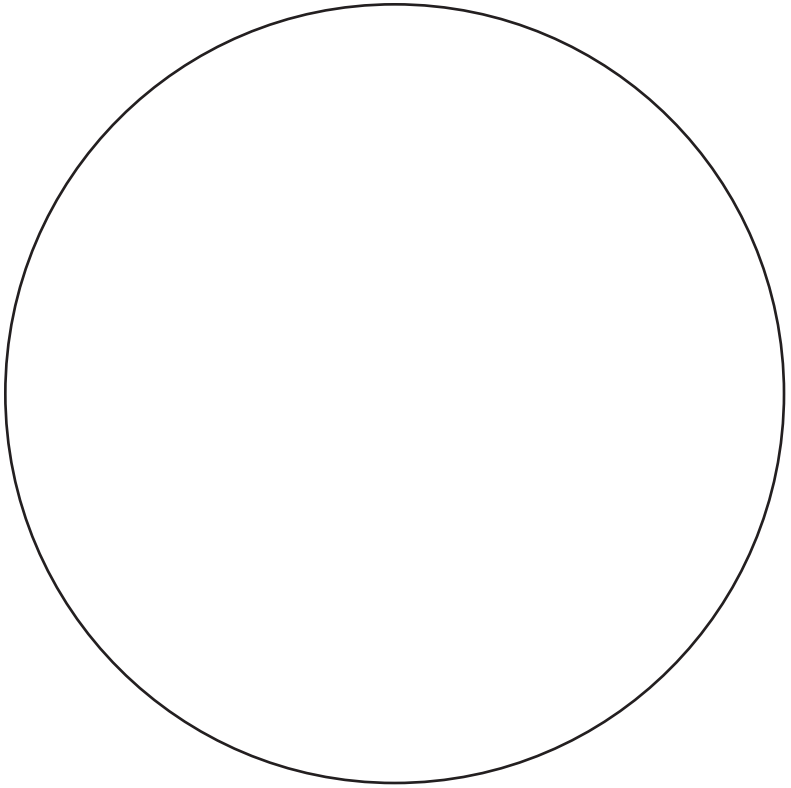
Name _____

Sorting Seeds!

Sort your seeds at least three times. Choose your favorite attribute and record it by gluing down the seeds. Don't forget to label your sets!

Sorting record: [ ] [ ] [ ]





Name _____

Sorting Seeds at Home!

Ask family members to sort your seeds. Record their strategies by writing the attribute they sorted by and the names they gave their sets. Glue an example next to each set label. Have each person sign next to his/her strategy!

Strategy/ Attribute	Example	Set Labels	Example	Signatures
size		big & tiny		
		&		
		&		
		&		

Sprouting Scientists!

Content Standard III

Objective 1

Connections

Standard III:
Students will develop an understanding of their environment.

Objective 1:
Investigate plants and plant growth.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math V; Language Arts VIII

Background Information

This activity is designed to provide students with the opportunity to observe and describe plants as they grow from seeds. It is recommended that you teach All Sorts of Seeds! prior to this activity so that students have had the opportunity to manipulate seeds. Students will also have the chance to use many process skills throughout this unit. You may teach the process skills in isolation, earlier in the school year, or concurrent with this activity (i.e. symbolization, observation, description, prediction, data collection, investigation, classification, segmentation and blending, problem solving, forming conclusions).

For this activity, group students in two different ways. They should be grouped into teams of four to five students. Give each team a name (e.g., "Team 1" or "Blue Team"). Alternately employ the jigsaw grouping strategy as well. This requires you to assign each member of each team a letter. Subsequently, in "Team 1," you will have Student A, Student B, Student C, and Student D. To form the jigsaw groups, instead of the teams, ask students to group by their assigned letter, instead of team name. So, all "A's" would become a group, and so on.

Team 1	Team 2	Team 3	Team 4	Team 5
Student A	Student A	Student A	Student A	Student A
Student B	Student B	Student B	Student B	Student B
Student C	Student C	Student C	Student C	Student C
Student D	Student D	Student D	Student D	Student D

Research Basis

Shepardson, D. P. (1999). Learning Science in a First Grade Science Activity: A Vygotskian Perspective. *Science Education, 83*(5), 621-637.

Classroom vignettes and child interviews illustrate that teachers can mediate students' learning by enacting these roles within the context of an activity: facilitator, guide and supporter, active participant and evaluator. As the teacher mediates, children construct their own knowledge.

Laplante, B. (1997). Teachers' Beliefs and Instructional Strategies in Science: Pushing Analysis Further. *Science Education, 81*(3), 227-293.

"School science," a version of science taught by many teachers, is remarkably different from science "as it is actually done." This study of teaching strategies used by teachers illustrates the profound impact that a teacher's own perception of science learning can have on student learning. Two vignettes punctuate the crucial necessity for inquiry as a process of leading students to the construction of science-related knowledge.

Assessment Suggestions

- Use student drawings/writing about the plant growth cycle to assess the level of their observational skills.
- Individual/small group interviews are a good way to assess what students are observing about plants and their environment.
- Assess students by having them sketch a plant with all the parts they observed during the investigation.
- Students write about/summarize the growth process from seed to plant.

Invitation to Learn

Pass out a lima bean (pre-soaked), toothpick, paper-towel/plate and hand lens to each student. Instruct them to investigate the lima bean seed. Students may use the toothpick to pry open the cotyledons and reveal the embryonic plant (root and leaf are visible).

Ask questions to guide student discussion about their investigation. For example: "What do you notice about this lima bean? How does it feel on the outside? What does it look like on the inside? What do you see? Do you know what it is? Do you know what it is called? Why do you think it is part of the bean/seed?"

Materials

For each student

- ❑ Pre-soaked lima bean
- ❑ Paper towel/plate
- ❑ Toothpick
- ❑ Hand lens
- ❑ Journals

Supply scientific vocabulary as is relevant to the discussion (e.g., seed coat, cotyledons [seed food], embryonic root, embryonic seed, etc.). Students sketch and write about their seed "dissection" in their journals.

Instructional Procedures

Materials

- ❑ Sprout and Grow Window
- ❑ Journals
- ❑ Journaling paper
- ❑ Nonstandard measures (e.g., plastic worms)
- ❑ Drawing paper
- ❑ Camera (optional)

1. "What will happen if I take one of these seeds and plant it in some soil?" Use the K-W-L chart to record claims of knowledge and questions about what will happen. Be sure to use follow-up questions in response to student statements in order to better understand what they know and have already experienced. Urge students to think of questions they might have about how seeds grow into plants, specifically the lima bean seeds (e.g., How long will it take to sprout? How tall will it grow to be? How many leaves will it have?, etc.). It is critical for students to establish that they would like to plant the seeds and "see what happens" in order to validate their predictions and answer their questions.
2. Plant seeds in the Sprout and Grow Window.
3. Explain to the students that you would like to support them in their predictions of what will happen to the seeds. You are also eager to help them answer the questions they posed about the future of the seeds. Talk about how scientists often have questions about nature and what happens with living things in our world. Tell them that one strategy scientists use to help them test their predictions and answer their questions is the strategy of collecting data/information. Pose the question: "As we start to watch these little seeds, what are some ways we could record what we are seeing and experiencing?" Students may mention sketches, journaling, pictures, etc.
4. Facilitate the collection of data by assigning students to teams. Group students in cooperative teams (e.g., tables) and prepare them for jigsaw groups by assigning team names and jigsaw group letters. Explain that every student will have the same job of observing the plants and recording data. Team members take turns gathering data daily. For example, Member "A" from each team will collaboratively gather data on Monday. Each Member "B" gathers data on Tuesday, and so forth. Assign each team a folder for data collection.
5. Student jigsaw groups collect data and share their findings with their teams each day. Students may use cameras, drawing/journal paper, hand lenses, nonstandard manipulatives, etc. to record their data.

