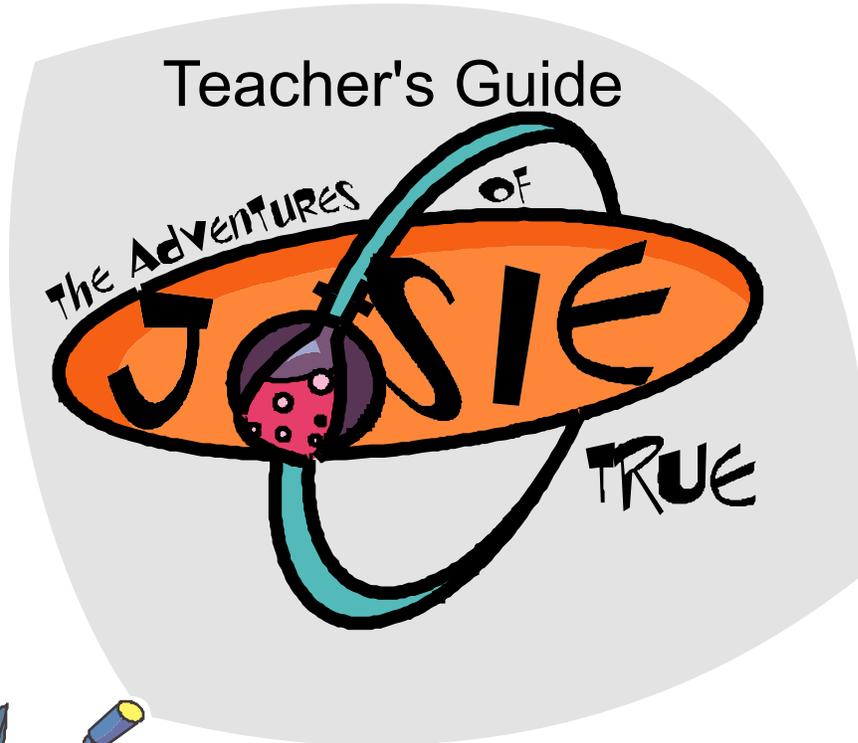


The Adventures of Josie True

<http://www.josietrue.com/>

Teacher's Guide



A Guide on How to Use
The Adventures of Josie True
to Meet National Curriculum Standards

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Designed by
Trinia B

Edited by
Mary Flanagan

Geared at the 5th grade curricular level, this teacher's guide contains activities, resources, and worksheets to help you utilize The Adventures of Josie True software program to meet national curriculum standards in Science and Mathematics. Written by Scholastic, Inc.'s Senior Science Editor Patricia Janes, this fun and informative guide represents cutting edge research in science and math education. Download, Copy, and Distribute! Use and Enjoy!

The Adventures of Josie True Teacher's Guide

Table of Contents



Introduction	N-1.1
Pulley Activity -Teacher	TA-1.1-1.3
-Student	SA-1.1-1.3
Light Activity -Teacher	TA-2.1-2.3
-Student	SA-2.1-2.3
Chili Parlor Activity Part I -Teacher	TA-3a.1-3a.3
-Student	SA-3a.1-3a.4
Chili Parlor Activity Part II -Teacher	TA-3b.1-3b.2
-Student	SA-3b.1-3b.2
Chili Parlor Activity Part III -Teacher	TA-3c.1-3c.3
-Student	SA-3c.1-3c.2
Money Conversion Activity -Teacher	TA-4.1-4.3
-Student	SA-4.1-4.3
Pipe Organ Activity -Teacher	TA-5.1-5.3
-Student	SA-5.1-5.3
Tetris Activity -Teacher	TA-6.1-6.3
-Student	SA-6.1-6.2
Distance Activity -Teacher	TA-7.1-7.2
-Student	SA-7.1-7.2
Circuit Activity -Teacher	TA-8.1-8.2
-Student	SA-8.1-8.2
Tangrams Activity -Teacher	TA-9.1-9.3
-Student	SA-9.19.2
Magic Squares Activity -Teacher	TA-10.1-10.3
-Student	SA-10.1-10.2
Temperature Activity -Teacher	TA-11.1-11.3
-Student	SA-11.1-11.2
Site Seeking In Chicago -Teacher	TS 1.1
-Student	SS 1.1-1.3
Site Seeking In Paris -Teacher	TS 2.1
-Student	SS 2.1-2.2



The Adventures of Josie True Teacher's Guide

Introduction

Welcome to The Adventures of Josie True (<http://www.josietrue.com>) and our accompanying teacher's guide. This guide will help you incorporate principles and activities from the Josie True game into your classrooms.

When we started this project in the late 1990s, our goal was to make a piece of innovative software accessible to as many children as possible. By making the project freely accessible on the internet, our hope is that children in schools and at home will have a chance to interact in the worlds and content we've developed.

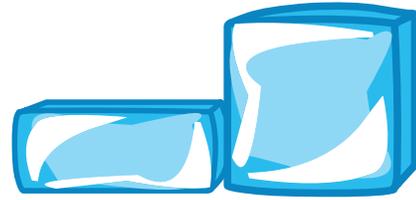
Our primarily volunteer staff couldn't have produced this guide or this project without the financial assistance of the National Science Foundation. Many thanks to them for supporting our efforts.

Sincerely,

Mary Flanagan
Associate Professor
University of Oregon
<http://www.maryflanagan.com>
<http://www.josietrue.com>

PULLEY ACTIVITY

SCIENCE: Simple machines
MATHEMATICS: Finding patterns
LANGUAGE ARTS: Research skills
ART: Photography



AIM: Students understand the purpose of—and the science behind—simple machines, namely the pulley.

BACKGROUND: Machines help us do many things that we could not do on our own. A simple machine is a device that changes a force applied to it. It increases the force that we apply to a task.

A force, or effort, is applied to one part of the simple machine. Another part of the machine then moves to overcome a resistance, called the load. A simple machine often magnifies the force applied to it, so that a small effort can move a large load. For example, a pulley helps us lift heavy objects. Other simple machines include the inclined plane, lever, wedge, wheel and axle, screw, and gear.

A pulley system changes the direction of the force we apply. Rather than pulling up, we pull down. This makes it easier to lift an object. We can use our own weight as a counterweight.

There are different types of pulleys systems. A single pulley has only one wheel. Multiple pulley systems utilize two or more wheels. With each additional pulley wheel, the job of lifting becomes easier. Using a two-wheeled pulley, you can lift twice as much weight than if you were to use no pulley at all. A three-pulley system can lift three times as much weight, and so on.

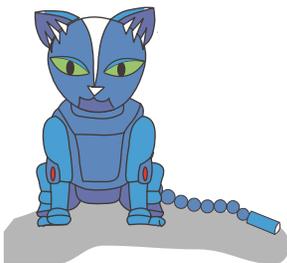
BEFORE PLAYING

Discussion: Explain to students that simple machines enable us to do many things that we couldn't do on our own. Ask students to choose which method would make the following tasks easiest:

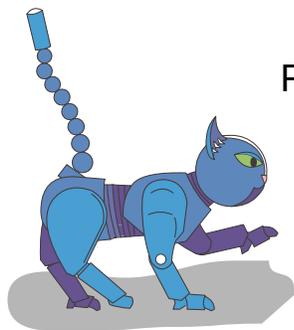
1. Move a grand piano by picking it up or pushing it up a ramp (pushing it up a ramp—inclined plane)
2. Lift a friend into the air by sitting on one end of a seesaw while your friend sits on the other or by picking him or her up (sitting on a seesaw—lever)
3. Lift a steel beam ten stories by using a crane or carrying it up ten flights of stairs (using a crane—pulley)
4. Open a soda bottle cap with your fingernails or a bottle cap opener (using a bottle cap opener—lever)

AFTER PLAYING

Research and Report: The pulley is one type of simple machine. Have your students use the library or Internet to research three other simple machines. (Examples: inclined plane, lever, wedge, wheel and axle, screw, gears.) Students should describe and give an example of those that they researched.



PULLEY ACTIVITY



ASSESSMENT: Assess students' answers on the After Playing Worksheet.

EXTENSION: Have students refer to their research from After Playing: Research and Report. Ask each student to choose a theme: "Simple Machines Around the House," or "Simple Machines Around Town." Students should look around their house or hometown to find an example of each simple machine that they researched. (Example: A bottle opener is a common household lever.) Then, have them take a photo of—or sketch—each example. Award bonus points for additional examples.

RESOURCES

<http://www.fi.edu/qu97/spotlight3/spotlight3.html>

This site from the Franklin Institute gives examples of simple machines, including the inclined plane, wedge, screw, lever, wheel and axle, and pulley. Have your students check it out as a primer for the After Playing: Research and Report.

The New Way Things Work, by David Macaulay (Houghton Mifflin Company, 1998, \$35.00, ISBN 0-395-93847-3). Readers of all ages will learn something from this book! Fun cartoons accompany explanations of how things work—from simple machines to the latest high-tech inventions. To order, call 1-800-733-2828.

TIP FOR PULLEY POWER (Student Hands-On Activity):

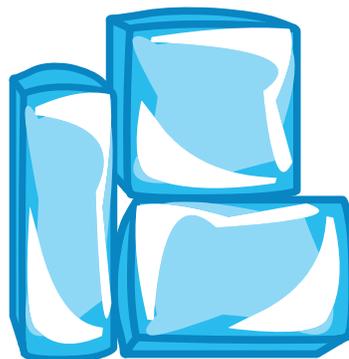
Ask students to bring in a rolling pin from home. If you still don't have enough rolling pins, try this substitute: Straighten a large paperclip and slip it through the center of an empty spool of thread.

ANSWERS

Pulley Power, Worksheet: (1. With a pulley. 2. With a pulley, you pull down, rather than up. So you can use your weight as a counterweight. 3. Answers will vary.)

Before Playing, Worksheet: (1. 2; 2. 50; Do the math: 2; 3. 3; 4. 75; Do the math: 3; 5. 4; 6. 100; Do the math: 4; Do the math: 125; 7. 125; 8. 150; 9. Multiplied 6 x 25 to get 150. Or students could have added 25 to their previous answer—125 + 25 = 150; 10. 250.)

After Playing, Worksheet: (1. 68; 2. 51; 3. 102; 4. 85; Bonus: 86, 64.5, 129, 107.5)



TA-1.2

PULLEY ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

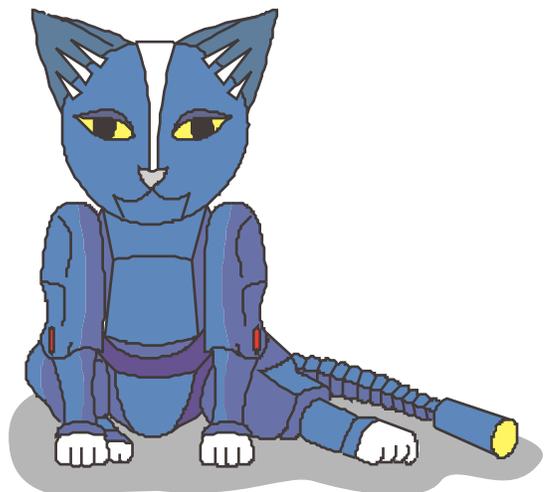
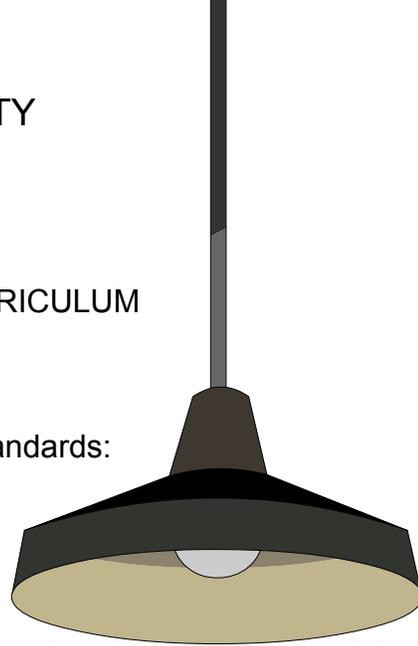
- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
- Compute fluently and make reasonable estimates
- Understand patterns, relations, and functions
- Develop and evaluate inferences and predictions that are based on data

Science:

- Change, constancy, and measurement
- Motions and forces
- Abilities of technological design

CURRICULUM AREAS

Science: simple machines; pulleys; forces; weight.
Scientific Inquiry: testing variables; experimenting; observing; gathering data; drawing conclusions; interpreting results.
Language Arts: library/Internet research; following directions.





PULLEY ACTIVITY (Student Hands-On Activity)

Name: _____

Date: _____

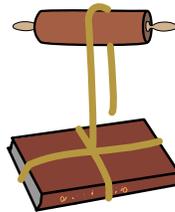
Materials:
Sturdy string
Scissors
Textbook
Rolling pin

Think: Have you ever been unable to lift a heavy object? Why was it hard to lift the object?

Predict: Will a pulley make it harder or easier to lift a heavy object? Explain your answer.

Procedure:

1. Cut a piece of string and tie it around your textbook, as shown.
2. Place the book on the floor and lift the book by pulling up on the string. Note the strength you need to use to lift the book.
3. Now, have your partner hold the rolling pin firmly by its handles.
4. Thread the string over the top of the rolling pin.
5. Pull down on the thread to lift the book. Again, note the strength you need to use to lift the book.



Conclusions:

1. Which requires less strength: lifting the book without a pulley or with a pulley?

2. How do you explain your answer to #1 above?

3. Elevators use a pulley system. What is another pulley system found in everyday life?



PULLEY ACTIVITY (Before Playing)

Name: _____

Date: _____

Click on the button that says, "close up of pulley."

1. How many wheels does this pulley have? _____

2. How many lbs. can icat lift if Josie uses this pulley? _____

Do the math! (Write your answer in the)

$$\boxed{} \times 25 = 50$$

Click on the button that says, "add one pulley wheel."

3. How many wheels does this pulley have? _____

4. How many lbs. can icat lift if Josie uses this pulley? _____

Do the math!

$$\boxed{} \times 25 = 75$$

Again, click on the button that says, "add one pulley wheel."

5. How many wheels does this pulley have? _____

6. How many lbs. can icat lift if Josie uses this pulley? _____

Do the math!

$$\boxed{} \times 25 = 100$$

Find the pattern, then predict:

Do the math!

$$5 \times 25 = \boxed{}$$



7. How many lbs. do you suppose icat can lift if Josie were to use a 5-wheeled pulley? _____ (Check your answer by clicking on "add one pulley wheel.")

8. How many lbs. do you suppose icat could lift if Josie were to use a 6-wheeled pulley? _____

9. Explain how you found the answer to #8. _____

10. How many lbs. do you suppose icat could lift if Josie were to use a 10-wheeled pulley? _____

pulleys
make lifting
easy!!

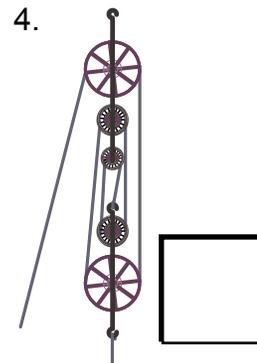
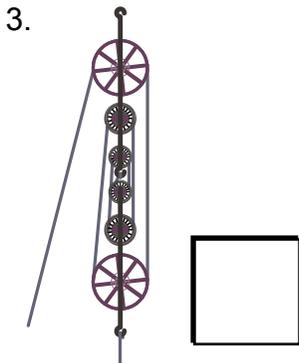
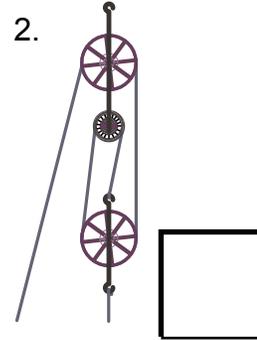
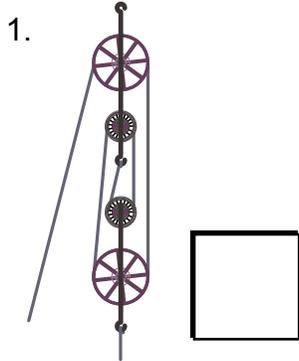
PULLEY ACTIVITY (After Playing)

Name: _____

Date: _____



Suppose you could lift 34 lbs. with a two-wheeled pulley. How much weight could you lift with the following pulleys?

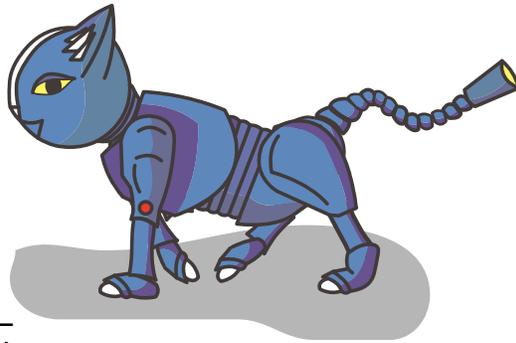


Bonus: Answer questions 1-4 again, this time supposing the two-wheeled pulley could lift 43 lbs.

LIGHT ACTIVITY

SCIENCE: Light
MATHEMATICS: Angles
LANGUAGE ARTS: Writing conclusions

AIM: Students discover the properties of light and reflection.



BACKGROUND: Light is a form of energy—without it, we cannot see. Traveling through space at approximately 186,000 miles per second, sunbeams and rays from lamps strike objects and bounce off of them. When an object reflects light rays toward our eyes, we see the object. Nearly all objects reflect light rays.

Although most objects are reflective, rays bounce most effectively off of smooth, shiny surfaces—such as mirrors. When light reflects off of mirrors, the angle of incidence equals the angle of reflection. In other words, the angle between the incoming ray and the mirror and the angle between the outgoing ray and the mirror are equal.

Light, a form of electromagnetic radiation, spreads out as it travels away from its source. Lenses—such as a magnifying glass—bend light rays so they come back together, intensifying the rays that hit a specific location.

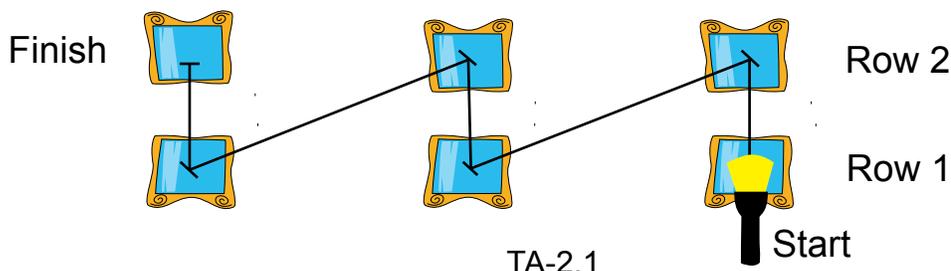
BEFORE PLAYING

Activity: Have your students discover for themselves that a bouncing ball's incoming angle equals its outgoing angle.

Ask your students to pair up, giving a ball to each pair. Have them bounce the ball back and forth (make sure the floor or pavement is smooth!) to each other. Ask them to share observations about how the ball bounces. (Observations will vary.) If no one observed the angle at which a ball bounces, prompt the desired observation by asking students to throw the ball to each other from different angles. For instance, if they throw the ball straight down, will it bounce toward their partner? (No, it will bounce straight up.) If they push it down and away, they will create a gentler angle and the ball will reach their partner. Explain to them that light reflects off objects in a similar way.

AFTER PLAYING

Challenge: Ask each student to bring in a small mirror from home (women's compacts work well). Arrange your students' desks in rows and create teams: rows 1 and 2 are a team, 3 and 4 are a team, and so on. Make sure that each student has a mirror. Give a flashlight to the students sitting in the first desk of rows 1, 3, 5, and so on. (If any students forgot to bring in a mirror, have them be the flashlight holder.) Turn off the lights. Challenge the teams to adjust their mirrors so that the light from the flashlight reflects off everyone's mirror on the team and reaches the last person in the row, as shown.



LIGHT ACTIVITY

ASSESSMENT: Assess students' answers on the After Playing Worksheet.

RESOURCES

<http://www.brainpop.com/science/light/light/index.weml>

At this site from BrainPOP, your students watch an animated movie about light, perform an experiment on mirrors and reflection, and then take a quiz. Interested in other science topics? BrainPOP's award-winning site has loads of animated movies that will hold kids' interest!

