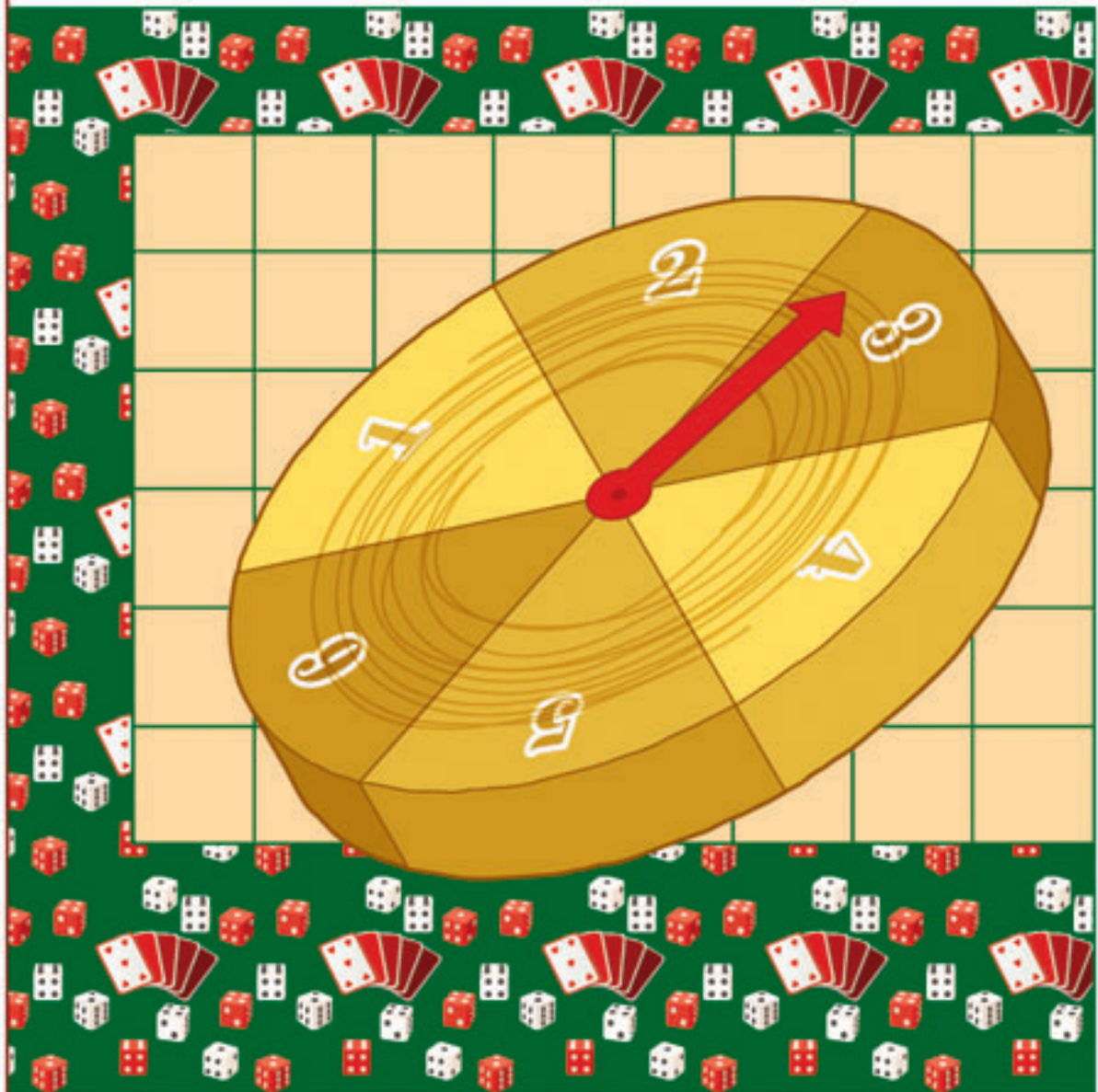


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MATH MARVELS



Purposeful Practice of Basic Skills

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Purposeful Practice of Basic Skills

Judy Bippert is a credentialed teacher with a master's degree and more than 30 years experience teaching junior high and college students, coordinating Gifted Education programs and supervising student teachers. Judy is a faculty member at San Diego State University, California. Best-selling titles she has co-authored include *A-Maze-ing Shapes*, *Athenian Secret*, *Game Factory*, *Into the Unknown*, *Project Polaris* and *Space Probe*.

Louise Vandling has a master's degree and more than 30 years experience as a teacher, administrator, district math mentor, university math methods instructor and staff developer. Louise is a mathematics specialist at the Casita Center for Technology, Science and Math magnet school in Vista, California, and an extended studies instructor at the University of California at San Diego. Best selling titles she has co-authored include *A-Maze-ing Shapes*, *Game Factory*, *Into the Unknown*, *Project Polaris* and *Space Probe*.

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The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. MATH MARVELS addresses mathematics standards as established by the National Council of Teachers of Mathematics (NCTM), as well as cooperative and applied learning standards. Games can be used to reinforce a number of the NCTM Principles and Standards. As NCTM states, “Opportunities to use strategies must be imbedded naturally in the curriculum...” Games offer this opportunity. In addition to providing practice with basic skills, games promote reasoning and problem solving, two major components of mathematical thinking. The specific standards addressed include:

NCTM Mathematics Standards

Number and Operations

- Understand numbers, ways of representing numbers, relationships among numbers and number systems
- Understand meanings of operations and how they relate to one another
- Compute fluently and make reasonable estimates

Algebra

- Understand patterns, relations, and functions

Problem Solving

- Build new mathematical knowledge through problem solving
- Solve problems that arise in mathematics and in other contexts
- Apply and adapt a variety of appropriate strategies to solve problems
- Monitor and reflect on the processes of mathematical problem solving

Communication

- Organize and consolidate their mathematical thinking through communication
- Communicate their mathematical thinking coherently and clearly to peers, teachers, and others
- Use the language of mathematics to express mathematical ideas precisely

Connections

- Recognize and use connections among mathematical ideas
- Understand how mathematical ideas interconnect and build on one another to produce a coherent whole
- Recognize and apply mathematics in contexts outside of mathematics

Probability

- Understand and apply basic concepts of probability

California Applied Learning Standards

Standard 2: Students will understand how to solve problems through planning and organization.

Standard 6: Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8: Students will understand the importance of teamwork. Students will work in teams to achieve objectives.

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Students love to play games and games are strong motivators to learning. MATH MARVELS includes a multitude of games with which students practice standards-based skills and problem-solve as they bring each game to life. The goal of this unit is to give students a purpose for learning and playing games that reinforce the skills necessary for success in mathematics.

Students experience decision making, working with groups, and considering practical aspects as they reinforce their own learning. Students practice mathematical skills using place value, computation, mental math, number sense, logic, and strategic thinking. Working together to play a game, students communicate orally about their mathematical thinking. Writing their analysis of the game provides insights into their mathematical understanding. MATH MARVELS benefits students in the following ways:

Knowledge

- Place value
- Number facts
- Number sense
- Probability
- Organization of time

Skills

- Problem-solving abilities
- Mental math
- Strategic (algebraic) thinking
- Estimation
- Number operations
- Logic
- Communication of mathematical ideas
- Organization of groups
- Elapsed time scheduling

Attitudes

- Positive attitudes toward mathematics
- Appreciation of the benefits of working in groups toward a common goal
- Confidence in decision making
- Understanding the necessity for developing strategies necessary for game proficiency

PURPOSE

OVERVIEW

OVERVIEW

Games provide development of multiple abilities in children in a positive setting. They reinforce a sense of personal responsibility for learning. Rather than the narrow “Is it right?” and “What’s my grade?” mentality, reinforcing skills through games develops a non-threatening atmosphere for learning mathematics. Games allow children to be more involved as they learn. Seeing, hearing, and doing simultaneously leads to maximum retention of skills. Second language learners find games a non-threatening means to practice their language skills while improving mathematics skills.

Games work best if they are both challenging and accessible to students of differing ability levels. To hold interest, games need to be engaging and “win-able.” For a game to be sustained over time it needs to be repeatable—to have situations or numbers change enough to make it a “new” game each time. Games need to allow multiple approaches and solutions. They should require strategic or algebraic thinking where repeated playing allows improvement of skills while building understanding of the strategy or logic underlying the game.

Parents, the community, and/or other classes participate in the product of this innovative learning unit. Students plan and prepare for a *Math Game Day* or *Night* culminating event. They learn a wide variety of games ranging in difficulty and skill level and make decisions about appropriate games for the intended participants. They plan how the games will be organized for the event. Real-life applications are integrated in the organizational details of determining space, audience, and time frames.

Weeks 1 and 2

During the first two weeks of the unit, students learn, play, and evaluate two to three games each day. Students work cooperatively in pairs, small groups, and as a class as they are challenged to use a variety of math skills to learn and practice each game. At the end of Week 2, the class discusses the game evaluations and determines which games will be played during the culminating *Math Game Day/Night* event.

Week 3

Students work in pairs to prepare for their culminating event. Each student pair is responsible for thoroughly learning and developing instructions for one game. During Days 12–14, student pairs teach other pairs their games as they develop a cohesive plan for *Math Game Day/Night*. Day 15 is the culmination *Math Game Day/Night* event. Each student pair teaches their game to the participants in attendance.

1. Before You Begin

Carefully and thoroughly read this entire Teacher Guide *before* beginning. Determine what games and variations are appropriate for your class and your *Math Game Day/Night* audience. It will be helpful to consider your students' skill levels and what skills you want to reinforce with your students. Try out the games yourself so you will be able to teach the games to your students.

Throughout the Teacher Guide, Interact employs certain editorial conventions to identify materials.

- a. In preparing materials, *Class set* means *one per student*.
- b. One *Day* on the **Unit Time Chart** is 45 minutes—one hour.
- c. All transparency masters and student handouts are listed by name using ALL CAPITAL LETTERS.
- d. Teacher reference pages are named in **Bold**.
- e. Special events are named using *Italics* (e.g., *Math Game Day/Night*).

2. Timing

Your class will need at least three weeks for the planning, preparation of the games and materials, and to hold your *Math Game Day/Night* event.

Weeks 1 & 2:

- Pre-planning for event (flyers, etc.)
- Learning games
- Choosing games

Week 3:

- Game preparation
- Game Preview days
- *Math Game Day/Night*

3. Grouping Students

Determine how students will work together. This unit is designed for students to work in small groups or pairs during Days 2–10 and in pairs during Days 11–14.

4. Games

There are 32 games from which to choose. See the **Game Chart** on page 14 for information on the recommended grade levels and content standards for each game. Older students can teach and play some of the games with students as young as Kindergarten or first grade.



SETUP DIRECTIONS



Overhead cards are helpful to teach many of these games. If you do not have any, make a set by copying a deck of cards (Ace–10) onto a transparency and cutting them apart.



The minimum materials needed for teaching the games: one deck of cards per student, three dice per two students, and 20 game markers per student.



Two-colored counters are those that are red on one side and white or yellow on the other.

Before beginning this unit, choose a game to model for students on Day 1. **Place It!** works well for a variety of abilities and grade levels. During Days 2–10 you will teach two to three games a day, for a total of 18–27 games. Select these games based on grade level, student needs, and the type of culminating event you have planned. Once students evaluate the games, you will select the games to use during your culminating *Math Game Day/Night*. During Days 11–14, students work in pairs as they learn and teach others how to play one of the games selected for your *Math Game Day/Night* event.

Game markers can be beans, buttons, or any other manipulative that can be used for game pieces. Markers that have a flat side, so they do not roll away, are recommended. Keep containers of different kinds/colors of game markers to be used for all games that need them. Each container should have 20–25 markers. Or create one container for each student using a zippered baggie or film canister with 15–25 markers per student. When a game calls for only seven markers (e.g., **Dicey**) that would be all that students would take out.

5. Materials

Prior to beginning MATH MARVELS, assemble the following materials in the quantities indicated in *Italics*. The materials are organized by game for your convenience.

- Overhead projector — *one*

101 (grades 4–6)

- Deck of cards (Ace–10) — *one per game*

Aim for Zero (grades 2–5)

- Paper (for recording) — *one per game*
- Pencils — *one per player*

Apple Tic-Tac-Toe (grades 1–2)

- Container (for counters) — *one per game*
- Counters (two-colored) — *10 per game*
- Game markers (different color per player) — *15+ per player*

Close to 30 (grades 3–5)

- Deck of cards (Ace–10) — *one per game*

Color Squares (grades K–6)

- Crayon or marker (two colors) — *one per player*
- Grid paper — *one per game (Optional)*

Columns and Rows (grades 5–6)

- Game markers (different color per player) — *12 per player*
- Paper (to record scores) — *one per player*
- Pencils — *one per player*

SETUP DIRECTIONS

Counting Coordinates (grades 4–6)

- Dice — *two of different colors*
- Paper — *one per player*
- Pencils — *one per player*

Cover It (grades 3–6)

- Game markers (different color per player) — *15 per player*
- 50 or 100-square grid — *as needed (Optional)*

Dicey (grades 2–6)

- Dice — *two per game*
- Game markers (different color per player) — *seven per player*

Digit Place (grades 4–5)

- Calculator — *one per player (Optional, used only for checking results)*
- Die (0–9) or deck of cards (Ace–10) — *one die or one deck of cards per game*
- Pen — *one per player*

Draw to Win (grades 2–5)

- Deck of cards (Ace–10) or a 0–9 spinner — *one per game*
- Pencil — *one per player*

Fast Facts (grades 4–6)

- Deck of cards (Ace–10) — *one per game*
- Paper (scratch) — *one per player*
- Pencil — *one per player*
- Timer — *one per game (Optional)*

Finding 10s (grades 1–3)

- Deck of cards (Ace–10) — *one per game*

Four in a Row (grades 5–6)

- Dice — *two per game*
- Game markers (different color per player) — *18 per player*

Fraction Battle (grades 5–6)

- Deck of cards (Ace–10) — *one per game*

Highest Wins (grades K–6)

- Deck of cards (Ace–10) — *one per game*

Left Overs (grades 3–6)

- Die or 1–6 spinner — *one per game*
- Game markers (different color per player) — *one per player*
- Paper (scratch) — *one per player (Optional)*
- Pencils — *one per player (Optional)*

Less is Best (grades 3–6)

- Calculator — *one per player (Optional)*
- Deck of cards (Ace–10) — *one per game*
- Timer — *one per game (Optional)*

Make 100 (grades 3–5)

- Deck of cards (Ace–6), die, or 0–6 spinner — *one per game*
- Pencils — *one per player*

SETUP DIRECTIONS

- Make a Path** (grades 2–5)
- Dice — *four per game*
 - Game markers (different color per player) — *24 per player*
 - 100-square grid — *as needed (Optional)*
- Make it Right** (grades 3–6)
- Deck of cards (Ace–10) or 0–9 spinner — *one per game*
- Make the Numbers** (grades 3–6)
- Deck of cards (Ace–10) — *one per game*
- Place It!** (grades 1–6)
- Deck of cards (Ace–10) — *one per every two players*
 - Pencils — *one per player*
- Play Them All** (grades 2–5)
- Game markers (different color per player) — *12 per player*
- Products in a Row** (grades 3–6)
- Game markers (different color per player) — *19 per player*
- Round Up—Round Down** (grades 3–5)
- Dice or deck of cards (Ace–6) — *two dice or one deck of cards per game*
 - Pencils — *one per player*
- Spin to Win** (grades K–3)
- Box (for play money) — *one per game*
 - Game markers (different color per player) — *five per player*
 - Paper clip (for spinner) — *one per game*
 - Pencil (sharpened; for spinner) — *one per game*
 - Play money (coins) — *20 pennies + 10 of each other coin per game*
- Subtraction Action** (grades 3–5)
- Deck of cards (Ace–10), 0–9 spinner, or decahedron die (0–9) — *one per game*
 - Pencils — *one per player*
- Take 10** (grades 1–3)
- Deck of cards (Ace–10) — *one per game*
- Target** (grades 3–6)
- Deck of cards (Ace–10) — *one per game*
 - Pencils — *one per player*
- Three-Dice Roll** (grades 2–6)
- Dice — *three per game*
 - Pencils — *one per player*
- Total 20** (grades 2–4)
- Deck of cards (Ace–10) — *one per game*

6. Reproducible Masters

Make copies of the following pages in the quantity indicated in *Italics*. The master pages for you to duplicate begin on page 24.

- GAME EVALUATION — *one class set per game evaluated + one transparency*
- GAME WRITE-UP — *one per student “teaching” each game*
- GAME WRITE-UP RUBRIC — *class set or transparency + one to post*
- OBSERVATION CHECKLIST — *20 (two per day for 10 days)*
- MATH GAME DAY/NIGHT INVITATION — *class set + as needed*
- MATH GAME DAY/NIGHT REMINDER — *as needed*
- MATH GAME DAY/NIGHT WELCOME — *as needed*
- DICE — *as needed*
- SPINNERS — *as needed*

Apple Tic-Tac-Toe (grades 1–2)

- APPLE TIC-TAC-TOE GAME BOARD (I, II, or III) — *one per game*

Close to 30 (grades 3–5)

- CLOSE TO 30 RECORD — *one per player*

Color Squares (grades K–6)

- COLOR SQUARES GAME (I or II) — *one per game*

Columns and Rows (grades 5–6)

- COLUMNS AND ROWS GAME BOARD — *one per game*

Counting Coordinates (grades 4–6)

- COUNTING COORDINATES GAME BOARD — *one per game*

Cover It (grades 3–6)

- COVER IT GAME BOARD — *one per game*
- COVER IT SPINNER — *one per game*

Dicey (grades 2–6)

- DICEY GAME BOARD — *one per game*

Digit Place (grades 4–5)

- DIGIT PLACE RECORD — *one per player*

Draw to Win (grades 2–5)

- DRAW TO WIN RECORD (I or II) — *one per player*

Four in a Row (grades 5–6)

- FOUR IN A ROW GAME BOARD — *one per game*

SETUP DIRECTIONS

- Fraction Battle** (grades 5–6)
- FRACTION BATTLE GAME BOARD — *one per game*
 - COMPARING FRACTIONS (equivalency chart) — *one per game (Optional)*
- Left Overs** (grades 3–6)
- LEFT OVERS GAME BOARD — *one per game*
- Less is Best** (grades 3–6)
- LESS IS BEST GAME BOARD (I or II) — *one per player*
 - LESS IS BEST RECORD — *one per player*
- Make 100** (grades 3–5)
- MAKE 100 RECORD — *one per player*
- Make a Path** (grades 2–5)
- MAKE A PATH GAME BOARD — *one per game*
- Make it Right** (grades 3–6)
- MAKE IT RIGHT GAME — *one per player*
- Make the Numbers** (grades 3–6)
- MAKE THE NUMBERS RECORD (I and II) — *one per player*
- Place It!** (grades 1–6)
- PLACE IT! GAME BOARD (I, II, or III) — *one per player*
 - PLACE IT! RECORD — *one per player*
- Play Them All** (grades 2–5)
- PLAY THEM ALL GAME BOARD — *one per game*
- Products in a Row** (grades 3–6)
- PRODUCTS IN A ROW GAME BOARD — *one per game*
- Round Up—Round Down** (grades 3–5)
- ROUND UP—ROUND DOWN RECORD — *one per player*
- Spin to Win** (grades K–3)
- SPIN TO WIN SPINNER — *one per game*
- Subtraction Action** (grades 3–5)
- SUBTRACTION ACTION GAME — *one per player*
- Target** (grades 3–6)
- TARGET RECORD — *one per player*
- Three-Dice Roll** (grades 2–6)
- THREE-DICE ROLL RECORD — *one per player*

7. Teacher Reference

These pages provide general information that pertains to managing the activities, but does not belong with or may not easily fit on the handouts (found on pages 14–17).

Game Chart — Graphic description of all games, with grade level, mathematical content, and materials needed

Teaching Tips — Guidance about various games or use of unit materials

8. Culminating Activity—Math Game Day/Night

The culminating *Math Game Day/Night* can be for another class, several classes, a parents evening or as a school-wide event.

Prior to beginning this unit, consider the following issues related to planning for your culminating event.

- Decide who the audience will be and carefully select your games based on this decision:
 - another class or several classes
 - students at a specific grade level
 - parents
 - school-wide event
- Decide on a date and time for your final *Math Game Day/Night* event.
- Determine the location and make reservation(s) if necessary.
- If you have a Game Night event, decide if you need food. Students can help plan the amount needed.
- Decide on the number of games participants will play during the culminating event. The sample chart below allows participants to rotate through four games during the *Math Game Day/Night* event.
- It is not necessary to have game rules written out for participants. However, send game boards and/or records home with parents to allow families to continue to enjoy playing the games.

Sample Time Chart for event: 2 hours, 10 minutes	
Set-up	15 minutes
Game 1	20 minutes
Game 2	20 minutes
Recess	15 minutes
Game 3	20 minutes
Game 4	20 minutes
Clean-up	20 minutes

1. **NCTM Principle Regarding Assessment**

Assessment should enhance students' learning. Ideally, it should support the learning of important mathematics concepts and furnish useful information to both the teacher and the students.

- a. Assessment is a valuable tool for making instructional decisions.
- b. To maximize the instructional value of assessment, move beyond a superficial 'right or wrong' analysis of tasks to focus on how students are thinking about the tasks.
- c. Scoring guides, or rubrics, help teachers analyze and describe students' responses to complex tasks and determine students' levels of proficiency.

2. **Determine Assessment Standards**

MATH MARVELS is designed for students in grades 2–6. You determine what “meets the standard” for your grade level.

- a. Use the **OBSERVATION CHECKLIST** to assess students' skill level. Students' conceptual understanding and number sense is assessed when they independently explain their game. After students are taught to play a game, assess individual students' understanding of the skill(s) involved in the game using the checklist. Each day, as students are learning new games, observe individual students.
- b. Use the **GAME WRITE-UP RUBRIC** to assess students' written evaluations of their specific game(s). In order for students to be successful they need to understand the scoring guide on which they will be graded.
- c. For students who do not “meet the standard” on any part of the assessment, allow them to rewrite their work after reviewing with you. Also consider allowing them to provide their responses orally.

3. **Using the Observation Checklist**

The **OBSERVATION CHECKLIST** allows you to keep track of individuals' skill level as well as their ability to adapt strategies for play. It is difficult to observe every student every day, however you should be able to rotate your observations so you can assess each student every two to three days. As you observe students playing a game, ask them to explain their strategies and their understanding of the game. For example, by observing students playing games you can see if the student understands if the 4 in 468 means 400 or is just a 4. Observations allow for assessing mathematical thinking in action and diagnosing how students think while they are performing operations on numbers.

- a. Observe students and record:
 - Proficiency of skill involved
 - Uses a variety of strategies
 - Understanding the rules
 - Persistence in helping others to understand how to play
- b. Questions that help with this process include:
 - What went on in your mind when _____?
 - Does that always work? Why or why not?
 - Do you see a pattern? Explain.
 - What's another way you might approach this?
 - What do you think would happen if _____?

4. What do Rubric Scores Mean?

When completing performance assessments, focus on “student work.” This work is *not* limited to written work. It includes demonstrated skills, oral exchanges, processes, strategies, and any other evidence that proves that the students have learned the targeted content or skill and can apply what they know.

4 – Exemplary

Generally this rating describes *exemplary* student work that exceeds the standard for the activity. The descriptor includes words such as “consistently,” “complete,” “with detail,” “actively,” and “willingly.” Students who earn a “4” demonstrate leadership and knowledge during participation in the simulation.

3 – Expected

Generally this rating describes *expected* student work that meets the standard with quality. The descriptors lack some of the positive adjectives of a “4,” but this student has mastered the content or skill and can demonstrate his/her understanding in an application setting.

2 – Nearly there

Generally this rating describes student work that is *nearly there*, that almost meets the standard. Sometimes inconsistent effort or a misconception of the content will result in a “2” rating. This student needs a little reteaching, needs to try a little harder, or needs to revise his/her work in order to meet the standards described.

1 – Incomplete

Generally this rating describes student work that is *incomplete*, that has not yet met the standard in content and/or skill. This student will require more instruction and another opportunity to demonstrate a knowledge or skill, or will require alternative instruction and assessment.