6. As the teacher, you decide how long this procedure continues. You may choose to have the students collect data for up to two weeks.
7. Throughout the duration of the investigation, you may want to teach some mini-lessons. Base your choice of supplemental activities on the questions and comments your students come up with as they gather data and observe the growth of the plants (K-W-L chart).
8. At the conclusion of the investigation, invite student teams to review their data and present it in some fashion (e.g., a book that shows the progressive growth of the plants, a graph that depicts the number of leaves/height of plants, or the number of days it took the seeds to sprout, etc.).
9. Revisit the K-W-L chart and discuss newfound knowledge and validated concepts.

Curriculum Extensions/Adaptations/Integration

- Teach the Seed House activity as found in the 2003 First Grade CORE Academy Handbook.
- Expose students to nonfiction books on plants and the growth cycle. Books like *Maple Tree* and *Sunflower* are especially nice because they have vivid photography that is both stimulating and informative to young scientists/data recorders.
- Share *How a Seed Grows* with your class. As an additional study of how plants grow, complete the activity described in the book.
- Share books that talk about plant parts, although it is not a formal part of the first grade core to teach plant parts and functions. Since students will be observing plants so closely, sharing books like *Plant Leaves, Plant Stems and Roots,* and *A Tree is a Plant* will provide them with a richer schema for thinking about what they see.
- Provide living plants in the classroom for students to observe. Encourage them to compare and contrast different plants. Having other plants in the classroom provides a springboard for additional discussions about plant attributes and graphing.
- Integrate this unit with subtraction practice. Read *Ten Seeds*. Challenge students to write subtraction stories to match what is happening in the story, in word and/or number sentences.

- Using *Ten Seeds* as a reference, invite students to write their own stories (both addition and subtraction) using nature as the setting. Provide them with manipulatives like plastic worms or foam flowers to help spark their imaginations.
- Have the students complete daily graphs by answering questions/collecting data on the topic of seeds and plant growth.
- As jigsaw groups meet to collect data, interview individual students to assess gaps in understanding or misconceptions. These interviews also provide an opportunity to encourage deeper ideas and expanded knowledge of your advanced learners.
- This lesson has built-in adaptations. It provides students the opportunity to work collaboratively and express their thoughts orally, as well as through pictures and writing.
- Provide scaffolding for emergent writers by posting the Seed/Plant Word Wall that you created in the All Sorts of Seeds! activity. Accommodate for ESL learners by providing pictures/illustrations next to the words.
- Give students (especially ESL) their own individual "plant dictionaries." Provide them with vocabulary and pictures to paste into their dictionaries as the unit progresses.

Resources

Books

Sunflower, by David M. Schwartz; ISBN 1-57471-581-X

Maple Tree, by David M. Schwartz; ISBN 1-57471-556-9

Plant Leaves, by David M. Schwartz; ISBN 1-57471-328-0

Plant Blossoms, by David M. Schwartz; ISBN 1-57471-329-9

Plant Stems & Roots, by David M. Schwartz; ISBN 1-57471-327-2

From Seed to Plant, by Gail Gibbons; ISBN 0-590-63892-0

A Tree is a Plant, by Clyde Robert Bulla; ISBN 0-439-45614-2

Ten Seeds, by Ruth Brown; ISBN 0-375-80697

How a Seed Grows, by Helene J. Jordan; ISBN 0-06-020185-1

Additional Media

Sprout and Grow Window, available from www.enasco.com; Item# SB36694J.

Family Connections

- Students identify a plant around or near their home. Challenge them to record as much data as they can about the plant (e.g., length, number of leaves, color, texture, fruit, seeds, bugs in residence, etc.).
- Send home (on loan) the data collection books compiled/written by student teams so that students may share their learning with family members.
- Have students write a letter to a family member telling about the growth of the seeds/plants.

Little Lima's Likely Story

Content Standard III

Objective 1

Connections

Standard III:
Students will develop an understanding of their environment.

Objective 1:
Investigate plants and plant growth.

Intended Learning Outcomes:
5. Understand and use basic concepts and skills.
6. Communicate clearly in oral, artistic, written, and nonverbal form.

Content Connections:
Math V; Language Arts VIII

Background Information

This activity provides students the opportunity to work cooperatively in monitoring an experiment that helps establish some basis for discussion of probability with plant growth, as well as the factors that contribute to plant growth. Teamwork practice in the Sprouting Scientists! activity prepares students to be successful with the jobs they will do as part of this activity.

Research Basis

Smith, D. C., & Neale, D. C. (1989). The Construction of Subject Matter Knowledge in Primary Science Teaching. *Teaching and Teacher Education, 5*(1), 1-20.

Teachers are responsible for facilitating students' conceptual change in science. Suggested strategies for teachers to use include finding out students' prior knowledge and predictions, asking for clarification and explanation, providing discrepant events, encouraging discussion about data, and clearly presenting alternative scientific explanations.

Roth, W. M., McGinn, M. K (1997). Graphing: Cognitive Ability or Practice? *Science Education, 81*(1), 91-105.

Graphing is a social practice that involves action and reflection, leading to understanding that is relational. Students should construct graphs from real-life situations.

Assessment Suggestions

- Use student journal entries to assess their construction of knowledge about plant growth.
- Videotape students during their team observations/discussions to assess student use of process skills to investigate (consult your administrator for questions about FERPA).

- Interview students to assess their understanding of conditions that affect plant growth.

Invitation to Learn

Show baby pictures of some/all students in the class. Let students try to guess which picture belongs to whom. Ask students to discuss what caused the growth from baby to first grader. "Are there specific things that a baby needs in order to grow into a first grader?"

Instructional Procedures

1. Show a lima bean seed and a grown plant (e.g., from the Sprout and Grow Window investigation).
2. Ask the students, "Can you prove that plants need specific conditions to grow?" (e.g., light, water, soil, etc.).
3. Scaffold for student discussion by asking questions like, "How can you show that plants need water to grow?"
4. Ultimately, students may decide on an experiment to show that there are conditions that affect plant growth.
5. Place students into teams of four or five. Explain that all students will help gather data for this experiment.
6. Decide which factors to test in the experiment. You may choose to have the following four test groups for each team of students:
   - control group (seed with water, soil and sunlight).
   - seed with water and sun, no soil.
   - seed with water and soil, no light.
   - seed with soil and sun, no water.
7. Have students graph their predictions for the success of each experimental group and the importance of each condition. Provide the opportunity for them to journal about the graphs. You may choose to keep an interactive class journal.
8. Provide students with hand lenses, measuring tools, paper, etc. for gathering data over a two-week period.
9. As a discrepant event, introduce the idea of growing a seed on a sponge. As a class, observe results. Do the results change or strengthen the concept that plants must have soil to grow?

Materials

- ❑ Lima beans
- ❑ Soil
- ❑ Plastic cups
- ❑ Graph icons
- ❑ *Little Lima's Chance* worksheet
- ❑ Colored (painted) lima beans—approximately 60 yellow, 15 brown, 15 blue, 15 white
- ❑ Brown paper lunch sacks—enough for each pair of students to have one
- ❑ Hand lenses
- ❑ Nonstandard measurement manipulatives
- ❑ Student journals

10. Read books about plants to the class and provide selections for student independent reading. Include books that talk about plant growth and uses of plants (see resources for suggested titles).
11. Play *Little Lima's Chance*. Discuss the probability of growth each experimental group has given the results of the game.
12. Compare results of *Little Lima's Chance* with the initial predictive graphs. Compare the results with the actual observations and data being collected on the experimental groups.
13. During the two-week period, interview/discuss with each team about the data they are collecting. Ask them to draw conclusions and make further predictions.
14. Create a class report/book to analyze and display the data and draw conclusions.
    - As a class, compare and contrast the data collected. Decide on norms that were observed by every team.
    - Elicit facts discovered through shared and independent reading.
    - Discuss the order in which the facts/norms should be presented.
    - Have cooperative groups work on writing each fact on a page of the class report/book.
    - Students may add illustrations or selected pieces of data.
    - Publish the book.