<http://www.miamisci.org/af/sln/index.html>

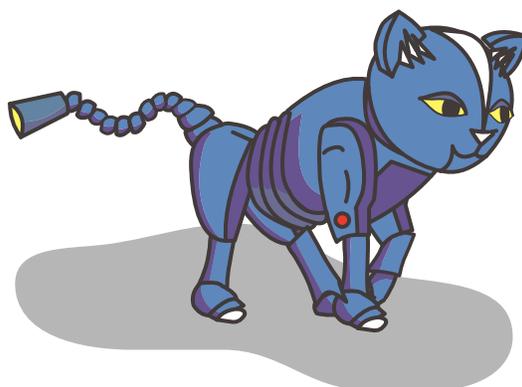
Visit the Atoms Family and tour Dracula's Library to learn more about the properties of light, waves, and particles. Or have your students check out places like Frankenstein's Lightning Laboratory to explore different forms of electricity and electrical safety—all by Miami's Museum of Science.

ANSWERS

Light Catcher, Worksheet: (Conclusions: Answers will vary. The angle between the incoming ray and the mirror and the angle between the outgoing ray and the mirror were equal.)

Before Playing, Worksheet: (1. With respect to the mirror, the angles made by the incoming and outgoing beams are equal. 2. 45. 3. 19. 4. 80. 5. 35.)

After Playing, Worksheet: (Across, row 1: 22, 78, 76, 15. Across, row 2: 2, 126, 12, 26. Across, row 3: 10, 19, 70, 21. Across, row 4: 42, 7, 86, 63. Angle of the incoming beam: 86. Angle between the mirror and the outgoing light beam is 86. We know this because the angle between the mirror and the incoming beam equals the angle between the mirror and the outgoing beam.)



LIGHT ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Understand meanings of operations and how they relate to one another
- Compute fluently and make reasonable estimates
- Develop and evaluate inferences and predictions that are based on data
- Understand measurable attributes of objects and the units, systems, and processes of measurement

Science:

- Evidence, models, and explanation
- Change, constancy, and measurement
- Transfer of energy

CURRICULUM AREAS

Science: light; energy.

Scientific Inquiry: testing variables; experimenting; observing; gathering data; drawing conclusions; interpreting results.

Language Arts: following directions; writing conclusions.

Technology: computer science.

Math: angles; finding patterns; addition; subtraction; multiplication; division.

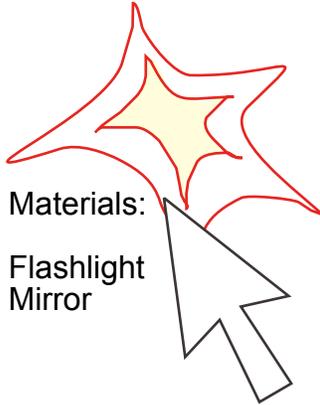


LIGHT ACTIVITY

(Student Hands-On Activity)

Name: _____

Date: _____



Materials:

Flashlight
Mirror

Think: Have you ever caught a glimpse of someone in a mirror and wondered if the person could see you too? What did you conclude: Could they see you or not?

Predict: Can you use a mirror to reflect light from a partner's flashlight onto another partner? How?

Procedure:

1. Break into groups of three.
2. Have one partner hold the flashlight and turn it on.
3. Have your other partner stand 3 m (10 ft) away from Partner #1.
4. Turn off the lights.
5. Use a mirror to reflect light from the flashlight onto your second partner: Adjust your location and the angle at which you hold the mirror.
6. Now have your partners increase their distance apart to 6 m (20 ft).
7. Again, try to reflect the flashlight's rays onto Partner #2 by adjusting your position and the angle at which you hold the mirror.



Conclusions:

In the space below, use words and pictures to explain how you had to hold your mirror in order to reflect light onto your partner. Think about the angle between the incoming ray and the mirror and the angle between the outgoing ray and the mirror. What do you notice?

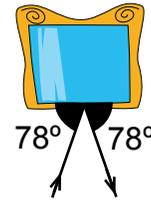
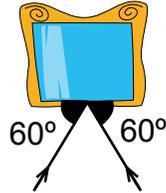
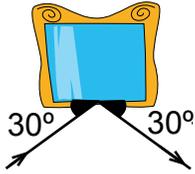


LIGHT ACTIVITY (Before Playing)

Name: _____

Date: _____

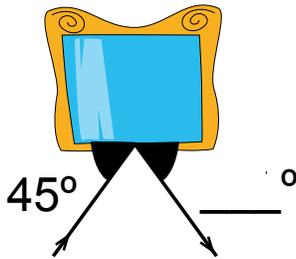
Look at the following pictures showing an incoming flashlight beam bouncing off a mirror. Find the pattern between the angles of the incoming and outgoing beams and the mirror.



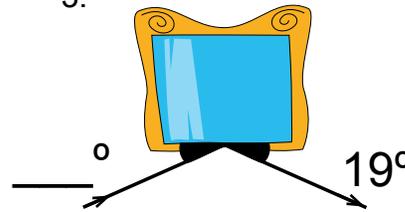
1. What is the pattern? _____

Using the pattern you found above, complete the following:

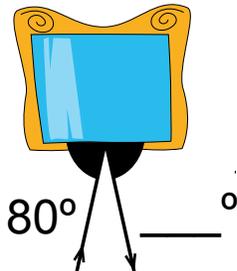
2.



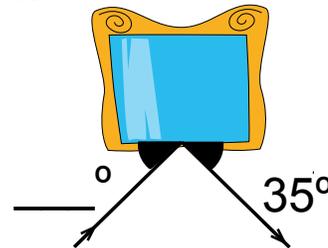
3.



4.



5.



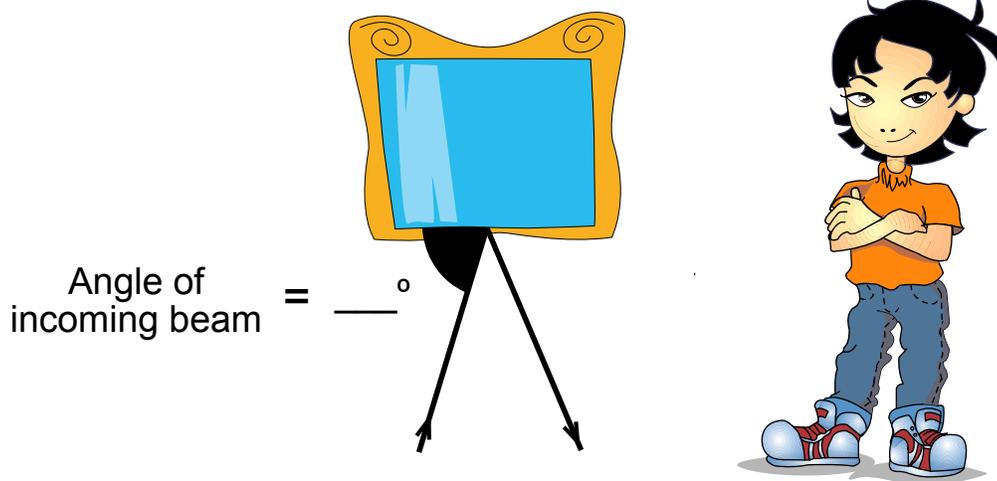
LIGHT ACTIVITY (After Playing)

Name: _____

Date: _____

Below is a diagram of an incoming and outgoing light ray. To figure out what angle each ray makes with the mirror, you need to solve some math questions. Begin with the highlighted box. Once you've found the answer, look for the box that starts with that answer and then solve the math question in that box. Continue solving questions like this until you've finished the chart. We did the first one for you. Your final answer will tell you the angle between the mirror and the incoming light beam.

45 - 23 = 22	26 x 3 =	2 + 74 =	19 - 4 =
10 - 8 =	63 x 2 =	22 - 10 =	76 - 50 =
21 - 11 =	12 + 7 =	78 - 8 =	15 + 6 =
126 / 3 =	70 / 10 =	42 + 44 =	7 x 9 =



What is the angle between the mirror and the outgoing light beam? How do you know? _____

CHILI PARLOR ACTIVITY I

MATHEMATICS: Fractions and decimals

SCIENCE: Measurement

LANGUAGE ARTS: Following directions

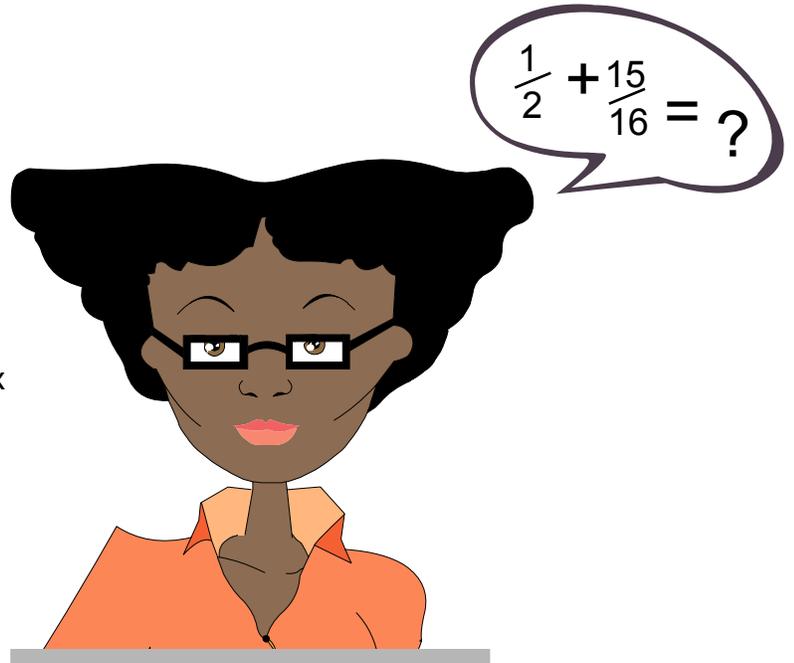
AIM: Students recognize and generate equivalent forms of fractions and decimals.

BACKGROUND: For students to excel in math, they need to have a basic understanding of mathematical terms. Before beginning this activity, it would be helpful to discuss the following terms and have students come up with examples of each:

- Whole number
- Fraction
- Numerator
- Denominator
- Mixed number
- Improper fraction
- Decimal

BEFORE PLAYING

Discussion: Ask students to describe their favorite homemade meal. For homework, give each student an index card. Have them ask their parent or guardian for the recipe to the meal. Tell students to write the recipe on the card and then bring the card in the next day. (On the index card, students should indicate serving size.) As a class, discuss the recipes: What do they have in common? (They all use measurements, have instructions, and so on.) How do they differ? (The ingredients, instructions, serving sizes, and so on vary from recipe to recipe.)



AFTER PLAYING

Activity: Once students have completed the two After Playing Worksheets, make the pudding according to the recipe on the second worksheet.

ASSESSMENT: Assess students' answers on the After Playing Worksheets. Observe students as they measure ingredients during the After Playing Activity.

EXTENSION: Collect the index cards from the Before Playing discussion. Photocopy the recipes. Construct a classroom cookbook and sell the cookbook throughout the school as a classroom fundraiser.

CHILI PARLOR ACTIVITY I

RESOURCES

[Comic-Strip Math: Mini-Story Problems](#), by Dan Greenberg (Scholastic, 2000, \$9.95, ISBN 0-43904-383-2). Tackle math the fun way! The cartoons and accompanying word problems in this book help students master fractions, measurement, problem solving, and more. To order, call 1-800-SCHOLASTIC.

<http://www.funbrain.com/numbers.html>

To help your students strengthen their math skills, visit this site from the Learning Network. The site includes games covering fractions, arithmetic, measurement, coordinates, and more.

http://www.pbs.org/wgbh/amex/kids/flight/feature_barn.html

Visit PBS's web site and read all about Bessie Coleman and her life as a barnstormer. Follow the links to learn about other famous fliers.

ANSWERS

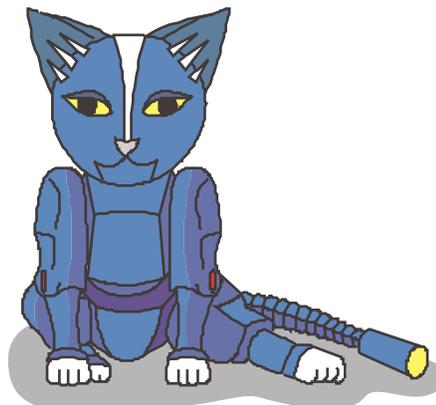
Brave Bessie, Worksheet: (1. She heard exciting tales from soldiers returning from World War I. 2. France. 3. Bessie believed in equality for all and she only wanted to support those who shared her ideals. Answers will vary.)

Before Playing, Worksheet: (Get to THE POINT.)

After Playing, Worksheet I: (Across: 1. Decimal. 2. Numerator. 3. Improper fraction.

Down: 1. Denominator. 4. Mixed number. 5. Whole number.)

After Playing, Worksheet II: (Ingredients: 1 package Jello Instant white chocolate pudding; 1 $\frac{3}{4}$ cup dry milk; $\frac{2}{3}$ cup water.)



CHILI PARLOR ACTIVITY I

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Understand numbers, ways of representing numbers, relationships among numbers, and number systems
- Compute fluently and make reasonable estimates
- Understand measurable attributes of objects and the units, systems, and processes of measurement
- Apply appropriate techniques, tools, and formulas to determine measurements

Science:

- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

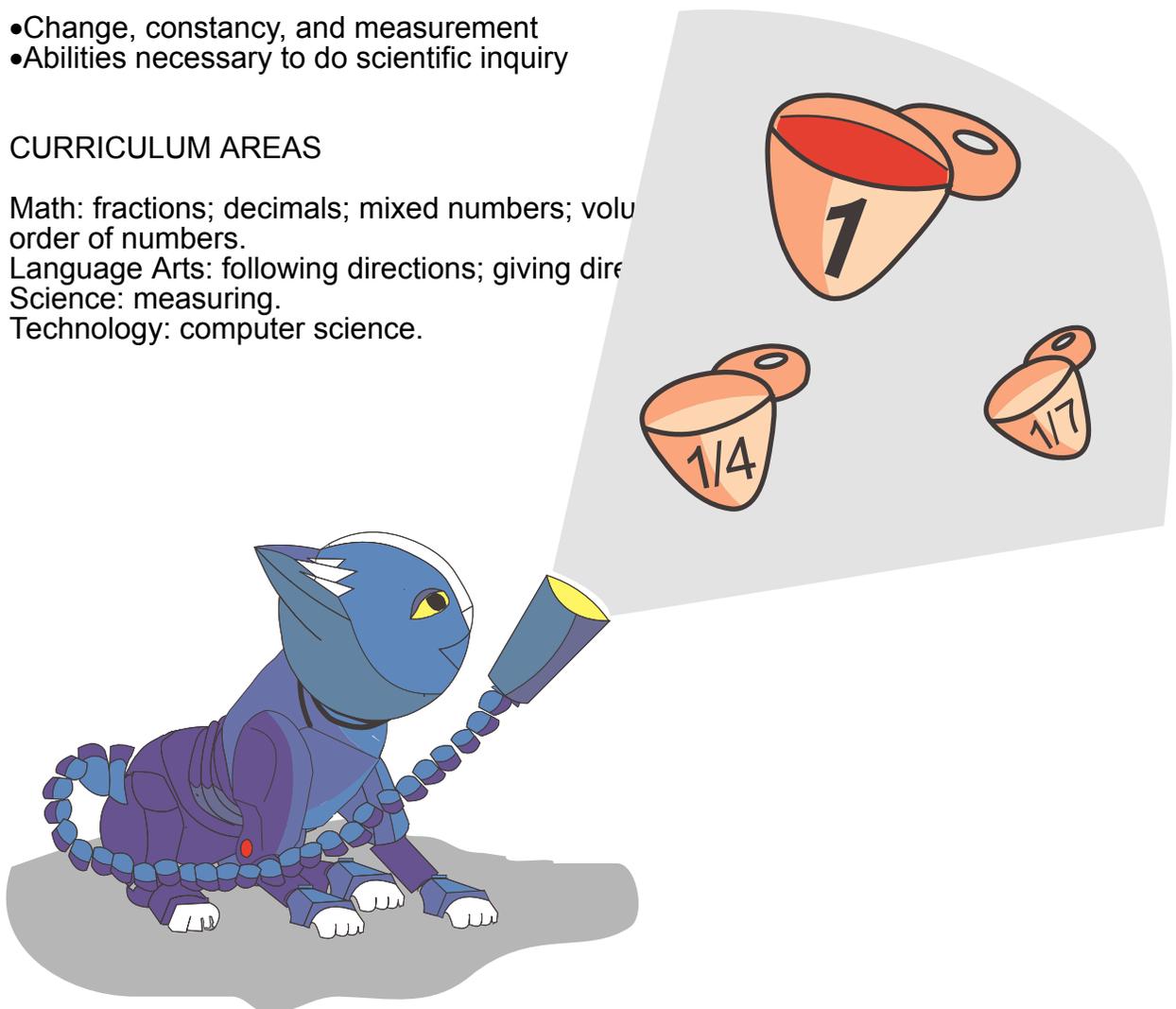
CURRICULUM AREAS

Math: fractions; decimals; mixed numbers; volume; order of numbers.

Language Arts: following directions; giving directions

Science: measuring.

Technology: computer science.





CHILI PARLOR ACTIVITY I

Brave Bessie
(Student Article)

Name: _____

Date: _____

Speeding, spinning, reeling—performing tricks. Bessie Coleman, the first African-American woman pilot and the first woman stunt pilot, put on a good show for spectators. But her fame didn't come easy.

Born to a poor family in Atlanta, Texas in 1892, Bessie Coleman grew up determined to escape poverty and achieve success. When she turned 23, she moved to Chicago. As she heard returning soldiers tell wild tales of flying in World War I, she decided to become a pilot.

Bessie applied to flying schools around the U.S. But she was a woman—and she was black. Very few women of any race held a pilot's license in 1918. Those who did were white and wealthy. School after school refused to admit Coleman.

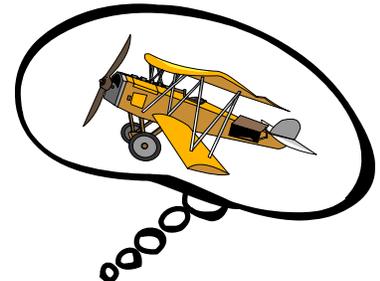
Not one to give up, Bessie learned French, withdrew her savings, and set off for Paris in 1920. In France, she enrolled in an aviation class. Seven months later, Bessie knew how to fly and received her international pilot's license. She headed home to the U.S.

Over the next five years, Coleman performed at many air shows. Reporters publicized her events as “heart-thrilling stunts.” People flocked to watch Bessie's air tricks. She used her fame to encourage other African Americans to fly. She also took a stand against racism by refusing to perform at locations that wouldn't admit African Americans.

On April 30, 1926, Bessie took her last flight. While preparing for an air show in Florida, one of her control gears got caught and her plane unexpectedly plunged toward earth. Despite her tragic death, “Brave Bessie”—as the press called her—reached more than just her personal goals. She helped achieve equality in the air.

Questions:

1. How did Bessie Coleman become interested in flying?
2. Where did Bessie have to go to get her pilot's license?
3. Why did Bessie refuse to perform at locations that wouldn't admit people of her race? Have you ever stood up for something you believed in? Explain.