RESOURCES

Bippert, Judy & Louise Vandling. *Game Factory, a Simulation in Which Pairs of Students Investigate Probability by Determining the Fairness of Games*, Interact, 1996.

UNIT TIME CHART



WEEKS 1 AND 2		
PRE-UNIT	DAY 1	DAYS 2–10
<ul style="list-style-type: none"> • Pre-planning for event (flyers, etc.) • Assemble materials for all games selected 	<ul style="list-style-type: none"> • Introduce unit • Present first game • GAME EVALUATION 	<ul style="list-style-type: none"> • Learning games (present 2–3 games each day) • GAME EVALUATION • Choose games for <i>Math Game Day/Night</i>
WEEK 3		
DAY 11	DAYS 12–14	DAY 15
<ul style="list-style-type: none"> • Assign Games to pairs • Game preparation • GAME WRITE-UP • GAME WRITE-UP RUBRIC 	<ul style="list-style-type: none"> • Game Preview days • GAME WRITE-UP • GAME WRITE-UP RUBRIC 	<ul style="list-style-type: none"> • <i>Math Game Day/Night</i> Culmination

GAME CHART

TEACHER REFERENCE

The majority of the games have variations that offer challenges to higher grades and ability levels.

Game	Grade Levels	Mathematical Content	Page Number
101	4–6	Mental Math Number Operations	37
Aim for Zero	2–5	Number Operations (Subtraction) Mental Math Strategic Thinking	38
Apple Tic-Tac-Toe*	1–2	Number Facts (Addition)	39
Close to 30	3–5	Number Operations (Subtraction)	43
Color Squares*	K–6	Strategic Thinking Logic	45
Columns and Rows	5–6	Number Operations Mental Math Integers Strategic Thinking	47
Counting Coordinates	4–6	Number Operations Integers Coordinates	49
Cover It	3–6	Number Sense	51
Dicey	2–6	Number Operations Mental Math Probability	54
Digit Place	4–5	Number Sense Place Value Estimation Mental Math	56
Draw to Win	2–5	Place Value Number Sense Probability	58
Fast Facts*	4–6	Number Operations Mental Math	61
Finding 10s	1–3	Number Sense Number Facts	62
Four in a Row	5–6	Equivalent Fractions	63
Fraction Battle	5–6	Comparing Fractions	65
Highest Wins	K–6	Mental Math Number Operations	68

GAME CHART

TEACHER REFERENCE

Game	Grade Levels	Mathematical Content	Page Number
Left Overs*	3–6	Division Mental Math	69
Less is Best*	3–6	Number Operations Mental Math	71
Make 100	3–5	Place Value Mental Math	75
Make a Path	2–5	Number Operations Mental Math	77
Make it Right	3–6	Number Operations (Division) Mental Math	79
Make the Numbers	3–6	Number Sense Place Value	81
Place It!*	1–6	Place Value Mental Math Probability	84
Play Them All	2–5	Strategic Thinking Number Operations (Addition) Mental Math	89
Products in a Row	3–6	Mental Math Strategic Thinking Number Operations (Multiplication)	91
Round Up—Round Down	3–5	Place Value Estimation Mental Math	93
Spin to Win*	K–3	Money Number Operations Mental Math	95
Subtraction Action	3–5	Mental Math Number Operations (Subtraction) Probability	100
Take 10	1–3	Number Operations	102
Target	3–6	Number Operations Algebraic Thinking Number Sense	103
Three-Dice Roll	2–6	Number Operations Algebraic Thinking Probability	105
Total 20	2–4	Number Operations Mental Math	107

* See Teacher Tips on pages 16–17.

TEACHER TIPS

TEACHER REFERENCE

These notes and suggestions for using materials or the various games are for your reference and are not necessarily appropriate for inclusion on the handout instructions. Use at your discretion.

HINTS

1. Using the Game pieces included with the unit

If you do not have dice or spinners in your classroom, copy the DICE and SPINNERS reproducible masters onto cardstock or heavy weight paper. The number of each will depend on the games you select for your class.

DICE

- One master is blank, in case you want to modify the numbers on the die.
- Consider allowing students to assemble the dice. Folding and taping the pattern reinforces that a die is a cube or hexahedron.

SPINNERS

- After copying the SPINNERS on heavy cardstock, assemble using a sharp pencil and a paper clip.
- Using the spinners:
 - With one hand, hold the sharpened pencil upright with the point placed through one end of the paper clip onto the center of the spinner.
 - With the other hand, flick one end of the paper clip and see where it lands.
 - Should the paper clip land on a line the player spins again.
 - Use the spinners as they are, or enlarge.

2. Games using cards

It is always an option to use the whole deck of cards. This is an added challenge, especially good for older students. If you choose to use the whole deck, J = 11, Q = 12, K = 13.

GAME NOTES

1. Apple Tic-Tac-Toe

- GAME BOARD I (a 4×5 grid of apples) is recommended for this game in the beginning. Students practice addition facts to 7, 8, 9, and 10.
- GAME BOARDS II and III are variations. With these more advanced apple grids students practice both addition and subtraction facts. GAME BOARD II is a 4×5 grid of apples, and GAME BOARD III is a 5×6 grid of apples.

2. Color Squares

- COLOR SQUARE GAME BOARD I is for very young students. The game is played very quickly on the smaller board. Game Board II will make the game last a little longer. Decide which is more appropriate for your students.
- If you use grid paper rather than the GAME BOARD masters, begin with a 3×5 grid for younger students.

3. Fast Facts

The objective is for students to play the game without scratch paper, to reinforce mental math abilities. However, consider allowing students to use paper and pencil as they begin learning the game.

4. Left Overs

The objective is for students to play the game without scratch paper, to reinforce mental math abilities. However, consider allowing students to use paper and pencil as they begin learning the game.

5. Less Is Best

Players are encouraged to calculate their answers in their heads within a two-minute time limit. However, if students are unable to do this, consider using a calculator or increasing the time limitation.

6. Place It!

It is important for students to have a chance to practice reading and writing the numbers they have made. Be sure that all students record their number on their PLACE IT! RECORD after each round. Periodically allow time for several students to share their numbers by reading them to the class.

7. Spin To Win

Players and/or teachers select spinners to be used, based on ability level.

TEACHING DIRECTIONS

WEEKS 1 AND 2



Place It! is an excellent first game. It reviews place value skills.



2–4 players, depending on the game

Play as a whole class with the teacher as the leader or with a leader for each group.



Consider also a letter(s) to a local newspaper and/or radio station.

Day 1

Materials

- GAME EVALUATION — *class set + transparency*
- Materials appropriate for the model game chosen
- Overhead projector — *one*

Teacher Reference

- **Game Chart**

Set up

Choose a game to model for students on Day 1. *Place It!* works well for a variety of abilities and grade levels.

Procedure

1. Read or tell the following information:
“Who likes to play games?”
(Allow students to raise hands or otherwise respond.)
This week we are going to begin learning some games that will help us do well in math.”
2. Introduce the first game and, using an overhead projector, model how to play.
3. Group students according to the appropriate number of players for the game you chose. Distribute game boards to each group. Students don’t need to have copies of the instructions.
4. Allow students time to play the game and to understand the rules. Ask if they enjoy this type of math.
5. Ask students to evaluate the game using the GAME EVALUATION. Model the use of this form using your transparency and the overhead projector.
6. Read or tell the following to introduce the culminating event:
“Perhaps other students at our grade/in the school/ your parents would enjoy learning how to play these games. Why don’t we put on a *Math Game Day/Night?*”
(This provides a purpose of learning the games and planning for the *Math Game Day/Night* event.)
7. With the students, determine the timing of the event—when and how long. Students begin to design posters/flyers and letters to advertise the event. Students write invitations to your target audience.

TEACHING DIRECTIONS

WEEKS 1 AND 2

Days 2–10

Materials

- GAME EVALUATION — *class set per game*
- Materials appropriate for the games chosen
- Overhead projector — *one*

Teacher Reference

- **Game Chart**

Procedure

1. Carefully select two to three games for each day. In making your choices, use the information provided in **Setup Directions #4, Games** on page 3, as well as carefully examining the teaching directions for each game. Gather the materials appropriate for each game. Use the **Game Chart** on pages 14–15, a handy graphic reference showing mathematical skills reinforced by each game.
2. Prior to teaching each game review the teaching directions and “play” the game yourself to be sure you are clear on the game’s procedures.
3. Model each game on the overhead projector. Group students as appropriate for each game. Allow students time to play each game and to understand the rules.
4. For each game have students complete a GAME EVALUATION which will be instrumental in determining the games for the final event. Students in grades 2 and 3 may not be ready to evaluate games. If so, use your discretion to determine which games to play for the culminating event.
5. On Day 10, share the results of the GAME EVALUATION ratings for each game. Using the students’ ratings of the games, select those to be played at the culminating event, *Math Game Day/Night* (enough for one game for each student pair). The higher the rating the better the students liked the game.



During the first two weeks you will teach two to three games a day, being sure students have enough time to get to know each one.

Carefully consider your students’ skill levels and the target audience of your Math Game Day/Night event when selecting the games.

Consider having students in grades 3, 4, and above take careful notes of the game directions as you explain them for each game. These notes should include: Name of game, materials needed, and step-by-step directions.



2–4 players, depending on the game

The GAME EVALUATION could be completed by pairs of students who have played the game together.

Students can reinforce their understanding of averages by compiling the numerical ratings of the games from the GAME EVALUATION forms.

Consider incorporating the writing of the GAME EVALUATION into language arts by having students write a narrative or persuasive paragraph.

TEACHING DIRECTIONS

WEEK 3



Student pairs

Some students prefer to work alone. If you have a capable student consider allowing him/her to teach a game on his/her own.

This is a chance for students to role-play being taught. They need to pretend they don't know the game.

Younger students will probably need the written rules. For grade 5 and above, consider not distributing the rules. Instead students can practice logical thinking and writing skills by writing their own step-by-step directions from what they understand about the game.

This writing assignment provides an assessment opportunity of students' conceptual understanding.

Day 11

Materials

- GAME WRITE-UP — *class set*
- GAME WRITE-UP RUBRIC — *class set or transparency + one to post*
- Materials appropriate for the games chosen
- Overhead projector — *one*

Procedure

1. Allow students to choose a partner with whom to work or assign student pairs.
2. Put the names of the games you will use for the culminating event on slips of paper (one for each pair) to be drawn, lottery fashion or assign games to pairs of students based on their interest and/or ability levels.
3. If students do not remember the game, distribute the game rules pages as well as the GAME BOARDS and/or RECORDS.
 - a. If they understand the game well enough, instruct them to write out the directions for how they will teach their game.
 - b. Each pair spends time practicing the game. Student pairs need to practice teaching the game to their partner, since they will teach the game to others during three *Math Game Day/Night Previews* over Days 12–14.
 - c. Students play the game several times until they know it very well.
4. Distribute GAME WRITE-UP to each student. Distribute or illuminate GAME WRITE-UP RUBRIC and discuss your expectations. The GAME WRITE-UP includes:
 - How they will explain the rules for the game
 - Materials needed to play the game
 - Strategies they found for playing the game
 - Mathematics involved in the game
 - Variations for playing the game
5. Students begin drafting their GAME WRITE-UP (to be polished and turned in prior to *Math Game Day/Night*).

Days 12–14

Materials

- GAME WRITE-UP — *class set*
- GAME WRITE-UP RUBRIC — *class set or transparency + one to post*
- Materials appropriate for the games chosen
- Overhead projector — *one*

Procedure

1. Prior to beginning the *Math Game Day/Night Previews*, students complete their GAME WRITE-UP. Review your expectations as appropriate. Collect these for assessment.
2. ***Math Game Day/Night Previews***
Each day one-third of the pairs are designated as the game leaders and the rest of the class rotates from game table to game table to learn the games to see how much time is needed for each rotation.
3. Instruct students to consider the following while playing each game:
 - The amount of space needed for the game
 - The amount of time needed for the game
 - The amount of time needed between games (for clean up and set up)
4. Following each *Math Game Day/Night Preview* day, conduct a class discussion to assist in planning the culminating event. Consider the following issues:
 - Decide how the games should be laid out in the specified location, taking into account how much space is needed for each game. Consider making a map of the area with each student pair deciding the amount of space needed for each game station.
 - Determine how much time should be allotted for each game or station. Participants will rotate stations in order to try several games during the event. It will be helpful to develop a time chart including start and end times and time for set-up and clean up (See next page for sample chart).



When students are teaching their game they may want to have their GAME WRITE-UP for reference. Decide ahead of time if you will allow them to use these.

Six-foot tables set up in a large room with one or two games at a table works well. Two to three student desks put together could create the same space depending on the size of student desks.



Review the information provided in Setup Directions #8, Culminating Activity—Math Game Day/ Night when planning for this event.

This is a good opportunity to work on elapsed time in a real-life situation.

Day 15—Math Game Day/Night Culmination

Materials

- Materials appropriate for the games chosen

Procedure

1. Have students assist with *Math Game Day/Night* setup. Have a map available for student reference (with information on how the games should be laid out in the specified location). Additionally, be sure students have their appropriate game materials.
2. Student pairs work to set up their game area and prepare to “teach” their game.
3. Once your *Math Game Day/Night* participants arrive, consider making an official welcome and educating them on what the class has accomplished. Inform your participants of the schedule you have worked out including the following information:
 - How many games participants can play?
 - How much time they will have to rotate between games?
 - How the games will be selected? (For instance, consider directing families with younger children to easier games.)
 - Where the games are located?
 - How participants will know when to switch games?
4. Allow participants to play the games. Follow your schedule.



Students can make signs for each game area as well as a map of the game setup.



Use a chart or flyer to inform your participants of the game schedule.



Use a signal like a bell for rotation times.

GAME EVALUATION

GAME EVALUATION

Student name _____

Name of game _____

	No	OK	Yes		
1. Was the game fun?	1	2	3	4	5
2. Does it make you think?	1	2	3	4	5
3. Do you understand how to play the game?	1	2	3	4	5
4. Did you find a strategy to help you play the game?	1	2	3	4	5

GAME EVALUATION

Student name _____

Name of game _____

	No	OK	Yes		
1. Was the game fun?	1	2	3	4	5
2. Does it make you think?	1	2	3	4	5
3. Do you understand how to play the game?	1	2	3	4	5
4. Did you find a strategy to help you play the game?	1	2	3	4	5

GAME WRITE-UP

Student name _____

Name of Game _____

1. Explain the rules for the game.

2. What materials do you need?

3. What strategies will help with the game?

4. What mathematics do you need to know to play the game
(for example, addition facts or multiplication tables)?

5. What variations are there for playing this game? Which, if any, did you use?

GAME WRITE-UP RUBRIC

Student name _____

4 — Exemplary:

- Demonstrates a clear, well-developed explanation of the rules involved in the game.
- Indicates consistent understanding of the math content involved in the game.
- Includes a thorough description of the materials and strategies necessary for the game.

3 — Expected:

- Demonstrates a clear explanation of the rules involved in the game.
- Indicates understanding of the math content involved in the game.
- Includes a well-developed description of the materials and strategies necessary for the game.

2 — Nearly There:

- Demonstrates an inconsistent understanding of the rules involved in the game.
- Indicates some understanding of the math content involved in the game.
- Includes a limited description of the materials and strategies necessary for the game.

1 — Incomplete:

- Does not complete the explanation of the rules involved in the game.
- Does not indicate understanding of the math content involved in the game.
- Has little or no clear description of the materials and strategies necessary for the game.

GAME WRITE-UP RUBRIC

Student name _____

4 — Exemplary:

- Demonstrates a clear, well-developed explanation of the rules involved in the game.
- Indicates consistent understanding of the math content involved in the game.
- Includes a thorough description of the materials and strategies necessary for the game.

3 — Expected:

- Demonstrates a clear explanation of the rules involved in the game.
- Indicates understanding of the math content involved in the game.
- Includes a well-developed description of the materials and strategies necessary for the game.

2 — Nearly There:

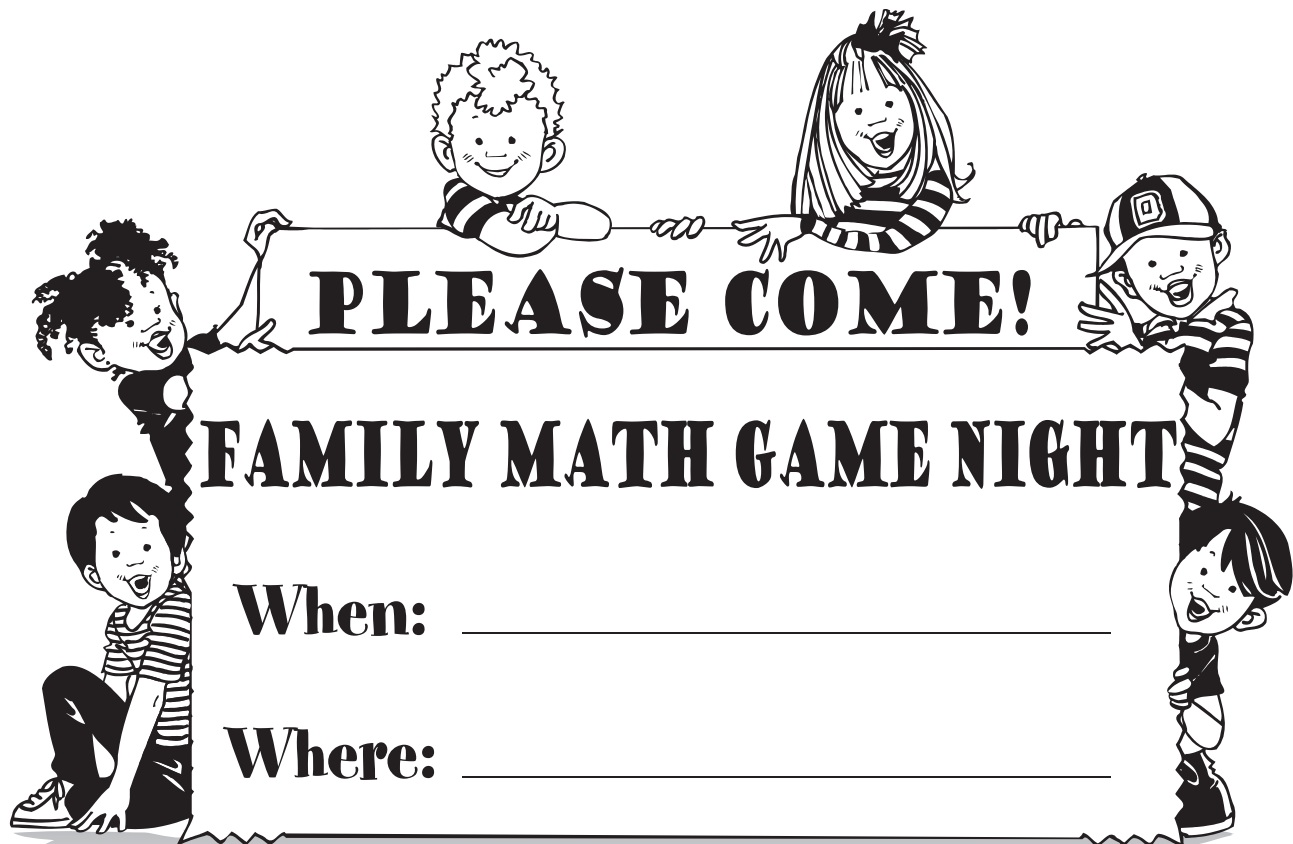
- Demonstrates an inconsistent understanding of the rules involved in the game.
- Indicates some understanding of the math content involved in the game.
- Includes a limited description of the materials and strategies necessary for the game.

1 — Incomplete:

- Does not complete the explanation of the rules involved in the game.
- Does not indicate understanding of the math content involved in the game.
- Has little or no clear description of the materials and strategies necessary for the game.

OBSERVATION CHECKLIST

Student Name		Comments



Join us for an evening of **fun and games**. Each family will receive:

Directions and game boards for the games,
There will be refreshments too!!

WE NEED TO KNOW HOW MANY PEOPLE ARE COMING.

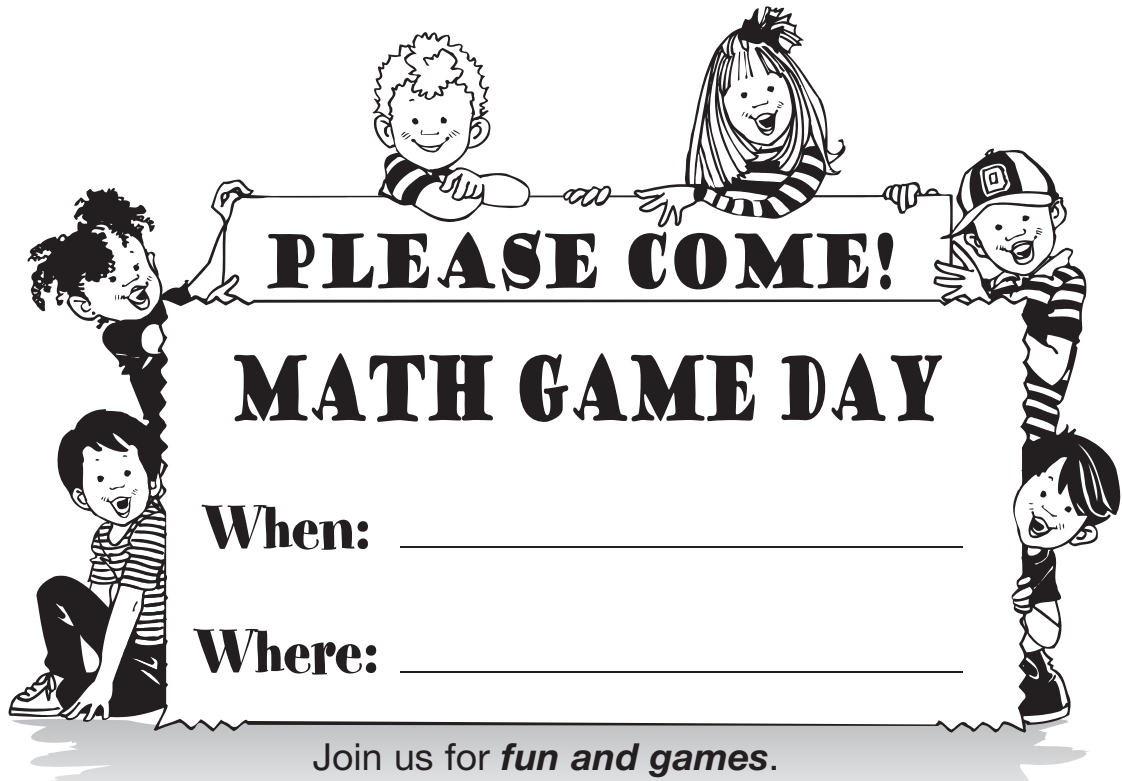
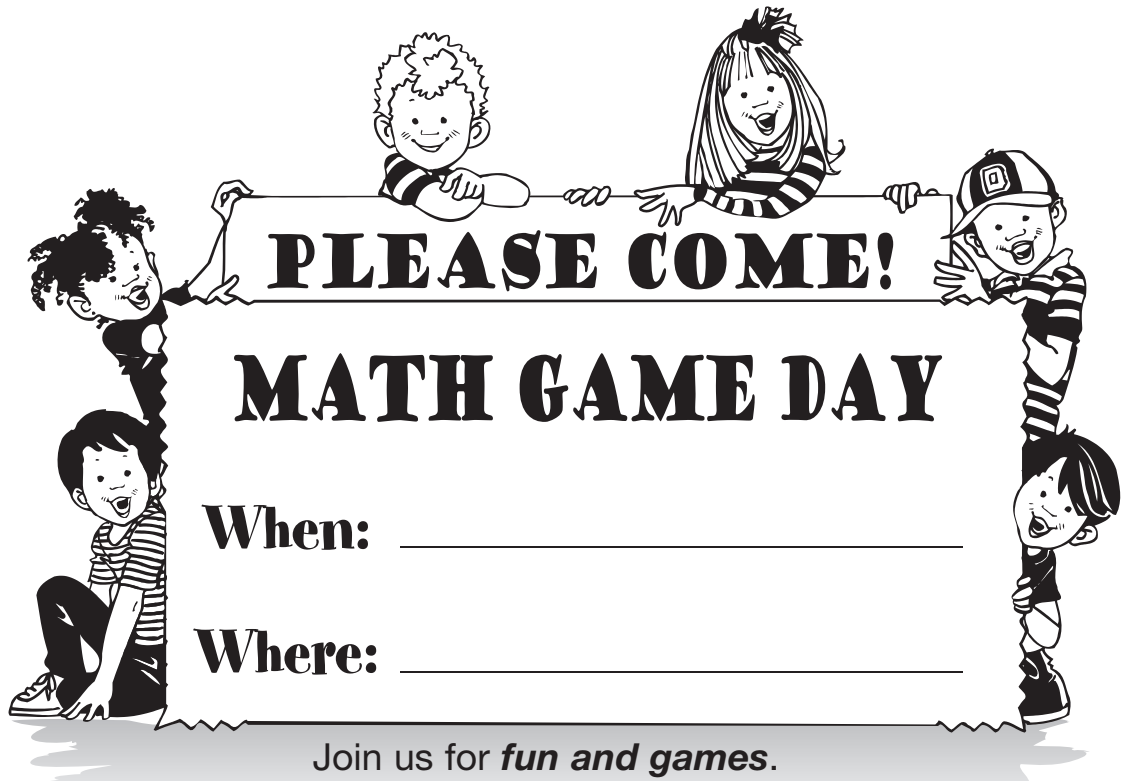
Please complete the following information and return it to your child's teacher by