Curriculum Extensions/Adaptations/Integration

- Read *Plantzilla* to your class. Discuss why they think the story is reality or fantasy. Students write letters to a scientist telling about their experiences with plants during class.
- Read *Weslandia*. Discuss the ways the main character uses plants (e.g., food, clothing, etc.). Students write lists of all the ways they use plants.
- Provide more activities with probability (see 2004 CORE Academy Handbook).
- Students further investigate how conditions affect plant growth by experimenting with temperature (growing plants in heat and cold).
- Advanced learners reflect on how the conditions required for plant growth affect the lives of farmers. Have them predict the results of a drought or flood on crop production.

- Encourage ESL students to continue to add to their plant dictionaries and use them as resources for reading and writing throughout the activity.

Resources

Books

From Shoot to Apple, by Stacy Taus-Bolstad; ISBN 0-8225-0670-X

From Tree to Paper, by Pam Marshall; ISBN 0-8225-0672-6

From Wheat to Bread, by Stacy Taus-Bolstad; ISBN 0-8225-0673-4

From Flower to Honey, by Robin Nelson; ISBN 0-8225-0667-X

From Cotton to T-Shirt, by Robin Nelson; ISBN 0-8225-4732-5

From Grass to Milk, by Stacy Taus-Bolstad; ISBN 0-8225-4734-1

Plantzilla, by Jerdine Nolen; ISBN 0-439-67953-2

Weslandia, by Paul Fleischman; ISBN 0-7636-1052-6

The Gardener, by Sarah Stewart; ISBN 0-374-42518-3

Family Connections

- Invite parents to a celebration where students present their report. Invite parents to play *Little Lima's Chance* with the students.

Name _____

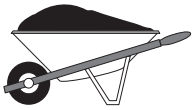
Little Lima's Chance

What are Lima Bean's chances of growing? Can Lima grow with only light and soil? Play this game of chance to make some predictions about how conditions affect plant growth.

Predict: Circle the set of conditions that are most likely to help Little Lima Bean grow into a healthy plant.

1. light water and soil

2. light and soil

3. soil  and water

4. water and light

Trial A: Put 3 yellow lima beans and 2 brown lima beans in a paper bag.

Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that only gets light and soil, but no water (brown)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Light and soil	Brown		

Trial B: Put 3 Yellow lima beans and 2 blue lima beans in a paper bag. Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that gets only soil and water, but no light (blue)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Soil and water	Blue		

Trial C: Put 3 Yellow lima beans and 2 white lima beans in a paper bag. Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that gets only water and light, but no soil (white)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Water and light	White		

Write about what you noticed:

Appendix

Word Sort

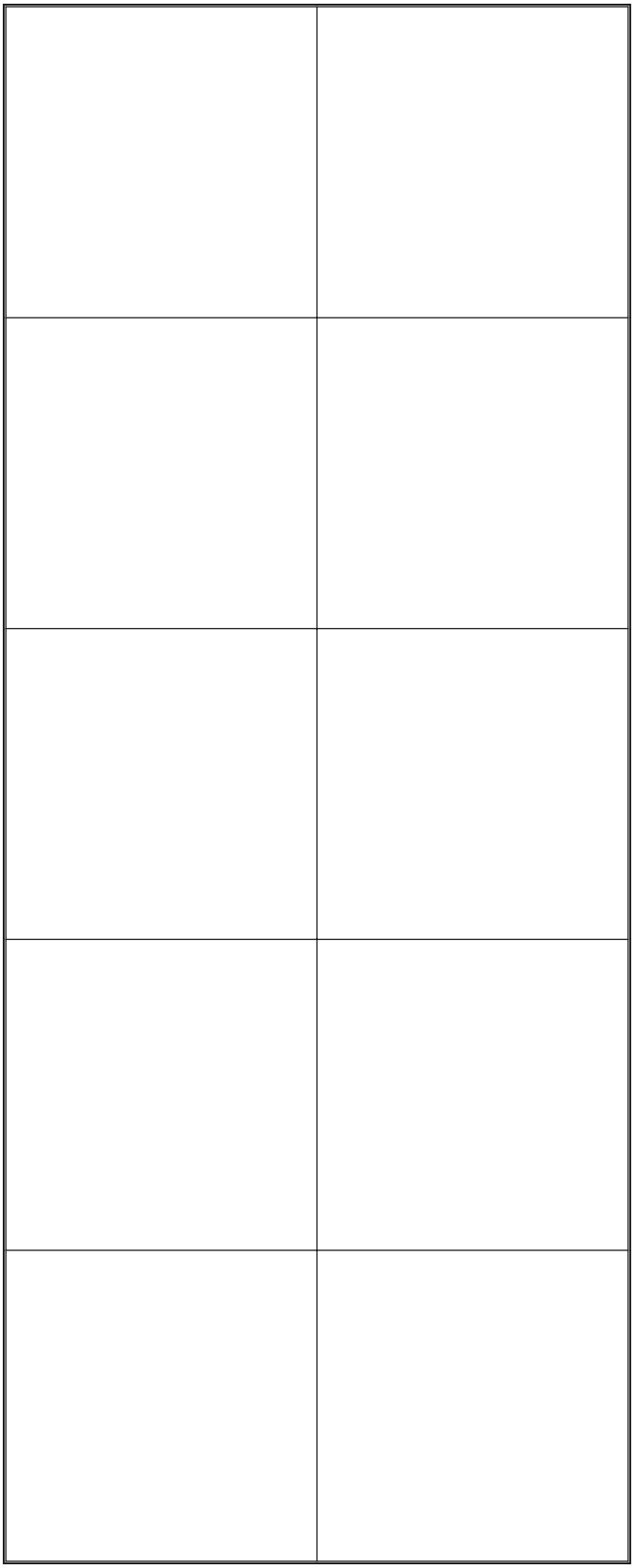
Objective	K-2 Core	3rd Core Area	Standards
1st Core Area	Indicator	ILO's	2nd Core Area
A measurable or observable student action that enables one to assess whether a student has mastered a particular Objective.		Consists of the Language Arts curriculum.	
A broad statement of what students are expected to understand.		A more focused description of what students need to know and be able to do at the completion of instruction.	
Consists of the Mathematics curriculum.		Describes the goals for students to gain knowledge and understand their world.	
Is designed to help teachers organize and deliver instruction.		Consists of the subject areas of the Fine Arts, Health and Physical Education, Science, and Social Studies.	