SA-3a.1

CHILI PARLOR ACTIVITY I (After Playing Worksheet, #1)

Name: _____

Date: _____

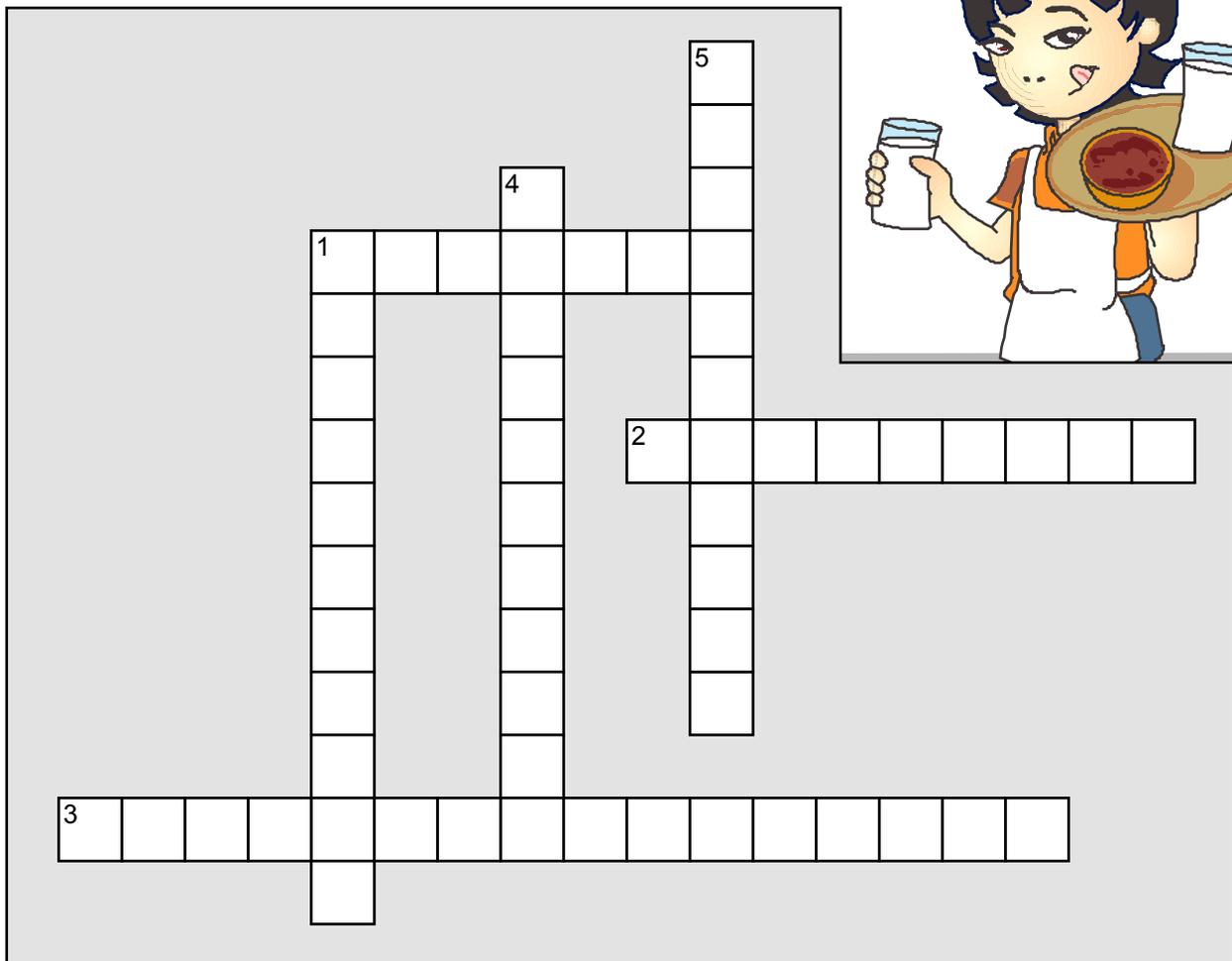
Read the clues below to fill in the crisscross puzzle with the correct words.

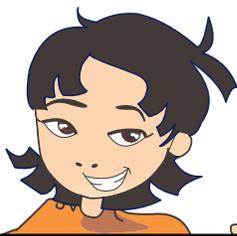
Across

- 1.) .5 is an example of a _____.
- 2.) In $11/14$, 11 is called the _____.
- 3.) $9/4$ is an example of an _____ _____.

Down

- 1.) In $7/8$, 8 is called the _____.
- 4.) $2 \frac{4}{5}$ is an example of a _____ _____.
- 5.) 7 is an example of a _____ _____.





CHILI PARLOR ACTIVITY I (After Playing Worksheet, #2)

Name: _____

Date: _____

We've given you a tasty recipe below—minus the ingredients! Follow each set of directions, then circle the word next to the correct answer. Write the word in the blank above the letter of the problem.

-Convert each of the following mixed numbers to improper fractions.

A.) $1 \frac{2}{3}$

B.) $2 \frac{4}{7}$

C.) $5 \frac{7}{8}$

$\frac{5}{3}$ chocolate

$\frac{14}{4}$ eggs

$\frac{40}{8}$ sugar

$\frac{1}{3}$ vanilla

$\frac{18}{7}$ milk

$\frac{47}{8}$ pudding

-Convert each fraction below to a decimal.

D.) $\frac{1}{2}$

E.) $\frac{2}{5}$

F.) $\frac{9}{10}$

.5 instant

.6 salt

.9 package

.75 mix

.4 water

.3 strawberry

-Add the following mixed numbers. Reduce.

G.) $1 \frac{1}{2} + 2 \frac{1}{2} = \underline{\hspace{2cm}}$

H.) $2 \frac{2}{3} + 2 \frac{1}{3} = \underline{\hspace{2cm}}$

I.) $5 \frac{1}{6} + 3 \frac{5}{12} = \underline{\hspace{2cm}}$

J.) $3 \frac{2}{5} + 2 \frac{1}{15} = \underline{\hspace{2cm}}$

3 icing

2 teaspoon

$8 \frac{7}{12}$ dry

$5 \frac{7}{15}$ white

4 cup

5 Jello

$8 \frac{5}{6}$ flour

$11 \frac{4}{15}$ brownie

Ingredients:

1 _____
 F H D J A C

$1 \frac{3}{4}$ cup _____
 I B

$\frac{2}{3}$ _____
 G E

Instructions:

Put the Jello Instant Pudding into a heavy-duty zip-lock bag. Add $\frac{2}{3}$ cup nonfat dry milk. Add $1 \frac{3}{4}$ cups of water. Seal the bag, shake well, and give the tasty treat a few minutes to settle. Serves 4.

CHILI PARLOR ACTIVITY II

MATHEMATICS: Ratios
SCIENCE: Measurement
LANGUAGE ARTS: Following directions

AIM: Students compute ratios and learn to reduce fractions.

BACKGROUND: Introduce students to the concept of ratio by asking them how many girls are in the class compared to boys. Explain to them that this relationship is a ratio, or proportion. As a class, discuss why and when ratios might be helpful. What information do ratios give?

BEFORE PLAYING

Discussion: As a class, define a ratio. (The relationship in quantity or size of two or more objects.) When do we use ratios? Have students list some common examples of ratios. (Answers will vary. Examples: the ratio of A's to B's on a test, the ratio of sixth grade students to fifth graders, and so on.)

AFTER PLAYING

Discussion: Ask students look at their answers from the Before Reading Worksheet. Have each student compute the ratio of pretzels to M&Ms, of pretzels to Raisins, and of Raisins to M&Ms. Which ratio is largest? Which ratio is smallest? (Answers will vary.)

ASSESSMENT: Check students' answers to the riddle on the After Playing Worksheet.

RESOURCES

[25 Super Cool Math Board Games](#), by Lorraine Hopping Egan (Scholastic, 1999, \$12.95, ISBN 0-59037-872-4). Reproducible board games build essential math skills. Topics include multiplication, division, fractions, estimation, and more. To order, call 1-800-SCHOLASTIC.

<http://www.figurethis.org/challenges/challenge/index.htm>

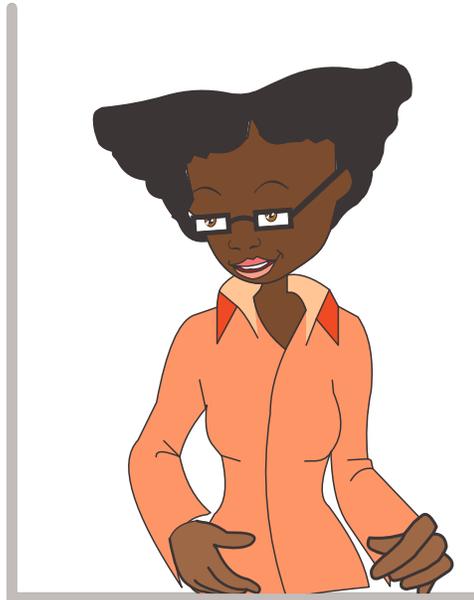
Funded by the National Science Foundation and the Department of Education, this site will challenge your students to solve word problems as they master decimals, fractions, ratios, measurement, algebra, geometry, statistics, and probability.

ANSWERS

Before Playing, Worksheet: (Answers will vary.)

After Playing, Worksheet: (Because THEY DON'T HAVE WINGS.)

Site Seeking in Chicago, Worksheet: (7a. $\frac{3}{10}$. 7b. $\frac{1}{6}$.)



CHILI PARLOR ACTIVITY II

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Use models, benchmarks, and equivalent forms to judge the size of fractions
- Model problem situations with objects and use representations such as graphs, tables, and equations to draw conclusions
- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles

Science:

- Systems, order, and organization
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

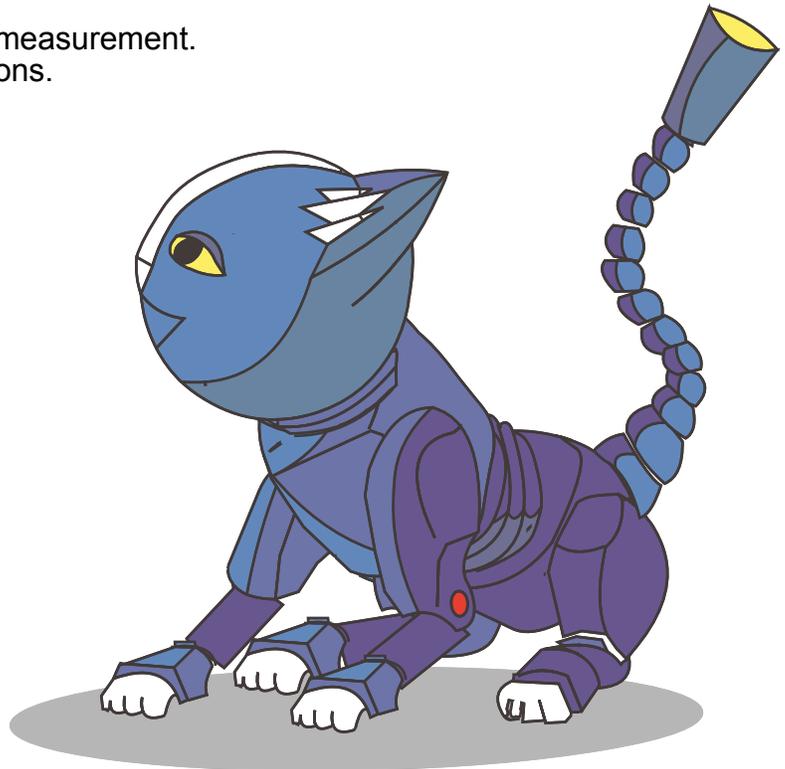
CURRICULUM AREAS

Math: fractions; ratios; volume; measurement.

Language Arts: following directions.

Science: measuring.

Technology: computer science



TA-3b.2

CHILI PARLOR ACTIVITY II (Before Playing)

Name: _____

Date: _____

Make "Munchies"

1. Break into groups of three.
2. Gather the following materials:
 - Raisins
 - M&Ms
 - Pretzels
 - Bowl
 - Spoon
 - 3 small paper cups
3. Measure $\frac{1}{2}$ cup raisins and pour them into the bowl.
4. Repeat Step 3 with the M&M candies.
5. Add $\frac{1}{4}$ cup pretzels to the bowl.
6. Stir the ingredients.
7. Fill the three cups with the "Munchie" mix. Keep one cup and give the others to each of your partners.
8. Answer the questions below.



Questions:

1. How many raisins are in your cup? _____
2. How many M&M candies are in the cup? _____
3. How many pretzels do you have? _____
4. Add up the number of raisins, M&M candies, and pretzels to see how many pieces of food are in your cup. What is the total? _____
5. Write a ratio, or a fraction, comparing the number of raisins to the total.

6. Write a ratio comparing the number of M&Ms to the total. _____
7. Write a ratio comparing the number of pretzels to the total. _____
8. What do you have the most of: raisins, M&Ms, or pretzels? _____



CHILI PARLOR ACTIVITY II (After Playing Worksheet)

Name: _____

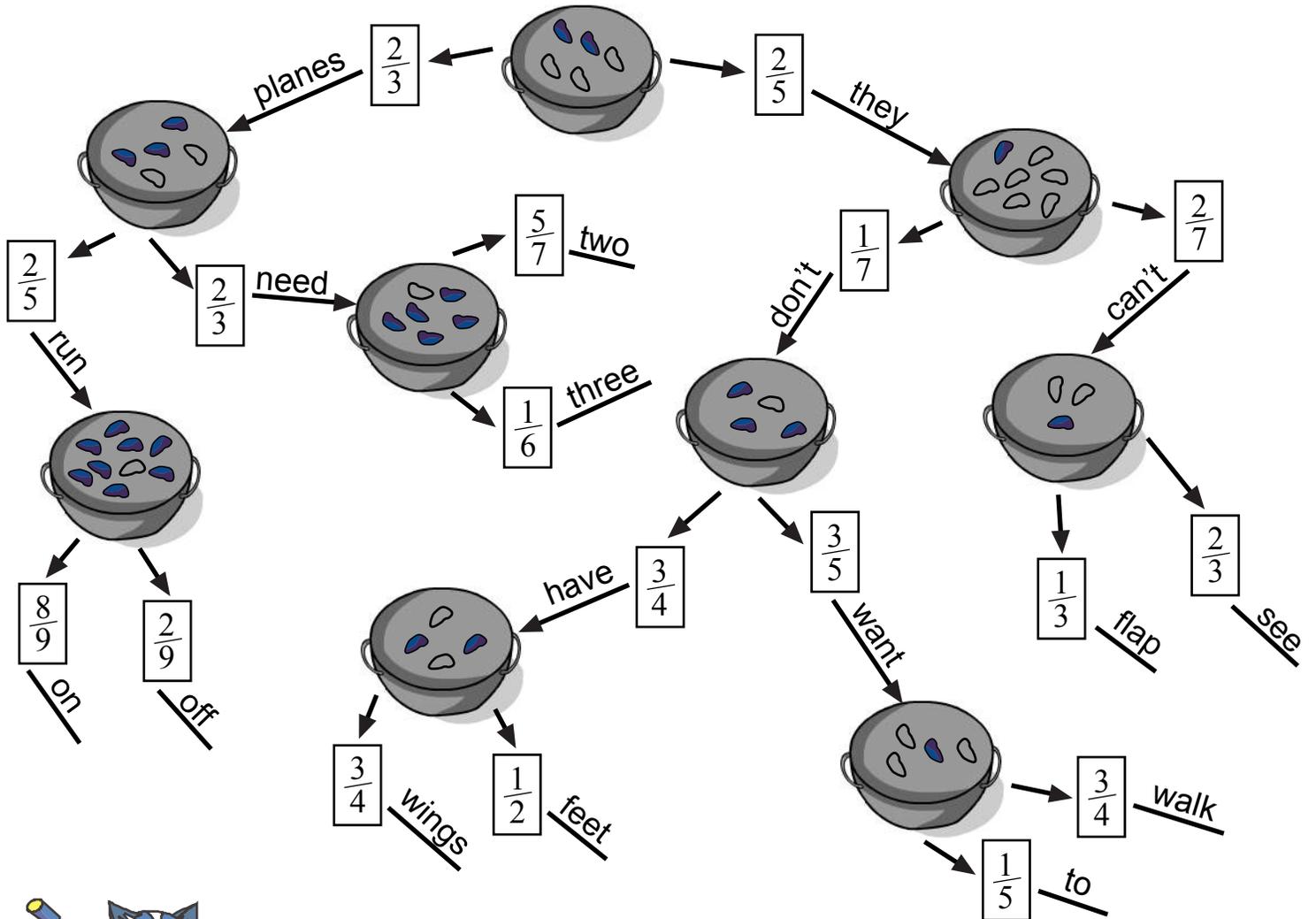
Date: _____

Q: Why do airplanes fly?

Solve this riddle by following the maze below.

Directions:

1. Begin with the bowl at the top.
2. Figure out how many black beans there are compared to all of the beans in the bowl.
3. Choose the path with the correct answer and write the word in the blanks at the bottom of the page.
4. Follow the correct path until you have filled in all four blanks.



Answer: Because _____

CHILI PARLOR ACTIVITY III

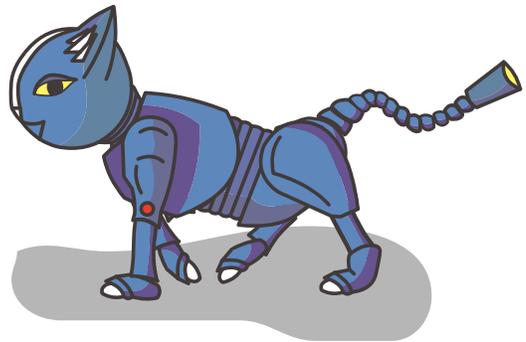
MATHEMATICS: Division of fractions
SCIENCE: Measurement

AIM: Students divide fractions, choose appropriate measuring tools, and determine equivalent fractions.

BACKGROUND: To complete this activity, students need to remember how to convert mixed numbers to improper fractions and how to divide fractions. Remind students of the rules for dividing fractions. As a class, discuss how dividing is equivalent to multiplying by the inverse. Write several examples on the board and go through each example step by step.

BEFORE PLAYING

Discussion: Ask students if they have ever had to share a snack with a brother, sister, or friend. How did they share? Did they divide the snack evenly? How did they know that they divided the portions equally? Next, ask students how would they divide a glass of lemonade between two people so that they knew for sure the portions were equal. Have students write down their responses and then discuss them as a class. (Answers will vary. One way would be to pour the lemonade from the glass into a measuring cup to see how much lemonade there is. Then divide that measurement in half and pour that amount into two glasses.)



AFTER PLAYING

Activity: Choose one recipe from the student-generated recipes in the Before Playing Discussion from Chili Parlor Activity I. Write the recipe on the board and tell students what the serving size is. Have students use math to cut the recipe in half.

ASSESSMENT: Check students' answers on the After Playing Worksheet.

CHILI PARLOR ACTIVITY III

RESOURCES

40 Fun-tabulous Puzzles for Multiplication, Division, Decimals, Fractions, & More, by Bob Olenych (Scholastic, 2000, \$9.95, ISBN 0-43919-941-7). With these puzzles, your students will hardly realize they are practicing their math skills! Students use basic operations as they solve puzzle problems with whole numbers, decimals, fractions, and more. To order, call 1-800-SCHOLASTIC.

<http://school.discovery.com/brainboosters/index.html#number>

Encourage your students to expand their math skills with the Discovery Channel's web site. Here they can practice lateral thinking, logic, reasoning, and spatial awareness with fun math games.

ANSWERS

Before Playing, Worksheet: (1.g, 2.d, 3.c, 4.j, 5.f, 6.a, 7.i, 8.e, 9.h, 10.b.)

After Playing, Worksheet: (Monday—4, Tuesday— $\frac{1}{2}$, Wednesday— $\frac{3}{5}$, Thursday— $\frac{2}{3}$, Friday— $\frac{1}{3}$.)

Site Seeking in Chicago, Worksheet: (8a. $4\frac{1}{2}$. 8b. $1\frac{1}{2}$.)