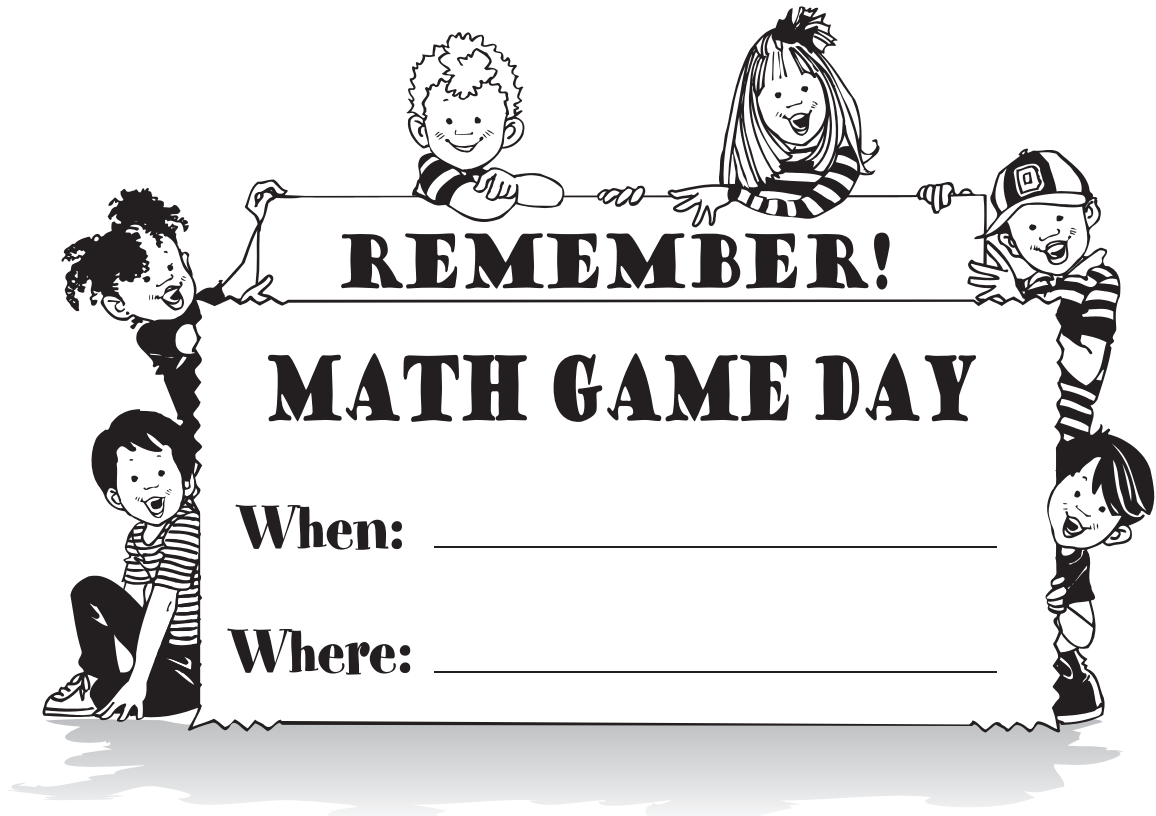
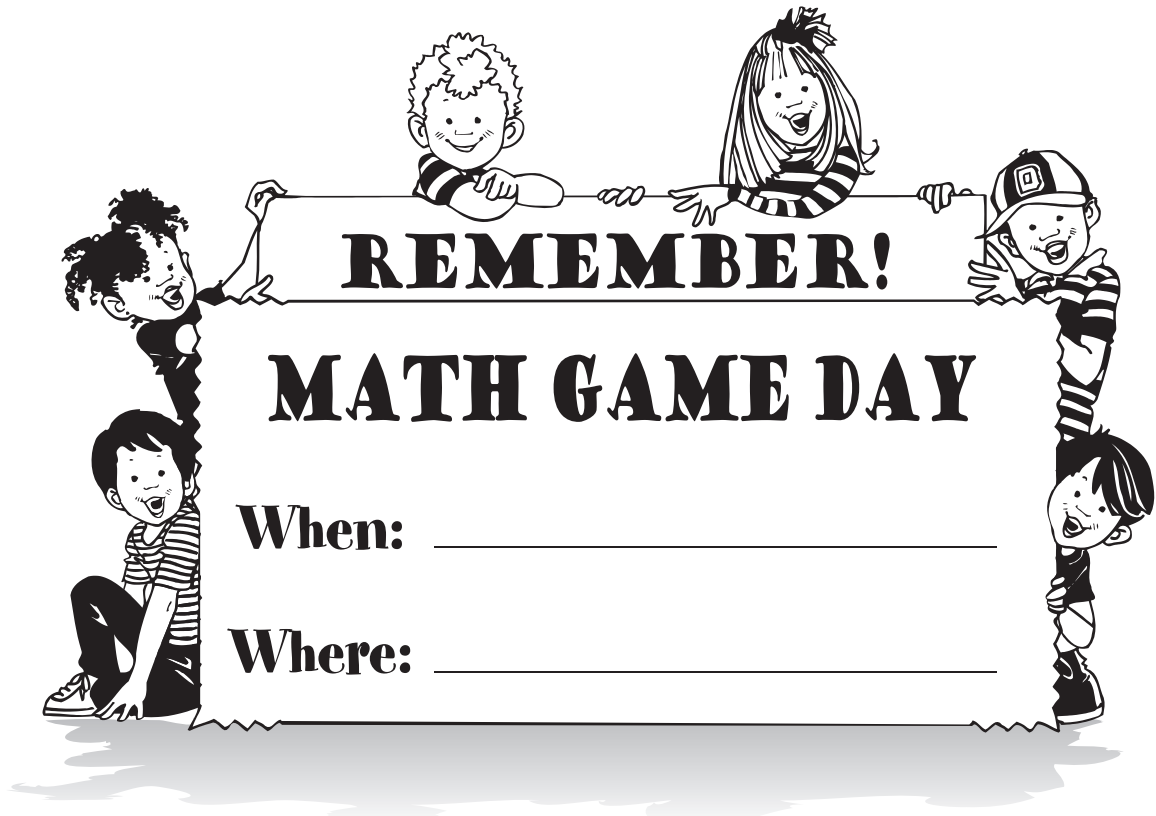
Student name: _____

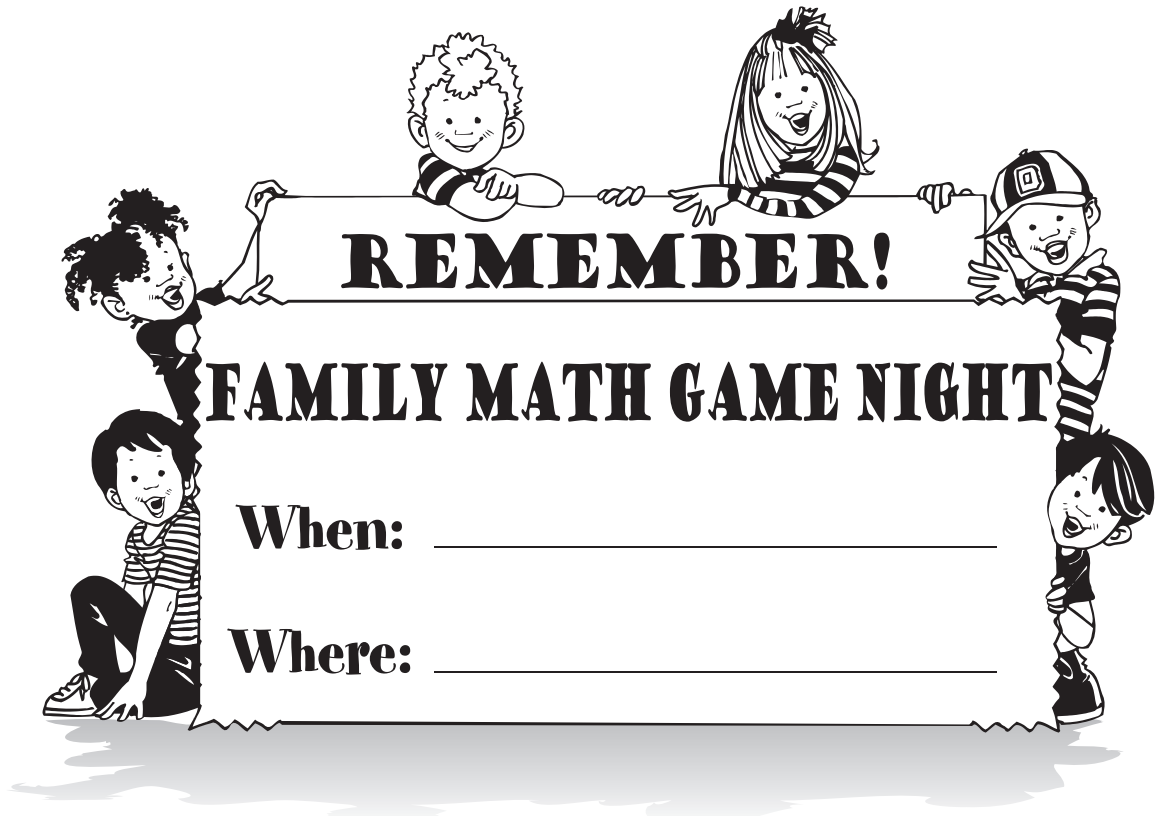
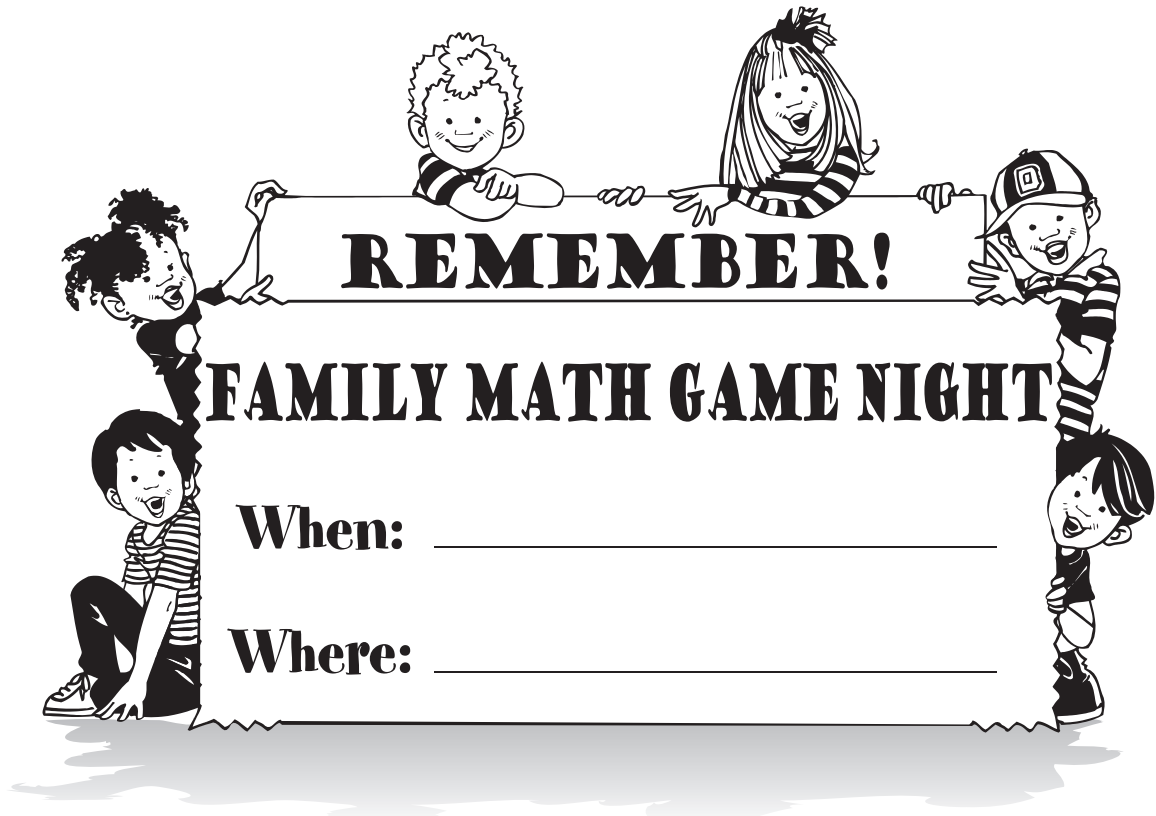
Teacher name: _____

How many people in your family will be coming
to Family Math Game Night? _____

PLEASE NOTE: *Students must be accompanied by an adult.*

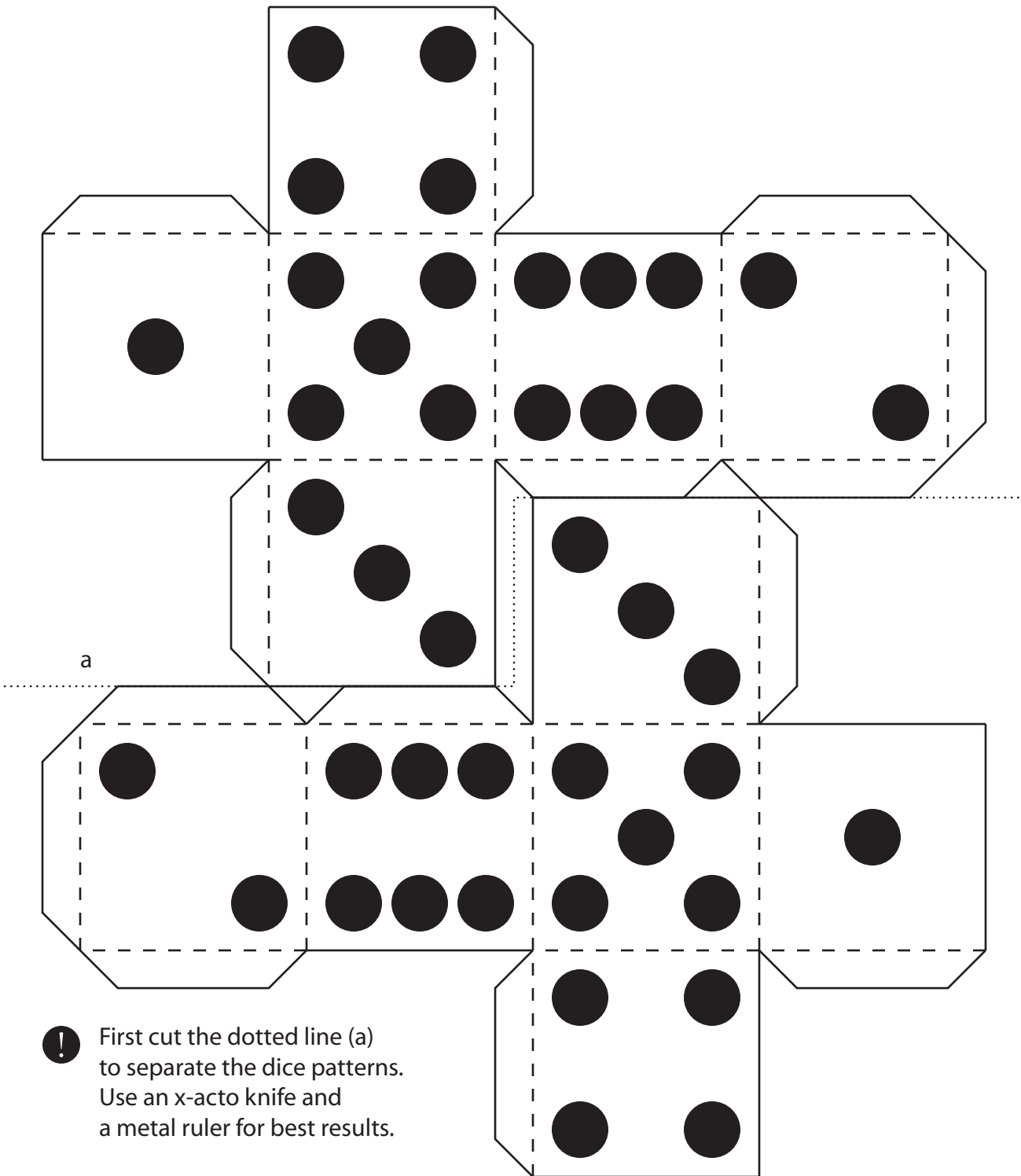






DICE-REGULAR

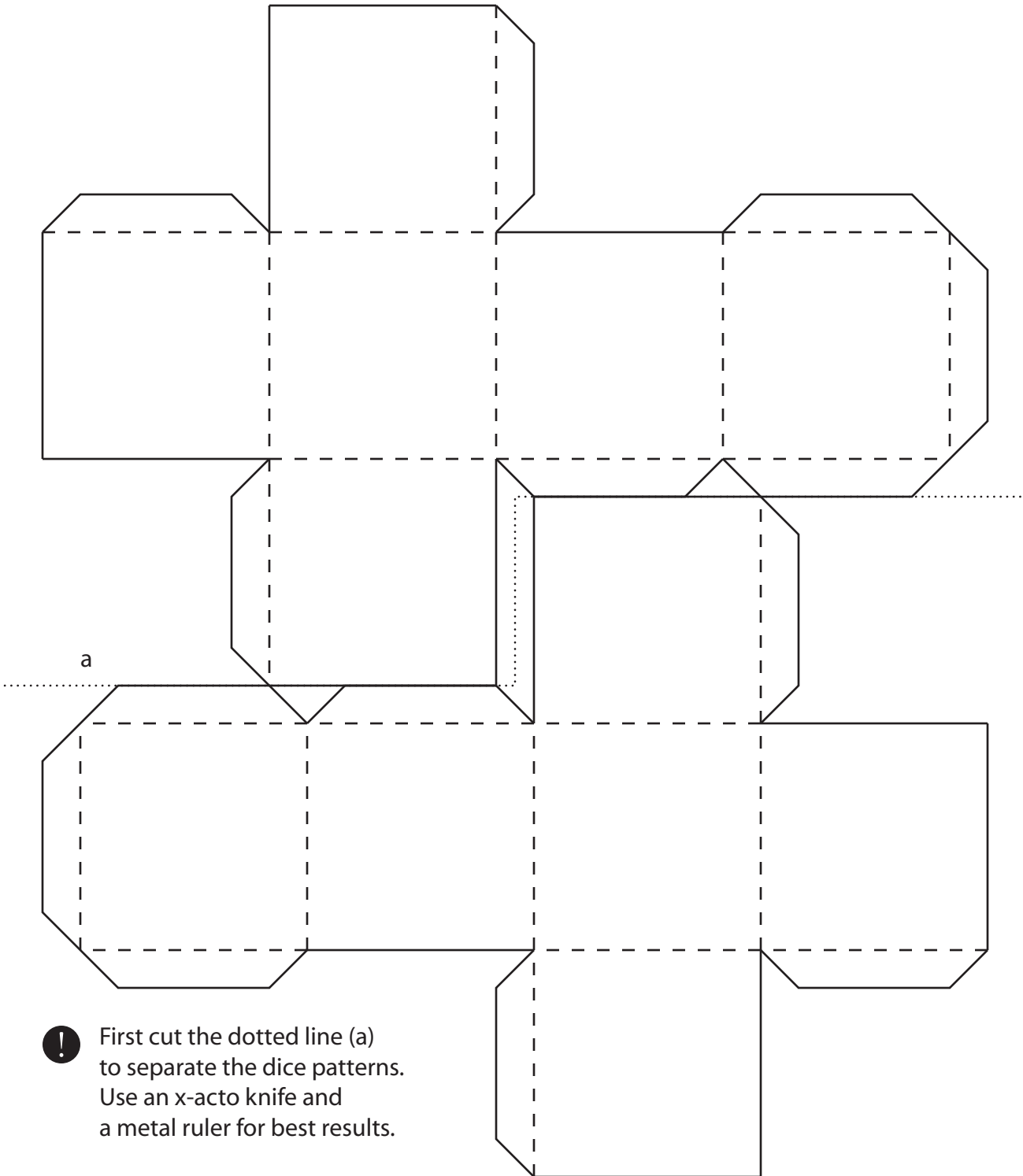
Copy onto cardstock or heavy weight paper. Fold and tape to create dice.



! First cut the dotted line (a) to separate the dice patterns. Use an x-acto knife and a metal ruler for best results.

DICE-BLANK

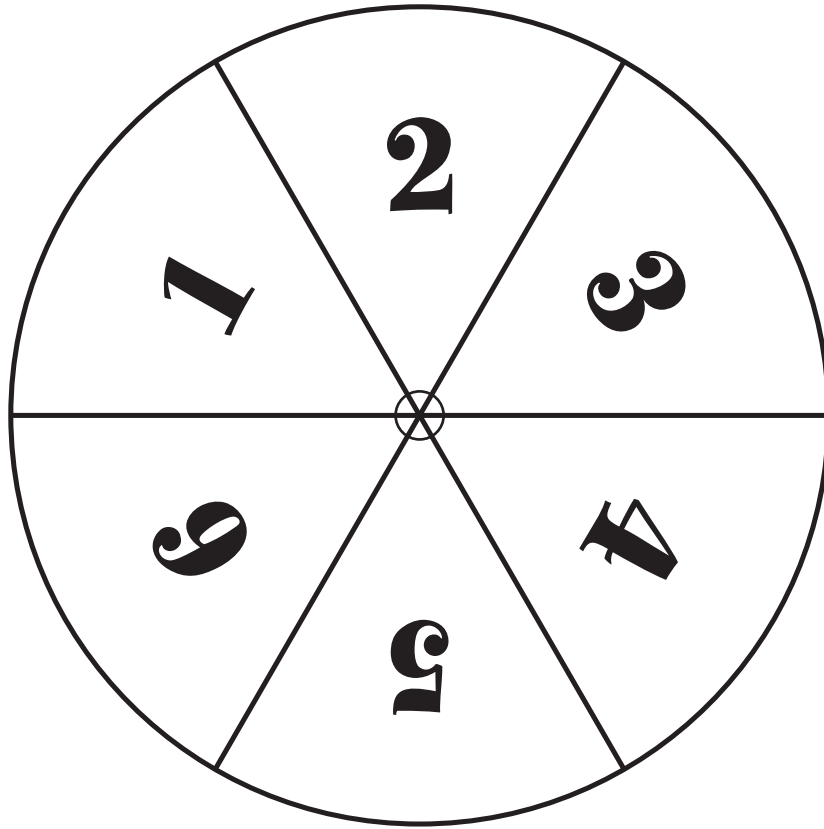
Copy onto cardstock or heavy weight paper. Fold and tape to create dice.