Name _____

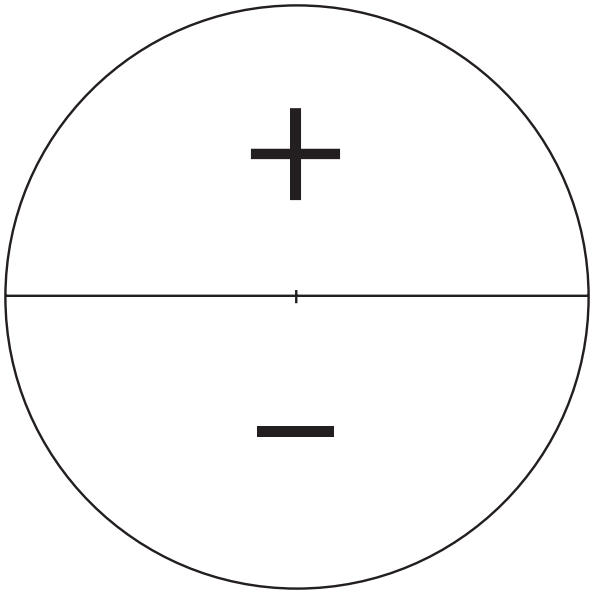
Number Train Number Sentences

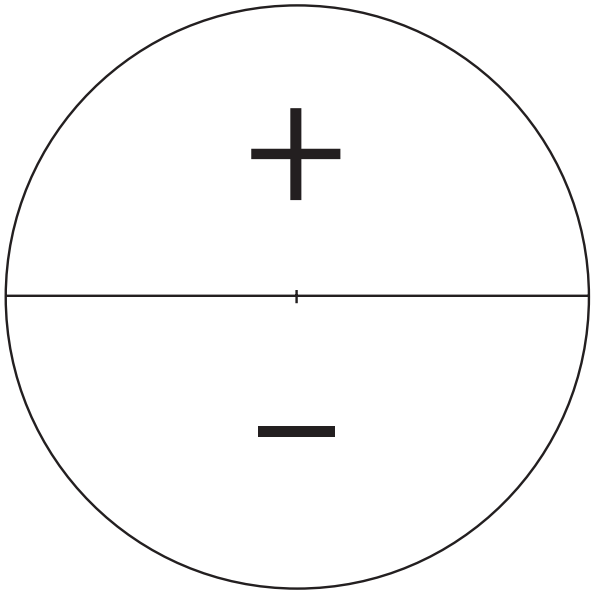
Name _____

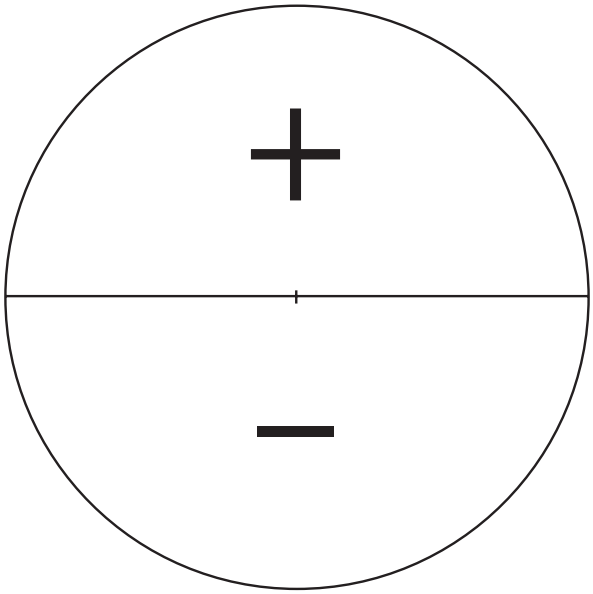
Ten Frame

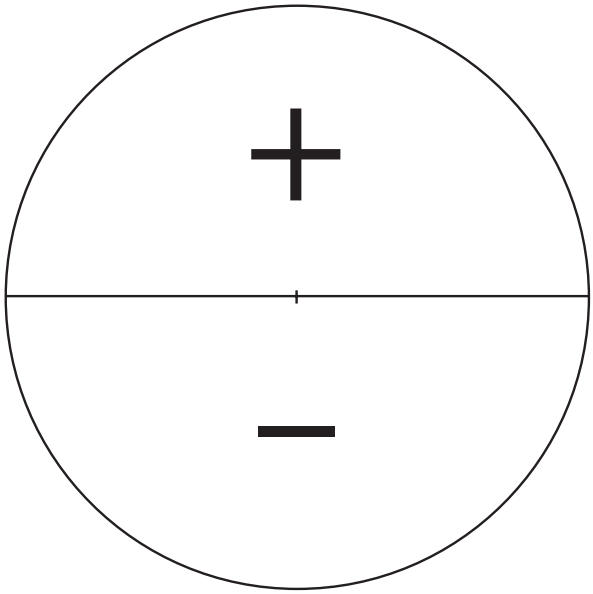


Number Train Plus/Minus Spinner









Name _____

Red/Yellow Toss

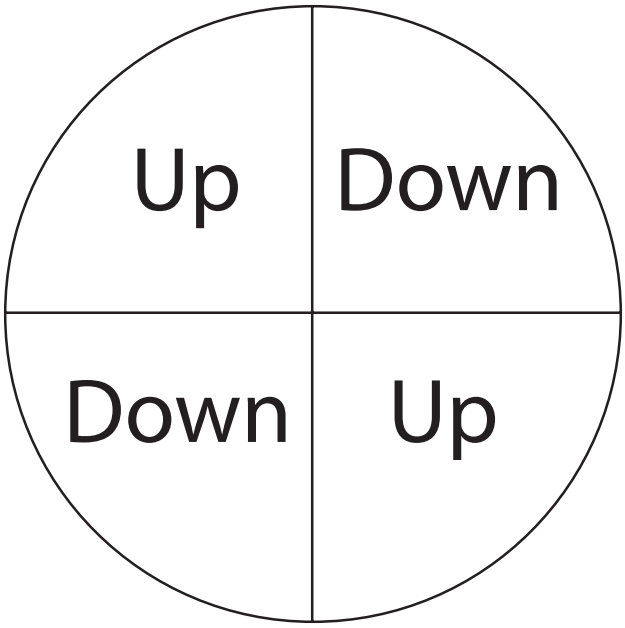
Red First	Yellow First
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____
_____	_____