CHILI PARLOR ACTIVITY III

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Recognize equivalent representations for the same number and generate them by decomposing and composing numbers
- Develop understanding of fractions as parts of unit wholes, as parts of a collection, as locations on number lines, and as divisions of whole numbers
- Use models, benchmarks, and equivalent forms to judge the size of fractions
- Understand the effects of multiplying and dividing whole numbers
- Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems
- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles

Science:

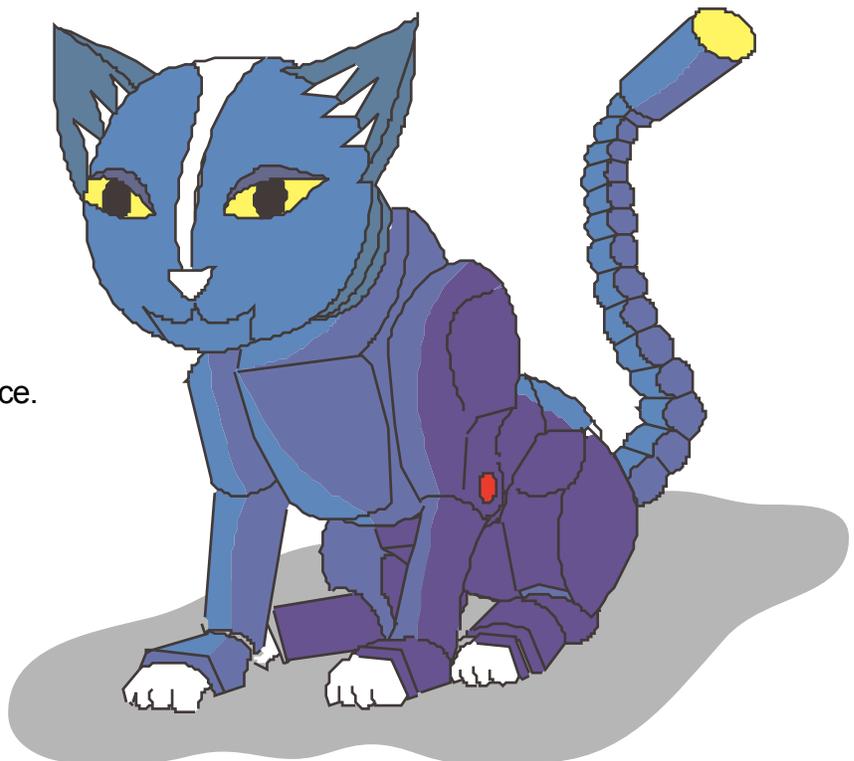
- Systems, order, and organization
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

CURRICULUM AREAS

Math: division of fractions, equivalent fractions, mixed numbers, problem solving.

Science: measuring.

Technology: computer science.



TA-3c.3

CHILI PARLOR ACTIVITY III (Before Playing)

Name: _____

Date: _____

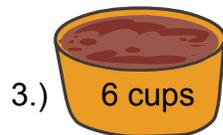
Divide the following bowls of chili evenly between four customers. Draw a line from the bowl to the correct answer.



* a.) $\frac{1}{2}$ cup



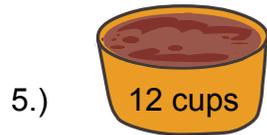
* b.) $3 \frac{1}{2}$ cups



* c.) $1 \frac{1}{2}$ cups



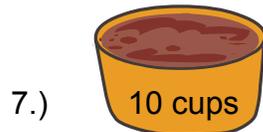
* d.) $\frac{3}{4}$ cup



* e.) $1 \frac{3}{4}$ cups



* f.) 3 cups



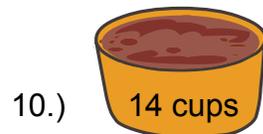
* g.) $2 \frac{1}{4}$ cups



* h.) $1 \frac{1}{4}$ cups



* i.) $2 \frac{1}{2}$ cups



* j.) $3 \frac{1}{4}$ cups

SA-3c.1

CHILI PARLOR ACTIVITY III

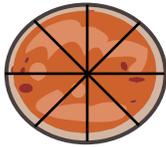
(After Playing Worksheet)

Name: _____

Date: _____

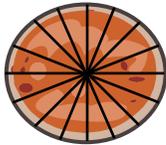
You're having a pizza party every day after school next week. Count the slices of pizza below and divide them so you and your friends all get the same amount of pizza. Reduce.

Example:



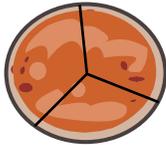
Two friends are coming over. (Plus you, makes 3!)
Think: $8/3 = ?$
Everyone gets $2 \frac{2}{3}$ slices.

Monday:



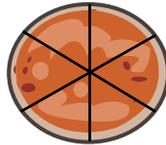
Three friends are joining you for pizza.
All four of you eat _____ slices.

Tuesday:



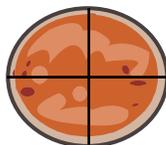
Five friends want to share your pizza with you.
The six of you chomp away at _____ slice.

Wednesday:



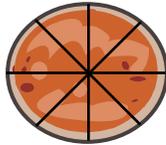
Nine of your friends are coming over.
Divide the pizza so the ten of you eat _____ slice.

Thursday:



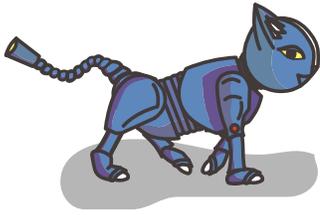
Six friends accepted your invitation for pizza.
Give everyone (including you!) _____ slice.

Friday:



Make room! 23 friends are here for pizza.
The 24 of you eat _____ slice each.





MONEY CONVERSION ACTIVITY

SOCIAL STUDIES: African-American history; global economics

MATHEMATICS: Money conversion; division; multiplication

LANGUAGE ARTS: Essay-writing skills

AIM: Students perform money conversions while visiting with Jesse Binga, a historical African-American banker from Chicago.

BACKGROUND: Different countries have various forms of currency. For example, in the United States the standard form of currency is the U.S. dollar. In Japan, the Yen is the standard currency.

The European Union, or EU, is a collective group of European countries that share common goals. Several Member States—including Germany, France, Italy, and Greece—developed a common market so that people, goods, and services could move more easily between them. Participating members adopted a new currency: the euro. The euro remains a scriptural currency (banknotes and coins are not yet available), but many financial markets have already made the switchover: foreign exchange, share and bond markets.

Towards the end of 2001, participating countries will issue euro banknotes and coins to banks and large retailers. And by February 28, 2002 at the latest, national banknotes and coins—including the German Mark, French Franc, Italian Lira, and Greek Drachma—will finally be entirely withdrawn from use.



BEFORE PLAYING

Discussion: As a class, follow the exchange rates for a specific country from day to day. Discuss how the rates fluctuate: Ask students to look through the local newspaper to see if it lists the current exchange rates. If so, have students clip the section out and bring it to class. Otherwise, have them record current exchange rates from the Internet. A good site is

<http://www.rubicon.com/passport/currency/currency.html>

AFTER PLAYING

Writing Prompt: Write a one-page essay about a time when someone encouraged you to achieve your goals. What did they do? How did that help you?

ASSESSMENT: Assess students' answers on the After Playing Worksheet.

EXTENSION: Ask each student to choose a currency, such as the Japanese Yen, to follow. Have each student create a line graph depicting the daily fluctuation of the exchange rate (based on the U.S. dollar) for a specified time period. At the end of the time period, collect the graphs and discuss the fluctuations. Why do exchange rates vary over time? For a hint, refer students to the news and to any current events that might be taking place in various countries.

MONEY CONVERSION ACTIVITY

RESOURCES

<http://www.x-rates.com>

While most sites only allow you to convert U.S. dollars to foreign currencies, this one allows you to view exchange rates from one foreign currency to another. For instance, here you can see the exchange rate from British Pounds to Japanese Yen.

<http://europa.eu.int/euro/html/home5.html?lang=5>

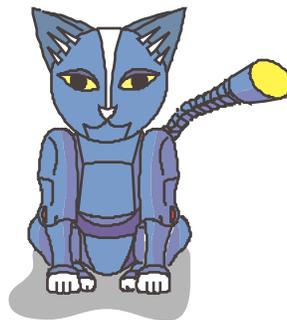
If you have questions concerning the EU or the euro, this is the site for you! The site includes detailed timetables outlining the transition from national currencies to the euro; information describing what the new banknotes and coins will look like; which countries will be switching to the euro; and so on.

ANSWERS

Banking With Binga, Worksheet: (1. The Binga State Bank—a bank open to African Americans. 2. He financed her aviation schooling in France. 3. Answers will vary.)

Before Playing, Worksheet: (Chart—four quarters; 10 dimes; 20 nickels. Questions—1. You would need 80 nickels. Multiply 20 nickels by four. 2. You would have three dollars. Divide 30 dimes by 10. 3. You owe her 12 quarters. Multiply four quarters by three.) Note: Some students may have problems conceptualizing these conversions. If they do, use three types of beans to represent coins: one type would represent quarters, one would represent dimes, and the other would represent nickels. Break students into groups and give them beans to manipulate and count.

After Playing, Worksheet: (German marks: tennis racket: 120; basketball: 48; tennis balls 24; softball glove: 72; total: 264. Italian Lira: tennis racket: 40; basketball: 16; tennis balls: 8; softball glove: 24; total: 88. Javan Florins: tennis racket: 30; basketball: 12; tennis balls: 6; softball glove: 18; total: 66.) Note: In real life, the actual prices of items would also vary by country. For instance, a certain tennis racket might cost \$60 in the United States. But in Ecuador, the same racket might cost only \$5.00. For the purposes of teaching money conversion, this is not an issue.



MONEY CONVERSION ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Social Studies:

- Individuals, groups, and institutions
- Global connections
- Civic ideals and practices

Mathematics:

- 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

Science:

- Systems, order, and organization
- Change, constancy, and measurement

CURRICULUM AREAS

Social Studies: African-American studies; global economics; current events.

Language Arts: writing; reading comprehension.

Technology: computer science.

Math: monetary systems; division; multiplication; making a line graph; interpreting a line graph.



TA-4.3



MONEY CONVERSION ACTIVITY

Banking With Binga
(Student Article)

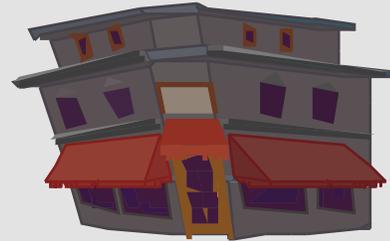
Name: _____

Date: _____

When you get paid for doing chores around the house or receive money as a gift, what do you do with it? If you don't spend your fortune right away, you might bring it to a bank for safekeeping. But not too long ago, banks closed their doors to many minority groups. That's when bankers like Jesse Binga stepped in!

Born in Detroit in 1865, Jesse Binga was determined to be successful at all that he did. After settling down in Chicago around 1893, he decided to make his fortune in real estate. By 1907, he was one of the most prosperous realtors in the city.

Pleased with his own accomplishments, Jesse wanted to help other members of the African-American community reach their goals. He believed that with reliable banks, African Americans could save money and get loans to build homes, start businesses, and pay for education. With this in mind, Jesse set out to open a fully state-chartered bank for African Americans. By 1921 the Binga State Bank was up and running! Within two years it passed the million-dollar mark in deposits and was the largest African-American bank in the world.



Was Jesse Binga successful in helping others reach their goals? You bet! He encouraged African-American Bessie Coleman to become a pilot and he financed her aviation schooling in France. She and others are proof that Jesse Binga was a man you could "bank" on!



Questions:

1. What did Jesse Binga open in 1921?
2. How did Jesse help Bessie Coleman?
3. Who do you know that has big dreams for the future? What could you do to help them reach their goals?

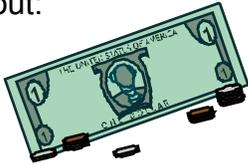


MONEY CONVERSION ACTIVITY (Before Playing)

Name: _____

Date: _____

Money comes in different forms. In the United States, our standard form of currency is the dollar. But we also use quarters, dimes, and nickels to purchase things. How do different forms of U.S. money compare? Complete the following chart to find out:



\$1.00 = _____ quarters
\$1.00 = _____ dimes
\$1.00 = _____ nickels

Suppose your neighbors paid you for doing some chores around the neighborhood. Unfortunately, everyone paid you in coins. Use your answers from the chart to complete these questions:

1. If you were to buy a book costing four dollars, how many nickels would you need? Explain how you would figure this out.

2. If you have 30 dimes, how many dollars do you have? Again, how did you calculate this?

3. Your best friend lent you \$3.00 last week. Now you want to pay her back in quarters. How many quarters do you owe her? Explain how you found your answer.

MONEY CONVERSION ACTIVITY (After Playing)

Name: _____

Date: _____

You bought some sporting goods, but you want to know how much you would have spent using different currencies. Look at the exchange rates listed below, then look at your receipt to see how much each item cost you in U.S. dollars. Calculate the cost of each item in German Marks, Italian Lira, and Javan Florins. Add the last column down to figure out the total money spent in each currency.

Sample Exchange Rates:



1 U.S. dollar	2 German Marks
3 U.S. dollars	2 Italian Lira
4 U.S. dollars	2 Javan Florins



U.S. dollars

1. tennis racket	Cost: \$60
2. basketball	Cost: \$24
3. tennis balls	Cost: \$12
4. softball glove	Cost: \$36
Total:	Cost: \$132

German Marks

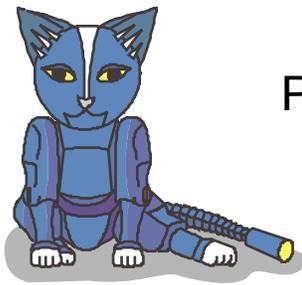
1. tennis racket	Cost:
2. basketball	Cost:
3. tennis balls	Cost:
4. softball glove	Cost:
Total:	Cost:

Italian Lira

1. tennis racket	Cost:
2. basketball	Cost:
3. tennis balls	Cost:
4. softball glove	Cost:
Total:	Cost:

Javan Florins

1. tennis racket	Cost:
2. basketball	Cost:
3. tennis balls	Cost:
4. softball glove	Cost:
Total:	Cost:



PIPE ORGAN ACTIVITY

SOCIAL STUDIES: African-American Women in the Arts

SCIENCE: Sound

MATHEMATICS: Analyzing Change

LANGUAGE ARTS: Research Skills

ART: Music

AIM: During a fictional encounter with Mahalia Jackson, a female African-American gospel singer, students discover that sound frequency varies with the amount of air vibrating in a column.

BACKGROUND: Sound travels through means of vibrations, or waves. These waves can pass through air, water, or various other mediums. A sound wave consists of compressions (regions of high pressure) and rarefactions (regions of low pressure). You hear sounds when the pressure change reaches your ears.

Pitch is the sensation of how high or deep a sound is.

A sound's pitch is higher if the frequency is greater and the wavelength (the distance between one crest of a wave and the next) is shorter.

Scientists measure waves—and therefore sound—in Hertz (Hz). One hertz is one complete vibration per second. The hertz is named after the German physicist, Heinrich Hertz.



BEFORE PLAYING

Activity: Set four same-size glass bottles in a line. Fill the first bottle with one inch of water, the second with two inches, the third with three inches, and the fourth with four inches. Have students blow gently across the top of each bottle, noting the pitch of each sound. (Answer: The more air the bottle contains, the lower its pitch will sound.)

AFTER PLAYING

Writing Prompt: Ask students to imagine that they were alive at the time of the civil rights movement. Have them write about a talent they could have shared to inspire others and give them the strength to fight for freedom. How do they work to inspire others now?

ASSESSMENT: Have students draw a picture of their final pipe organ. (Answer: The left-hand pipe should be the tallest, while the others get progressively shorter.)

EXTENSION: Have students perform library research to discover how gospel influenced other types of music, including rhythm and blues and rock and roll.

PIPE ORGAN ACTIVITY

RESOURCES

The Science of Sound and Music, by Shar Levine & Leslie Johnstone (Sterling Publishing Co., 2000, \$19.95, ISBN 0-8069-7183-5). What do you get when you pair an award-winning author with a science teacher? An informative book filled with science experiments that reinforce the concepts of sound. To order, call 1-800-367-9692.

Mahalia Jackson: Queen of Gospel Song, by Leslie Gourse (Franklin Watts, 1996, \$24.00, ISBN 0-531-11228-4). Young adults or advanced younger readers will be fascinated by this biographical journey through Mahalia's life—from tragic childhood events to her rise as the “queen of gospel music.” To order, call 1-800-621-1115.

The Best of Mahalia Jackson, cd or audio cassette (Sony/Columbia, 1995, price varies, ASIN B000002AZG). You can't go wrong with this selection of Mahalia's greatest hits! To purchase, visit your nearest music store.

ANSWERS

Queen of Gospel, Worksheet: (1. New Orleans. 2. Gospel. 3. Answers will vary.)
Before Playing, Worksheet: (1. Wave crests should be low and far apart. 2. Wave crests should be high and close together. 3. Low. 4. High.)
After Playing, Worksheet: (1. D—494, a—262, b—330, c—392. 2. B—330, d—494, a—262, c—392.)



PIPE ORGAN ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Social Studies:

- Individual development and identity
- Civic ideals and practices

Science:

- Change, constancy, and measurement
- Transfer of energy

Mathematics:

- Understand numbers
- Analyze change

CURRICULUM AREAS

Physical Science: sound; frequency.

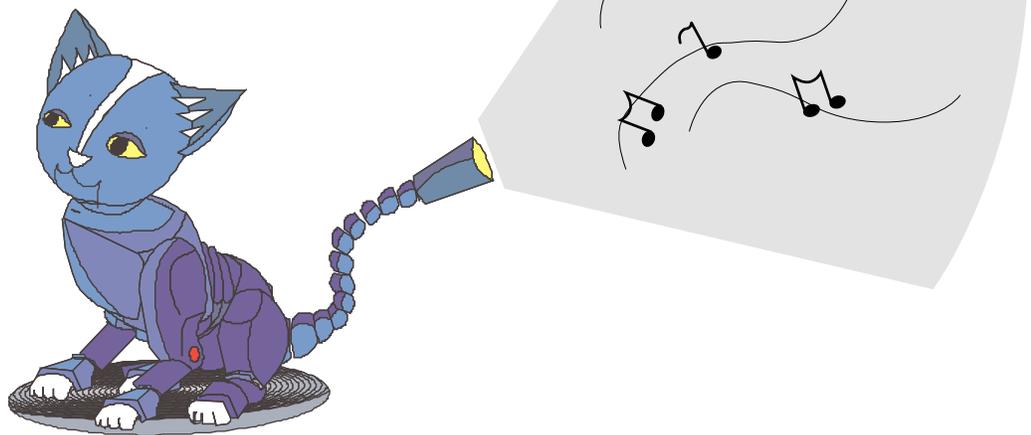
Social Studies: African-American studies; women's studies; civil rights movement.

Language Arts: writing; library skills; research skills.

Art: music.

Technology: computer science; oscilloscopes; tuning forks.

Math: analyzing change; arranging numbers sequentially.



PIPE ORGAN ACTIVITY



Queen of Gospel
(Student Article)

Name: _____

Date: _____

Put your hands together and clap to the tune. That's what people did when they heard the thunderous voice of gospel singer Mahalia Jackson. But Mahalia's music did more than ignite the rhythm within. Her music inspired African-Americans to fight for their freedom.

Born on October 26, 1911 in New Orleans, Mahalia Jackson came to be hailed as the queen of gospel music. She grew up singing gospel in her family's Baptist church, and soon added her own flair to the hymns: clapping her hands, shaking her body, and sometimes even dancing down the church aisles.

Although Mahalia grew up listening to rhythm and blues, she never sang to the tunes—she promised herself that she would only sing songs that praised the Lord. Mahalia became famous among African-American churchgoers, but soon white audiences flocked to hear her sing at concerts. Her fame spread quickly.

In the 1950s, African-American ministers called upon Mahalia to sing for the civil rights movement, the fight for equal rights. During the summer of 1963—before Martin Luther King, Jr. made his famous speech beginning, "I have a dream..."—Mahalia sang "I Been 'Buked and I Been Scorned." The crowd of about two hundred thousand people clapped along, joining her in this song about how they would one day tell God that they had been abused for too long.

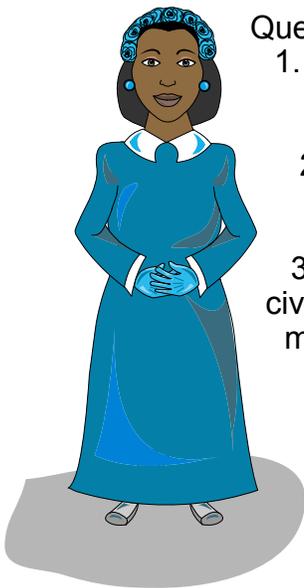
Nine years later, at age sixty, Mahalia Jackson had a heart seizure at a Chicago hospital and died. The world mourned, but they knew: The queen of gospel would live on in the music she had created, the spirits she had lifted, and the freedom that she had helped to win.