! First cut the dotted line (a) to separate the dice patterns. Use an x-acto knife and a metal ruler for best results.

SPINNERS

Copy onto cardstock or heavy weight paper.

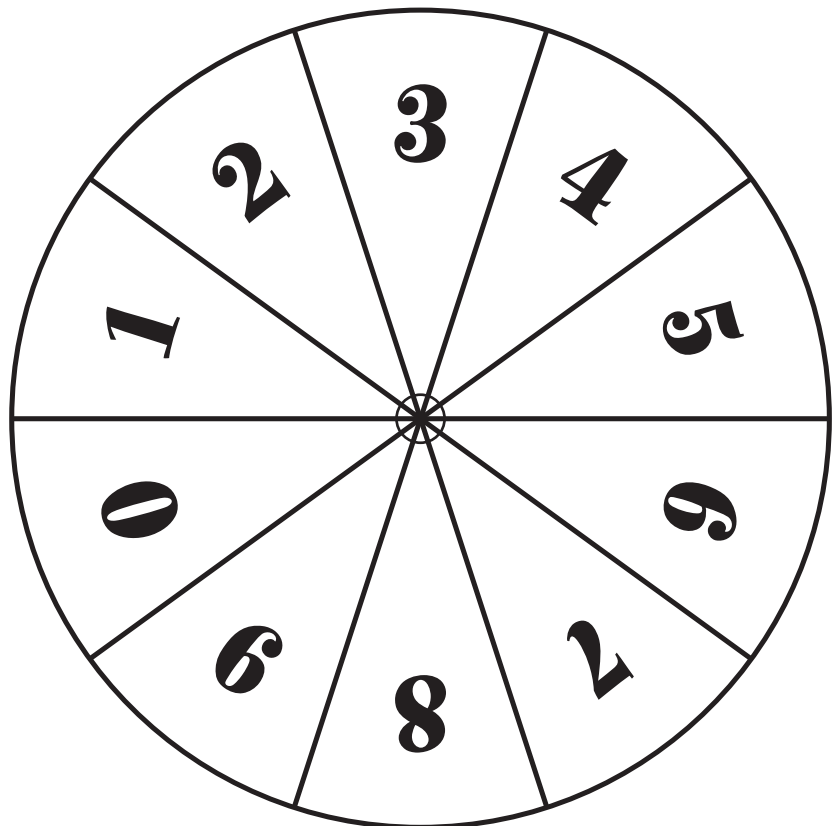


It is not necessary to cut spinners into circles.

In fact, it is better to cut the spinners along the dotted lines to make square spinners.

Use a few fingers to hold the spinner down while spinning the sweeper.

For added stability, paste the spinner to a larger piece of cardstock or scrap wood.



101

Mathematical Content: Number Operations, Mental Math

Number of players: 2–4

Objective: The first player to reach 101 exactly (without going over) wins.

Materials

- Deck of cards (Ace–10) — *one per game*

Directions

1. Each player draws a card. High card deals first.
2. The dealer shuffles the cards and deals *five* cards to each person and places the remainder of the deck in the center of the table face down.
3. The dealer selects one of his/her five cards, places it face up in the center of the table, and states the value of the card. (S)he then draws another card from the stack so (s)he still has five cards in his/her hand.
4. The next player (in a clockwise direction) places a card face up and states the sum of the two cards together, then draws another card.
5. Each player keeps adding a card to the face up stack, calling out the sum of all the cards in the stack.
6. The first player to reach 101 exactly (without going over) wins.
7. **Special rules**
 - a. The 10 card can be used as +10 or –10.
 - b. Ace can be +1 or +11.
 - c. A 9 does not change the sum.
8. **Variations**

Use a full deck of cards (no jokers)

 - a. Jack reverses the direction of play without changing the value.
 - b. Queen and King are counted as 10.
 - c. Count the Queen as 11 and the King as 12.

AIM FOR ZERO

Mathematical Content: Number Operations (subtraction), Mental Math, Strategic Thinking

Number of players: 2

Objective: The winner is the first player to reach zero.

Materials

- Paper (for recording) — *one per game*
- Pencils — *one per player*

Directions

1. The player whose first name comes first in the alphabet goes first.
2. Each player writes 150 on his/her side of the paper.
3. The first player can subtract any number from 1 to 10 from 150 and show the difference.
4. The second player then chooses a number to subtract from 150. This number can be any number from 1 up to 10 more than the number that the first player subtracted.

(For example, if the first player chose 8, the second player could choose any number from 1 to 18; if the first player chose 3, the second player could choose any number from 1 to 13.)

5. Play continues with each player subtracting any number from the number 1 up to 10 more than the number subtracted by the previous player. **NOTE: Players may NOT use zero.**

Example:

Player 1 starts.

<u>Player 1</u>	<u>Player 2</u>
150	150
– 8	– 18
<hr/>	<hr/>
142	132
– 26	– 36
<hr/>	<hr/>
116	96
– 46	– 56
<hr/>	<hr/>
70	40
– 20	– 30
<hr/>	<hr/>
50	10
– 20	– 10
<hr/>	<hr/>
30	0

6. The winner is the first player to reach zero.

7. Variations

- a. Use a different starting number.
- b. Have players subtract from 1 to 15 more than the other player's number.

APPLE TIC-TAC-TOE

Mathematical Content: Practice addition facts to 7, 8, 9, and 10

Number of players: 2

Objective: The first player to get “Apple Tic-Tac-Toe” or three in a row, across, down, or diagonally, wins.

Materials

- APPLE TIC-TAC-TOE GAME BOARD (I, II, or III) — *one per game*
- Container (for counters) — *one per game*
- Counters (two-colored) — *10 per game*
- Game markers (different color per player) — *15+ per player*

Directions

1. The player whose first name comes last in the alphabet goes first.
2. The player chooses to put 7, 8, 9, or 10 two-colored counters into the container, shakes the container, and pours out the counters.
3. The player then looks for an addition fact on the game board that matches the arrangement of counters and places a game marker on the fact.

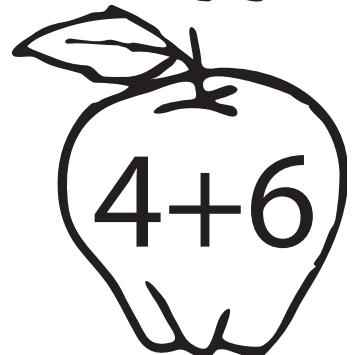
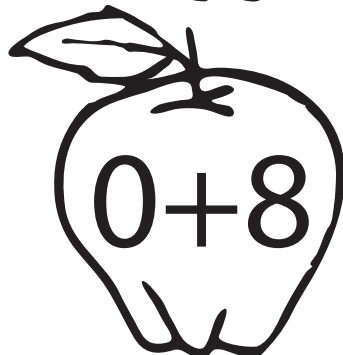
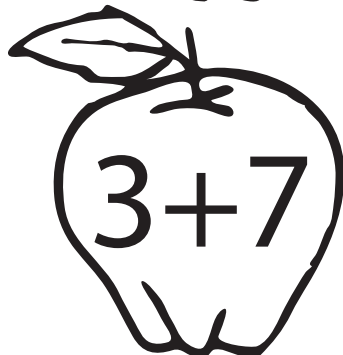
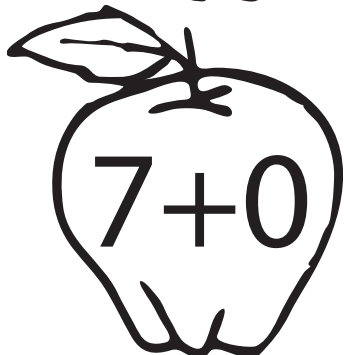
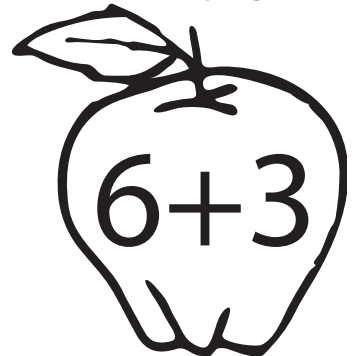
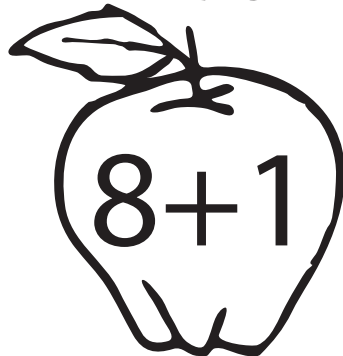
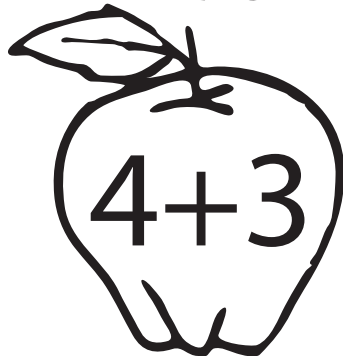
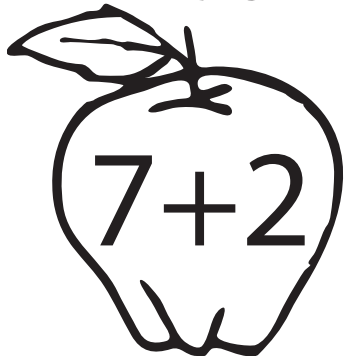
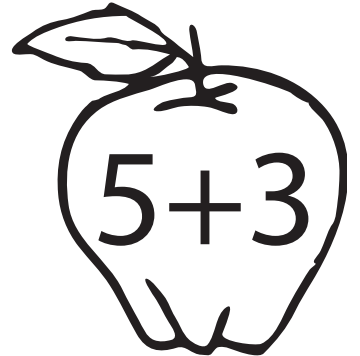
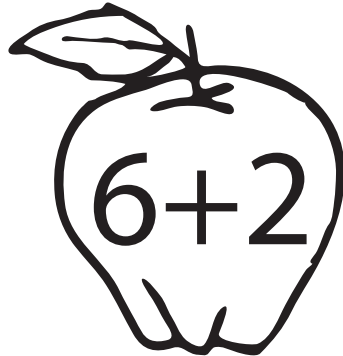
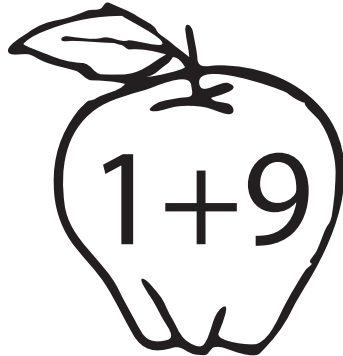
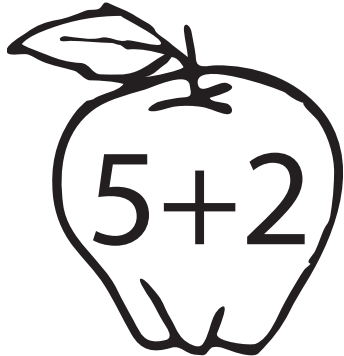
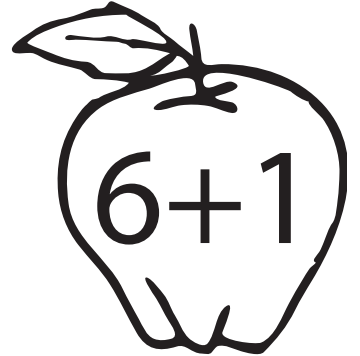
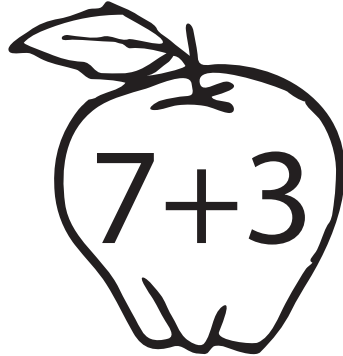
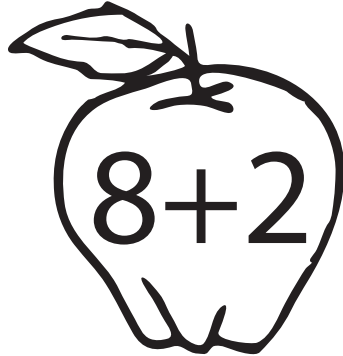
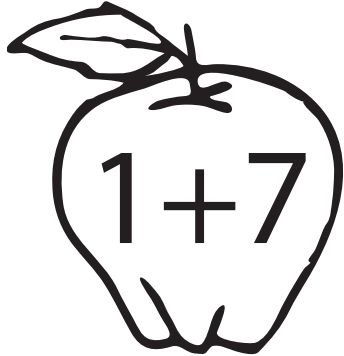
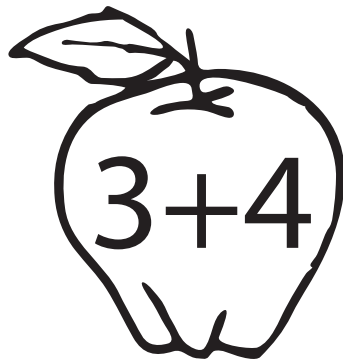
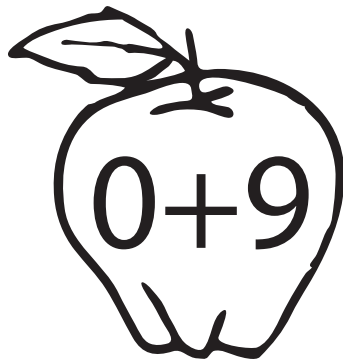
Example:

If 3 of one color and 7 of the other color come up the player could put a marker on $3 + 7$ or $7 + 3$ (or $7 - 3$ on Game Boards II and III).

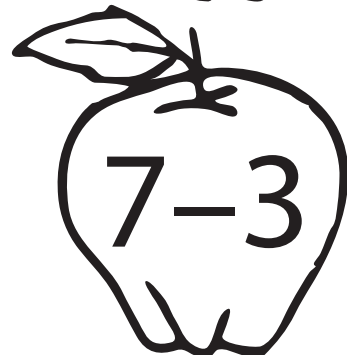
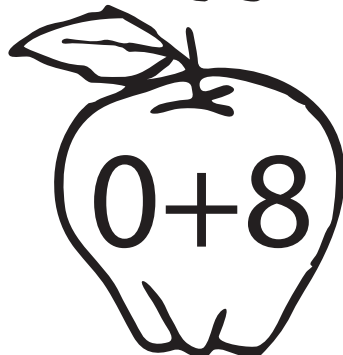
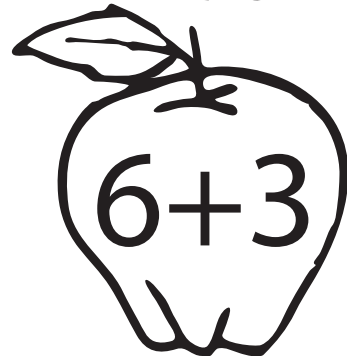
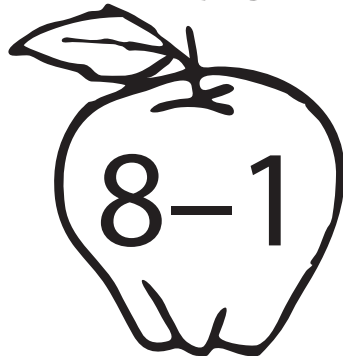
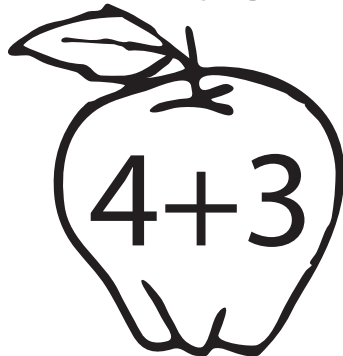
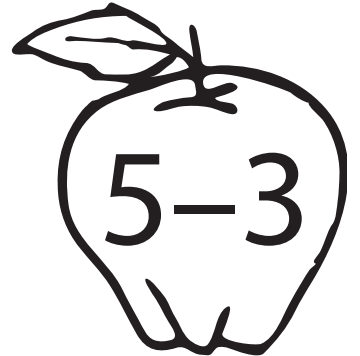
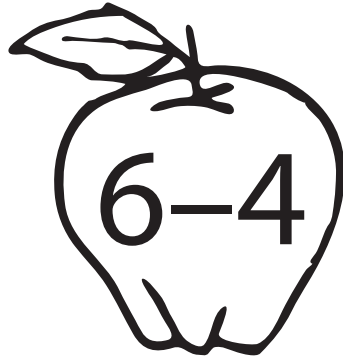
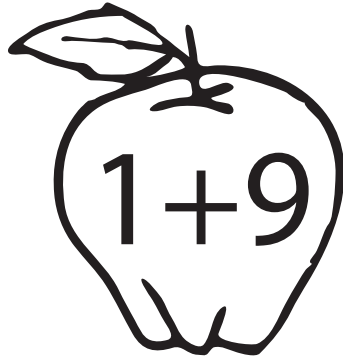
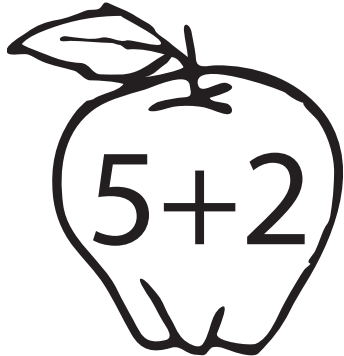
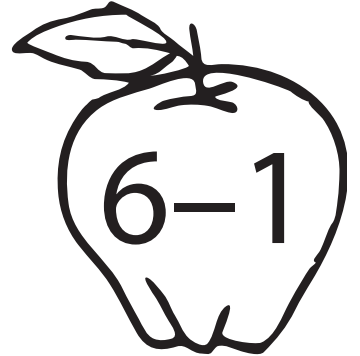
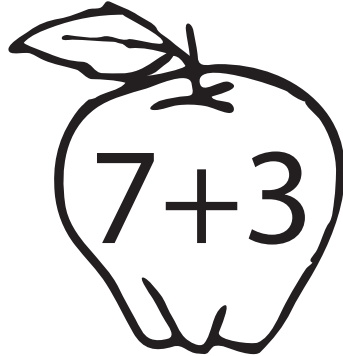
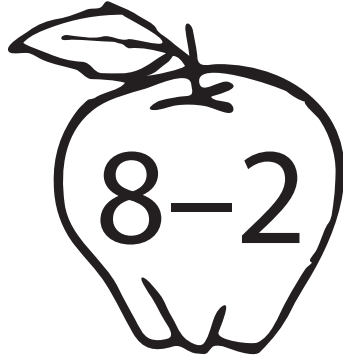
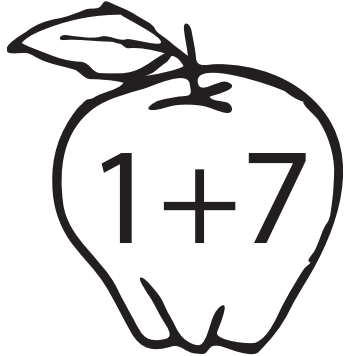
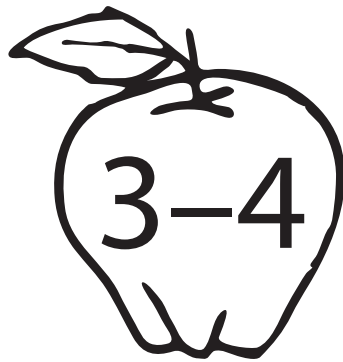
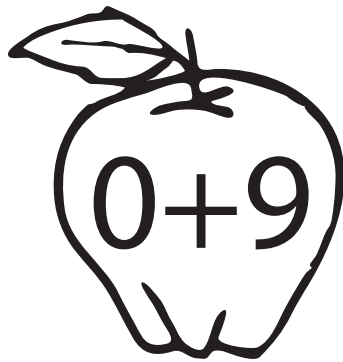
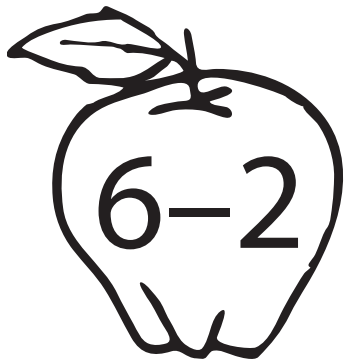
4. If the fact(s) is already covered, the player loses his/her turn.
5. The first player to get “Apple Tic-Tac-Toe” or three in a row, across, down, or diagonally, wins.
6. **Variations**
 - a. Players need four in a row on APPLE TIC-TAC-TOE GAME BOARD I to win.
 - b. Use APPLE TIC-TAC-TOE GAME BOARD II (addition and subtraction; 4×5 game board) for three or four in a row.
 - c. Use APPLE TIC-TAC-TOE GAME BOARD III (addition and subtraction; 5×6 game board) for four or five in a row.

APPLE TIC-TAC-TOE

GAME BOARD I

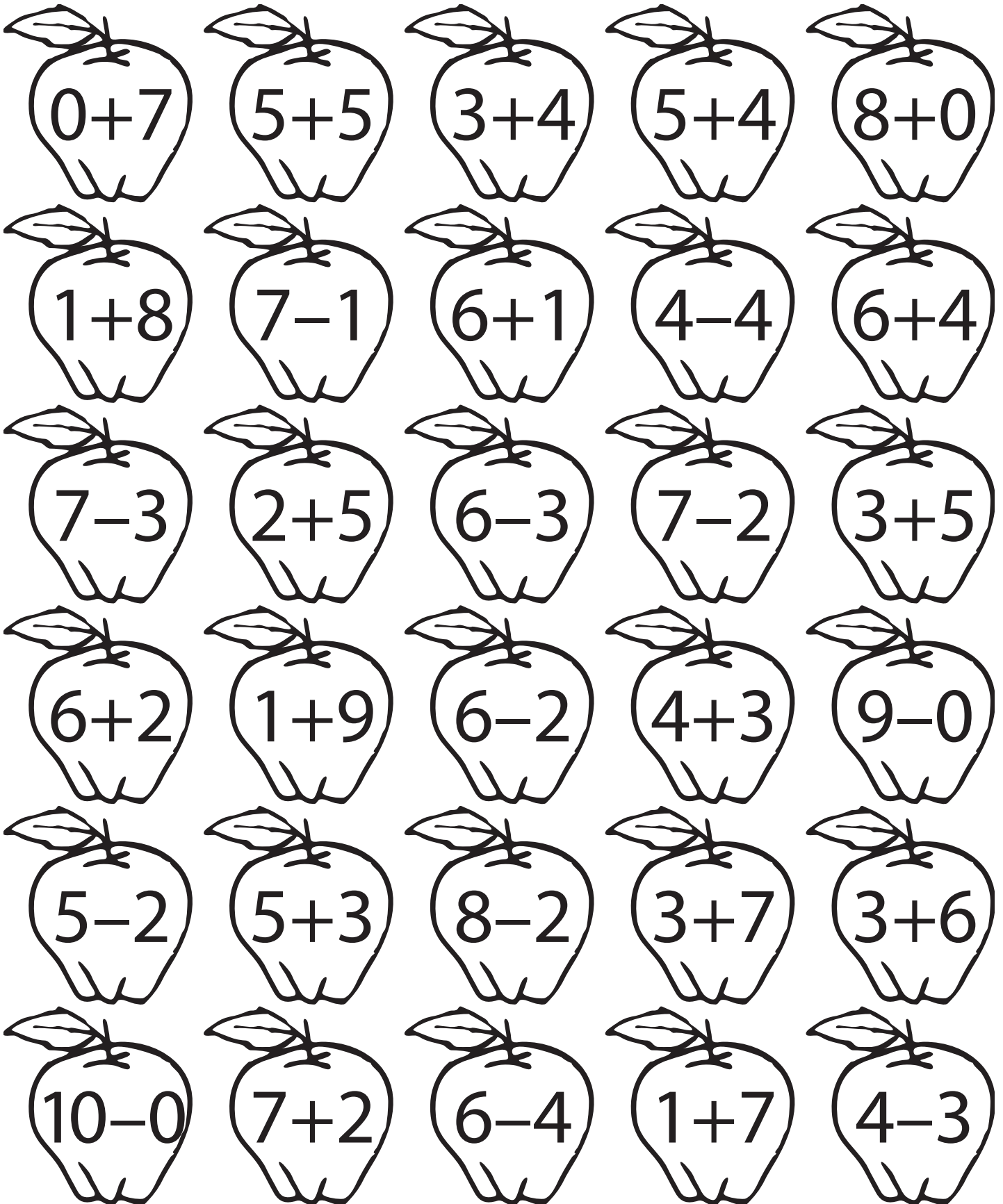


APPLE TIC-TAC-TOE GAME BOARD II



APPLE TIC-TAC-TOE

GAME BOARD III



CLOSE TO 30

Mathematical Content: Number Operations (Subtraction with 2-digit numbers)

Number of players: 2–4

Objective: The player with the lowest total score after four rounds is the winner.