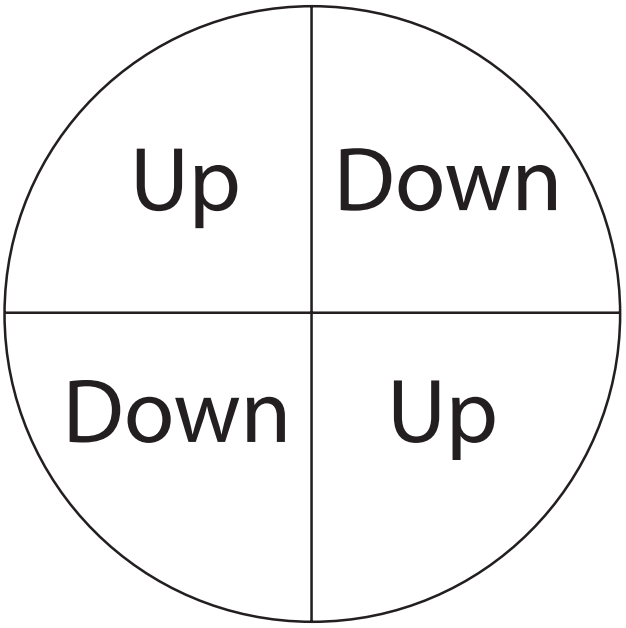
Name _____

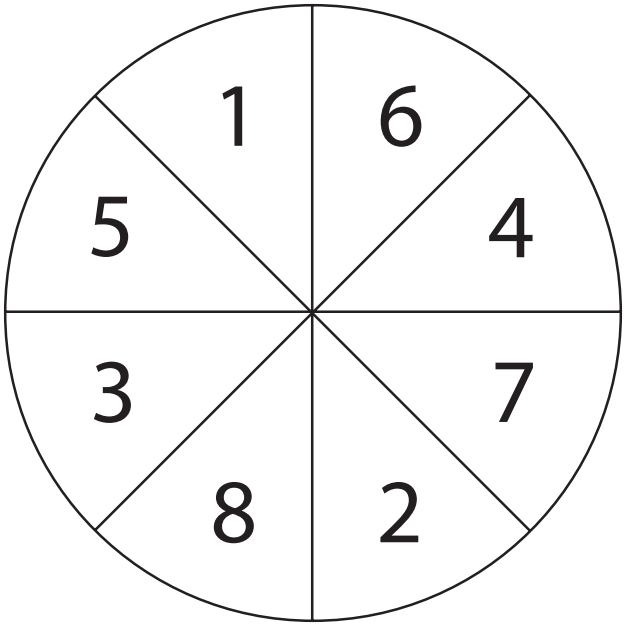
Elevator Game Board

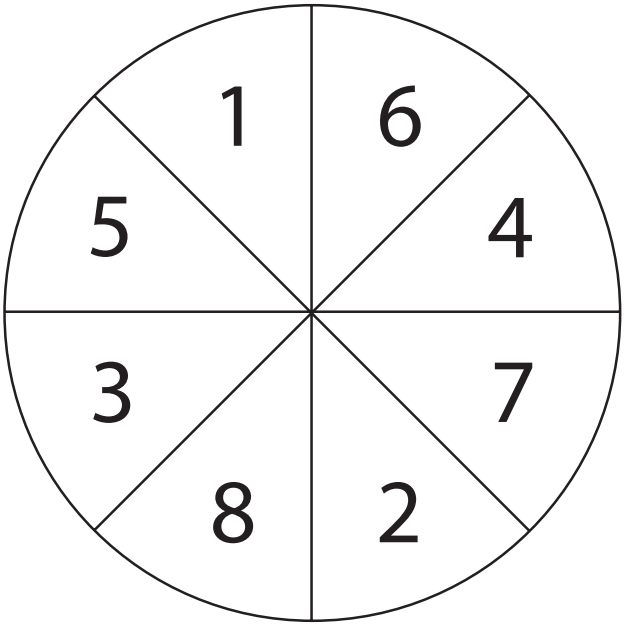
Floor 8
Floor 7
Floor 6
Floor 5
Floor 4
Floor 3
Floor 2
Floor 1

Elevator Spinners

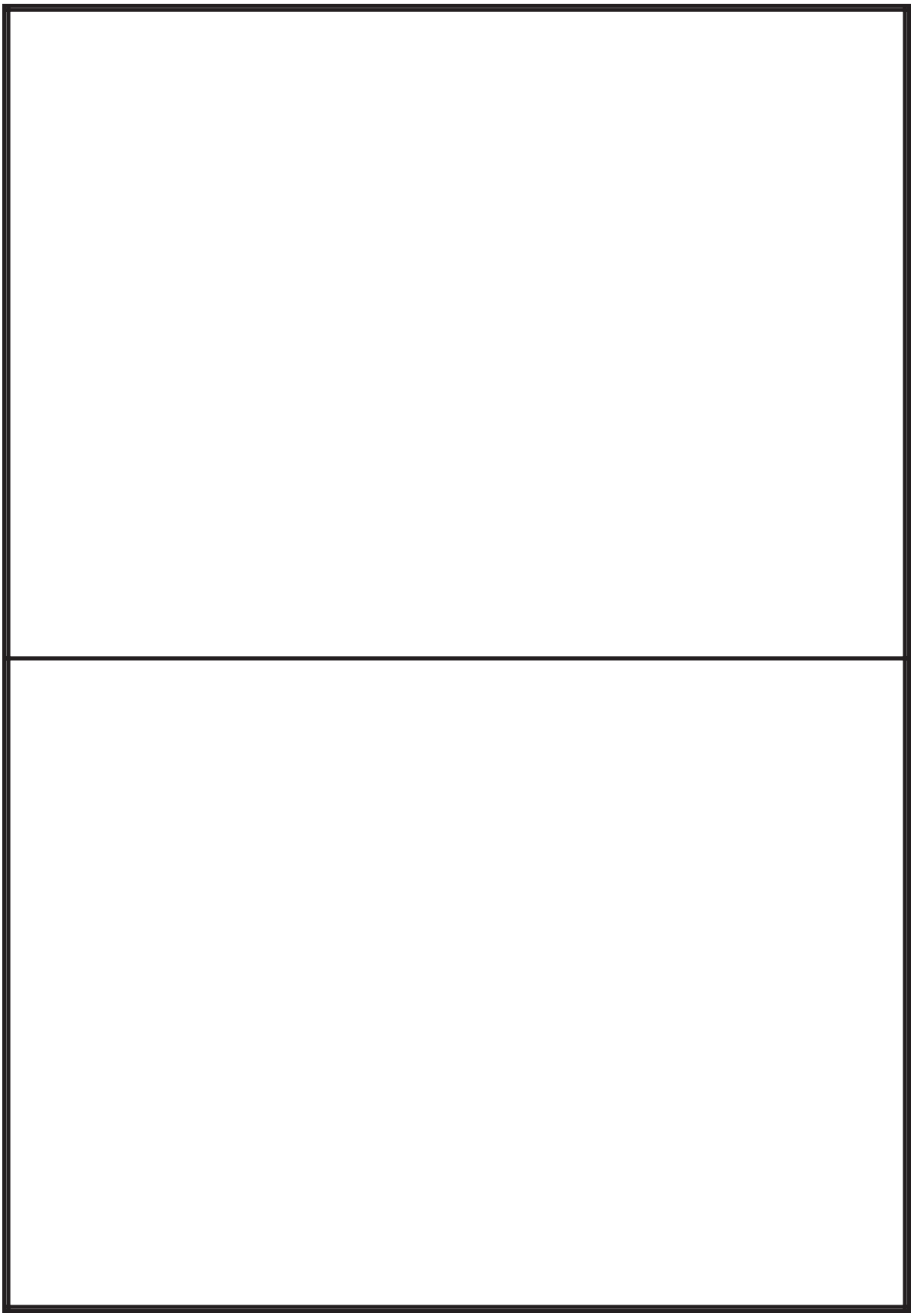




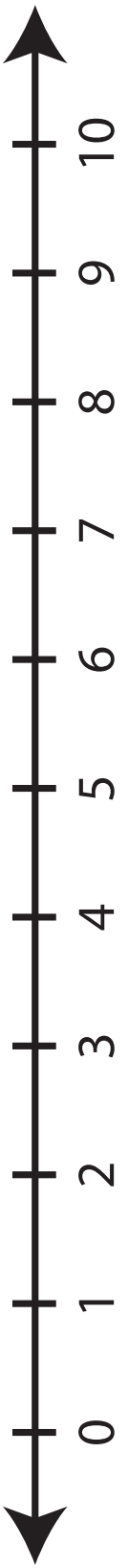




Two-Sided Counting Mat



Number Line



Name _____

Looks Like/Sounds Like Chart

Looks Like	Sounds Like

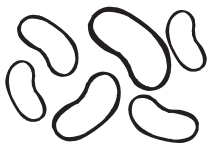
Name _____

Add It Up

Red Beans on top	White Beans on top	Red Beans on top	White Beans on top
Red Beans on top	White Beans on top	Red Beans on top	White Beans on top
Red Beans on top	White Beans on top	Red Beans on top	White Beans on top