Questions:

1. Where was Mahalia Jackson born?

2. What type of music did she sing?

3. How do you think Mahalia's songs helped to inspire people during the civil rights movement?



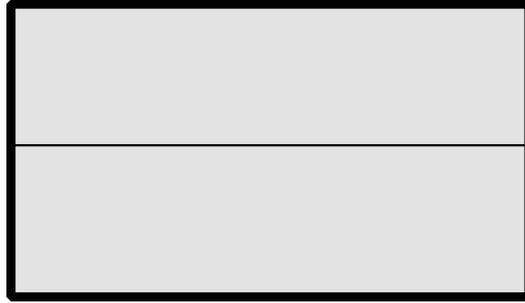


PIPE ORGAN ACTIVITY (Before Playing)

Name: _____

Date: _____

1. Click on a pipe and lengthen it until its frequency reads close to 350 Hz (Hertz; the unit of sound). In the box below, draw the blue wave pattern that you see—this wave graphs the sound the pipe makes at this length.



2. Shorten the pipe until the frequency reads close to 550 Hz. Draw the blue wave pattern that you see.



Complete the following:

3. When the pipe is long, is the frequency high or low?

4. When the pipe is short, is the frequency high or low?



PIPE ORGAN ACTIVITY (After Playing)

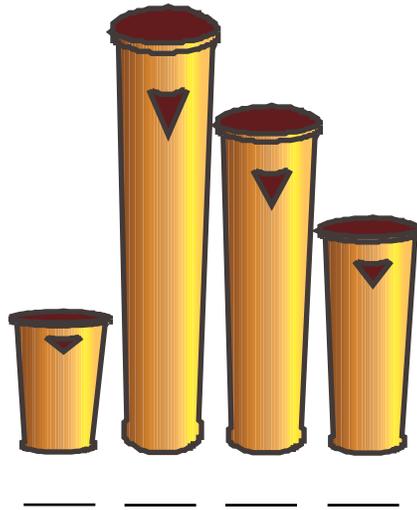
Name: _____

Date: _____

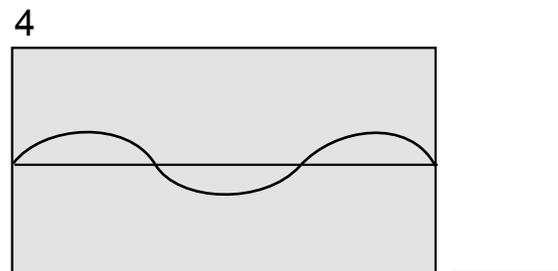
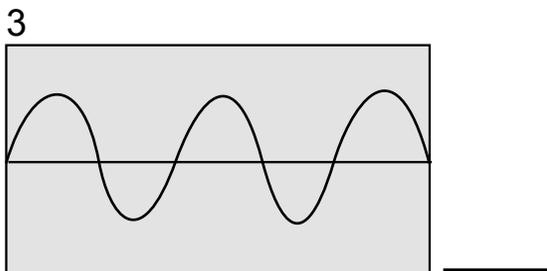
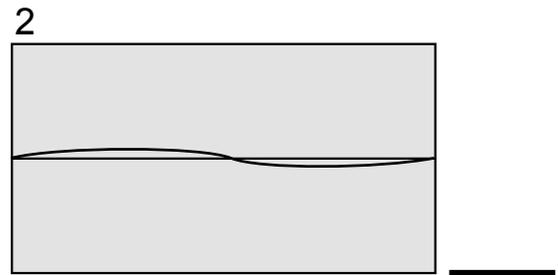
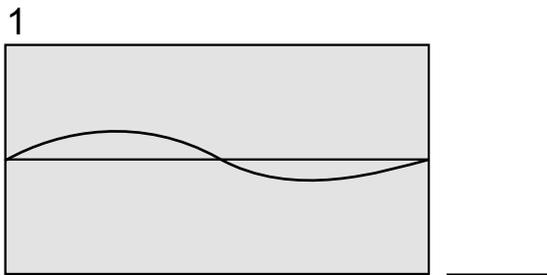
Use the following frequencies to complete the questions below.

- a. 262 Hz
- b. 330 Hz
- c. 392 Hz
- d. 494 Hz

1. On the blanks provided, write the letter of the frequency that each pipe would produce. (Hint: Do long pipes play at high or low frequencies?)



2. On the blanks provided, write the letter of the frequency that each sound wave describes. (Hint: Does a pattern with high peaks show a high- or low-frequency sound?)



TETRIS ACTIVITY

MATHEMATICS: Geometry
SCIENCE: Critical Thinking
ART: Drawing

AIM: Students manipulate geometrical figures.

BACKGROUND: This game is a lesson in geometrical transformations. A geometrical transformation changes an object's position or orientation, but not its shape or size. There are three basic transformations: translations, reflections, and rotations. A translation, or slide, changes the object's position without changing its orientation. A reflection, or flip, is similar to a mirror image. A rotation, or turn, spins the pattern around a point.

BEFORE PLAYING

Discussion: As a class, discuss the types of geometric transformations. Help students define slide, flip, and turn. Help them visualize each transformation and its result by coming up with everyday slides, flips, and turns. (Examples: Slide—playground slide, you move from high to low but you are still sitting upright when you hit the bottom. Flip—gymnast doing a handstand. Turn—basketball player pivoting on one foot.)

AFTER PLAYING

Activity: Explore tessellations, or mosaics created by repeatedly positioning one or more congruent shapes next to each other without gaps or overlaps. A tessellation is a result of performing geometric transformations. Visit the tessellation web sites or look through the tessellation book listed under Resources below. Then challenge your students to design and color their own tessellations. Post the drawings around the room.

ASSESSMENT: Check students' answers on the After Playing Worksheet.



TETRIS ACTIVITY

RESOURCES

Symmetry and Tessellations: Investigating Patterns (Grades 5-8), by Jill Britton (Dale Seymour, 1999, \$25.95, ISBN 0-76900-083-5). Integrate art and math with creative math projects that explore symmetry, patterns, and more. To order, call 1-800-526-9907.

M.C. Escher (1898-1972), a famous Dutch graphic artist, masterfully combined art and math in his works. Visit these sites to view his butterfly, lizard, and fish tessellations.

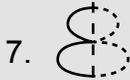
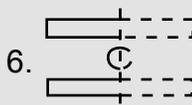
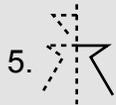
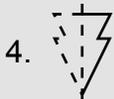
<http://www.worldofescher.com/gallery/SymmetryE70.html>

<http://www.worldofescher.com/gallery/SymmetryE25.html>

<http://www.worldofescher.com/gallery/SymmetryE72.html>

ANSWERS

Before Playing, Worksheet: (1.



After Playing, Worksheet:
(Escher slid, flipped, and turned shapes to create beautiful art.)



TETRIS ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

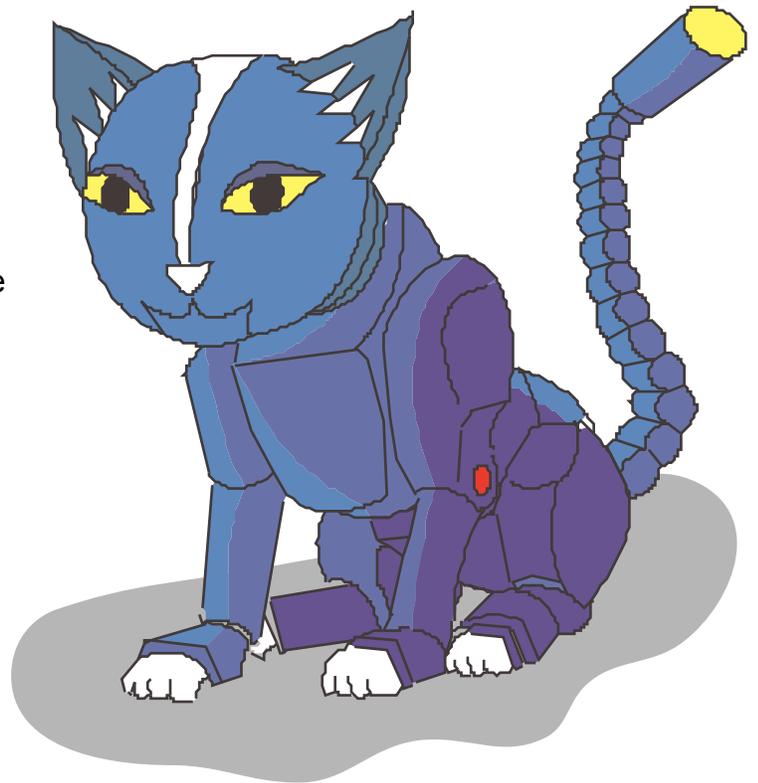
- Predict and describe the results of sliding, flipping, and turning two-dimensional shapes
- Identify and describe line and rotational symmetry in two- and three-dimensional shapes and designs
- Create and describe mental images or objects, patterns, and paths
- Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life
- Investigate, describe, and reason about the results of subdividing, combining, and transforming shapes
- Describe the shape and important features of a set of data and compare related data sets, with an emphasis on how the data are distributed

Science:

- Systems, order, and organization
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

CURRICULUM AREAS

Math: geometry, flipping, sliding, turning, symmetry, congruency.
Science: measuring.
Art: drawing tessellations.
Technology: computer science.





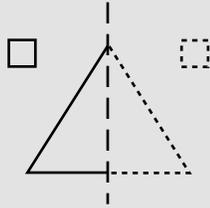
TETRIS ACTIVITY (Before Playing)

Name: _____

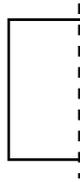
Date: _____

Using the dotted line as the line of symmetry, complete each shape.

Example:



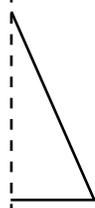
1.)



2.)



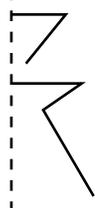
3.)



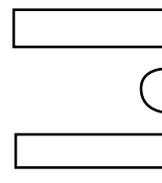
4.)



5.)



6.)



7.)



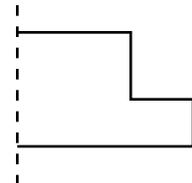
8.)



9.)



10.)





TETRIS ACTIVITY (After Playing)

Name: _____

Date: _____

Identify each image as a slide, flip, or turn. Circle the word under the correct column.
Use a mirror to decipher the message about a famous artist.

	Original	Image	Slide	Flip	Turn
Example:			No	No	Yes
1.)			Nstnan	Mac	Escher
2.)			took,	slid,	colored,
3.)			flipped,	spook,	slid,
4.)			so	threw	and
5.)			went	bounced	turned
6.)			shapes	cook	drawings
7.)			and	to	he
8.)			create	fly	see
9.)			terrible	beautiful	happy
10.)			paintings.	food.	art.

DISTANCE ACTIVITY



MATHEMATICS: Measurement; multiplication and division

SCIENCE: Speed

SOCIAL STUDIES: Map skills

AIM: Students use multiplication and division to solve algebraic equations.

BACKGROUND: Introduce or remind students of the algebraic concept of using a letter to represent an unknown quantity. On the board, write the formula $d = (r \times t)$. Below each variable, or letter, write what the letter represents. So, d = distance, r = rate (speed), and t = time. Explain to students how to solve this equation for the variable t . Present several examples and solve them as a class. For instance, suppose distance equals 100 meters and rate equals 50 meters/minute. Then t would equal 2 minutes.

BEFORE PLAYING

Activity: Reintroduce students to maps, distances, and scales. Break students into groups. Give each group a map of the state in which you live. Choose two major cities and ask students to determine—as the crow flies—which city is closest to their hometown.

Have students use the scale to determine how far each city is from their hometown. Have students suppose that two cars are traveling at 90 km/hr. How long would it take to arrive at the two destinations? Remind students to use the proper units for distance and solve the formula, $d = r \times t$, for the variable t .



AFTER PLAYING

Discussion: Review the formula $d = r \times t$. Ask students what d stands for (distance). Then ask them what the variables r and t represent (rate and time). Discuss the importance of units. If rate is measured in km/hr, in which units should distance be measured? (km) What if rate were measured in mi/hr? (Then distance should be measured in miles.)

ASSESSMENT: Assess students' answers on the After Playing Worksheet.

RESOURCES

Great Map Mysteries: 18 Stories and Maps to Build Geography and Map Skills. by Susan Julio (Scholastic Inc., 1999, \$10.95, ISBN 0-590-89641-5). Students solve mysteries by tracing routes, determining latitude and longitude, comparing time zones, and more. To order, call 1-800-SCHOLASTIC.

Quiz your students on distance, direction, and latitude and longitude.

ANSWERS

Before Playing, Worksheet: (Route #2 is shorter. Ms. Trombone likes to TRAVEL.)

After Playing, Worksheet: (Josie reaches her destination first.)

DISTANCE ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

- Understand various meanings of multiplication and division
- Understand the effects of multiplying and dividing whole numbers
- Identify and use relationships between operations, such as division as the inverse of multiplication, to solve problems
- Develop fluency in adding, subtracting, multiplying, and dividing whole numbers
- Represent the idea of a variable as an unknown quantity using a letter or a symbol
- Express mathematical relationships using equations
- Investigate how a change in one variable relates to a change in a second variable
- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles
- Select and use benchmarks to estimate measurements

Science:

- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

Social Studies:

- People, places, and environment
- Global connections

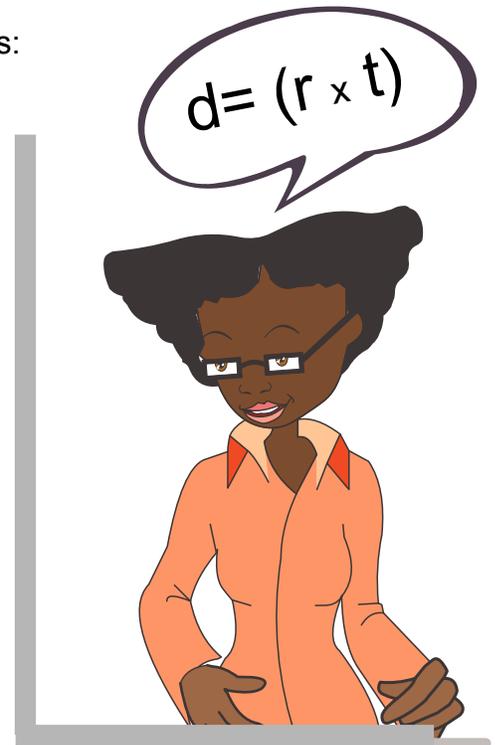
CURRICULUM AREAS

Mathematics: measurement, multiplication and division, manipulating algebraic equations, solving algebraic equations.

Social Studies: geography, maps.

Language Arts: following directions.

Technology: computer science.



DISTANCE ACTIVITY

(Before Playing Worksheet)

Name: _____

Date: _____

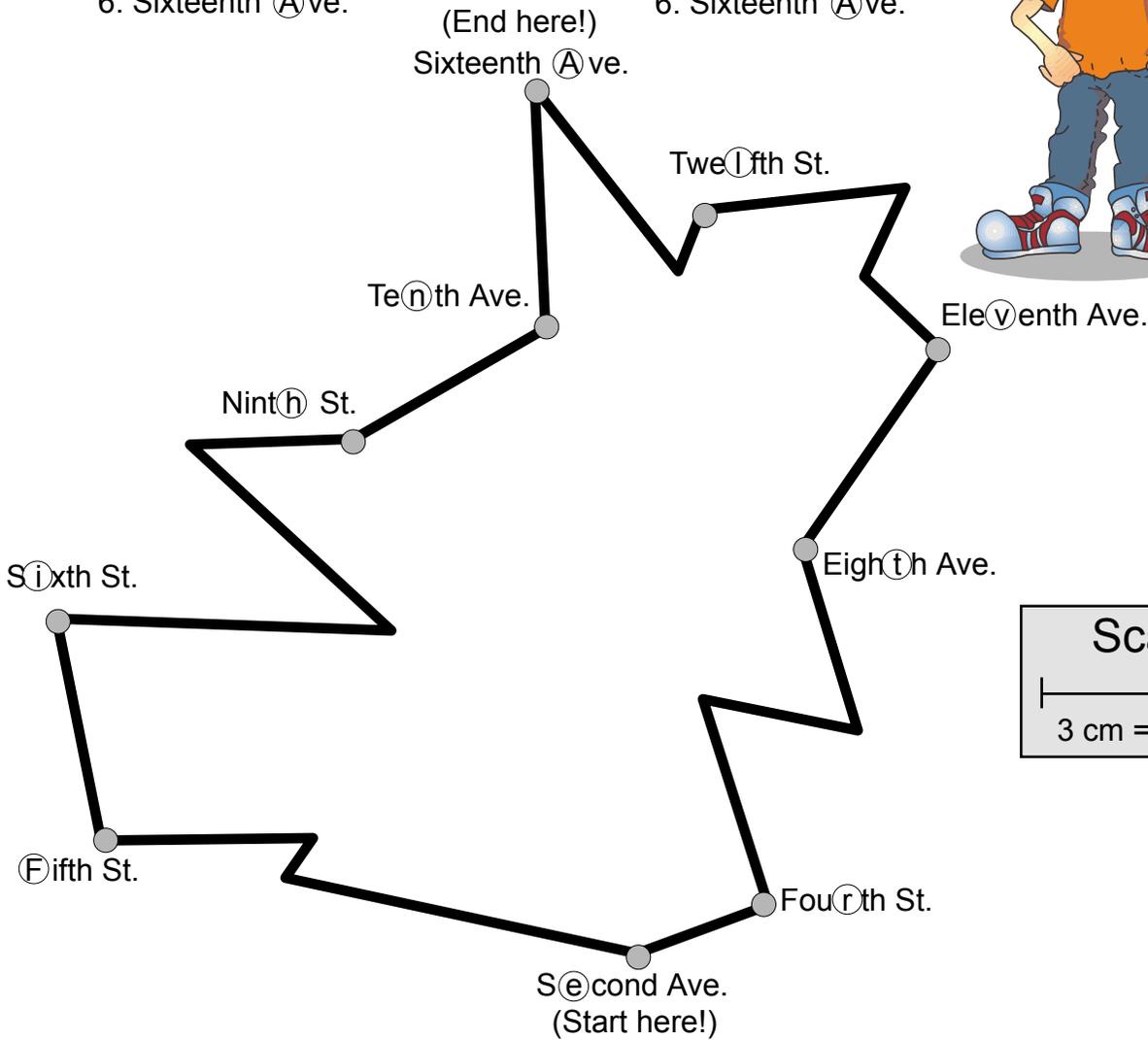
Consider the two routes below. Use the scale to determine which trip is shorter. In the correct route, the circled letters spell something. Unscramble the letters to find out what Ms. Trombone likes to do.