Materials

- CLOSE TO 30 RECORD — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*

Directions

1. Each player draws a card. The player with the lowest card goes first.
2. Cards are shuffled and each player is dealt four cards.
3. Each player arranges the 4 cards to make two 2-digit numbers with a difference close to 30.
4. The 2-digit numbers and their difference are recorded on CLOSE TO 30 RECORD.
5. Players calculate their score by finding the difference between the answer to their subtraction problem and 30, whether it is greater than or less than 30.

Example:


Claire draws a 3, 4, 6, and 2. Claire could use the numbers to make $64 - 32 = 32$.

The score is 2 ($32 - 30 = 2$).

6. The player with the lowest total score after four rounds is the winner.
7. **Variation**
Draw 6 cards and make two 3-digit numbers with a difference as close to 300 as possible.


CLOSE TO 30 RECORD

Player: _____




—

Score A: _____
(difference from 30)




—

Score B: _____
(difference from 30)



—

Score C: _____
(difference from 30)



—

Score D: _____
(difference from 30)

Add all of your scores (A, B, C, and D) to find your **TOTAL SCORE:** _____

COLOR SQUARES

Mathematical Content: Strategic Thinking, Logic

Number of players: 2

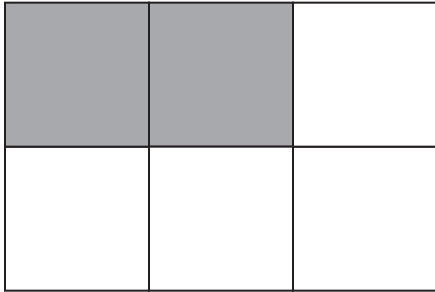
Objective: The player who colors in the last square wins.

Materials

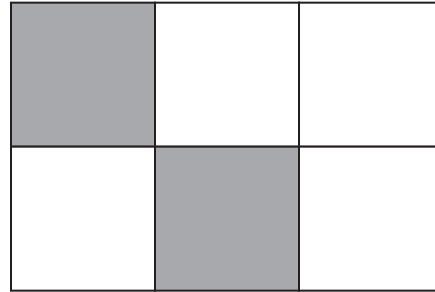
- COLOR SQUARES GAME I or II (or grid paper) — *one per game*
- Crayon or marker (two colors) — *one per player*

Directions

1. The player whose last name comes first in the alphabet goes first.
2. Each player takes a turn coloring in one or two squares on the COLOR SQUARES GAME. If a player chooses to color in two squares, the squares must have a common side.



OK



Not OK

3. The player who colors in the last square wins.
4. **Variations**
 - a. Players can color in one, two or three squares on their turn.
 - b. The player who colors in the last square loses.
 - c. Use 8×8 grid paper for a bigger game board.

COLOR SQUARES GAME I

Player: _____

COLOR SQUARES GAME II

Player: _____

COLUMNS AND ROWS

Mathematical Content: Number Operations, Integers, Mental Math, Strategic Thinking

Number of players: 2

Objective: The player whose score meets the objective is the winner.

Materials

- COLUMNS AND ROWS GAME BOARD — *one per game*
- Game markers (different color per player) — *12 per player*
- Paper (to record scores) — *one per player*
- Pencils — *one per player*

Directions

1. Player whose last name comes last in the alphabet goes first.
2. The object of the game is to get the highest positive total.
3. The first player can only move left or right across the rows, the second player can only move up and down the columns.
4. The player that goes first must start by placing a marker on the center row to the left or right of the \pm symbol. The player records the number on which the marker is placed.
5. The second player can then place a marker up or down in the column where the marker was placed by the first player and then records the number.
6. The first player then places a marker in the same row, left or right of the marker just placed by the second player.
7. Each number is added to each player's score after the player's marker has been placed.
8. Players continue to take turns alternating from rows to columns until one player can no longer play.
9. Players cannot play the \pm square.
10. Players cannot play a square where there is already a marker.
11. The player whose score meets the objective is the winner.
12. **Variations**
 - a. The object is to get the largest negative total.
 - b. The object is to get the score closest to 0.
 - c. The object is to get the highest absolute value (distance from zero, either positive or negative).

COLUMNS AND ROWS GAME BOARD

-17	-4	10	6	-9
12	3	-15	-20	13
7	-19	±	11	-22
-2	-14	1	9	-16
5	8	-20	-24	18

COUNTING COORDINATES

Mathematical Content: Number Operations, Integers, Coordinates

Number of players: 2

Objective: The player with the greatest score at the end of 10 turns wins the game.

Materials

- COUNTING COORDINATES GAME BOARD — *one per game*
- Dice — *two of different colors*
- Paper — *one per player*
- Pencils — *one per player*

Directions

1. Players roll dice. Player with lowest sum goes first.
2. Decide which color die will represent the “x” coordinate; the other one will represent the “y” coordinate. Write those colors on your paper before beginning the game.

Example:

x is green, y is blue.

3. Players take turns throwing the dice.
4. After each throw, the player finds an integer by looking at the square on COUNTING COORDINATES GAME BOARD that corresponds to the intersection of the grid numbers shown on the dice.

Example:

Green die represents x and the roll is 4. Blue die represents y and the roll is 3. The coordinating square is -4 .

5. Record the integer on the paper. After the first turn, players add the integer to the previous value.
6. Each player rolls the dice 10 times. The player with the greatest score at the end of 10 turns wins the game.

Example:

Turn	Roll	Score
1	$x = 4, y = 3$	-4
2	$x = 6, y = 2$	$\begin{array}{r} +5 \\ \hline +1 \end{array}$
3	$x = 1, y = 2$	$\begin{array}{r} -3 \\ \hline -2 \end{array}$

7. Variation

- a. Have the winner be the player with the greatest absolute value (greatest value regardless of sign) for a final score.
- b. Have the winner be the player with a score closest to zero.

COUNTING COORDINATES GAME BOARD

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

x

COVER IT

Mathematical Content: Number Sense, Math Vocabulary including: Odd/Even, Prime, Composite, Divisibility, Multiples, and Factors

Number of players: 2–3

Objective: The player who gets four in a row wins.

Materials

- COVER IT GAME BOARD — *one per game*
- COVER IT SPINNER — *one per game*
- Game markers (different color per player) — *15 per player*

Directions

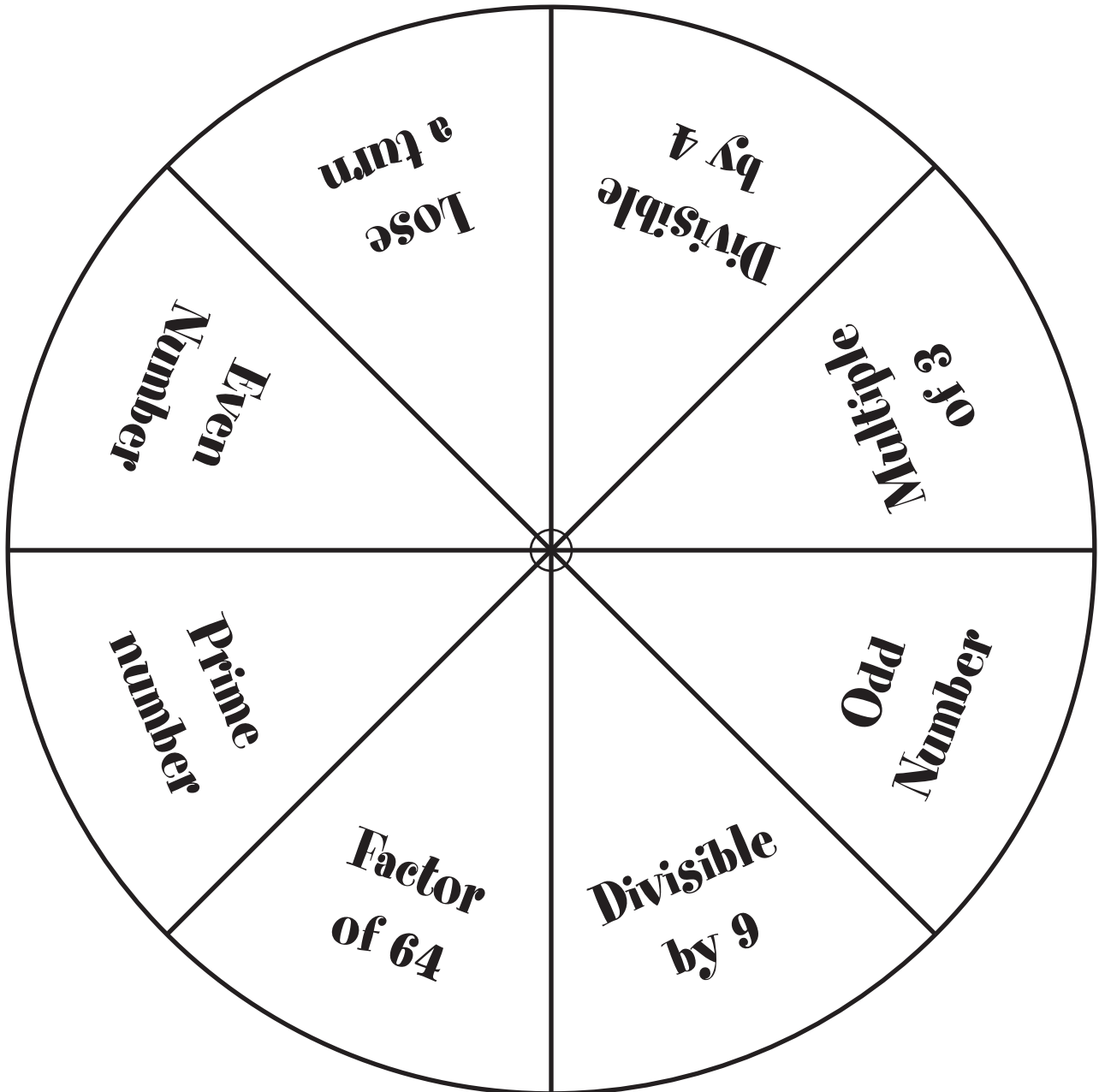
1. Player whose birthday comes first in the calendar year goes first.
2. The first player spins and covers a number on the game board that fits the description on the spinner.
3. Players take turns until one player has four markers in a row horizontally, vertically, or diagonally.
4. If the player cannot find an uncovered number to fit the description or if the player spins “lose a turn,” the player loses that turn.
5. The player who gets four in a row wins.
6. **Variations**
 - a. Winners have five markers in a row.
 - b. Play on a 50 chart or a 100 chart for five or six in a row.

COVER IT

GAME BOARD

8	21	27	12	25	17
28	13	63	2	5	36
3	26	35	18	24	4
16	72	1	33	11	30
54	9	32	6	48	31
81	15	7	90	34	19

COVER IT SPINNER



DICEY

Mathematical Content: Number Operations, Mental Math, Probability

Number of players: 2

Objective: The winner is the first player to remove all his/her markers.

Materials

- DICEY GAME BOARD — *one per game*
- Dice — *two per game*
- Game markers (different color per player) — *seven per player*

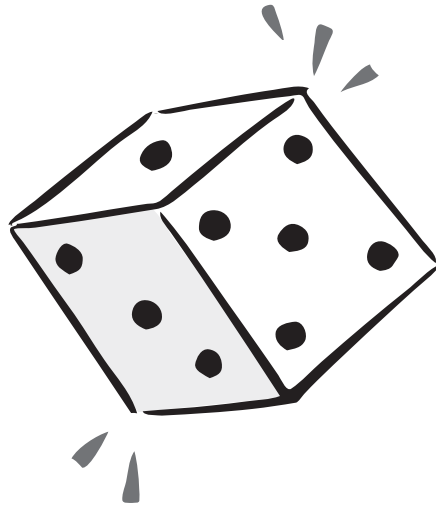
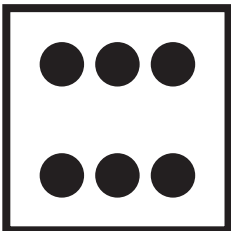
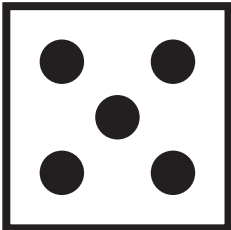
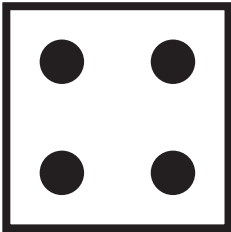
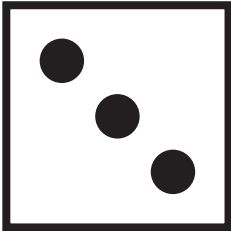
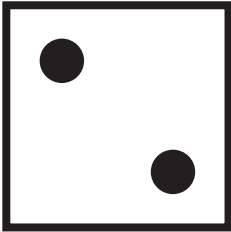
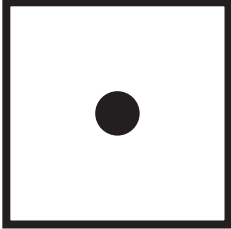
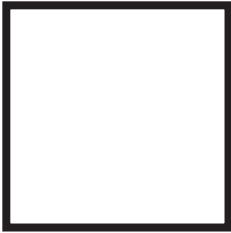
Directions

1. Players roll dice. Player with the highest sum goes first.
2. Players cover the seven die spaces on their side of the board.
3. Players take turns rolling two dice.
4. Remove one marker if the sum or difference is there.

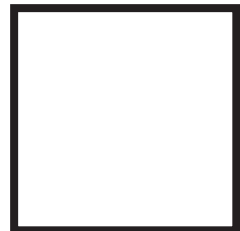
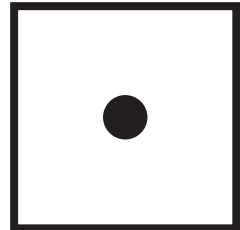
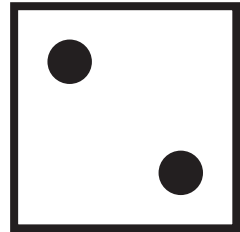
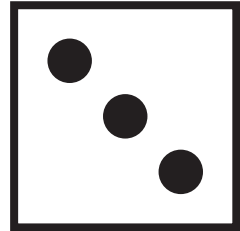
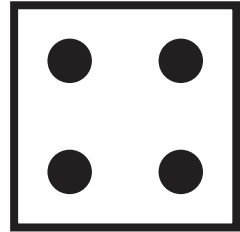
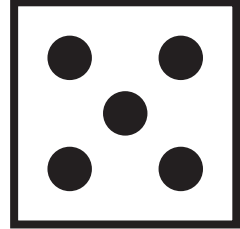
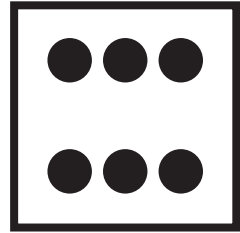
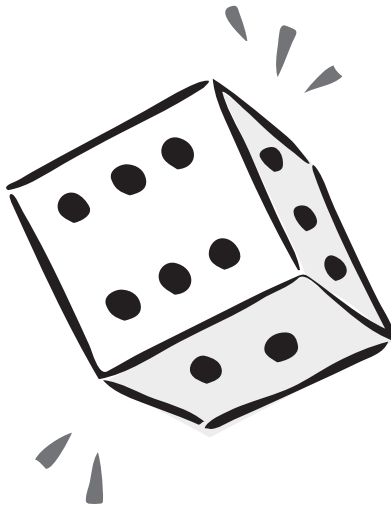
Example:

If both 4 and 2 are rolled, the player could remove a marker on the 6 or the 2.

5. If no marker can be removed, the player must return a marker to any one of the vacant numbers on his/her side of the board.
6. The winner is the first player to remove all his/her markers.
7. **Variations**
 - a. Players can add, subtract, multiply, or divide to remove a marker.
 - b. Use three dice and any combination of addition, subtraction, multiplication, and division to remove a marker.



DICTIONARY



DIGIT PLACE

Mathematical Content: Number Sense, Place Value, Estimation, Mental Math

Number of players: 2 – whole class with a leader

Objective: The person with the lowest score after 6 rounds is the winner.

Materials

- DIGIT PLACE RECORD — *one per player*
- Calculator — *one per player (Optional, used only for checking results)*
- Die (0–9) — *one per game*
- OR—
- Deck of cards (Ace–10; Ace = 1, 10 = 0, other cards at face value) — *one per game*
- Pen — *one per player*

Directions

1. Each player is given a DIGIT PLACE RECORD. One person is designated the leader.
2. The leader determines a target number between 200 and 300. Make sure that every player writes the target number on their record at the beginning of each round.
3. The leader rolls the die or draws a card and calls out numbers one at a time (10 cards/rolls of the die per round). Students **MUST** enter the digit as soon as it is read. (A student who erases a number to change it's place or holds a number in their head instead of writing it down until the next number is read will have the round crossed off and their score will be 50 points for that round.)
4. If at the end of a round a player has an empty box, they will receive a score of 25 points even if the empty box is in the discard.
5. Players try to make four two-digit numbers that when added together come as close to the target number as they can—the sum can be more or less than the target number. The goal is to come closest to the target number. The score for each round is the difference between the player's sum and the target number.
6. At the end of each round, players may check their arithmetic and find their score with the calculator.
7. At the end of each game (6 rounds), players add up all their scores and the person with the lowest sum is the winner.

Example:

	Sum	Target	Score								
<table border="1"><tr><td>5</td><td>2</td></tr></table> + <table border="1"><tr><td>6</td><td>5</td></tr></table> + <table border="1"><tr><td>9</td><td>0</td></tr></table> + <table border="1"><tr><td>4</td><td>2</td></tr></table> =	5	2	6	5	9	0	4	2	249	257	8
5	2										
6	5										
9	0										
4	2										
Discard <table border="1"><tr><td>1</td><td>0</td></tr></table>	1	0									
1	0										

DRAW TO WIN

Mathematical Content: Place Value, Number Sense, Probability

Number of players: Small group or whole class with a leader

Objective: The winner is the player with the most points after 9 rounds.

Materials

- DRAW TO WIN RECORD (I or II) — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*

—OR—

- 0–9 Spinner — *one per game*
- Pencil — *one per player*

Directions

1. Each player is given a DRAW TO WIN RECORD (I or II). One person is designated the leader for each round. There are 9 possible rounds.
2. The leader announces the goal for the first round: to try to make the largest possible number, the smallest possible number, or a number closest to a number (such as 500).
3. Cards are shuffled and placed face down in the middle of the table.
4. The leader draws a card and tells the value of the card to the players.
5. Players record the number in one of the boxes for that round keeping in mind the goal (biggest, smallest, etc.) for that round. **Note:** ONCE A NUMBER IS WRITTEN IN A BOX, IT CANNOT BE CHANGED.
6. After all the numbers for the round have been drawn, players share their numbers. Each player that has the number that meets the goal receives one point. Other players receive zero. The winner is the player with the most points after 9 rounds.

Example:

(Playing for highest number) Draw #1 = 5, player places the 5 in the *tens* place. Draw # 2 = 3, player places the 3 in the *ones* place. Draw #3 = 4. Player must put the 4 in the *hundreds* place creating 453. Since this is not the greatest possible number (543) that can be made, the player receives zero.

7. Variations

- a. Use DRAW TO WIN RECORD II. It has a greater number of digits.
- b. Remove commas and place decimals, 2–3 places from the right.

Example:



Target the largest or smallest number.

DRAW TO WIN RECORD I

Player: _____

Points Round

_____	1			
_____	2			
_____	3			
_____	4			
_____	5			
_____	6			
_____	7			
_____	8			
_____	9			

DRAW TO WIN

RECORD II

Player: _____

Points Round

_____	1						
_____	2						
_____	3						
_____	4						
_____	5						
_____	6						
_____	7						
_____	8						
_____	9						

FAST FACTS

Mathematical Content: Number Operations, Mental Math

Number of Players: 2–4

Objective: The player with the most cards/points wins.

Materials

- Deck of cards (Ace–10; Ace = 1, 10 = 10, other cards face value) — *one per game*
- Paper (scratch) — *one per player*
- Pencil — *one per player*
- Timer — *one per game (Optional)*

Directions

1. Each player draws a card. The player with the highest card will be the dealer.
2. The dealer places *five* cards face up on the table. An additional card, the target, is placed face up. Each player then tries to use addition, subtraction, multiplication, and/or division to combine all five cards so that the result is the numerical value of the target card. Each of the cards must be used *once and only once*. The target card is *not* used in the calculations.
3. When a player has a solution he/she says, “Fast Facts!” and explains his/her solution. If correct, the player gets six points. If incorrect, the player must lose five points. The cards are removed and a new hand is dealt. Points are recorded on scratch paper.
4. A maximum of *three minutes* is allowed to solve each hand. A timer may be useful.
5. Play ends when the pack is depleted or when time is called. The player with the most cards/points wins.

Example:

5, 8, 5, 6, 2 are drawn. Target card is 5.

One possible solution is $\frac{5}{5} + 8 - 6 + 2 = 5$

6. Variations

- a. Have players use two, three, four, or all five cards to solve the hand. Scoring will vary:
 - 2 cards = 2 points
 - 3 cards = 3 points
 - 4 cards = 4 points
 - 5 cards = 5 points
- b. Place two cards in the target area to represent a two-digit number.
- c. Use the face cards as 10’s, or 11, 12, and 13 depending on the skill level of the players.
- d. For practice with decimals, use a decimal point with the target number.

Example:

If the target card is 5, the target is .5. Possible solution is $(5 + 5 - 8)$ divided by $(6 - 2) = .5$

- e. If players are just beginning to learn their facts the pressure caused by the time limit may be eliminated.

FINDING 10s

Mathematical Content: Number Sense, Number Facts

Number of Players: 2–4

Objective: The player with the most cards wins.

Materials

- Deck of cards (Ace–10; Ace = 1, 10 = 10) — *one per game*

Directions

1. Each player draws a card. Highest card goes first.
2. The first player shuffles the cards and deals out *nine* cards face up in a 3×3 array (figure a), placed in the middle of the table for all players to see. Stack the remaining cards face down.
3. On each turn, the player takes any one, two, or three cards from the array that added together equal 10. When the player can no longer find combinations that add to 10 the turn is over and the player fills the array to nine cards from the deck.
4. The next player then finds and takes all combinations that equal 10, then refills the array for the next player.
5. If there are no cards or combinations equal to 10 that can be made from an array, the player may draw a card from the deck and use it with the cards in the array to make 10. If none are found, the card is put on the bottom of the deck and the next player gets to try to draw a card.
6. When there are no combinations that equal 10 and the deck is gone the game is over. Players count their cards. The one with the most cards wins.

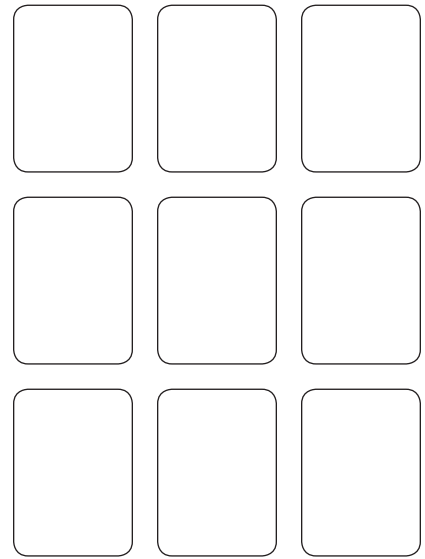


figure a.