Name _____

Bean Addition

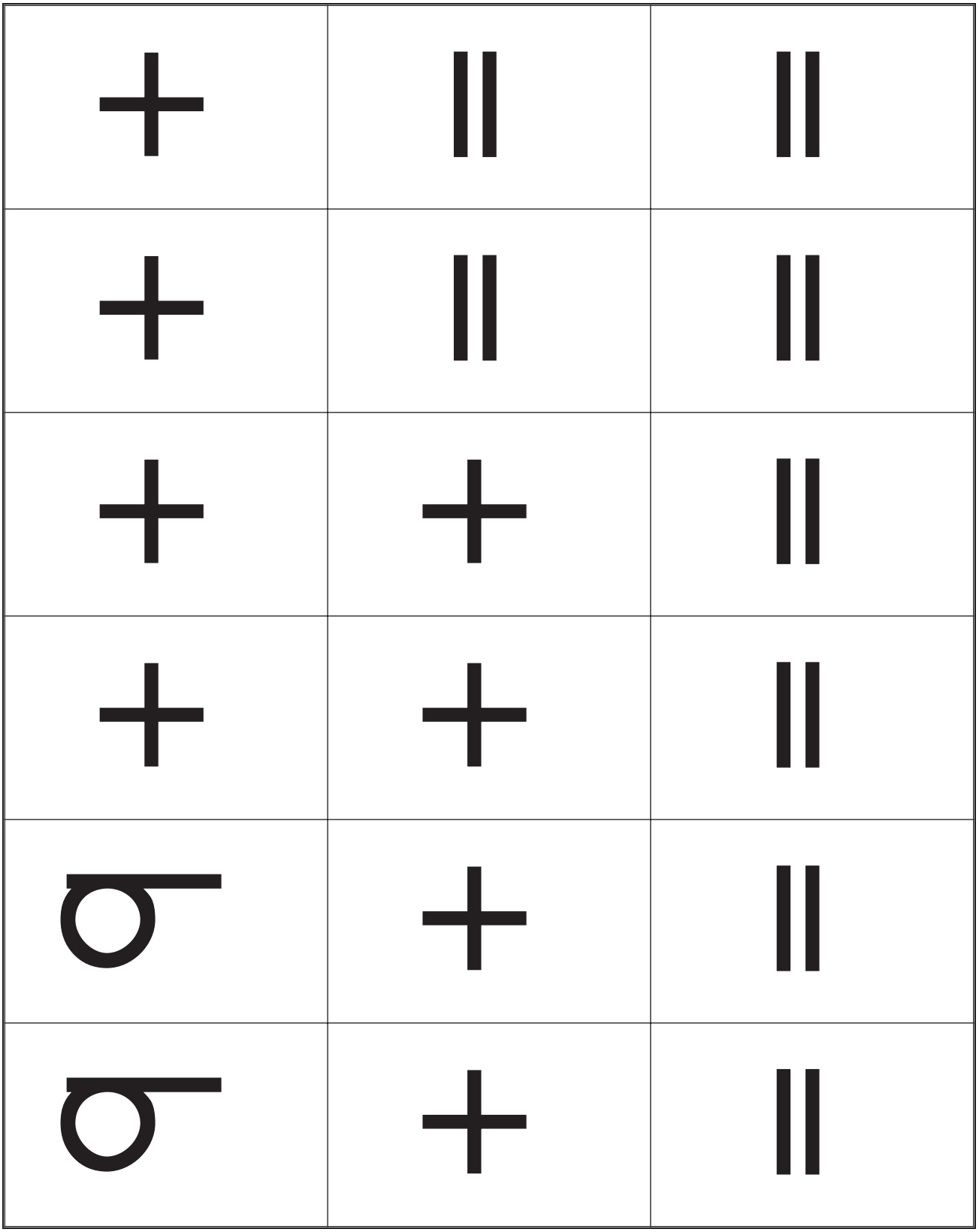


Glue the correct number of beans inside each box to solve the addition number sentence.

2+1 =	_____	4+3 =	_____
2+0 =	_____	4+5 =	_____
4+4 =	_____	1+3 =	_____
1+4 =	_____	1+5 =	_____

Numeral Cards

2	5	8
2	5	8
1	4	7
1	4	7
0	3	6
0	3	6



Name _____

My Music Magic Performance

I helped my group decide what to do:

I helped by:

_____

_____

_____

I did my performance part:

My part was:

_____

_____

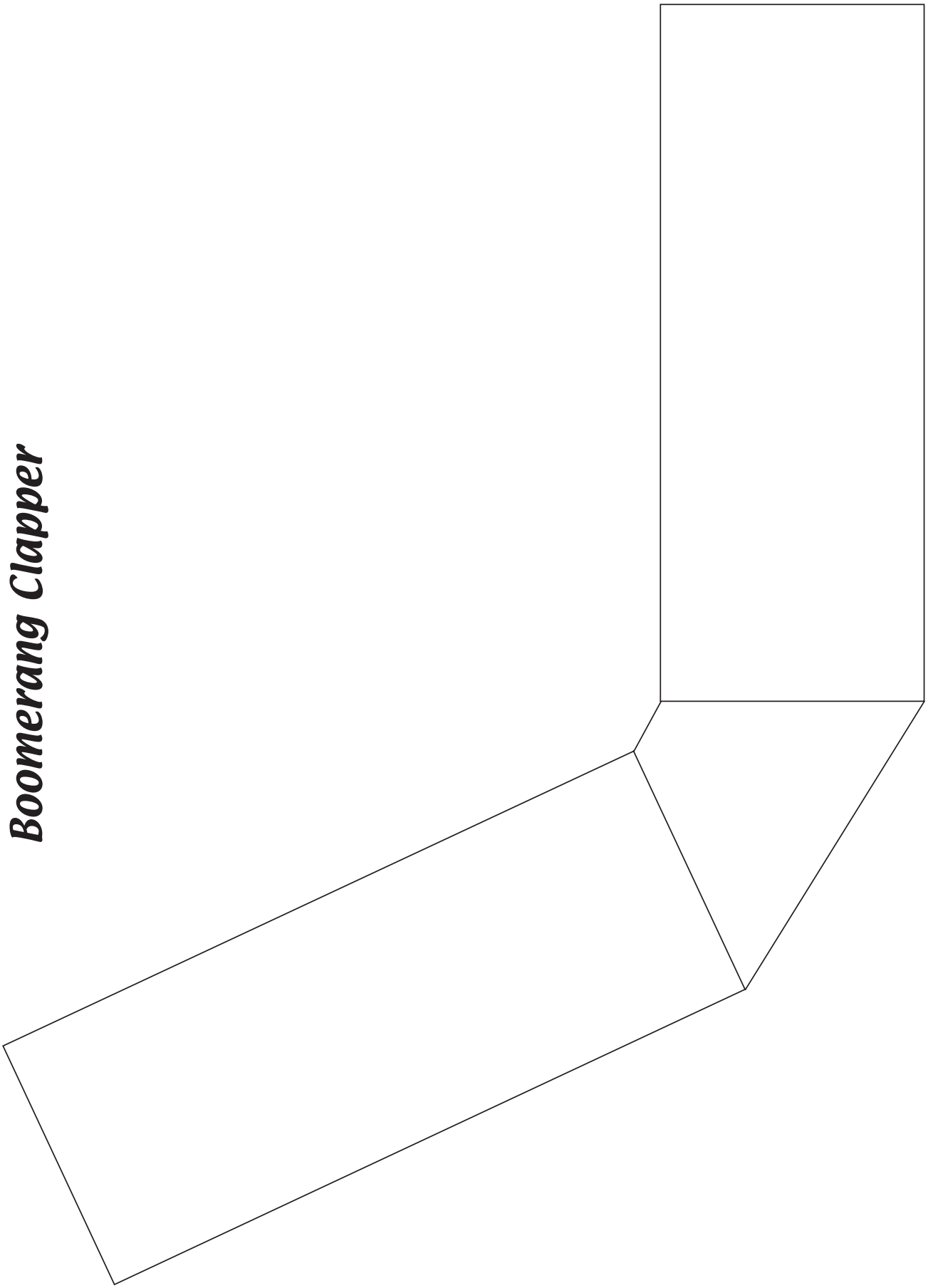
_____

Name _____

Musical Storyboard

1	2
3	4
5	6
7	8

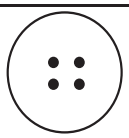
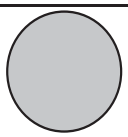
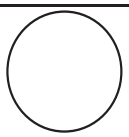
Boomerang Clapper



Name _____

Button Up

Predict which button will make it to the top first by marking an x in one top box. Roll the button die. Put a corresponding real button in the space above the picture. Continue until one column reaches the top. Record by drawing buttons in each square that had a real button in it.

2-holed	 4-holed	shank	 metal	 white	texture

Name _____

Sock Tally Sheet

Predict which sock color you think will be pulled out of the basket the most. Circle the color name. Everyone in the class can have a turn to pull out a sock as the students make tallies in the socks.

blue	red	green

Repeat the activity with 2 blue socks this time.