Route #1:

1. S@cond Ave.
2. F(ifth) St.
3. S(i)xt St.
4. Nint(h) St.
5. Te(n)th Ave.
6. Sixteenth (A)ve.

Route #2:

1. S@cond Ave.
2. Fou(r)th St.
3. Eigh(t)h Ave.
4. Ele(v)enth Ave.
5. Twe(l)th St.
6. Sixteenth (A)ve.



What does Ms. Trombone like to do? _____

DISTANCE ACTIVITY

(After Playing Worksheet)

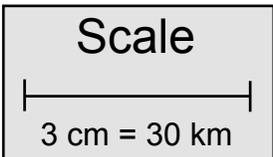
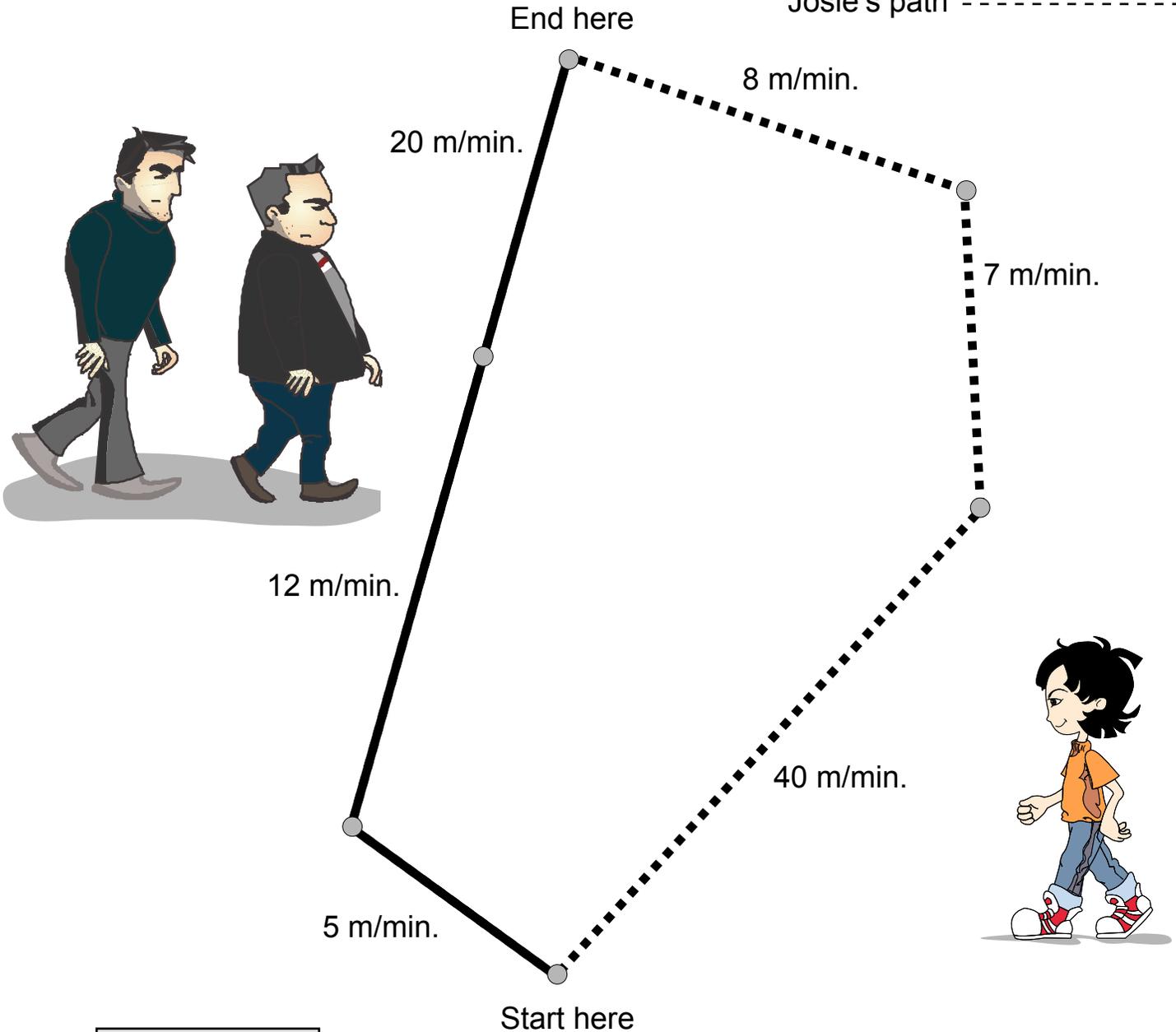
Name: _____

Date: _____

Determine who will reach their destination first: Josie or the thieves. Use the scale below and the formula: distance = rate \times time.

Thieves' path _____

Josie's path - - - - -



CIRCUITS ACTIVITY

SCIENCE: Electricity
TECHNOLOGY: Invention
ART: Technical drawing

AIM: Students learn how to complete a circuit.

BACKGROUND: Wires and cables carry electricity from a power source (such as a battery or power plant) to its destination (such as a flashlight bulb or a lamp in your house). When you flip a light switch, you are completing one of these pathways, called a circuit. When you close the circuit, the bulb lights.

BEFORE PLAYING

Discussion and Activity: Remind students that electricity can be dangerous. Discuss electrical safety as it relates to power sources—batteries, electrical outlets, power lines, and so on. Break students into groups. Have them unscrew the top of a flashlight and look at the flashlight's parts. How do the parts fit together? How are the batteries positioned? Draw a picture of the flashlight's components and their placement.

AFTER PLAYING

Discussion: Ask your students how lemons could power iCat. Since lemon juice is a weak acid, lemons are able to act much like the solution in a wet cell battery. When a lemon's acid reacts with two metals—for instance, copper and steel—it can create a weak electric current.

ASSESSMENT: Observe students as they investigate circuits. Assess students' Before and After Playing Worksheets.

RESOURCES

[Spy Science](#), by Jim Wiese (John Wiley & Sons, 1996, \$12.95, ISBN 0-471-14620-X). Students use science to build fun spy gadgets. Several of the playful devices utilize electricity. To order, call 1-800-225-5945.

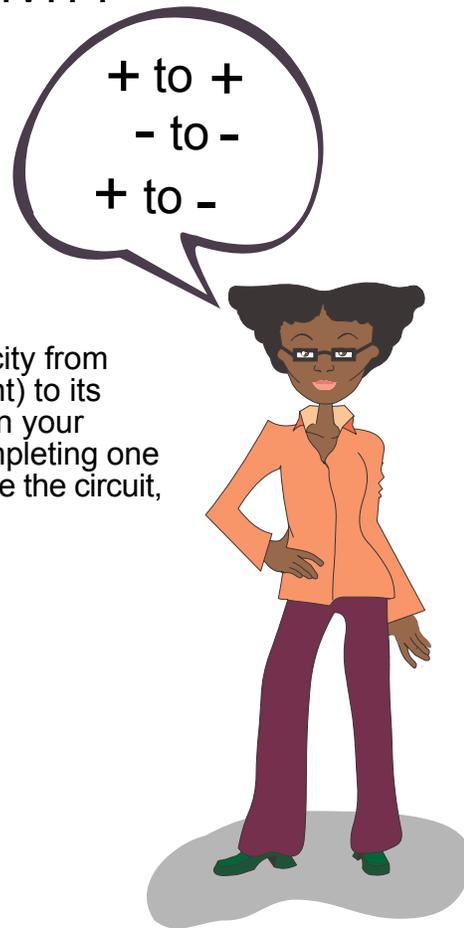
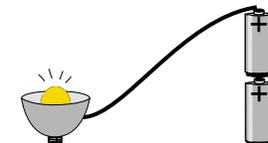
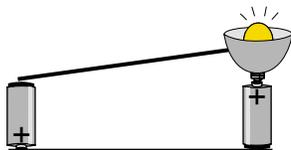
<http://www.brainpop.com/science/electricity/electricity/index.weml>

Through a movie, a cartoon, and an experiment, this great site teaches students the basics of static and current electricity.

ANSWERS

Before Playing, Worksheet: (a. Flashlight does not turn on. b. Flashlight turns on. c. Flashlight does not turn on.)

After Playing, Worksheet: (Answers may vary. Examples:



CIRCUITS ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Science:

- Systems, order, and organization
- Abilities necessary to do scientific inquiry
- Transfer of energy
- Understandings about science and technology
- Science and technology in society

CURRICULUM AREAS

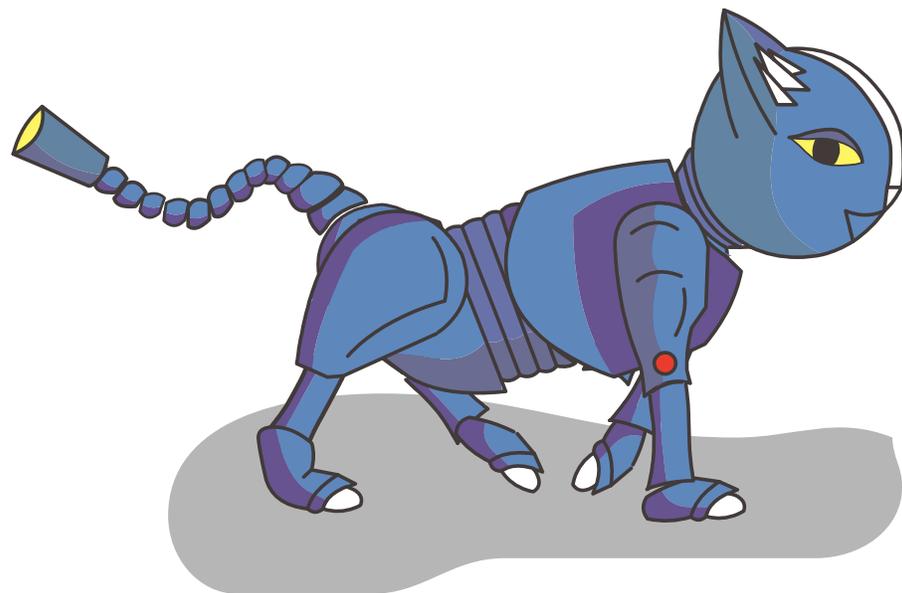
Science: electricity, circuits, voltage, amps, power sources.

Scientific Inquiry: testing variables; experimenting; observing; gathering data; drawing conclusions; interpreting results.

Language Arts: following directions.

Technology: computer science; invention.

Art: technical drawing.



TA-8.2

CIRCUITS ACTIVITY

(Before Playing Worksheet)

Name: _____

Date: _____

Gather the following materials, then experiment to answer the questions below.

Materials:

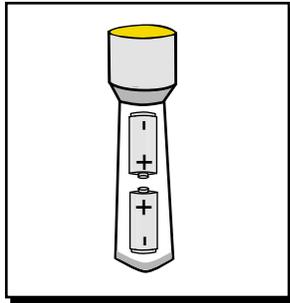
Flashlight that uses two "C" or "D" batteries

Two "C" or "D" batteries

Procedure:

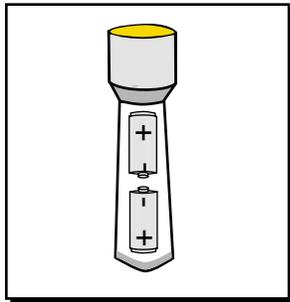
1. Look at the pictures below.
2. Load the batteries into your flashlight according to each picture.
3. Try to turn on the flashlight.
4. Record your results.

a.)



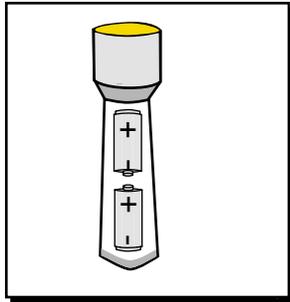
Results:

b.)

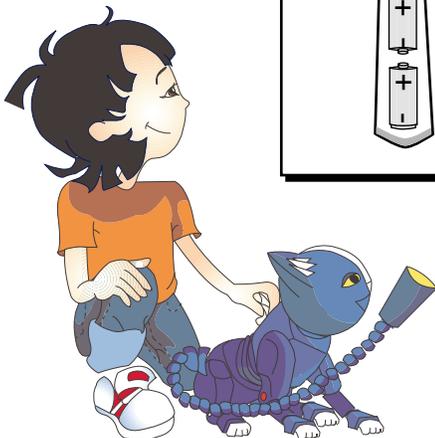


Results:

c.)



Results:



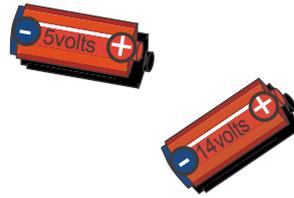
CIRCUITS ACTIVITY

(After Playing Worksheet)

Name: _____

Date: _____

Materials:
Aluminum foil
Ruler
Scissors
Two "C" or "D" batteries
Top of a flashlight (bulb and rim unscrewed from the bottom of the flashlight)
Tape



Think: Think back to the activity you performed before playing the circuits game. How are the parts of a flashlight positioned?

Predict: How can you turn foil, batteries, and a bulb into a circuit?

Procedure:

1. Cut a 20-cm (8-in.) by 20-cm (8-in.) piece of aluminum foil. Fold the foil in half three times so it forms a long, thin strip.
2. Repeat Step 1 with a second piece of foil. These two foil strips will act as your wires.
3. Arrange the materials to form a circuit that lights the bulb. Use the tape to hold the materials together.

Conclusions:

In the space below, draw a diagram of the circuit that lit the bulb.



TANGRAMS ACTIVITY

MATHEMATICS: Geometry
SOCIAL STUDIES: World cultures
ART: Two-dimensional constructions

AIM: Students analyze shapes in order to complete geometric puzzles.

BACKGROUND: The tangram is an ancient Chinese puzzle made from a large square cut into seven pieces. The seven pieces, or shapes, include a small square, two small congruent triangles, two large congruent triangles, a medium-size triangle, and a parallelogram. Each individual piece is called a tan. The tans can be arranged to make pictures.

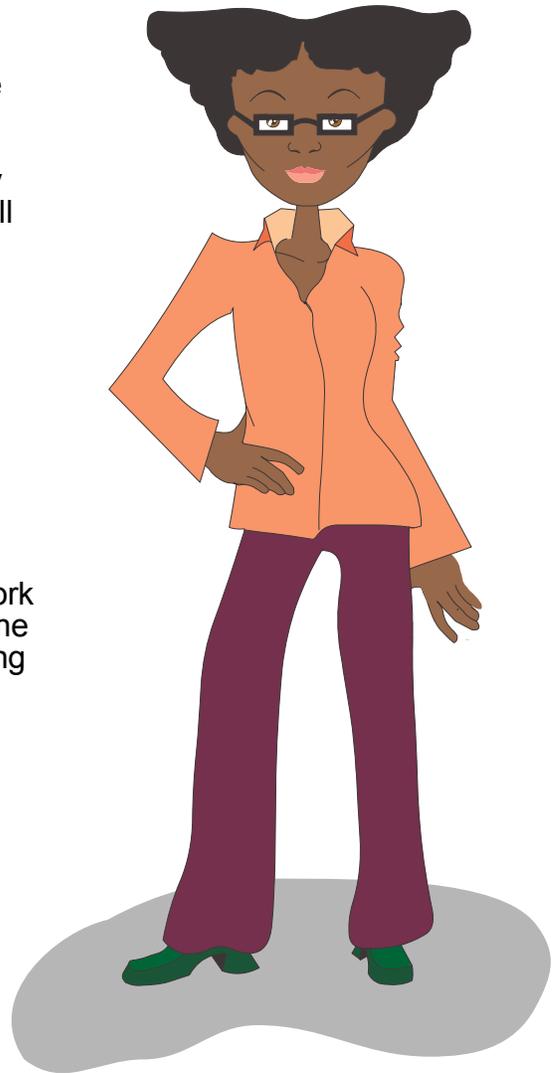
BEFORE PLAYING

Activity and Discussion: Break students into groups of four. Give each group a simple interlocking puzzle and tell them that they have three minutes to put together as much of the puzzle as they can. When three minutes are up, ask each group to explain any tricks they used to put the puzzle together. (Answers will vary. Examples: find the four corners first, separate the edge pieces from the middle pieces, separate puzzle pieces by colors, and so on.)

AFTER PLAYING

Writing Prompt: Ask students to explain, in writing, how they went about solving the tangrams. Did the same tactics work for each puzzle? Explain.

ASSESSMENT: Observe students as they work on the tangrams. Ask them to explain what the goal of each puzzle is and how they are working to reach that goal.



TANGRAMS ACTIVITY

RESOURCES

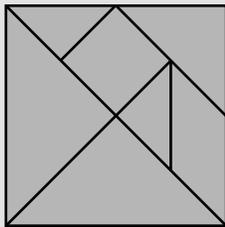
[The Warlord's Puzzle](#), by Virginia Walton Pilegard (Pelican Publishing, 2000, \$14.95, ISBN 1-56554-495-1). This beautifully illustrated book tells a dramatic tale of an artist that gives an ancient warlord an exquisite square tile. The warlord loves the tile, but the artist accidentally breaks it into seven pieces. The warlord warns of punishment for the artist if the tile can not be fixed, and he offers a reward to the first person that can put the tile back together. To order, call 1-800-843-1724.

<http://www.strongmuseum.org/kids/tangram.html>

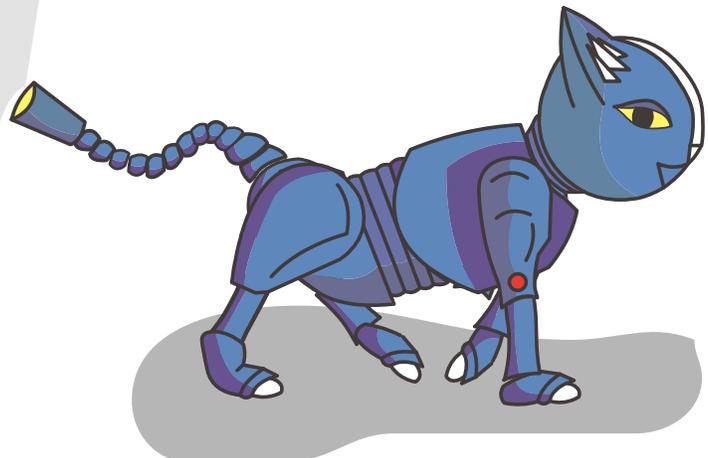
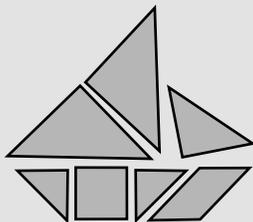
This site—designed for kids—will give your students a brief history of tangrams and provides several challenging puzzles.

ANSWERS

Before Playing, Worksheet:



After Playing, Worksheet: (Tangrams will vary.)



TANGRAMS ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

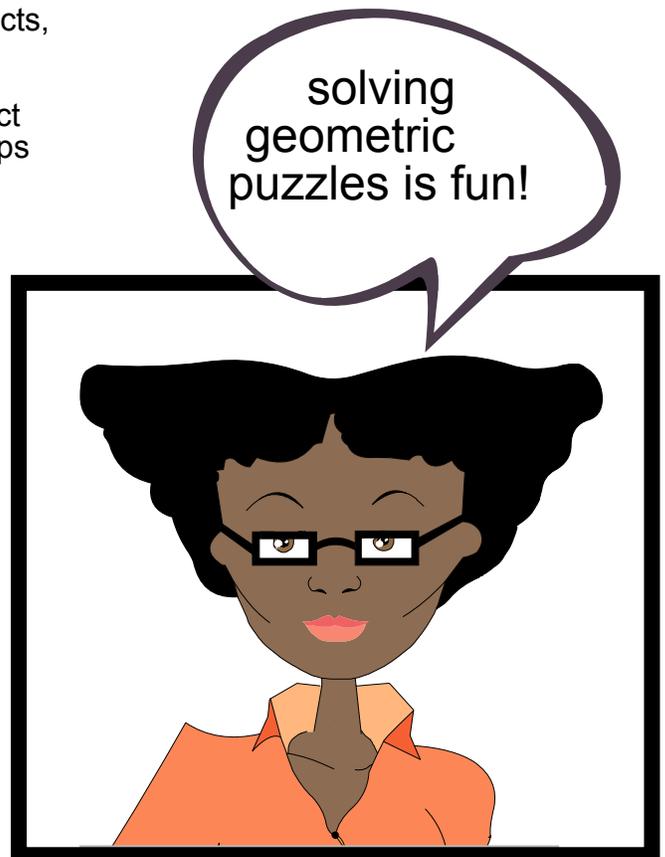
- Describe, extend, and make generalizations about geometric and numeric patterns
- Represent and analyze patterns and functions, using words, tables, and graphs
- Investigate how a change in one variable relates to a change in a second variable
- Build and draw geometric objects
- Create and describe mental images of objects, patterns, and paths
- Identify and draw a two-dimensional representation of a three-dimensional object
- Recognize geometric ideas and relationships and apply them to other disciplines and to problems that arise in the classroom or in everyday life

Science:

- Systems, order, and organization
- Evidence, models, and explanation
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

CURRICULUM AREAS

Math: geometry: logic.
Language Arts: descriptive writing.
Art: building geometric objects.
Technology: computer science.
Science: scientific inquiry.