*The first player deals out nine cards **face up** in a 3×3 array.*

7. Variations

- a. Use the face cards and find combinations that equal 13. (J = 11, Q = 12 and K = 13)
- b. Allow players to use addition and subtraction or to use any operation to equal the target number.
- c. Make a 4×4 array using the whole deck (no jokers).
- d. Choose another target number such as 17 or 20.

FOUR IN A ROW

Mathematical Content: Equivalent Fractions

Number of Players: 2

Objective: The first player to get four in a row, horizontally, vertically, or diagonally, wins.

Materials

- FOUR IN A ROW GAME BOARD — *one per game*
- Dice — *two per game*
- Game markers (different color per player) — *18 per player*

Directions

1. Players roll dice. The player making a proper fraction closest to 1 goes first.
2. Players take turns rolling the dice.
3. Each player throws the dice and makes a proper fraction numerator smaller than denominator with the numbers rolled.
4. The player then finds an equivalent fraction on the game board and covers it with a marker.

Example:

If 3 and 4 are rolled, player could cover $\frac{3}{4}$ or $\frac{6}{8}$ or $\frac{9}{12}$.

5. If a player gets doubles he/she loses a turn.
6. The first player to get four in a row, horizontally, vertically, or diagonally, wins.
7. **Variations**
 - a. If an opponent's marker is on the fraction the player may remove the opponent's marker.
 - b. Play for five in a row.

FOUR IN A ROW

GAME BOARD

$\frac{7}{14}$	$\frac{3}{9}$	$\frac{2}{12}$	$\frac{8}{20}$	$\frac{6}{12}$	$\frac{6}{8}$
$\frac{9}{15}$	$\frac{3}{18}$	$\frac{20}{24}$	$\frac{16}{20}$	$\frac{4}{20}$	$\frac{4}{24}$
$\frac{10}{25}$	$\frac{12}{15}$	$\frac{10}{20}$	$\frac{6}{9}$	$\frac{15}{18}$	$\frac{5}{20}$
$\frac{4}{10}$	$\frac{3}{12}$	$\frac{10}{12}$	$\frac{6}{18}$	$\frac{15}{25}$	$\frac{5}{25}$
$\frac{12}{20}$	$\frac{2}{10}$	$\frac{10}{15}$	$\frac{8}{16}$	$\frac{9}{12}$	$\frac{20}{25}$
$\frac{4}{16}$	$\frac{12}{16}$	$\frac{8}{10}$	$\frac{5}{15}$	$\frac{6}{10}$	$\frac{8}{12}$

FRACTION BATTLE

Mathematical Content: Comparing Fractions

Number of Players: 2

Objective: The player with the most cards is the winner.

Materials

- FRACTION BATTLE GAME BOARD — *one per game*
- COMPARING FRACTIONS (equivalency chart) — *one per game (Optional)*
- Deck of cards (Ace–10; Ace = 1, 10 = 10) — *one per game*

Directions

1. Each player draws two cards. Using the smaller number as the numerator, the player making a fraction closest to zero goes first.
2. The deck of cards is shuffled and divided in half between the two players. Each player's half is placed face down in front of the player.
3. For each play, players draw two cards and place them on the game board to form a proper fraction. (The smaller card is used as the numerator.)
4. The player with the smallest fraction (closest to zero) wins the hand. The other player gives the “winner” his/her cards for this hand.

If players' fractions are the same value (for example, $\frac{1}{2}$ and $\frac{2}{4}$) each player draws two more cards and compares their fractions. The player with the fraction closest to zero gets all 8 cards.

Example:

Player A has Ace (1) and 3, making $\frac{1}{3}$. Player B has 2 and 8, making $\frac{2}{8}$. Player B wins.

5. Play continues until all the cards are gone. The player with the most cards is the winner.
6. **Variations**
 - a. Player with the largest fraction (closest to 1) is the winner. Using the example above, Player A wins (with $\frac{1}{3}$).
 - b. Player with the fraction closest to $\frac{1}{2}$ is the winner. Using the example above, Player A wins (with $\frac{1}{3}$).
 - c. Cards are placed to form an improper fraction and the player with the fraction closest to 2 wins.

FRACTION BATTLE
GAME BOARD



PLAYER A



PLAYER B

COMPARING FRACTIONS

Halves

$$\frac{1}{2}$$

Thirds

$$\frac{1}{3}$$

$$\frac{2}{3}$$

Fourths

$$\frac{1}{4}$$

$$\frac{2}{4}$$

$$\frac{3}{4}$$

Fifths

$$\frac{1}{5}$$

$$\frac{2}{5}$$

$$\frac{3}{5}$$

$$\frac{4}{5}$$

Sixths

$$\frac{1}{6}$$

$$\frac{2}{6}$$

$$\frac{3}{6}$$

$$\frac{4}{6}$$

$$\frac{5}{6}$$

Sevenths

$$\frac{1}{7}$$

$$\frac{2}{7}$$

$$\frac{3}{7}$$

$$\frac{4}{7}$$

$$\frac{5}{7}$$

$$\frac{6}{7}$$

Eighths

$$\frac{1}{8}$$

$$\frac{2}{8}$$

$$\frac{3}{8}$$

$$\frac{4}{8}$$

$$\frac{5}{8}$$

$$\frac{6}{8}$$

$$\frac{7}{8}$$

Ninths

$$\frac{1}{9}$$

$$\frac{2}{9}$$

$$\frac{3}{9}$$

$$\frac{4}{9}$$

$$\frac{5}{9}$$

$$\frac{6}{9}$$

$$\frac{7}{9}$$

$$\frac{8}{9}$$

Tenths

$$\frac{1}{10}$$

$$\frac{2}{10}$$

$$\frac{3}{10}$$

$$\frac{4}{10}$$

$$\frac{5}{10}$$

$$\frac{6}{10}$$

$$\frac{7}{10}$$

$$\frac{8}{10}$$

$$\frac{9}{10}$$

Elevenths

$$\frac{1}{11}$$

$$\frac{2}{11}$$

$$\frac{3}{11}$$

$$\frac{4}{11}$$

$$\frac{5}{11}$$

$$\frac{6}{11}$$

$$\frac{7}{11}$$

$$\frac{8}{11}$$

$$\frac{9}{11}$$

$$\frac{10}{11}$$

Twelfths

$$\frac{1}{12}$$

$$\frac{2}{12}$$

$$\frac{3}{12}$$

$$\frac{4}{12}$$

$$\frac{5}{12}$$

$$\frac{6}{12}$$

$$\frac{7}{12}$$

$$\frac{8}{12}$$

$$\frac{9}{12}$$

$$\frac{10}{12}$$

$$\frac{11}{12}$$

HIGHEST WINS

Mathematical Content: Mental Math, Number Operations

Number of Players: 2–4

Objective: The winner has the most cards at the end of the game.

Materials

- Deck of cards (Ace–10; Ace = 1, 10 = 10, other cards at face value) — *one per game*

Directions

1. The dealer distributes an equal number of cards in stacks for each player, face down.
2. Simultaneously, players reveal the top two cards from their stacks. The player whose total added value of the two cards is greater keeps all the turned up cards.
3. When equal values are revealed, those players turn over a third card. The player whose three cards have the greatest value keeps all the cards. It is possible that a fourth card may need to be turned over.
4. The winner has the most cards at the end of the game.
5. **Variations**
 - a. The greatest product wins.
 - b. The lowest sum or product wins.
 - c. The least or greatest difference wins.

LEFT OVERS

Mathematical Content: Division, Mental Math

Number of players: 2 or 4

Objective: The first player to reach FINISH **exactly** is the winner.

Materials

- LEFT OVERS GAME BOARD — *one per game*
- Die — *one per game*
- OR—
- 1–6 Spinner — *one per game*
- Game markers (different color per player) — *one per player*
- Paper (scratch) — *one per player (Optional)*
- Pencils — *one per player (Optional)*

Directions

1. Each player rolls the die. The player with the highest number plays first. Others follow in clockwise rotation. Players' markers are placed on START.
2. Each player, in turn, rolls the die and divides the number their marker is resting on by the number on the die (Start = 11). The player then moves the number of spaces “left over” (the remainder).

Example:

If the marker rests on 38 and a 6 is rolled, the player may move *two spaces*.

$$38 \div 6 = 6 \text{ r } 2$$

3. The first player to reach FINISH **exactly** is the winner. If a player has a remainder that takes him/her past the finish line he/she must go back that number of spaces rather than forward. On the next turn he/she can resume moving toward the finish line.
4. **Variation**
Use a deck of cards (A–9) or 0–9 spinner. If a zero is spun, the player takes another turn.

LESS IS BEST

Mathematical Content: Number Operations, Mental Math

Number of players: 2–4

Objective: The object of the game is to score the most points by making math problems with small answers.

Materials

- LESS IS BEST GAME BOARD (I or II) — *one per player*
- LESS IS BEST RECORD — *one per player*
- Calculator — *one per player (Optional)*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*
- Timer — *one per game (Optional)*

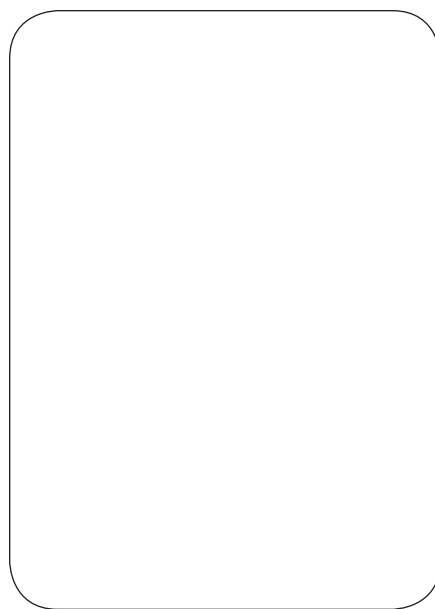
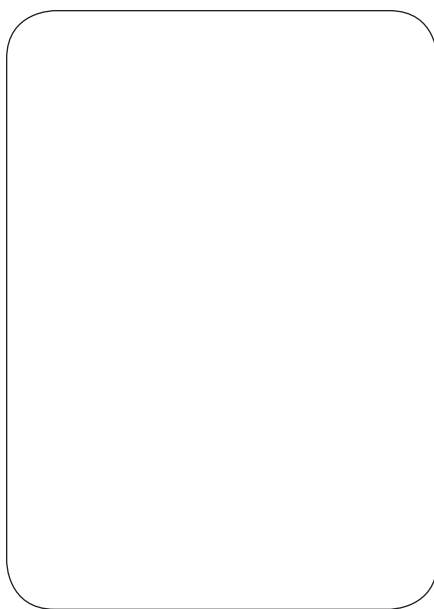
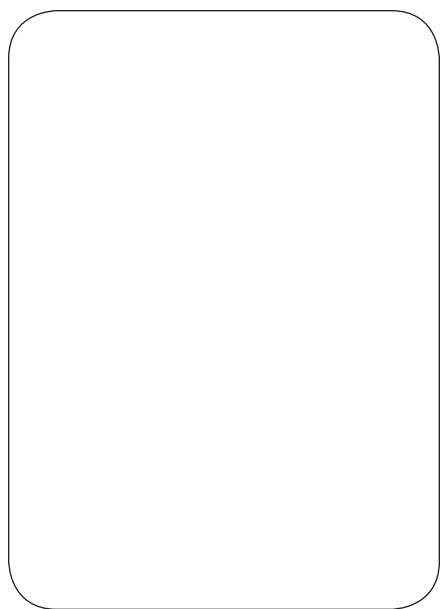
Directions

1. Players or the teacher select a board and operation for use in each game. Each player must have the same game board and a record.
2. Players cut for deal. Low card starts. Play rotates clockwise.
3. As each card is drawn, it must be placed on the game board. Cards are placed on each board to form the smallest answer. Cards may not be removed once they are placed.
4. After the cards are placed on a game board, players must calculate the answer to their problem. Players are encouraged to calculate each answer in their heads without paper/pencil or calculator within a two-minute time limit.
5. The player with the smallest answer receives one point for the round, recording it on his/her record.
6. The game ends at the end of five rounds. The player with the most points is the winner.
7. Cards should be shuffled each time the deck is used up.
8. **Variations**
 - a. Make the largest sum.
 - b. Make the smallest or largest difference.
 - c. Make the smallest or largest product.
 - d. Make the smallest or largest quotient.

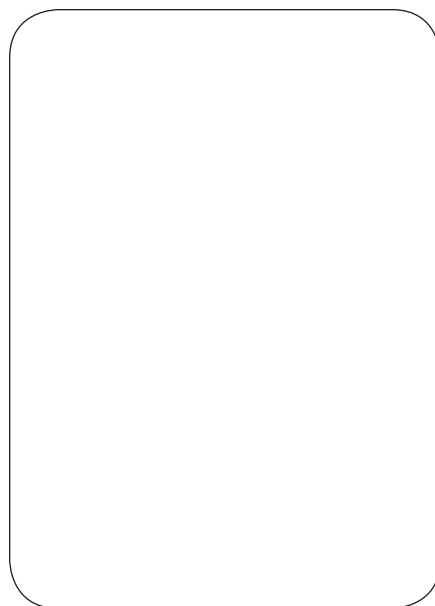
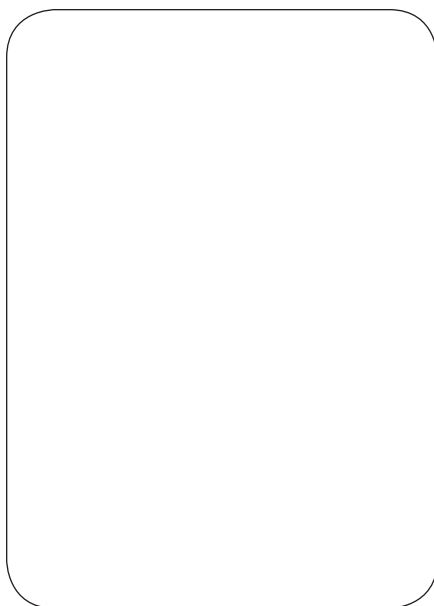
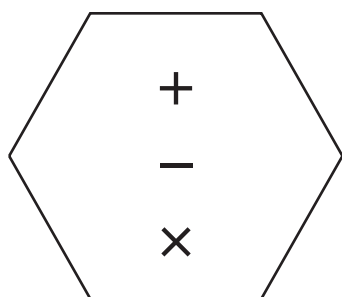
LESS IS BEST

GAME BOARD I

Addition, Subtraction, Multiplication

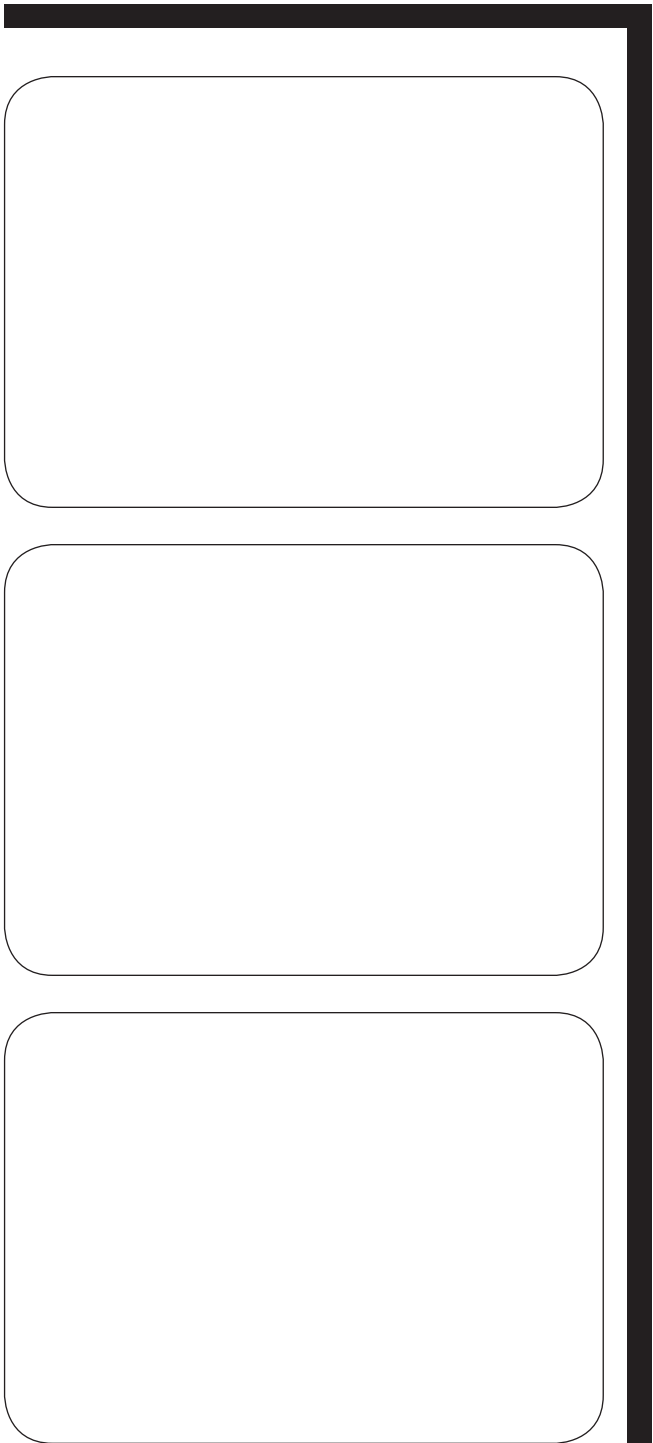
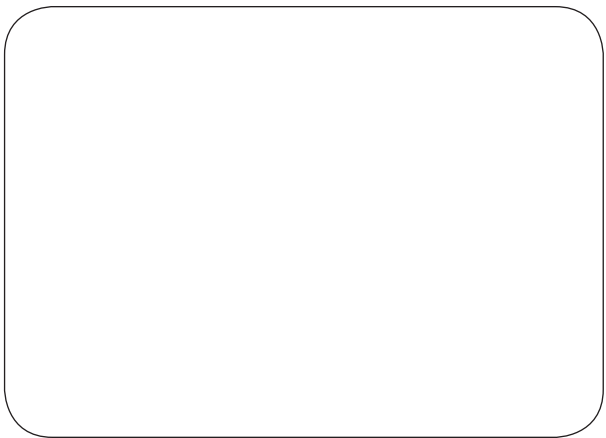



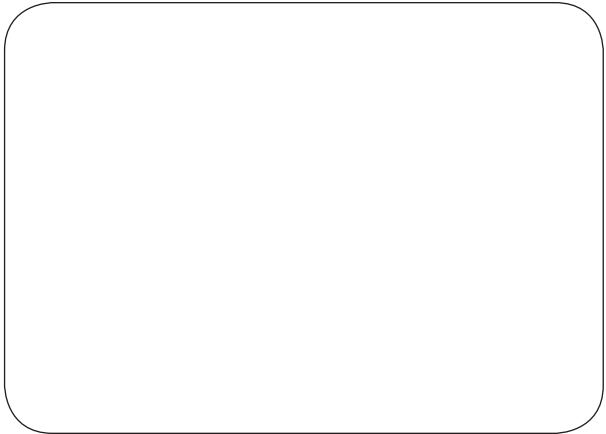

circle the
operation:



**LESS IS BEST
GAME BOARD II**

Division



		
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**LESS IS BEST
RECORD**

Player: _____

<i>Round #</i>	<i>Score</i>
1	_____
2	_____
3	_____
4	_____
5	_____
Total:	_____

**LESS IS BEST
RECORD**

Player: _____

<i>Round #</i>	<i>Score</i>
1	_____
2	_____
3	_____
4	_____
5	_____
Total:	_____

**LESS IS BEST
RECORD**

Player: _____

<i>Round #</i>	<i>Score</i>
1	_____
2	_____
3	_____
4	_____
5	_____
Total:	_____

**LESS IS BEST
RECORD**

Player: _____

<i>Round #</i>	<i>Score</i>
1	_____
2	_____
3	_____
4	_____
5	_____
Total:	_____

MAKE 100

Mathematical Content: Place Value, Mental Math

Number of players: 2–4

Objective: The player with the most points at the end of the four games is the winner. (Or at the end of a designated game time.)

Materials

- MAKE 100 RECORD — *one per player*
- Deck of cards (Ace–6; Ace = 1) — *one per game*
—OR—Die — *one per game*—OR—1–6 Spinner — *one per game*
- Pencils — *one per player*

Directions

1. Players each draw one card. The player with the highest number goes first.
2. The cards are shuffled and the deck is placed face down in the middle of the table. Players take turns drawing a card.
3. After each draw the player writes the value of the card in the one's (1's) or the ten's (10's) place on his/her MAKE 100 RECORD. Once the number is written in one of the places, it cannot be changed.
4. Each player draws a total of *six* cards, one at a time, recording the number each time.
5. After each player has drawn *six* times, players find the total of their draws. The player who is closest to 100 WITHOUT GOING OVER receives 1 point.
6. The player with the most points at the end of the four games is the winner. (Or at the end of a designated game time.)

Example:

Draw	10's	1's
1	3	0
2		6
3	4	0
4		2
5	1	0
6		3
<hr/>		
Total	9	1

Hint: If players are just beginning to learn place value, have them place a 0 in the 1's place when they place a number in the 10's place.

7. Variations

- a. Have players use a deck of 40 cards to make 100 using same rules.
(Ace–10; Ace = 1, 10 = 0, other cards at face value)
- b. Have players “Make 1000.”

Example:

Draw	100's	10's	1's
1	1	0	0
2	3	0	0
3	3	0	0
4		4	0
5	2	5	0
6		0	0
<hr/>			
Total	9	9	0

MAKE 100 RECORD

Player: _____

GAME #1

<i>Draw</i>	<i>10's</i>	<i>1's</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
Total:	_____	_____
Score:	_____	

GAME #2

<i>Draw</i>	<i>10's</i>	<i>1's</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
Total:	_____	_____
Score:	_____	

GAME #3

<i>Draw</i>	<i>10's</i>	<i>1's</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
Total:	_____	_____
Score:	_____	

GAME #4

<i>Draw</i>	<i>10's</i>	<i>1's</i>
1	_____	_____
2	_____	_____
3	_____	_____
4	_____	_____
5	_____	_____
6	_____	_____
Total:	_____	_____
Score:	_____	

MAKE A PATH

Mathematical Content: Number Operations, Mental Math

Number of players: 2

Objective: The first player to complete a *continuous path* from one side of the game board to the other is the winner.

Materials

- MAKE A PATH GAME BOARD — *one per game*
- Dice — *four per game*
- Game markers (different color per player) — *24 per player*

Directions

1. Each player rolls one die. The person with the highest number goes first and chooses to be player A or player B.
2. Each player in turn rolls the four dice. The player selects three of the numbers rolled using addition and/or subtraction to calculate one of the numbers in the first row/column (**shaded area**) on the game board. The player then covers that number with a game marker. If no number can be made, the player loses his/her turn.
3. After getting a game marker on the board, each player rolls the four dice and must calculate a number that touches a side or corner of his/her previous square in order to place a game marker. If a player cannot calculate a number or if the only number he/she can make is already taken, he/she loses the turn.
4. First player to complete a *continuous path* from one side of the game board to the other is the winner.

Example: Player A has a marker on 10 and rolls a 3, 6, 1, and 2.

The player can place a marker on

$$5 = 6 - (3 - 2)$$

—OR—

$$0 = 3 - 2 - 1$$

—OR—

$$8 = 6 + 3 - 1$$

—OR—

$$1 = 6 - 3 - 2$$

5. Variations

- a. Allow players to start at any number on the board then work their way towards the start and finish by covering a number adjacent to any one of their previous squares.
- b. Players roll three dice and add, subtract, multiply, and/or divide to find a number on the board.
- c. Use a 100 chart as the game board. Have players use addition, subtraction, multiplication, and division to make a path from one side to another (does not need to be straight).

MAKE A PATH GAME BOARD

Player B starts here

	18	2	10	3	6	1	8	
	3	8	0	5	6	5	18	
	9	7	15	12	16	6	17	
<i>Player A starts here</i>	7	5	10	1	6	10	3	<i>Player A finishes here</i>
	5	8	12	0	3	13	6	
	7	14	8	3	14	2	6	
	5	7	4	8	7	3	2	

Player B finishes here

MAKE IT RIGHT

Mathematical Content: Number Operations (Division), Mental Math

Number of players: 2—whole class with a leader

Objective: The first player who completes three correct division problems in any row, column, or diagonal is the winner.

Materials

- MAKE IT RIGHT GAME — *one per player*
 - Deck of cards (Ace–10; Ace = 1, 10 = 0, other cards at face value) — *one per game*
- OR—
- 0–9 Spinner — *one per game*

Directions

1. The cards are shuffled and stacked with numerals facing down. A leader picks the top card and reads it aloud.
2. Each player chooses a square on his/her MAKE IT RIGHT GAME and writes the numeral in one of the three boxes within that square. Once a numeral is written down, it cannot be moved to any other box or square.
3. Play continues as cards are chosen and read. The players perform mental division work. They write the number that is read in **any** box on the MAKE IT RIGHT GAME. They attempt to form a complete division problem in every square. (It is not necessary to complete one division statement in three consecutive card draws.)
4. Players must write down each numeral that is read. (Sometimes they will not be able to form a correct division statement.)
5. The first player who completes three correct division problems in any row, column, or diagonal is the winner.
6. **Variation**
To practice more difficult division, problems in the form of *figure a* can be used. Use only division problems with remainders of zero.

figure a. —
$$\begin{array}{r} \square \square \\ \square \square \square \end{array}$$

MAKE IT RIGHT GAME

1

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

2

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

3

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

4

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

5

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

6

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

7

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

8

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

9

$$\begin{array}{r} \square \\ \hline \square \quad \square \end{array}$$

MAKE THE NUMBERS

Mathematical Content: Number Sense, Place Value

Number of Players: 2

Objective: The player with the most points wins.

Materials

- MAKE THE NUMBERS RECORD (I and II) — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*

Directions

1. Players each draw one card. The player with the lowest card goes first.
2. Players take turns drawing three cards. The player then attempts to make a 3-digit number that meets one of the conditions on MAKE THE NUMBERS RECORD.
3. The player records the number next to the condition that it fits. If the number does not meet any of the conditions, the player must still write the number on one of the blanks. Blanks do not have to be filled in order.
4. Once a number is written it cannot be moved.
5. After each player has drawn five sets of cards, circle the number that is closest to meeting each of the conditions. That player gets a point. If both players meet the condition, circle both numbers. Both players get a point.
6. The player with the most points wins. Play Games 1 and 2 (these are shorter), or if time allows, play Game 3 instead.

Example:

Game #1

Draw #	Condition	My Number	Partner's Number	My Points	Partner's Points
1.	Number closest to 450	455	420	1	
2.	Number with even numbers in the tens and ones place	983	962		1
3.	Number between 600 and 800	738	653	1	1
4.	Number between 200 and 500	387	410	1	1
5.	Number closest to 100	367	158		1
Totals				3	4

Partner wins with 4 points.

7. Variation

Students create conditions and create new games.

MAKE THE NUMBERS RECORD I

GAME #1

Player: _____

<i>Draw</i>	<i>Condition</i>	<i>My Number</i>	<i>Partner's Number</i>	<i>My Points</i>	<i>Partner's Points</i>
1.	Number closest to 450	_____	_____	_____	_____
2.	Number with even numbers in the tens and ones place	_____	_____	_____	_____
3.	Number between 600 and 800	_____	_____	_____	_____
4.	Number between 200 and 500	_____	_____	_____	_____
5.	Number closest to 100	_____	_____	_____	_____
Totals:				_____	_____

GAME #2

Player: _____

<i>Draw</i>	<i>Condition</i>	<i>My Number</i>	<i>Partner's Number</i>	<i>My Points</i>	<i>Partner's Points</i>
1.	Number with an odd number in the 100's place	_____	_____	_____	_____
2.	The sum of the digits in the number is greater than 5	_____	_____	_____	_____
3.	The sum of the digits in the number is less than 6	_____	_____	_____	_____
4.	Number closest to 900	_____	_____	_____	_____
5.	Number between 350 and 600	_____	_____	_____	_____
Totals:				_____	_____

MAKE THE NUMBERS RECORD II

GAME #3

Player: _____

<i>Draw</i>	<i>Condition</i>	<i>My Number</i>	<i>Partner's Number</i>	<i>My Points</i>	<i>Partner's Points</i>
1.	Number closest to 450	_____	_____	_____	_____
2.	Number with even numbers in the tens and ones place	_____	_____	_____	_____
3.	Number between 600 and 800	_____	_____	_____	_____
4.	Number between 200 and 500	_____	_____	_____	_____
5.	Number closest to 100	_____	_____	_____	_____
6.	Number with an odd number in the 100's place	_____	_____	_____	_____
7.	The sum of the digits in the number is greater than 5	_____	_____	_____	_____
8.	The sum of the digits is less than 6	_____	_____	_____	_____
9.	Number closest to 900	_____	_____	_____	_____
10.	Number between 350 and 600	_____	_____	_____	_____
11.	Odd number greater than 675	_____	_____	_____	_____
12.	Number closest to 362	_____	_____	_____	_____
13.	Number that can be divided evenly by 10	_____	_____	_____	_____
14.	Number with three odd digits	_____	_____	_____	_____
15.	Number closest to 0	_____	_____	_____	_____
Totals:				_____	_____

PLACE IT!

Mathematical Content: Place Value, Mental Math, Probability

Number of players: Whole class or small group with a leader

Objective: After five rounds, the player with the highest total is the winner (or lowest, depending on the goal).

Materials

- PLACE IT! GAME BOARD (I, II, or III) — *one per player*
- PLACE IT! RECORD — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per every two players*
- Pencils — *one per player*

Directions

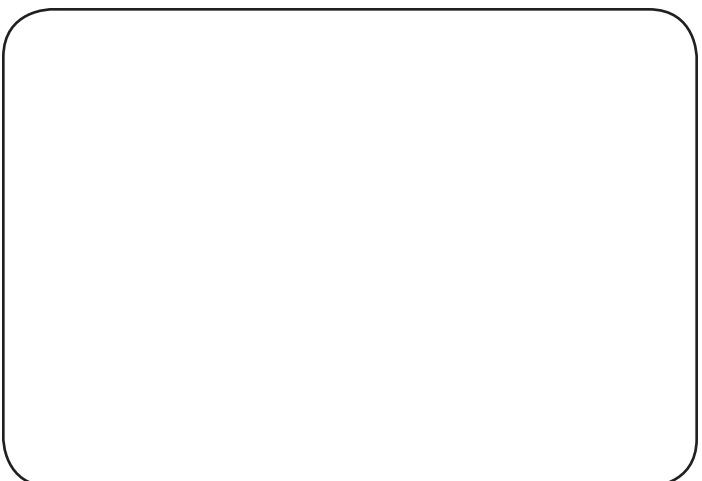
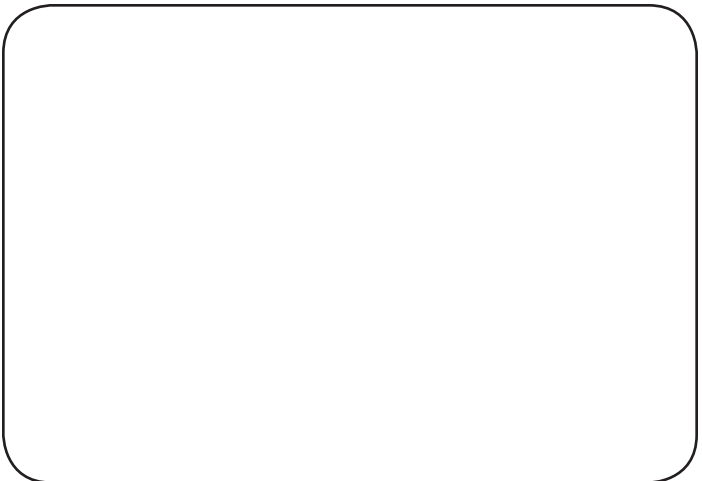
1. Each two players divide their deck of cards in half.
2. Players shuffle their cards and place them face down. Players must NOT look at the cards in their deck.
3. Before beginning, the leader tells the players if they are going to try to make the largest or the smallest number for the five rounds of the game.
4. When every one is ready, the leader says “One, two, three, **PLACE IT!**” At the command “PLACE IT!” each player turns over the top card of his/her deck and places it on one of the card frames on the game board.
5. Four cards will be drawn and placed on the game board in this fashion, one at a time. The discard spot may be used for ONLY one of the four cards.
6. Once a card is placed, it CANNOT be moved.
7. Decisions must be made quickly. As soon as the first card is drawn and placed the leader continues with “One, two, three, **PLACE IT!**”
8. At the end of each round, the number made by the cards is written on the record.
9. After five rounds, the player with the highest total is the winner (or lowest, depending on the goal).
10. **Variations**
 - a. Students who are ready for practice with four-digit numbers could play this game by drawing five cards to make a four-digit number using PLACE IT! GAME BOARD II.
 - b. Place a decimal point between two numbers.
 - c. Use PLACE IT! GAME BOARD III to practice with money.

Example: Find the number closest to 1.

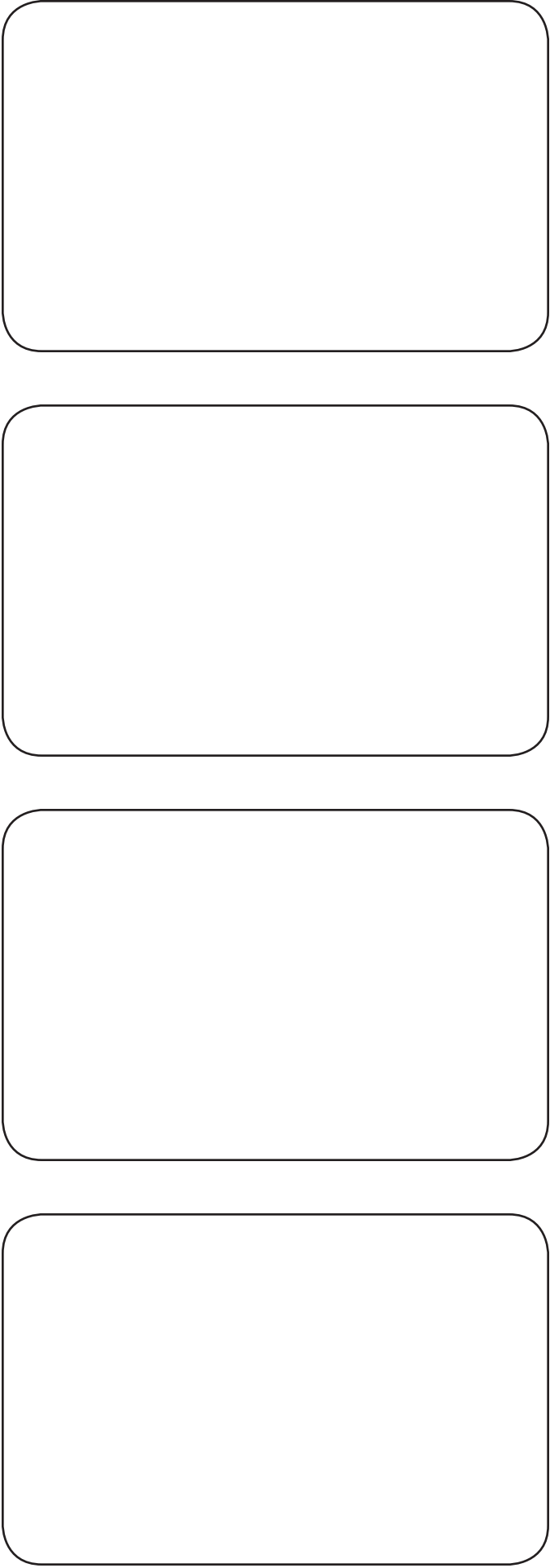
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PLACEMAT!

GAME BOARD I



DISCARD



PLACE IT!

GAME BOARD II

DISCARD



PLACED IT!

GAME BOARD III

DISCARD

**PLACE IT!
RECORD**

Player: _____

ROUNDSCORE

1 _____

2 _____

3 _____

4 _____

5 _____

TOTAL _____

**PLACE IT!
RECORD**

Player: _____

ROUNDSCORE

1 _____

2 _____

3 _____

4 _____

5 _____

TOTAL _____

**PLACE IT!
RECORD**

Player: _____

ROUNDSCORE

1 _____

2 _____

3 _____

4 _____

5 _____

TOTAL _____

**PLACE IT!
RECORD**

Player: _____

ROUNDSCORE

1 _____

2 _____

3 _____

4 _____

5 _____

TOTAL _____

PLAY THEM ALL

Mathematical Content: Mental Math, Number Operations (Addition), Strategic Thinking

Number of players: 2

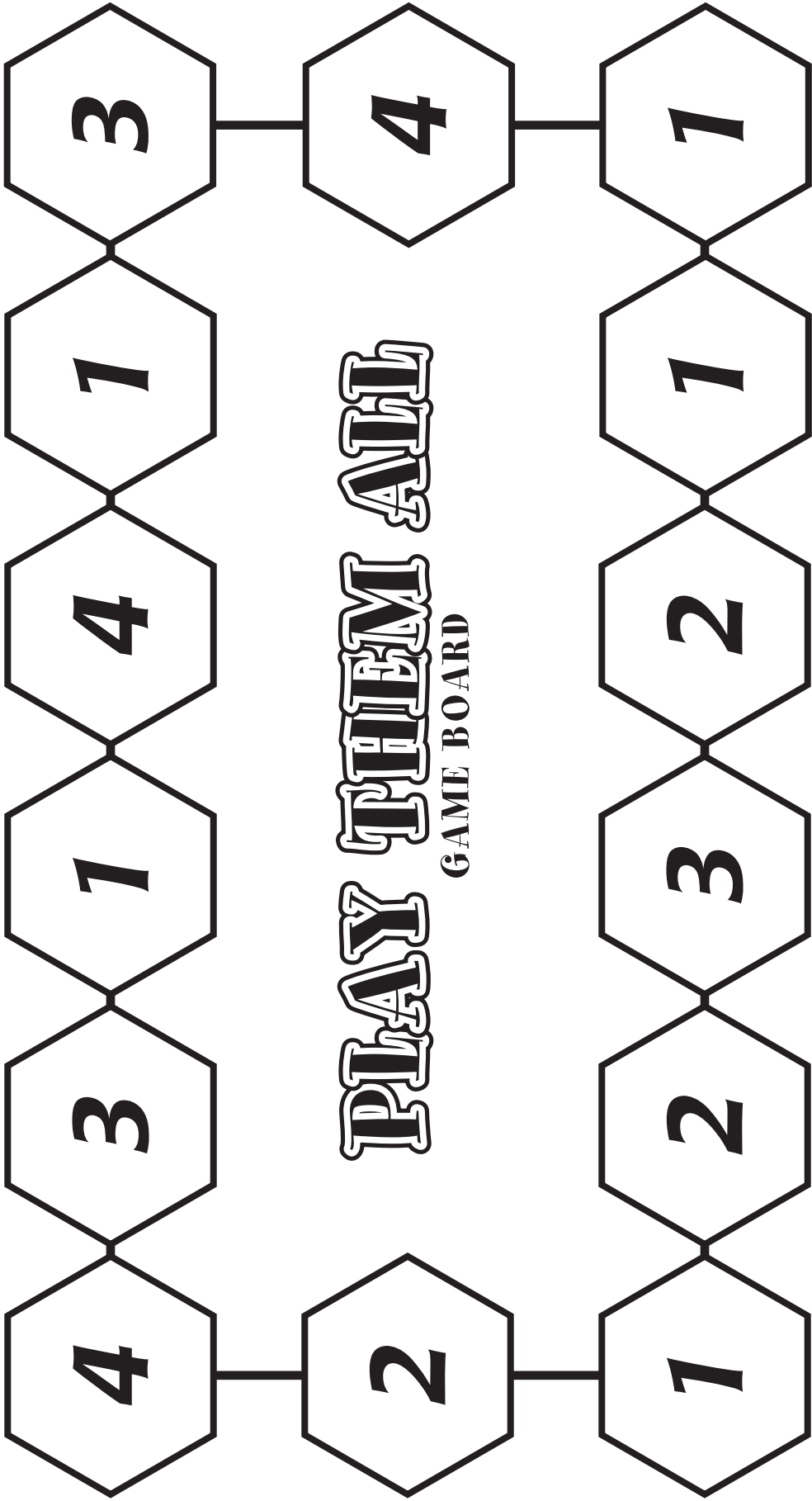
Objective: The first player to play all 12 markers wins.

Materials

- PLAY THEM ALL GAME BOARD — *one per game*
- Game markers (different color per player) — *12 per player*

Directions

1. The player whose first name comes first in the alphabet goes first.
2. The first player chooses one hexagon and puts the number of markers to match the number shown.
3. The next player must then put markers in one of the two hexagons adjacent to the first hexagon.
4. Players take turns putting markers in a hexagon next to one already containing markers, each time placing the number of markers matching the number shown.
5. The last play must be exact. A player with two markers may not play in a three or four hexagon.
6. If there is no play possible the player loses the turn.
7. The first player to play all 12 markers wins. If neither player can play, but both have markers left, the one with the fewest markers left wins. If both players have the same number of markers left the game is a tie.
8. **Variation**
Use 15 markers per player.



PRODUCTS IN A ROW

Mathematical Content: Number Operations (Multiplication), Mental Math, Strategic Thinking

Number of players: 2

Objective: The player with three markers in a row wins.

Materials

- PRODUCTS IN A ROW GAME BOARD — *one per game*
- Game markers (different color per player) — *19 per player*

Directions

1. The player whose first name comes last in the alphabet goes first.
 2. First player studies the **Factor Board** (numbers between 4–12) at the bottom of the game board and selects two **factors**. Place colored markers on the two factors and on the product of the two factors on the **Product Grid**.
 3. The second player moves only one of the factor markers on the **Factor Board** and places his/her marker on the product of those two factors on the **Product Grid**.
- Example:**
If the first player places markers on factors 4 and 7 and a marker on product 28, the second player can only move the marker on 4 or 7.
4. Players alternate moving only one marker at a time on the **Factor Board** and placing their markers on the **Product Grid**.
 5. Two markers may both be on the same number on the **Factor Board**. Only one marker may be placed on any space on the **Product Grid**. If a player selects factors that make a product already covered, that player loses his/her turn.
 6. The player with three markers in a row wins.

7. Variation

Players work for four or five in a row.

PRODUCTS IN A ROW

GAME BOARD

Product Grid

90	20	99	80	63	132
70	28	64	35	96	40
120	84	81	45	54	60
66	24	72	110	32	25
72	88	55	50	56	36
49	77	48	108	30	44

Factor Board

.....

4 5 6 7 8 9 10 11 12

ROUND UP—ROUND DOWN

Mathematical Content: Place Value, Mental Math, Estimation, Practice Rounding to 10's

Number of players: 2–4

Objective: After four games the person with the most points wins.

Materials

- ROUND UP—ROUND DOWN RECORD — *one per player*
- Dice — *two per game*
- OR—
- Deck of cards (Ace–6) — *one per game*
- Pencils — *one per player*

Directions

1. For each game, the players agree on a **Target Number** between 100 and 300. All players write the **Target Number** on their record.
2. Players roll one die or pick a card. Highest number goes first.
3. The first player rolls the pair of dice or draws two cards from a face down, shuffled deck.
4. The player looks at the two numbers rolled (cards drawn) and decides which should be in the ones place and which in the tens place of a two digit number. The number is then entered into the first column of ROUND UP—ROUND DOWN RECORD under **Actual #**. The player then rounds the number to the nearest ten and writes the rounded number in the second column under **Rounded #**.
5. The dice are then passed to the next player who repeats the steps and records on his/her record. If cards are used they should be set aside after each round. If players run out of cards the used cards should be shuffled and placed face down to continue the game.
6. Each player rolls the dice or draws two cards for 5 rounds. The player with a sum of rounded numbers that comes closest to the target number receives one point. After four games the person with the most points wins.

Example:

Target number is 150. Player A. gets these numbers.

Round	Rolled or Drawn	Actual #	Rounded #
1.	1 and 4 (41 or 14)	14	10
2.	2 and 5 (25 or 52)	25	30
3.	2 and 4 (42 or 24)	24	20
4.	4 and 6 (46 or 64)	64	60
5.	1 and 2 (12 or 21)	21	<u>20</u>
Total:			140

7. Variations

- a. Draw three cards to make a three-digit number and round the number to the nearest 10 or 100.
- b. Insert a decimal point and have students draw two cards and round to the nearest tenth or three cards and round to the nearest hundredth.

ROUND UP-ROUND DOWN RECORD

Player: _____

GAME #1

Target Number _____

Round	Actual #	Rounded #
1	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
2	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
3	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
4	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
5	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>

Total: _____

Points Earned: _____

GAME #2

Target Number _____

Round	Actual #	Rounded #
1	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
2	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
3	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
4	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
5	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>

Total: _____

Points Earned: _____

GAME #3

Target Number _____

Round	Actual #	Rounded #
1	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
2	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
3	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
4	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
5	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>

Total: _____

Points Earned: _____

GAME #4

Target Number _____

Round	Actual #	Rounded #
1	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
2	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
3	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
4	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>
5	<input type="text"/> <input type="text"/>	<input type="text"/> <input type="text"/>

Total: _____

Points Earned: _____

SPIN TO WIN

Mathematical Content: Money, Number Operations, Mental Math, Probability

Number of players: 2–4

Objective: After five spins the player with the most money wins.

Materials

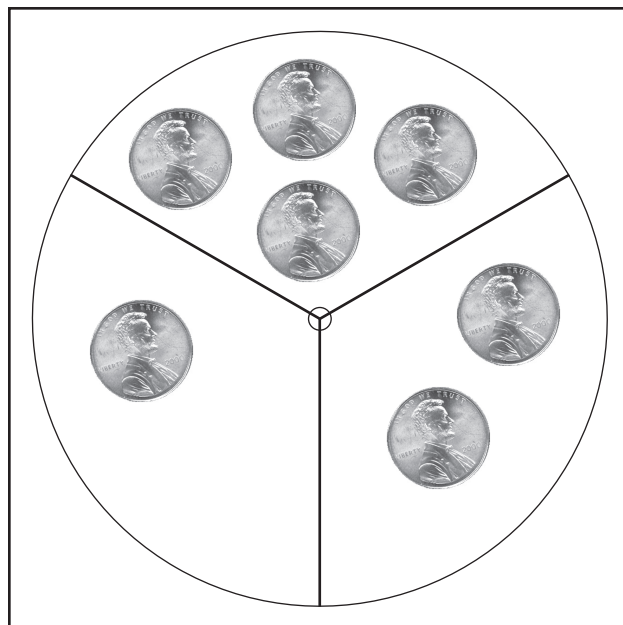
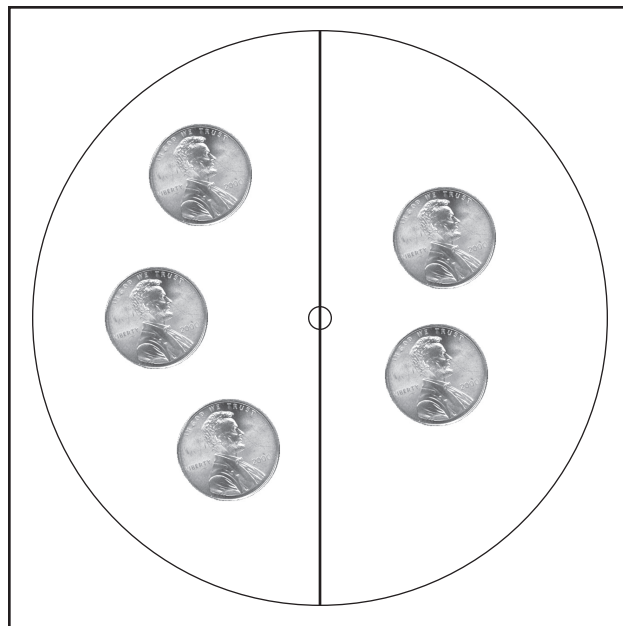
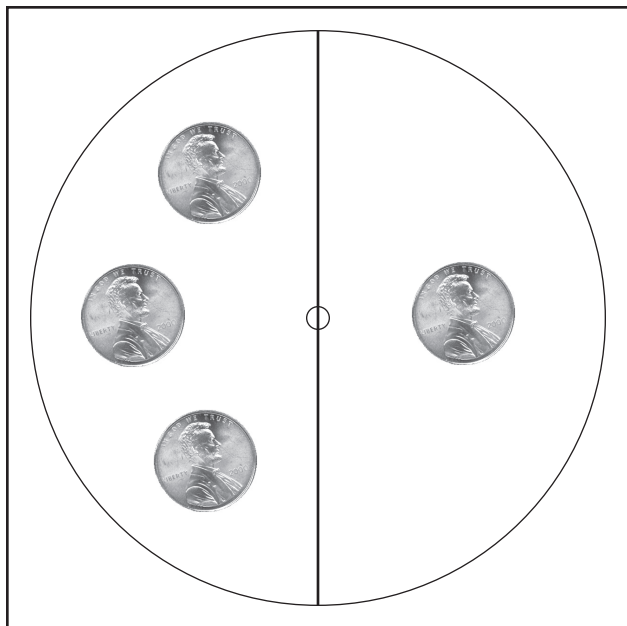
- SPIN TO WIN SPINNER — *one per game*
- Box (for play money) — *one per game*
- Game markers (different color per player) — *five per player*
- Paper clip (for spinner) — *one per game*
- Pencil (sharpened; for spinner) — *one per game*
- Play money (coins) — *20 pennies + 10 of each other coin per game*

Directions

1. Select spinner(s) to use for the game.
2. Each player spins the spinner. The player with the greatest amount goes first.
3. Each player will spin the spinner *five* times. Each player begins with *five* game markers. With each spin the player puts one back to keep track of the *five* spins.
4. After each spin, players take the amount of money shown on the spinner from the coin box.
5. After all players have had five spins, each player counts his/her money.
6. The player with the most money wins.
7. **Variations**
 - a. Players spin 10 times.
 - b. Make the winner for each game the one closest to 10 cents, 50 cents, 75 cents, or \$1.00. Then have players choose which spinner to use for each spin.
 - c. Have players start with \$1.00 and give back the amount spun each time. The winner is the player with the least amount of money left after five spins.

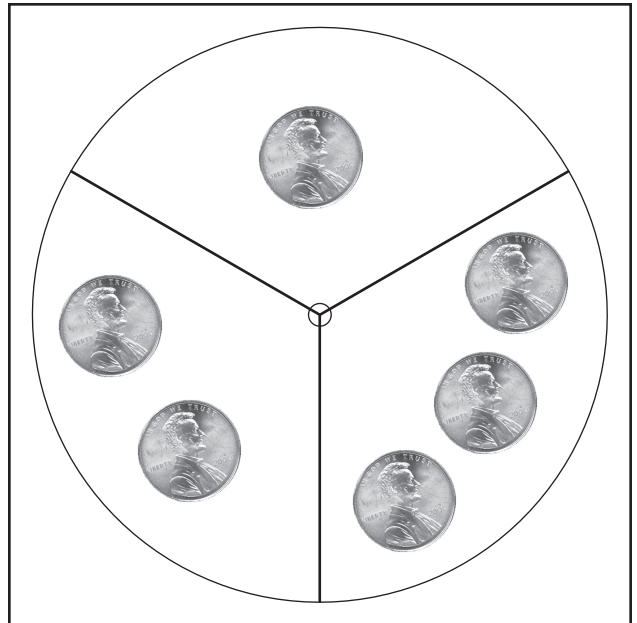
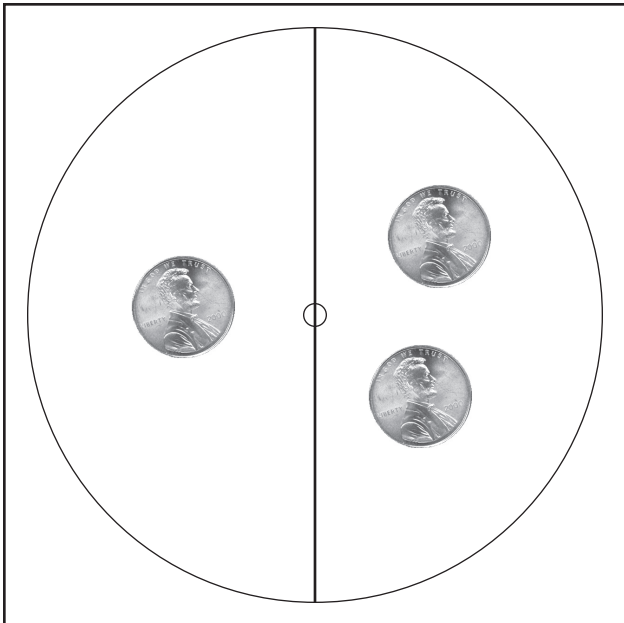
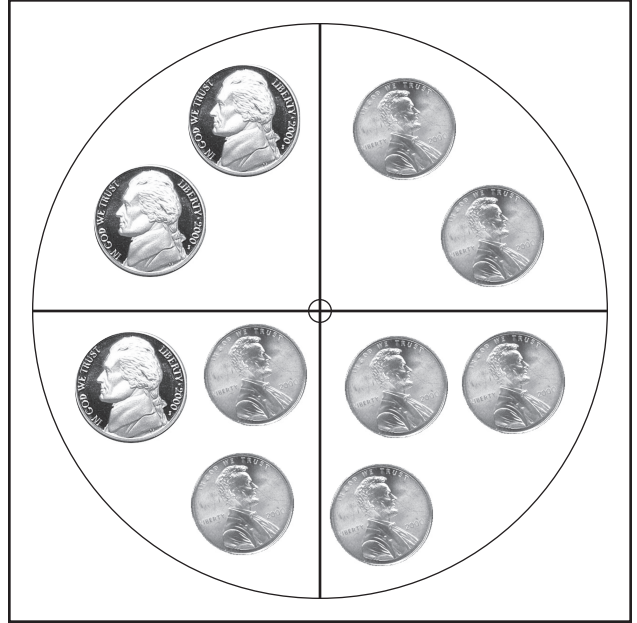
SPIN TO WIN

SPINNERS (1)



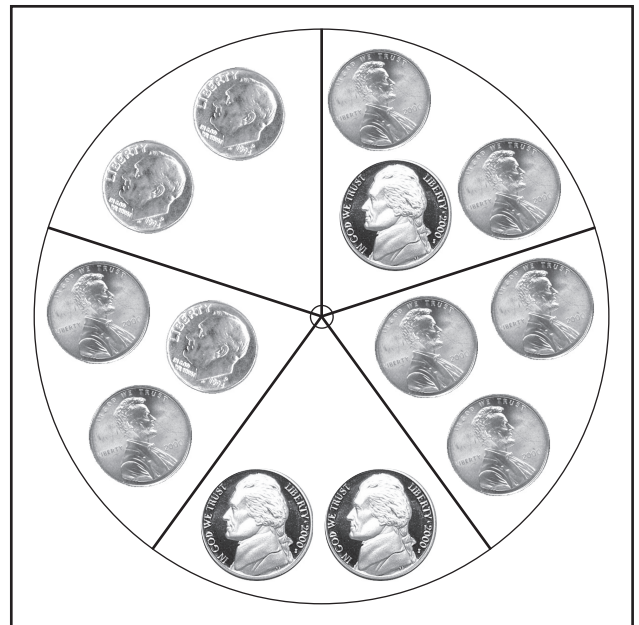
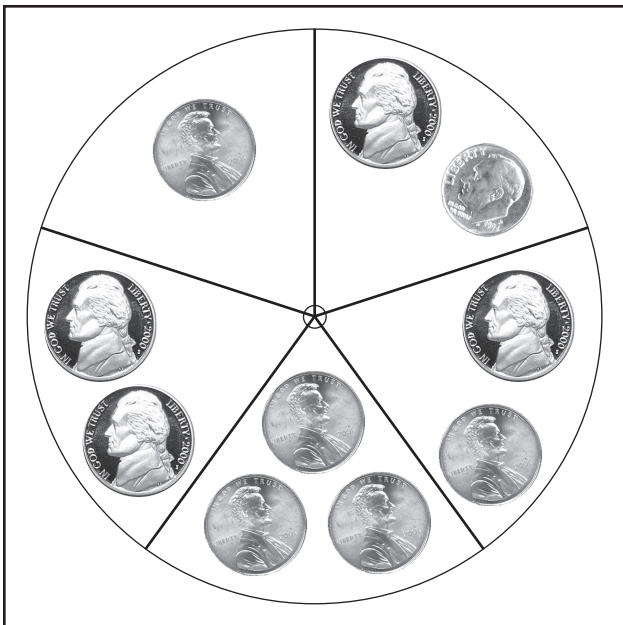
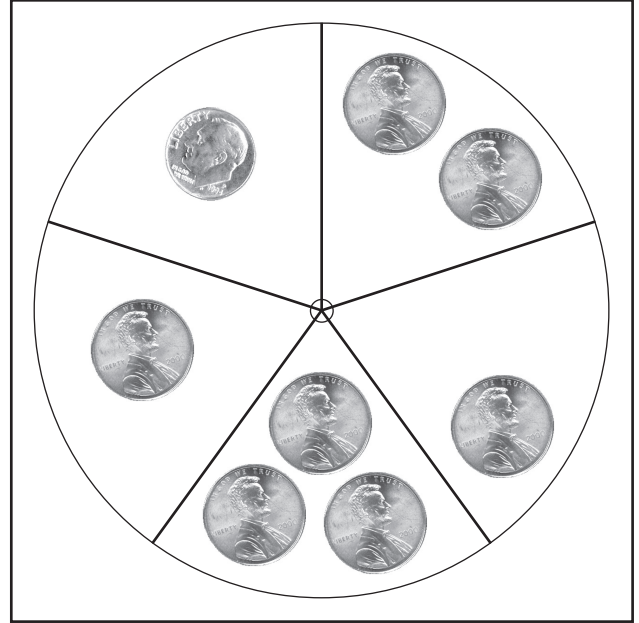
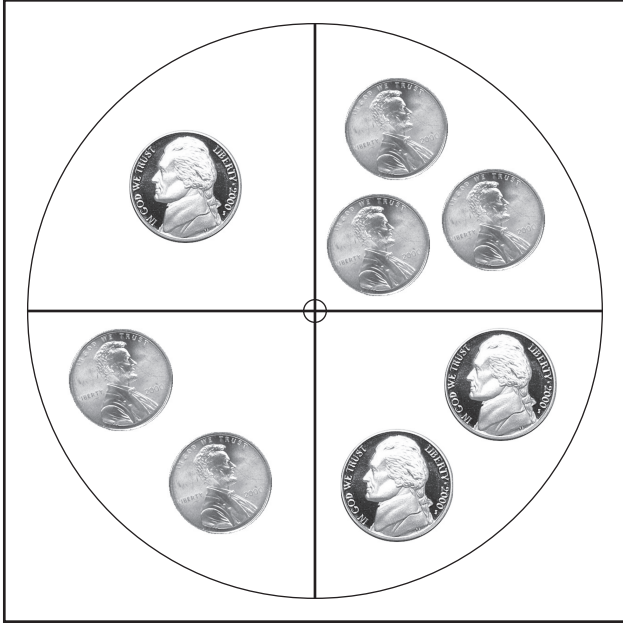
SPIN TO WIN

SPINNERS (2)

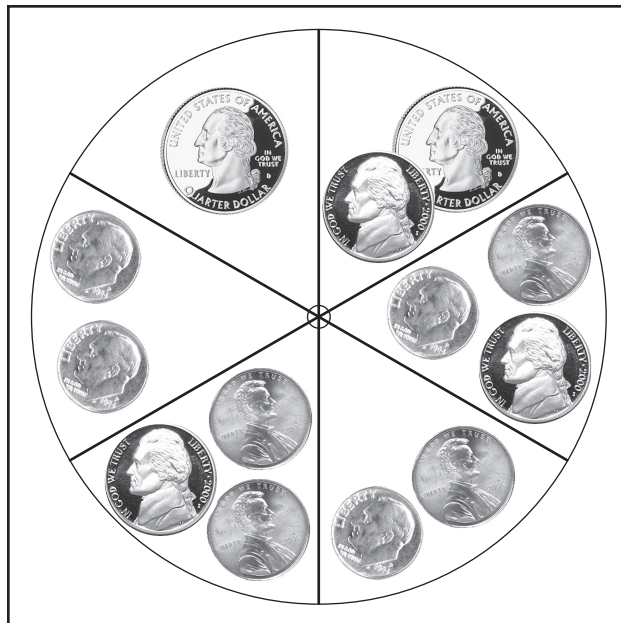
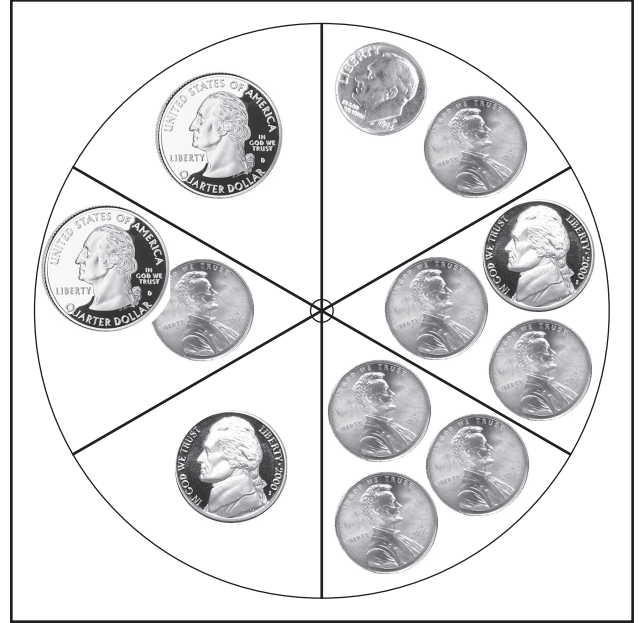
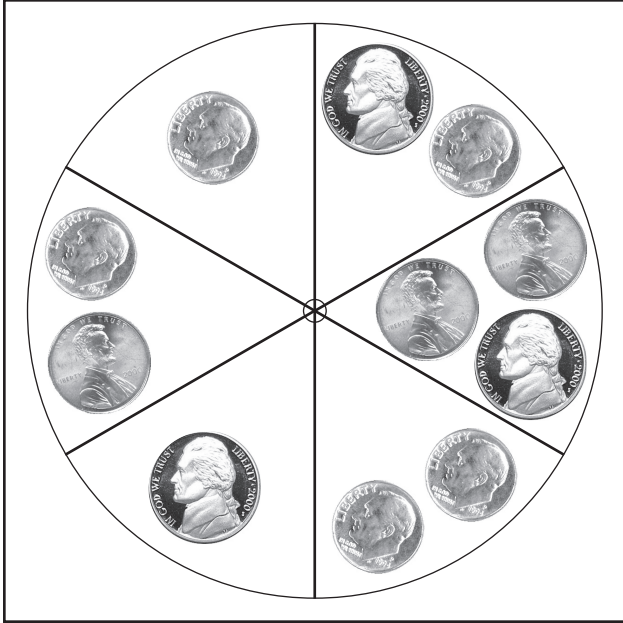


SPIN TO WIN

SPINNERS (3)



SPIN TO WIN SPINNERS (4)



SUBTRACTION ACTION

Mathematical Content: Number Operations (subtraction), Mental Math, Probability

Number of players: 2

Objective: The player at the end of nine rounds with the most points is the winner.

Materials

- SUBTRACTION ACTION GAME — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*
—OR—
0–9 Spinner — *one per game*
—OR—
Decahedron die (0–9) — *one per game*
- Pencils — *one per player*

Directions

1. Each game consists of *nine* rounds. Each problem is one round.
2. Players draw a card to see who goes first (high card or low card).
3. The first player draws a card and writes the digit in one of the four boxes for that round. Once a number is written it cannot be moved. The card is then taken out of play.
4. The second player then draws a card and writes the number in one of the boxes. Players continue to take turns drawing cards until all boxes in the round have numbers.
5. In each round, the player has the option to discard one card. That card is not used in the problem.
6. When players have used all the cards in the deck, the cards are reshuffled before play continues.
7. At the end of each round the player with the greatest difference records a point. If players have the same differences, they both get a point.
8. After each problem is complete, the players compare differences. A point is earned by making a subtraction problem with the greatest difference. Points are tallied in the right hand column.
9. The player at the end of nine rounds with the most points is the winner.
10. **Variations**
 - a. Players win a point for having the lowest difference or a difference closest to 20.
 - b. Players subtract two digits from two or three digits to get the greatest/lowest difference.

SUBTRACTION ACTION GAME

Player: _____

POINTS

ROUND 1

		Discard
—		
<hr/>		

ROUND 2

		Discard
—		
<hr/>		

ROUND 3

		Discard
—		
<hr/>		

ROUND 4

		Discard
—		
<hr/>		

ROUND 5

		Discard
—		
<hr/>		

ROUND 6

		Discard
—		
<hr/>		

ROUND 7

		Discard
—		
<hr/>		

ROUND 8

		Discard
—		
<hr/>		

ROUND 9

		Discard
—		
<hr/>		

TAKE 10

Mathematical Content: Number Operations—Addition combinations to make 10

Number of players: 2–4

Objective: The player with the most cards wins.

Materials

- Deck of cards (Ace–10; Ace = 1, 10 = 10) — *one per game*

Directions

1. Each student draws a card. High card chooses first.
2. All 40 cards are laid out on the table face up.
3. Players take turns choosing one, two, or three cards that have a sum of 10 and put them in their own stack. (One “10” works.)
4. When there are no combinations of cards left that equal 10, the game is over. Players then count the cards in their stack to determine the winner.
5. The player with the most cards wins.

6. Variations

- a. Have students find 2 or 3 cards that add to a number between 10 and 20.
- b. Have students find 2, 3, or 4 cards that add to a number between 20 and 30.
- c. Remove the 10's from the deck and place all the cards face down. The game is then played like concentration but the player must find the pairs that make 10.
- d. Have players find 3 or 4 cards that make a higher number such as 36, 54, or 100 by using any combination of operations (+ – × ÷).
- e. Use A–K (J = 11, Q = 12, K = 13) with any operation to find the target number.

TARGET

Mathematical Content: Algebraic Thinking, Number Sense, Number Operations

Number of players: 2–4

Objective: The winner is the player with the lowest score after five rounds.

Materials

- TARGET RECORD — *one per player*
- Deck of cards (Ace–10; Ace = 1, 10 = 0) — *one per game*
- Pencils — *one per player*

Directions

1. Players each draw one card. The player with the lowest card goes first.
2. Players select a target multiple of 10 from 10 to 100 (for example, 10, 20, 30, 40) for each of the *five* rounds. All players write the agreed upon target number on their record.
3. Cards are shuffled and placed face down in the middle of the table.
4. Each player draws *four* cards and uses any combination of operations to try to come closest to the target. Each player must use all four numbers drawn.
5. Players record their equation and the total. The score is the difference between the total and the target.
6. The winner is the one with the lowest score after five rounds.

Example: Player draws four cards—9, 5, 4, and 2— and makes this equation.

Equation	Total	Target	Score
$(9 - 2) \times 5 + 4 =$	39	40	1

7. Variation

Draw five cards and select a target multiple of 10 between 100 and 200.

Example: Player draws five cards—9, 2, 2, 5, and 5— and makes this equation.

Equation	Total	Target	Score
$[(9 \times 2) - 2] \times (5 + 5) =$	160	150	10

TARGET RECORD

Player: _____

	Equation	Total	Target	Score
1.	_____	= _____	_____	_____
2.	_____	= _____	_____	_____
3.	_____	= _____	_____	_____
4.	_____	= _____	_____	_____
5.	_____	= _____	_____	_____
			Total Score:	_____

TARGET RECORD

Player: _____

	Equation	Total	Target	Score
1.	_____	= _____	_____	_____
2.	_____	= _____	_____	_____
3.	_____	= _____	_____	_____
4.	_____	= _____	_____	_____
5.	_____	= _____	_____	_____
			Total Score:	_____

THREE-DICE ROLL

Mathematical Content: Number Operations, Algebraic Thinking, Probability

Number of players: 2–4

Objective: The first player to make all 16 numbers is the winner.

Materials

- THREE-DICE ROLL RECORD — *one per player*
- Dice — *three per game*
- Pencils — *one per player*

Directions

1. Each player rolls three dice. The player with the greatest sum goes first.
2. Each player takes turns rolling three dice.
3. The player combines the value of all three dice using any combination of addition or subtraction to form an equation equal to one of the numbers from 0–15 on his/her THREE-DICE ROLL RECORD. If no equation can be made, the player loses his/her turn.
4. Only one equation can be formed per roll. Numbers are written in the squares and operations are written in the octagons. Use parentheses within the squares to indicate order of operations.
5. The first player to make all 16 numbers is the winner.

Example:

Player rolls a 3, 4, 6 and can make these equations.

$$\boxed{3} \otimes \boxed{4} \otimes \boxed{6} = 13$$

OR

$$\boxed{6} \otimes \boxed{4} \otimes \boxed{3} = 7$$

OR

$$\boxed{(6 \otimes 4)} \otimes \boxed{3} = 5$$

OR

$$\boxed{4} \otimes \boxed{(6 \otimes 3)} = 1$$

6. Variations

- a. Players use all four operations to complete their equations.
- b. Players must complete the equations in order beginning with 0. If a player is unable to make an equation equal to 0 on his/her first roll, the player loses his/her turn and must continue trying to make a 0 on each successive roll before moving on to the next number.

THREE-DICE ROLL RECORD

Player: _____

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 0$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 8$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 1$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 9$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 2$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 10$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 3$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 11$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 4$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 12$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 5$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 13$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 6$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 14$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 7$$

$$\square \text{ } \text{octagon} \text{ } \square \text{ } \text{octagon} \text{ } \square = 15$$

TOTAL 20

Mathematical Content: Number Operations (addition facts to 20), Mental Math

Number of players: 2–3

Objective: The one with the most cards wins.

Materials

- Deck of cards (Ace–10; Ace = 1, 10 = 10) — *one per game*

Directions

1. Cards are shuffled and each player draws a card. The one with the highest card is the dealer. Each player receives *four* cards to be held in the hand so the other players cannot see the cards.
2. Four cards from the remaining deck are then placed on the middle of the table face up. The rest of the cards in the deck are placed face down next to the face up cards.
3. The player to the right of the dealer takes a card from his/her hand and places it on one of the face up cards so that both cards can be seen and states the sum of the cards. The player then draws a card from the face-down deck to maintain four cards in his/her hand.
4. In clockwise direction, players continue to take turns placing one of the cards from their hand on one of the face-up stacks to try to sum to 20.
5. If a player plays a card that makes a sum of exactly 20, the player takes that stack of cards. The stack is replaced by drawing a new card from the face-down deck and placing it face up on the table.
6. A card may not be put on a stack that makes the sum more than 20. If a player cannot place a card on the stack without going over 20 the player may take a card from his hand and start a new stack on the table.
7. The game ends when the cards in the deck are gone and players cannot make a stack equal to 20 with their remaining cards. Extra cards on the table or those in players' hands do not count in the score.
8. Players count the number of cards they have taken. The one with the most cards wins.
9. **Variation**
Add to a number greater than 20 (for example, 32).

T E A C H E R F E E D B A C K F O R M

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R E L E A S E F O R M F O R P H O T O G R A P H I C I M A G E S

To Teachers:

To help illustrate to others the experiential activities involved and to promote the use of simulations, we like to get photographs and videos of classes participating in the simulation. Please send photos of students actively engaged so we can publish them in our promotional material. Be aware that we can only use images of students for whom a release form has been submitted.

To Parents:

I give permission for photographs or videos of my child to appear in catalogs of educational materials published by Interact.

Name of Student: _____ (print)

Age of Student: _____ (print)

Parent or Guardian: _____ (print)

Signature: _____ Date: _____

Address:

Phone: _____

Interact

10200 Jefferson Blvd.
Culver City, CA 90232-0802
310-839-2436