2 blue socks	red	green

Name _____

Spoonful of Money

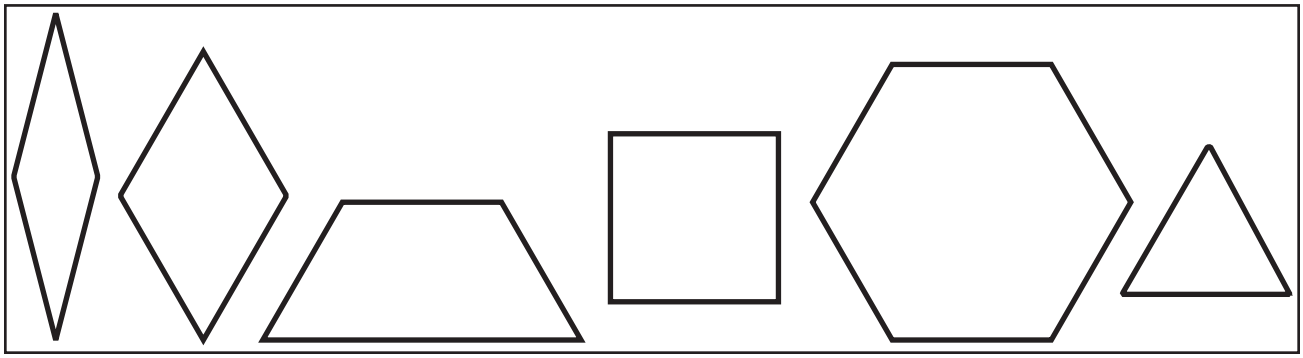
Dimes										
Nickels										
Pennies										

Write 3 sentences about the graph.

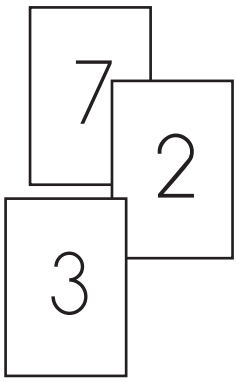
Name _____

Pattern Block Tally Sheet

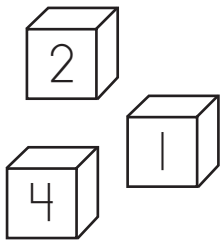
Roll a pattern block die or spin a spinner 12 times. Draw out that pattern block and place in the middle. Record by placing tally marks in the shapes below. Arrange blocks into a design. Replace the blocks with paper shapes and glue.

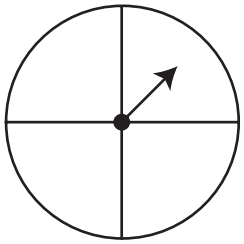


Name _____



Probability Games





Activity Packet

- ❑ Double Dice Addition Facts
- ❑ Ten Beans
- ❑ Exactly Ten
- ❑ Runts Race
- ❑ Bear Race
- ❑ Traveling the World
- ❑ Pattern Block Tally
- ❑ Button Up

Double Dice Addition Facts

Make a prediction by marking an x in one box at the top. Roll 2 number cubes (1-6). Record the number sentence in the box above the sum. Continue until one column reaches the top. When you are finished, make a tally on the class chart to show your winning number.

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
2	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**

Ten Beans

From a bowl of beans, try to pull out 10 beans. Put the beans in the ten frame. Tally the results below. Do it 10 times.

Ten Frame				

Results		
Less than 10	Exactly 10	More than 10

Exactly Ten

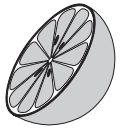
This game is played in pairs.

Place a shuffled deck of *Exactly Ten Cards* face down on the draw pile. The first player picks a card and puts it face up by his/her desk. Then pick a second card to see if the two numbers add up to exactly 10. If they do, the player keeps those two cards in a stack. If not, discard both cards face up on the discard pile. The second player picks a card from the draw pile. If the top card of the discard pile adds up to 10 with the first card, then the player may keep both cards. If not, the player takes a second card from the draw pile to see if that will combine with the first card to add up to 10. As you collect sets of two cards that add up to 10, keep them in separate piles on your desk. If a "happy" card is drawn, it is wild and may be used for the number needed to add to another card to make 10. Play continues until all the cards from the draw pile are gone. Players count their sets of two cards that add up to exactly 10. Record all of those number sentences on the *Exactly Ten* worksheet. Be sure to substitute the "happy" card number for the number needed to make 10. The person with the most sets wins.

These are my sets that add to exactly 10.

Runts Race

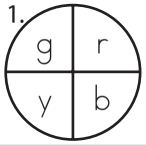
Predict by marking an x in one box to the far right. Spin the Runts spinner. Draw and color a fruit in the correct space. Continue until one of the fruits reaches the end of the row.

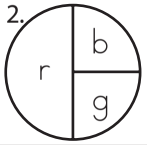
pink														☐
green														☐
 orange														☐
yellow														☐
red														☐
blue														☐

Bear Race

Put an x in the box to the right for your prediction. Build each graph with bears as you spin. Color the squares.

I used spinner #_____								
red								☐
blue								☐
yellow								☐
green								☐

1. 

2. 

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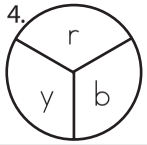
4. 

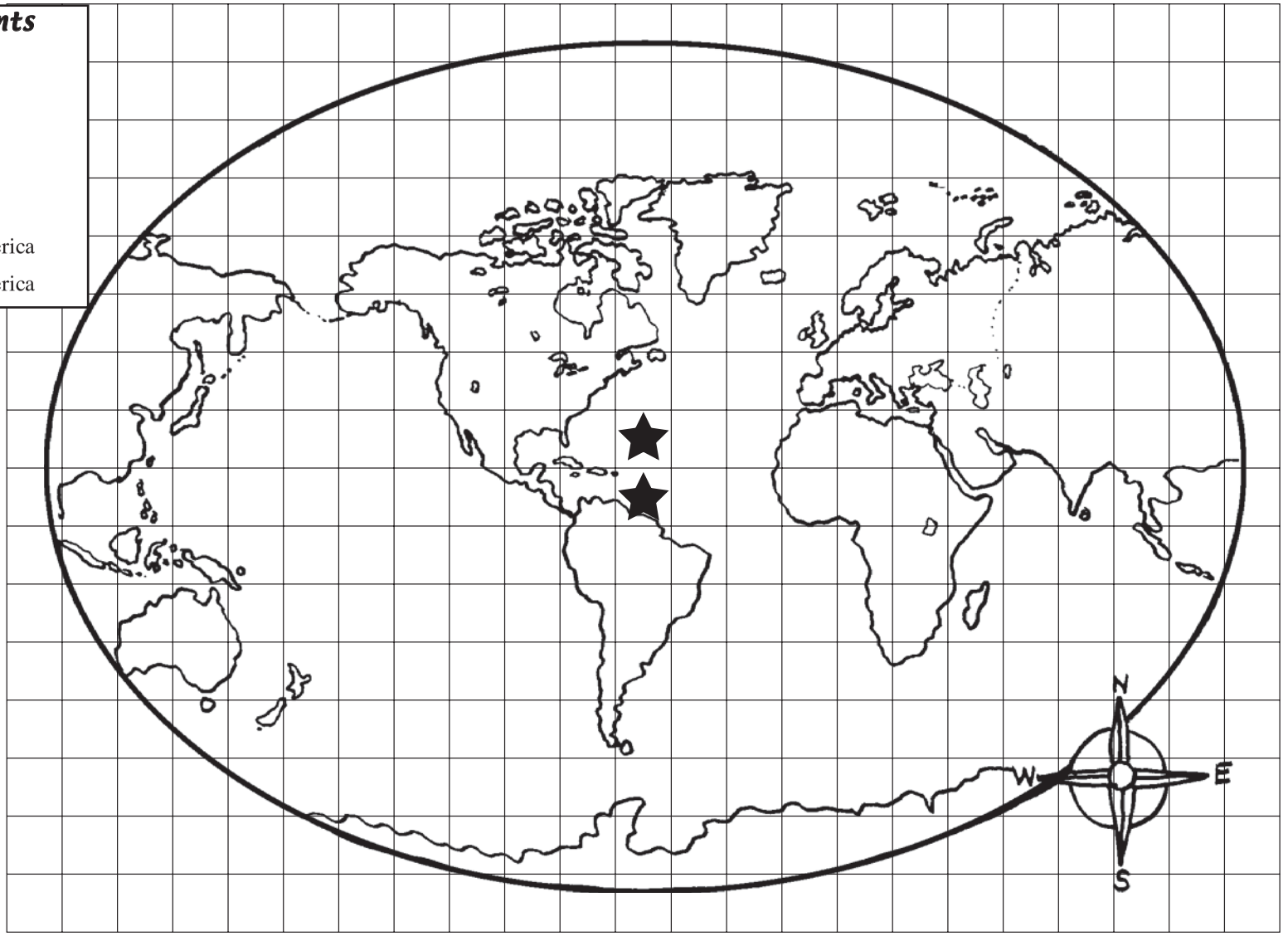
I used spinner #_____ Use a different spinner than before. Compare your results with the rest of your group.								
red								☐
blue								☐
yellow								☐
green								☐