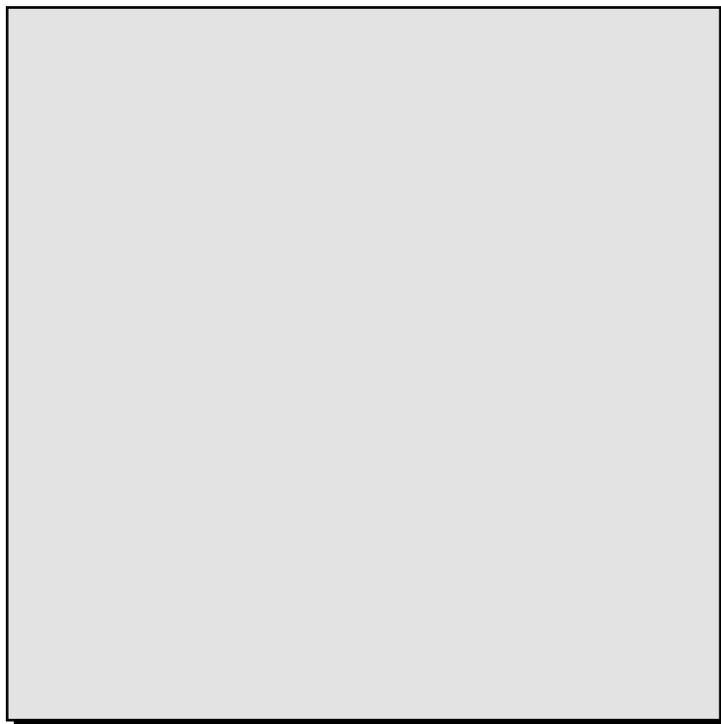
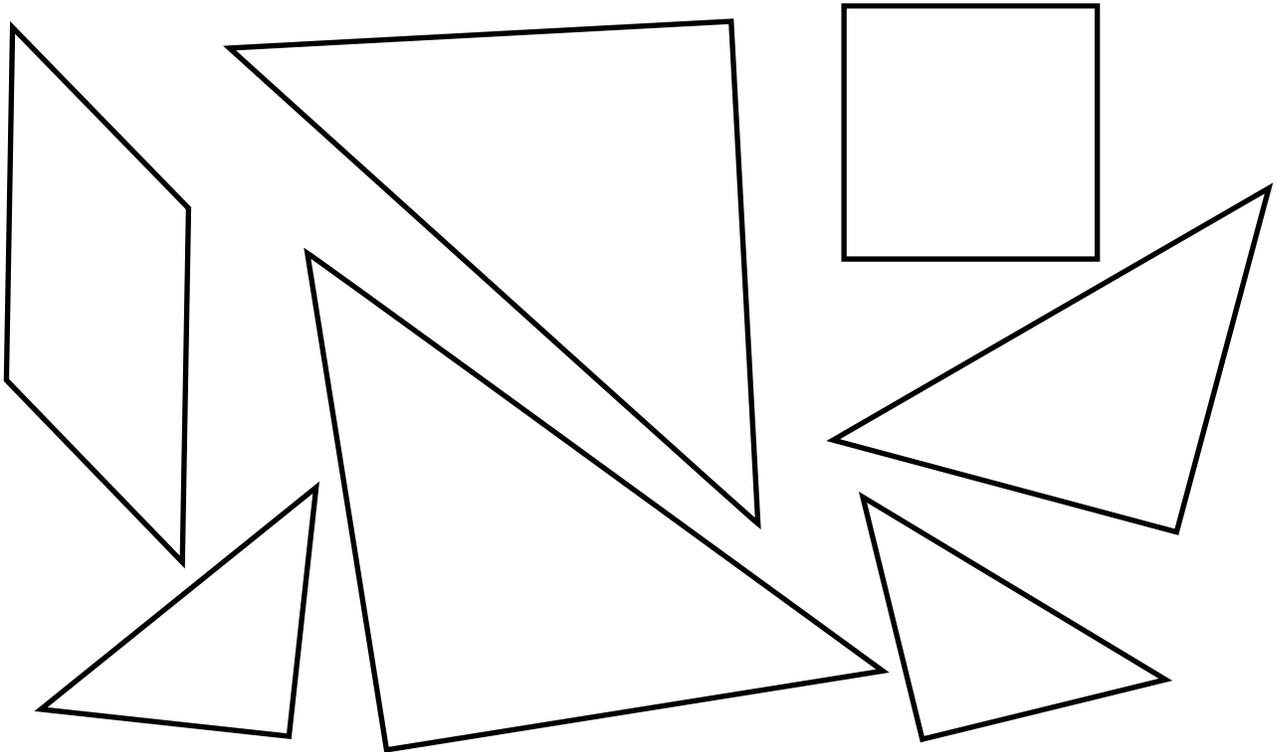
TANGRAMS ACTIVITY

(Before Playing Worksheet)

Name: _____

Date: _____

Cut out the seven shapes below and arrange them (so they don't overlap!) to fit in the shaded square.



SA-9.1

TANGRAMS ACTIVITY

(After Playing Worksheet)

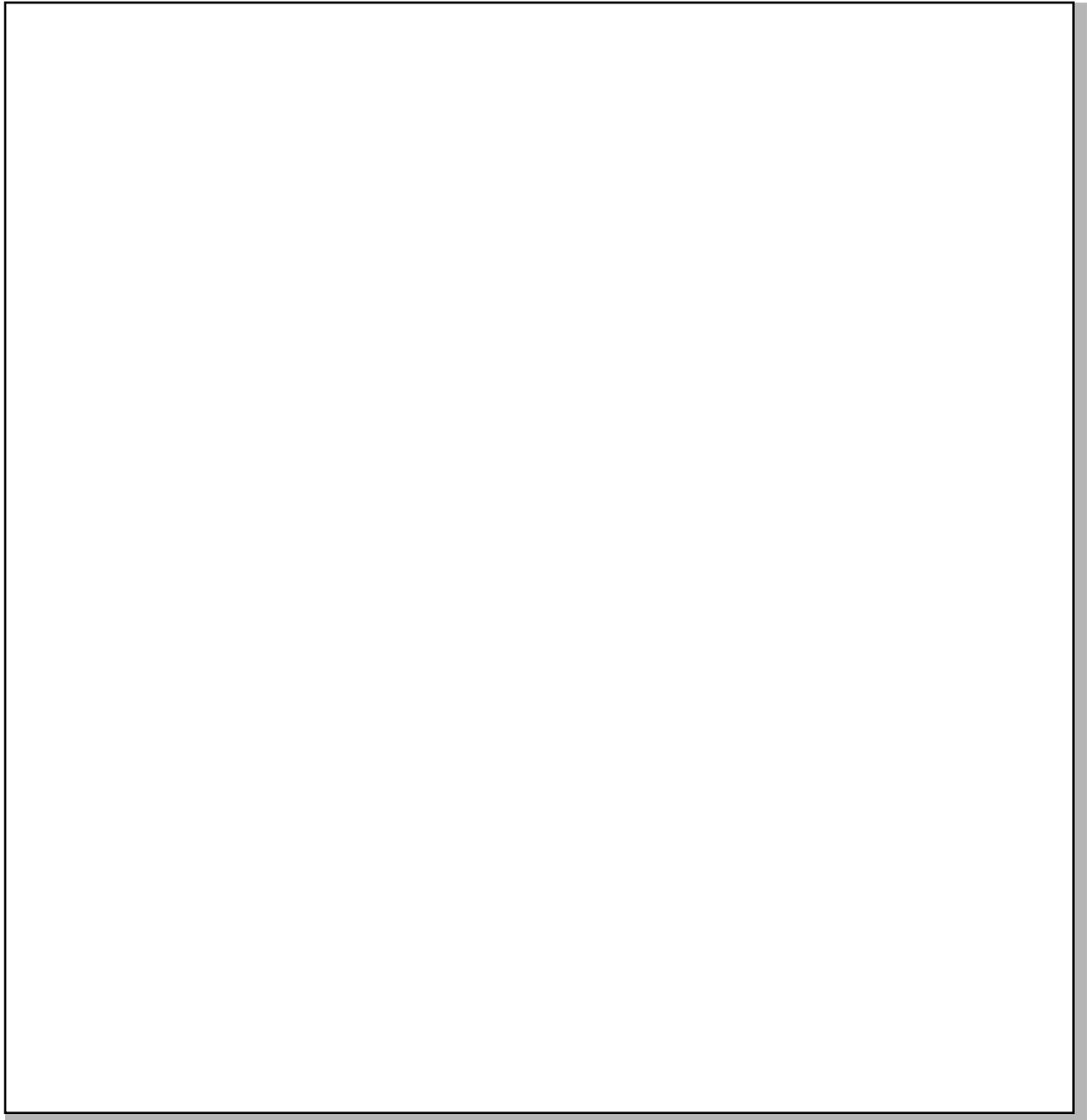
Name: _____

Date: _____

In the box below, create your own tangram design. Use the tangram pieces that you cut out of your Before Playing worksheet.

Then, trace the outline of your design, give your tangram a title, and trade your worksheet for another student's. Can you complete each other's tangrams?

(Title of your tangram)



MAGIC SQUARES ACTIVITY

MATHEMATICS: Addition and subtraction
LANGUAGE ARTS: Descriptive writing
SOCIAL STUDIES: World cultures

AIM: Students use addition, subtraction, logic, and process skills to complete math puzzles.

BACKGROUND: A magic square is a box of numbers arranged so that any line of numbers, including the diagonal, adds up to the same number. In the 3 by 3 magic square, the sum of each row, column, and diagonal is 15. The origin of the magic square is much debated. However, it is believed that the Chinese knowingly constructed the first 3 by 3 magic square around 400 B.C. The Chinese magic square is called Lo-shu.

BEFORE PLAYING

Activity: Play the game, "I'm thinking of a number," with a twist! Begin the round by saying, "I'm thinking of a number. The sum of this number and five equals 13." The first student with the correct answer (8) is the next to think of a number. Play several rounds.

Begin the next set by saying, "I'm thinking of a number that—when added to four and nine—equals 27." Again, the first student with the correct answer (14) thinks of the next number. Play several rounds. Allow students to use paper and pencils.

AFTER PLAYING

Writing Prompt: Ask students if they solved the magic squares game the first time around. How many tries did it take for them to get the correct answer? Have students explain, in writing, how they solved the puzzle.

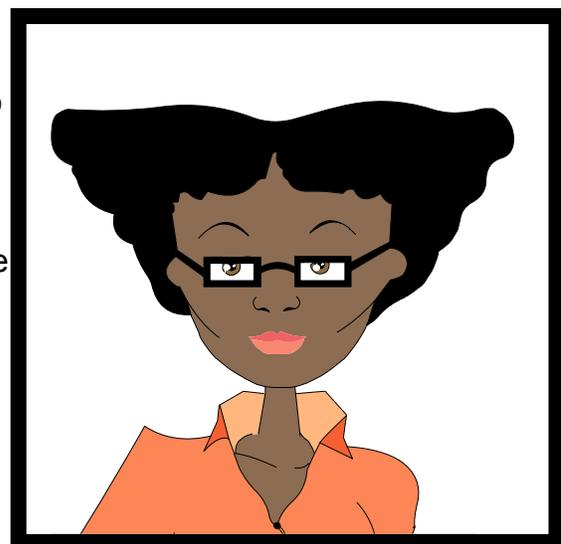
ASSESSMENT: Assess students' answers on the Before and After Playing Worksheets.

RESOURCES

Ben Franklin and the Magic Squares (Step into Reading, Step 3), by Frank Murphy (Random House, 2001, \$3.99, ISBN 0-375-80621-0). Although this book is intended for younger readers, it is a great way to introduce the magic square. It tells of Ben Franklin's many inventions including the story of how he created the magic square. To order, call 1-800-733-3000.

<http://www.edu4kids.com/msq>

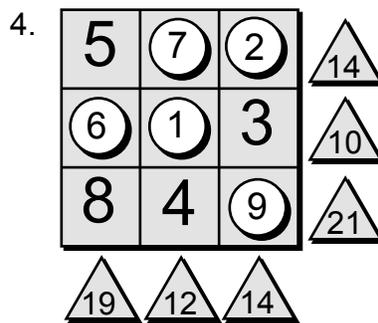
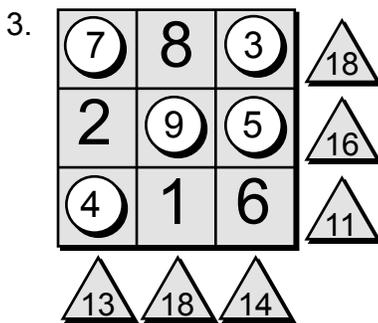
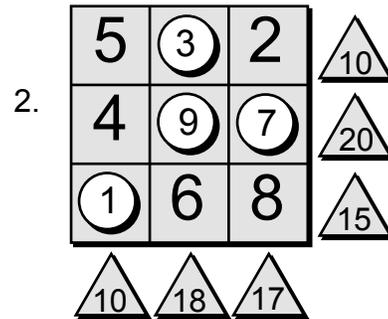
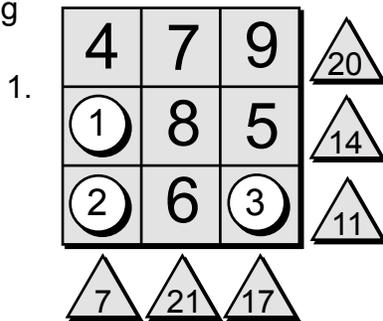
Visit this site to play magic squares games. With three different levels, the games are sure to challenge all of your students



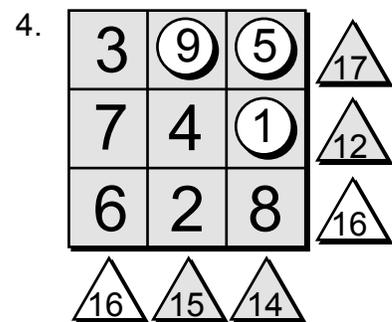
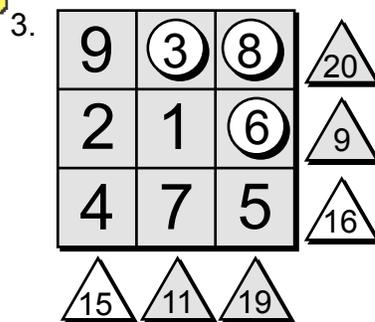
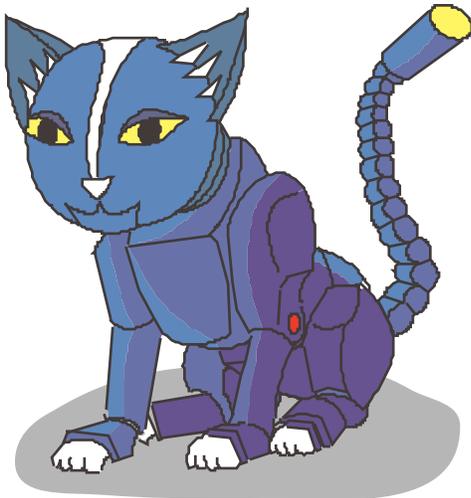
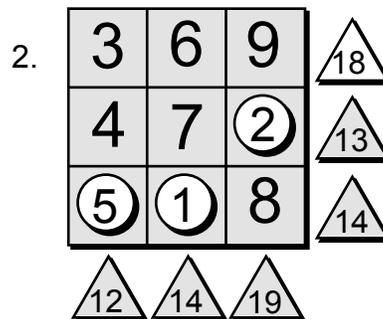
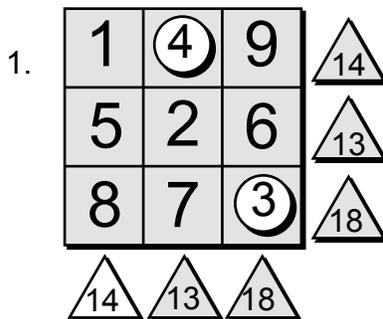
TA-10.1

MAGIC SQUARES ACTIVITY

ANSWERS
Before Playing
Worksheet:



After Playing,
Worksheet:



MAGIC SQUARES ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Mathematics:

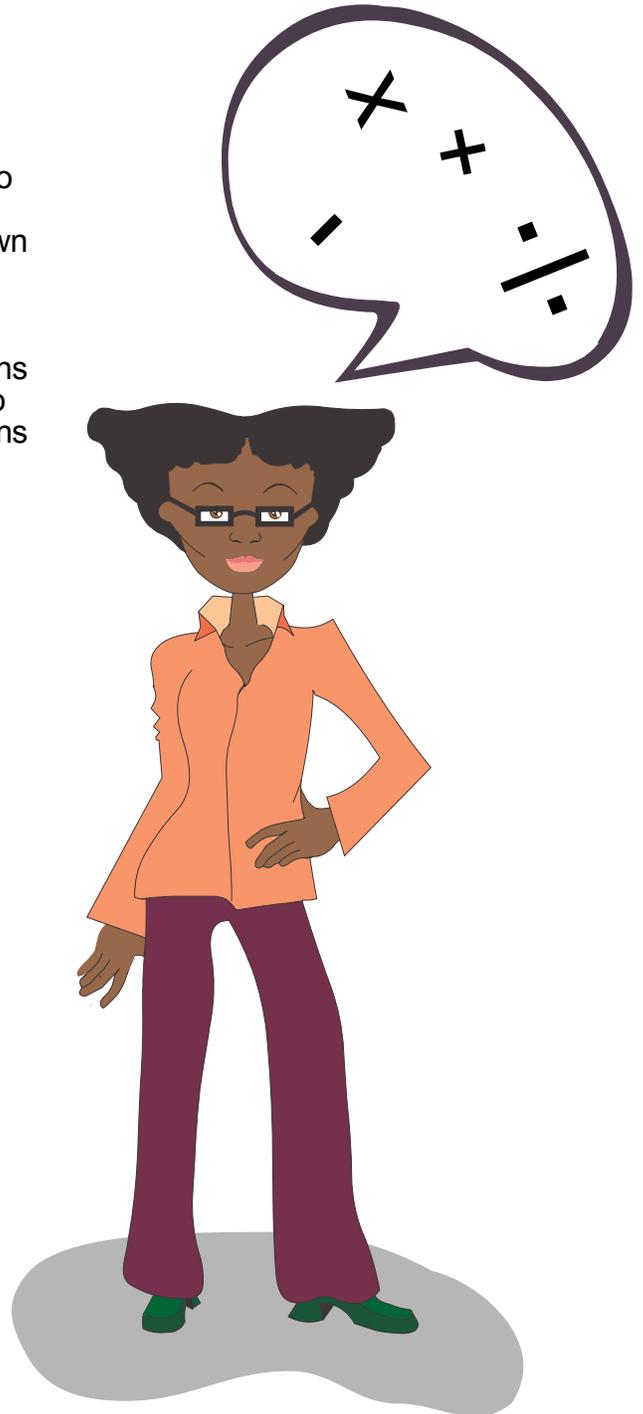
- Develop fluency in adding, subtracting, multiplying, and dividing whole numbers
- Develop and use strategies to estimate the results of whole-number computations and to judge the reasonableness of such results
- Represent the idea of a variable as an unknown quantity using a letter or symbol
- Express mathematical relationships using equations
- Propose and justify conclusions and predictions that are based on data and design studies to further investigate the conclusions or predictions

Science:

- Systems, order, and organization
- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry

CURRICULUM AREAS

Math: addition; subtraction; logic.
Social Studies: world cultures.
Language Arts: descriptive writing.
Technology: computer science.
Science: scientific inquiry.





MAGIC SQUARES ACTIVITY

(Before Playing)

Name: _____

Date: _____

Using numbers one through nine, fill in the blank  's so the numbers in the boxes add up to the numbers in the  's.

1.)

4	7	9	
	8	5	
	6		
			

2.)

5		2	
4			
	6	8	
			

3.)

	8		
2			
	1	6	
			

4.)

5			
		3	
8	4		
			



MAGIC SQUARES ACTIVITY

(After Playing Worksheet)

Name: _____

Date: _____

Fill in the blank  's and  's so the numbers in the boxes add up to the numbers in the  's.

1.)

1		9	 14
5	2	6	 13
8	7		 18
	 13	 18	

2.)

3	6	9	
4	7		 13
		8	 14
 12	 14	 19	

3.)

9			 20
2	1		 9
4	7	5	
	 11	 19	

4.)

3			 17
7	4		 12
6	2	8	
	 15	 14	

TEMPERATURE ACTIVITY

SCIENCE: Heat

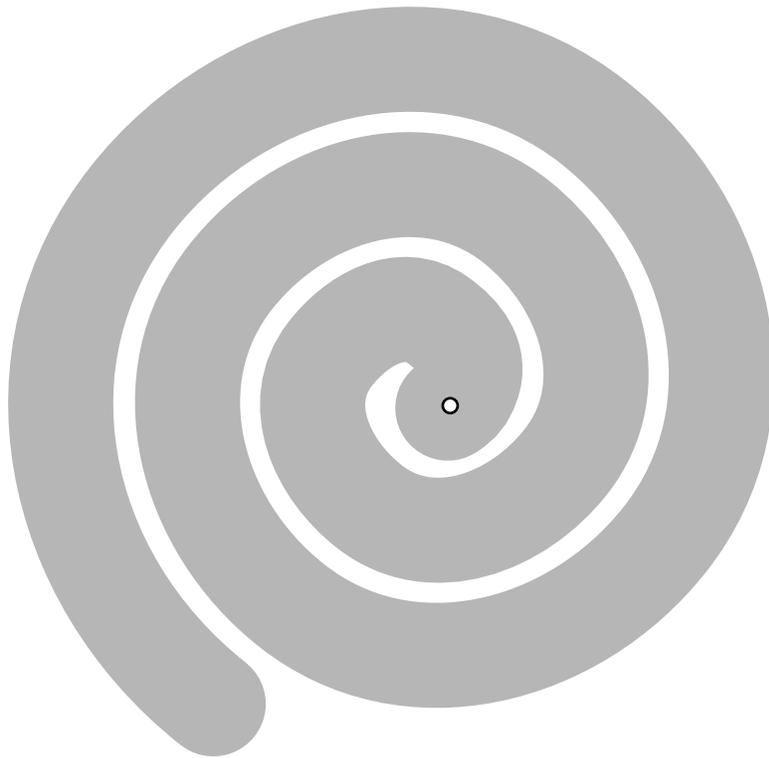
MATHEMATICS: Reading a thermometer

AIM: Students understand the relationship between heat and density.

BACKGROUND: How does a hot air balloon work? As the air inside the balloon becomes hotter than the air outside, it gets lighter. When the weight of the air inside the balloon, plus the weight of the balloon and its passengers, is less than the weight of the same volume of air outside, the balloon will begin to float in the air. The top or side of each hot air balloon has an opening, called a vent, which can be controlled by the pilot by pulling a rope called the vent line. When the pilot opens the vent, hot air from inside the balloon is let out. Heavier cool air coming in through the bottom opening, called the mouth, replaces the escaping hot air. With more heavy air inside the balloon, it goes down.

BEFORE PLAYING

Activity: Have students see that hot air rises. Cut out the pattern below. Hold the resulting spiral above a lamp that has an incandescent bulb. Watch for a while and have students discuss their observations. (As the bulb heats up, the air above the bulb will also heat up—generating an upward-moving air current. This current will cause the spiral to rotate.)

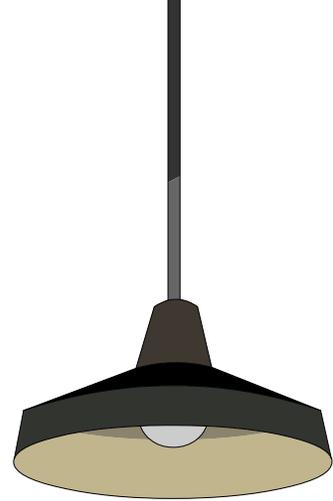


TEMPERATURE ACTIVITY

AFTER PLAYING

Research and Art Activity: As a class, create a timeline of the history of ballooning: Ask each student to draw a colorful picture of a hot air balloon. Post the hot air balloons around the room. Next to each drawing, post one fact of the history of ballooning. Have students go to the following Internet site as a guide:

<http://www.pbs.org/wgbh/nova/balloon/science/history.html>



ASSESSMENT:

Assess students' After Playing Worksheet.

RESOURCES

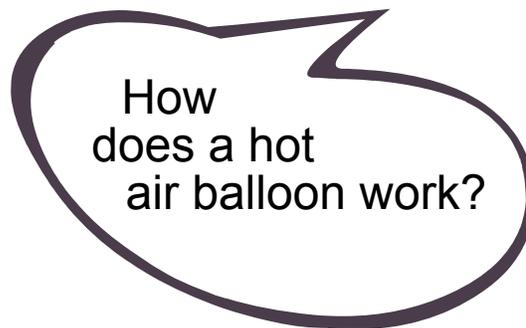
Rocket Science: 50 Flying, Floating, Flipping, Spinning Gadgets Kids Create Themselves, by Jim Wiese (John Wiley & Sons, 1995, \$12.95, ISBN 0-471-11357-3). Students learn the science behind fun diving, scooting objects. To order, call 1-800-225-5945.

<http://www.pbs.org/wgbh/nova/balloon/>
NOVA's site on balloon racing includes both the science and history of ballooning.

ANSWERS

Before Playing, Worksheet: (The balloon expanded. When the warm water heated the air inside the bottle, the molecules of air moved faster and expanded, thereby stretching the balloon.)

After Playing, Worksheet:
(Thermometer #1 matches balloon c, thermometer #2 matches balloon a, thermometer #3 matches balloon b, and thermometer #4 matches balloon d. Conclusion: MORE.)



TEMPERATURE ACTIVITY

CONNECT TO YOUR CURRICULUM

This activity can help you meet these National Standards:

Science:

- Change, constancy, and measurement
- Abilities necessary to do scientific inquiry
- Properties and changes of properties in matter
- Motions and forces
- Abilities of technological design

Mathematics:

- Investigate how a change in one variable relates to a change in a second variable
- Identify and build a three-dimensional object from two-dimensional representations of that object
- Understand such attributes as length, area, weight, volume, and size of angle and select the appropriate type of unit for measuring each attribute
- Understand the need for measuring with standard units and become familiar with standard units in the customary and metric systems
- Select and apply appropriate standard units and tools to measure length, area, volume, weight, time, temperature, and the size of angles

CURRICULUM AREAS

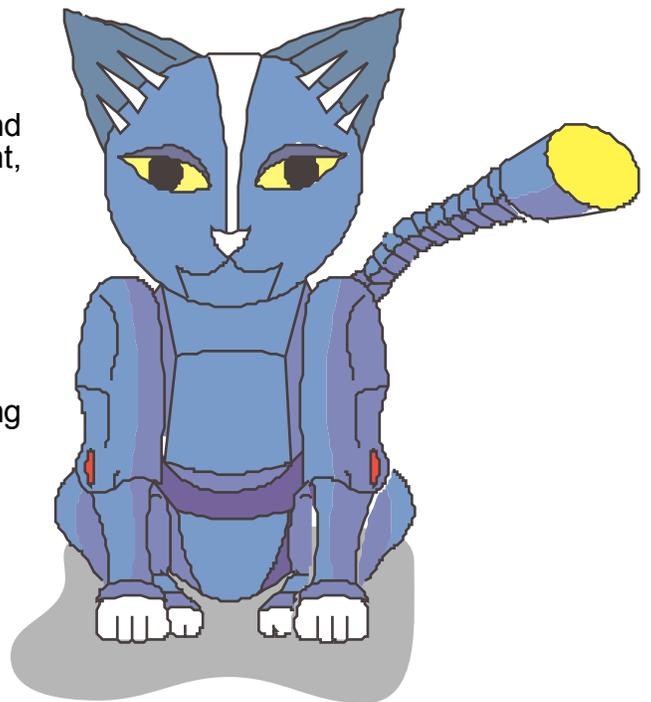
Science: heat, density, gases, temperature, weight.

Scientific Inquiry: testing variables; experimenting; observing; gathering data; drawing conclusions; interpreting results.

Mathematics: reading a thermometer.

Language Arts: following directions.

Technology: computer science.



TEMPERATURE ACTIVITY (Before Playing Worksheet)

Name: _____

Date: _____

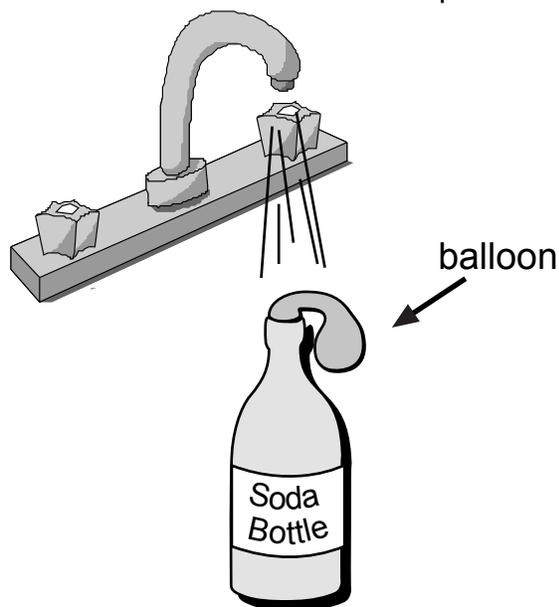
Perform the experiment below to discover how hot air can inflate a balloon.

Materials:

Empty 2-liter plastic soda bottle
Freezer or large bowl filled with ice cubes
Balloon
Warm tap water
Sink

Procedure:

1. Place the soda bottle in the freezer (or cover it with the ice in the bowl) for five minutes.
2. Remove the bottle and stretch the balloon over the top of the bottle.
3. Put the bottle in the sink and run warm tap water over it.



Conclusions:

What happened to the balloon when you ran warm tap water over the cold bottle? Explain why the balloon might have done this. (Hint: Think back to the activity in which you held the spiraled paper over a hot light bulb.)

TEMPERATURE ACTIVITY

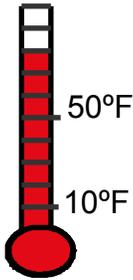
(After Playing Worksheet)

Name: _____

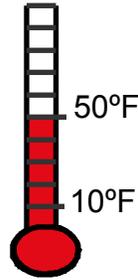
Date: _____

Read the thermometers below. Then draw lines matching each thermometer with the heaviest balloon that could fly in that temperature.

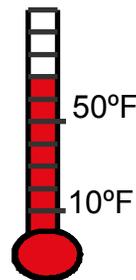
1.)



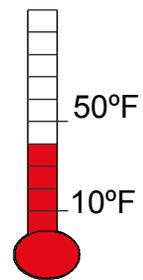
2.)



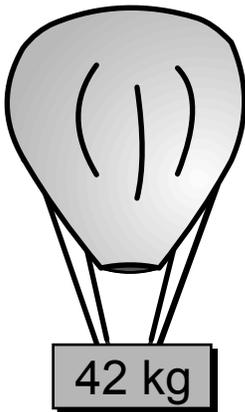
3.)



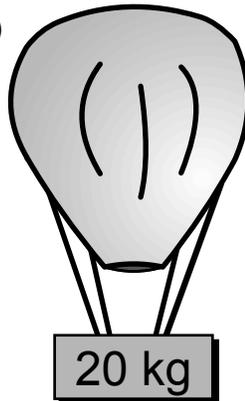
4.)



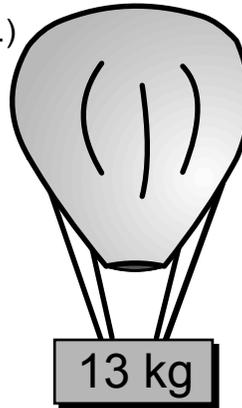
a.)



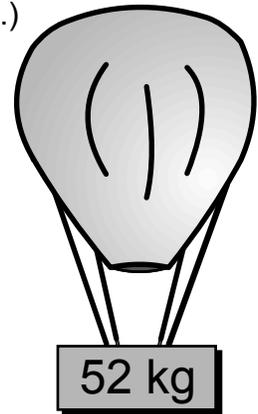
b.)



c.)



d.)



Conclusion:

Read the following sentence and circle the word that makes the statement true:

When it is cold outside, balloons can lift MORE / LESS (circle one) weight than when it is hot outside.

SITE SEEKING In Chicago

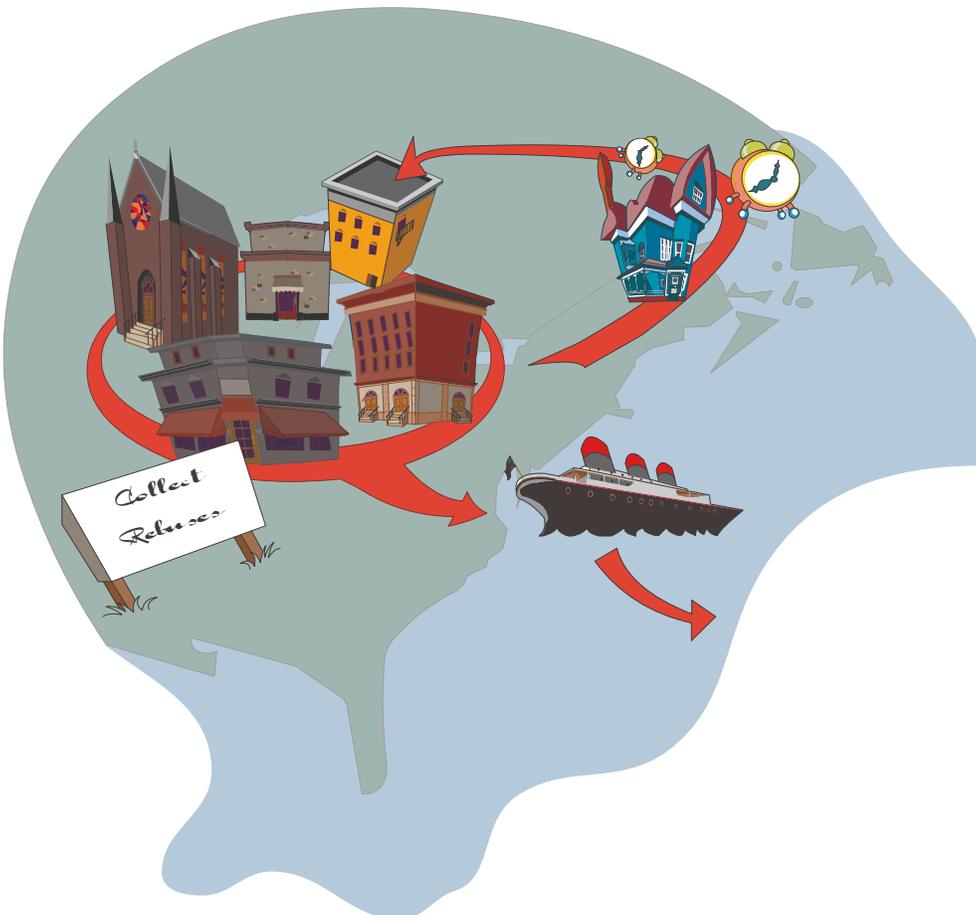
ANSWERS

Site Seeking in Chicago, Worksheet:

(1a. A tuning fork. 1b. You could adjust your voice until it matches the note made by the fork. 2a. Close together. 2b. If the wave's crests are close together, the sound has a high frequency—or is high-pitched. If the crests are far apart, it has a low frequency—or is low-pitched. 3a. The German Mark. 3b. Six British Pounds. 4a. Three times as much weight. 4b. Twice as much weight.

5a. The measure of the angles is equal. 5b. 47 degrees. 6a. .7. 6b. Answers will vary. For example, .3 or .4. 7a. 3/10. 7b. 1/6. 8a. 4 1/2. 8b. 1 1/2. 9a. The object slides to the right. 9b. Push the left arrow three times and push the down arrow two times.)

Chicago
has been a lot of
fun!!!



TS-1.1



SITE SEEKING In Chicago

Name: _____

Date: _____

Play the game to find the answer to part "A" of each question.
Then tap your brain to answer part "B"!

1A. What object did you need before you could tune the pipe organ for Mahalia Jackson? _____

1B. Suppose you were to hit the object from 1A on a table. The object would vibrate, creating a musical note. Explain how this could help you to begin a song on the correct note. _____

2A. An oscilloscope (ah-SILL-eh-scope) is an instrument that measures sound waves. When a pipe is high-pitched, are the wave's crests (tops) far apart or close together? _____

2B. Humans can only hear sounds that range from 20 to 20,000 Hz. If a sound has too low of a frequency or too high of a frequency, people aren't able to hear it (although some other animals can!). How could an oscilloscope help someone figure out if a sound is high- or low-pitched even if they couldn't hear it? _____

3A. What is the standard currency used in Germany? _____

3B. Suppose one U.S. dollar was worth 2 German Marks, and 2 German Marks were worth 6 British Pounds. How many British Pounds would one U.S. dollar be worth? _____



SITE SEEKING
In Chicago
Continued

Name: _____

Date: _____

4A. Suppose you were to use a three-wheeled pulley. How much more weight could you lift than if you didn't use a pulley at all? _____

4B. Consider a three-wheeled pulley and a six-wheeled pulley. How much more weight can the six-wheeled pulley lift compared to the three-wheeled pulley?

5A. How does the angle between a mirror and an incoming light beam compare - to the angle between the mirror and the outgoing beam? _____

5B. Suppose an incoming beam made a 47-degree angle with a mirror. What angle would the outgoing beam make with the mirror? _____

6A. Which is the highest decimal: .5, .2, .7? _____

6B. Write a decimal that is higher than .2, but lower than .5. _____

7A. Suppose you were to open a refrigerator containing three carrots, two onions, and five green peppers. What is the ratio of carrots to the total number of vegetables?

7B. Now suppose you were to add eight cucumbers. Now what is the ratio of carrots to the total number of vegetables? _____

8A. Two customers sit down to eat 9 cups of chili. How many cups should each person get if you are to give them equal amounts of chili? _____

SITE SEEKING
In Chicago
Continued

Name: _____

Date: _____

8B. Before you get to serve the chili to the two customers above, four more people join the table. Now how many cups of chili should each customer get? Be sure to divide the chili equally! _____

9A. What happens to the game pieces on your screen when you push the right arrow key? Use the proper term: slide, flip, or turn. _____

9B. Suppose you wanted to move a game piece three units to the left and then two units down. Which keys would you press and how many times would you press each of them? _____



SITE SEEKING In Paris

ANSWERS

Site Seeking in Paris, Worksheet: (1a. 15. 1b. 8 and 9. 2a. 7. 2b. 4a. Distance. 4b. 200 km. 5a. 20 kg. 5b. 20 kg. 3a. Connected the battery's minus sign to the lamp's plus sign. 3b. Arrange the batteries so the plus (or positive end) of one battery touches the minus (or negative end) of the other battery.)



SITE SEEKING In Paris

Name: _____

Date: _____

Play the game to find the answer to part “A” of each question.
Then tap your brain to answer part “B”!

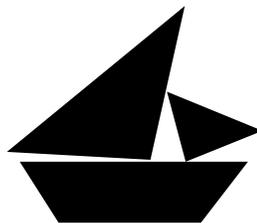
1A. Solve the following:

$$3 + 5 + 7 =$$

1B. Using numbers one through nine, fill in the 's to make the following equation true:  + 4 +  = 21

2A. How many puzzle pieces, or tans, are in a tangram?

2B. Arrange your tans to create the following tangram:



3A. To complete the circuit in the game, did you connect the battery's minus sign to the lamp's plus sign or to the lamp's minus sign? _____

3B. Suppose you were given a flashlight that takes three “C” batteries. Explain how you would arrange the batteries in order to light the bulb. In your explanation, include the words “plus” and “minus.” _____

4A. Complete the following formula: Rate x Time = _____.

4B. Suppose someone travels at 100 km/hr for 2 hours. How far will they travel?

SITE SEEKING
In Paris
Continued

Name: _____

Date: _____

5A. When the outside temperature is 26.7 C, how much weight can a hot air balloon lift? _____

5B. If crickets were chirping at a rate of 40 chirps every 15 seconds, how much weight could the balloon lift? _____