Traveling the World

Each partner places a bead on either one of the stars in the middle of the map. Spin the NESW spinner for the direction to move, and roll the 1-2-3 die for the number of spaces. The first player to get his/her bead to the edge of the grid wins.

7 Continents

- ❑ Africa
- ❑ Antarctica
- ❑ Asia
- ❑ Australia
- ❑ Europe
- ❑ North America
- ❑ South America

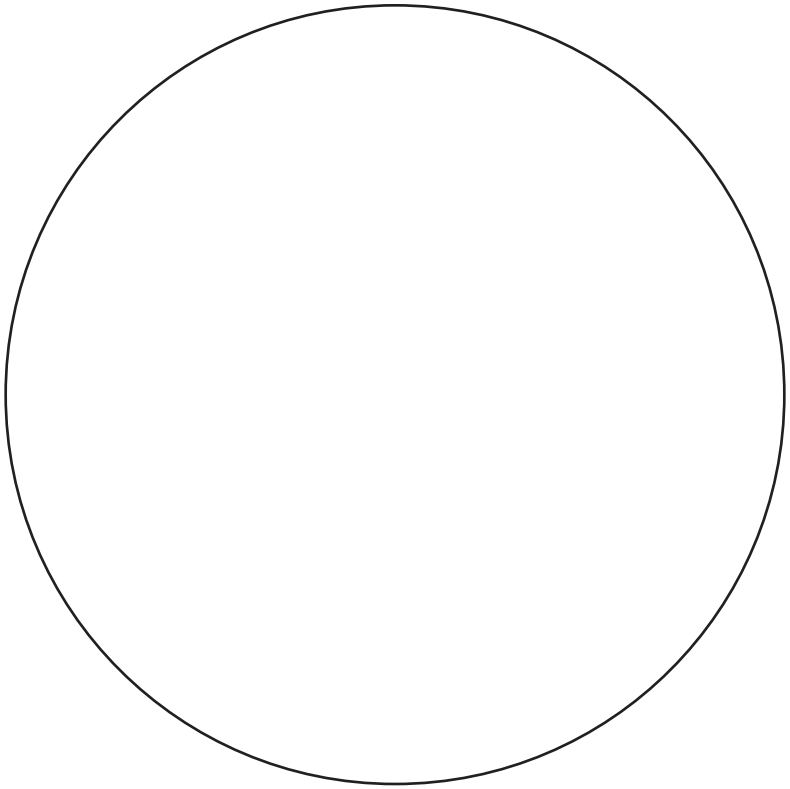


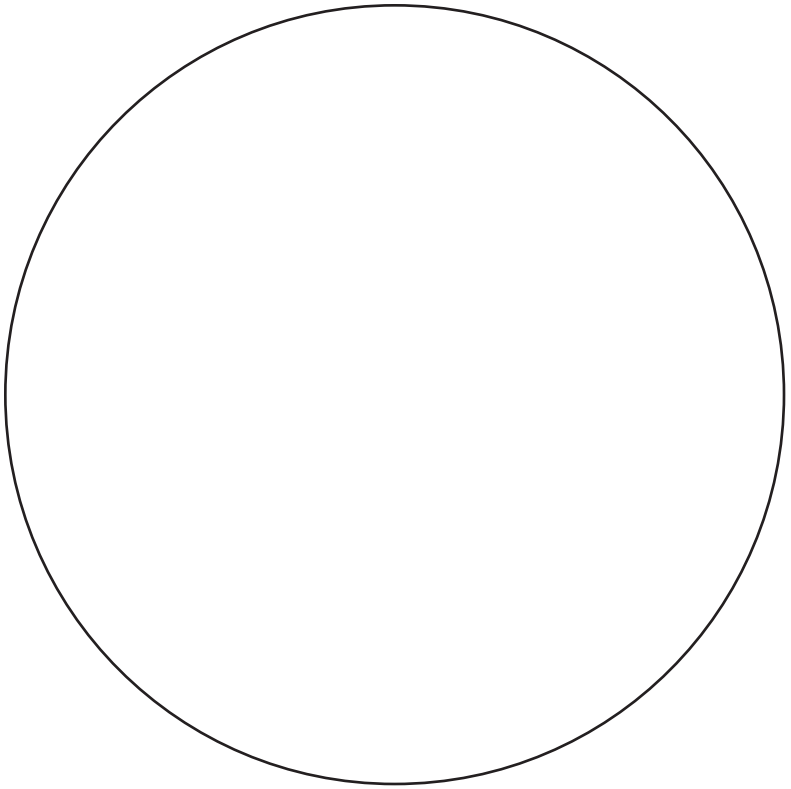
Name _____

Sorting Seeds!

Sort your seeds at least three times. Choose your favorite attribute and record it by gluing down the seeds. Don't forget to label your sets!

Sorting record: [ ] [ ] [ ]





Name _____

Sorting Seeds at Home!

Ask family members to sort your seeds. Record their strategies by writing the attribute they sorted by and the names they gave their sets. Glue an example next to each set label. Have each person sign next to his/her strategy!

Strategy/ Attribute	Example	Set Labels	Example	Signatures
size		big & tiny		
		&		
		&		
		&		

Name _____

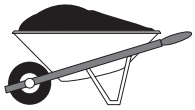
Little Lima's Chance

What are Lima Bean's chances of growing? Can Lima grow with only light and soil? Play this game of chance to make some predictions about how conditions affect plant growth.

Predict: Circle the set of conditions that are most likely to help Little Lima Bean grow into a healthy plant.

1. light water and soil

2. light and soil

3. soil  and water

4. water and light

Trial A: Put 3 yellow lima beans and 2 brown lima beans in a paper bag.

Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that only gets light and soil, but no water (brown)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Light and soil	Brown		

Trial B: Put 3 Yellow lima beans and 2 blue lima beans in a paper bag. Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that gets only soil and water, but no light (blue)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Soil and water	Blue		

Trial C: Put 3 Yellow lima beans and 2 white lima beans in a paper bag. Are the chances for a seed that gets light, soil and water (yellow) better than the chances for a seed that gets only water and light, but no soil (white)? Draw one seed from the bag and record the result with a tally mark. Return the seed to the bag and repeat 25 times. Write the totals. Circle the color drawn most.

Conditions	Color of Seed	Number of Times Seed is Drawn	Total
Light soil and water	Yellow		
Water and light	White		

Write about what you noticed: