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McRuffy 1st Science Sample
Includes:

Scope & Sequence
Alignment to national standards
Sample lessons with worksheets
Additional worksheet samples
Resource Packet samples

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McRuffy 1st Science Curriculum ISBN 1-59269-093-9
includes teacher's manual, workbook, and resource packet

Items are also available separately:

McRuffy 1st Science Teacher's Manual 1-59269-094-7

McRuffy 1st Science Workbook 1-59269-097-1

McRuffy 1st Science Resource Packet 1-59269-095-8

A Science Lab Kit is also available MK0940

(66 lessons taught two per week)

Scope and Sequence

Unit 1: Comparing Area (I)	Lessons 1 - 2
Unit 2: The Five Senses (L)	Lessons 3 - 6
Unit 3: Weather (E)	Lessons 7 - 9
Unit 4: Movement & Position (P)	Lessons 10 - 12
Unit 5: Investigating (I)	Lessons 13
Unit 6: Special Abilities (L)	Lessons 14 - 16
Unit 7: Earth Materials (E)	Lessons 17 - 19
Unit 8: Magnets (P)	Lessons 20 - 25
Unit 9: Sizes and Shapes (I)	Lessons 26 - 28
Unit 10: Animal Appetites (L)	Lessons 29 - 30
Unit 11: Sun and Shadows (E)	Lessons 31 - 34
Unit 12: Solid, Liquid, Gas (P)	Lessons 35 - 37
Unit 13: Mirror Cards (I)	Lessons 38 - 40
Unit 14: Plants and Animals (L)	Lessons 41 - 43
Unit 15: Water (E)	Lessons 44 - 46
Unit 16: Exploring Mixtures (P)	Lessons 47 - 49
Unit 17: Investigating, Measuring, Graphing (I)	Lessons 50 - 52
Unit 18: Part (L & P)	Lessons 53 - 57
Unit 19: Critter Cards (L)	Lessons 58 - 60
Unit 20: Absorption (E)	Lessons 61 - 62
Unit 21: Electricity (P)	Lesson 63 - 65
Unit 22: Sound (P)	Lesson 66

The major emphasis of each unit is designated by a single letter in parenthesis:

I = Scientific Inquiry

L = Life Sciences

E = Earth and Space Sciences

P = Physical Sciences

Items in the Science Kit	Lessons
magnet wand	13, 20, 21, 22
magnets (other shapes)	23, 24, 25
ring magnets	23, 24, 25
pattern block pieces (20)	1, 2, 10, 39
magnifier	17, 57
safety mirror	29, 35, 38, 39, 40
ping pong ball	3, 11, 15, 34
magnetic marble	13, 22
glass marble	13
mini light bulb	61, 62
bulb holder	64, 65
wires	64, 65
wooden Magnetic ring holder	23, 24, 25

Other common items are also used in the lessons that are not included in the kit.

Alignment to National Science Education Standards Grade K to 4

Standard A Science As Inquiry

Developing abilities for scientific inquiry

Units 1, 2, 5, 7, 8, 9, 12, 13, 14, 15, 16, 17, 19

Developing an understanding of scientific inquiry

Units 1, 5, 7, 8, 12, 15, 16, 17

Standard B Physical Science

Understanding of properties of objects and materials

Units 2, 5, 8, 9, 12, 13, 16, 17, 21, 22

Understanding the position and motion of objects

Unit 4

Understanding light, heat, electricity, and magnetism

Units 8, 12, 21

Standard C Life Science

Understanding the characteristics of organisms

Units 2, 6, 10, 14, 18, , 19, 22

Understanding organisms and environments

Units 6, 10, 14, 15, 18

Standard D Earth and Space Science

Understanding properties of earth materials

Units 2, 7, 12, 20

Understanding objects in the sky

Units 3, 11

Understanding changes in earth and sky

Units 3, 11, 15, 20

Standard E Science and Technology

Developing the ability for technological design

Units 1, 4, 8, 9, 13, 16, 17, 18

Understanding science and technology

Unit 4, 8, 17, 18

Developing abilities to distinguish between natural objects and objects made by humans

Unit 11

Standard F Science in Personal and Social Perspectives

Understanding about personal health

Units 2, 20, 21

Understanding types of resources

Units 6, 7, 11, 12, 15

Science and technology in local challenges

Unit 15

Standard G Sciences as a Human Endeavor

Units 3, 19

Standard U Unifying Concepts and Processes

Understanding systems, order, organization

Units 1, 4, 5, 8, 13, 18, 22

Using evidence, models, explanations

Units 4, 8, 11

Understanding change, constancy, and measurement

Units 1, 11, 15, 17

Understanding form and function

Units 1, 4, 9, 17, 18

More detailed information about National Science Standards (*Content Standards*) can be found on the web at:

<http://www.nap.edu/readingroom/books/nse/html>

Lesson 19

Objective

Students will learn how earthworms interact with the earth. (L)

Materials

- * Workbook page lesson 19
- * Digging Worms Game
- * Dice
- * Ruler
- * Workbook page for lesson 19
- * Optional: earthworms, container for earthworms

Preparation

Assemble the game by cutting apart the leaf cards, sun cards, and cast cards. You may use any game pieces or cut out, fold, and tape the worm pieces into little tent shapes. Two to six players can play on a single game board. The teacher can be one of the players. The game can be played in this lesson or at any other time for review and fun.

You may have students go on an earthworm hunt before or after the lesson. Students can compare the different sizes, shapes, and colors of earthworms.

Teaching

Teach about earthworms. The game will reinforce the concepts taught in the lesson. If you have actual earthworms you may show them to students at any point in the lesson. You may have students study the environment of worms and decide what they need to live.

Today we're going to learn about some very important animals. These animals have no arms. They have no legs. They also have no bones, eyes, ears, or lungs. Can you guess what animal I'm talking about? Have students make guesses.

The animal I'm talking about is an earthworm. You may not realize it, but earthworms are amazing and important animals. Have you noticed in the autumn leaves fall from some trees and some parts of plants wither and fall to the ground. What do you think happens to all the dead parts of plants?

Earthworms and other tiny animals eat them. What do you think would happen if they didn't? (Have students consider what would happen if the dead leaves or plants never go away.)

Worms get rid of the old plant parts. After eating, the food passes through their bodies. When we eat food left over parts pass through our bodies. We use the restroom to get rid of those parts. What passes out of the worm's body is called its cast. The cast is left on the ground. It helps plants grow.

Where do worms live? (underground)

Worms live underground, so they don't need eyes. They do sometimes come above ground to get food. That sometimes causes problems for worms. There are lots of animals on top of the ground that like to worms. What animals do you think would eat worms? (frogs, salamanders, birds, shrews, moles)

Worms can't see animals that are hunting them, but they can feel vibrations. They can also tell if it is light or dark. If the worm senses a shadow, it knows to hide.

Worms have tiny hair-like bristles all over their bodies. These help them grip the side of the hole. They poke their heads up to grab food. If an animal grabs them, the bristles will grip the hole and hold on. But earthworms are an important part of a lot of animals' diets.

Worms help plants. Worms help animals. Worms even help fishermen. They also help make dirt better. First of all, their casts make soil richer. Richer means the dirt is better for growing things. Worms also dig tunnels. The tunnels help water and air flow into the ground. This also makes the soil richer.

As they dig, the soil gets mixed up. This helps mix in dead plant and animal material. There can be about 25 worms in a cubic foot of soil. Use the ruler to help students visualize a cubic foot of soil. An acre of land can have over one million worms in it. An acre of land is smaller than a football field. The one million worms can turn over 40 tons of soil in a year. That's the weight of about six African elephants. They eat about ten tons of waste a year. That's the weight of about one and a half African elephants.

Worms make soil richer and looser. This helps the roots of plants to grow. It helps rain drain into the ground to water the roots. People eat plants or animals that eat plants. All our food depends on rich soil. Worms are an important part of creating rich soil.

Conclusion

Complete the worksheet with the students. Read the questions and choices. Students will fill in shapes next to the best answers.

Look at the four pictures. Under each picture is a circle and a square. The pictures are a frog, leaf, stem, and a skink. If the picture is of something that helps earthworms, fill in the circle. If it's something that hurts earthworms, fill in the square.

Now fill in a circle, square, or triangle to answer the last two questions.

How many worms did we say in the lesson, might be in a cubic foot of soil? 100, 25, or 1 (25)

The amount of soil turned over by 1 million worms a year weighs the same as: 6 elephants, 20 mice, 12 cats. (6 elephants)

Introduce the game to students. The game is designed to remind students of ways worms help the soil and other animals.

Now, you get to be a worm, or at least play a game as a worm. In this game, each worm digs a tunnel, eats three leaves, places a cast for a plant, and dig around the roots of a plant. But, be careful. There are plenty of animals trying to eat a worm.

It's quicker to move along the top of the ground, but more dangerous. It's safer for the worms to dig deeper, but it takes more spaces to travel between leaves.

Digging Worms Game Rules:

To Begin: Give each player a cast piece. Place the leaves on the matching color leaf spaces. Decide who goes first by rolling the dice once. The highest number goes first. The player to the left goes next.

To Play: Roll to begin a turn. There are two choices of tunnels. Players can move in any direction along the paths. The worms can go deeper and have fewer animals to worry about or take the shorter way and risk attack. If you land on a space with another worm, the worm ahead of you is blocking the tunnel. Back up to the closest empty space. More than one worm can be on a leaf pile at a time.

Sun Spaces: If you land on a sun space, pick up a sun card from the sun pile if you do not already have one. If no sun cards are on the pile, you do not get a card. You can only have one sun card at a time. The sun card can protect you from a frog, bird, skink, or shrew because the worm can feel their shadows. Once you use the sun card, it must be returned to the sun pile.

If you land on a space with a frog, bird, skink, or shrew, the player on the right rolls a dice for the animal. The player on the animal space (the worm) then rolls the dice. The highest number wins. If the worm wins it gets to stay on the space. If the animal wins, the worm loses a leaf, or the worm can play the sun card if the player has one. The worm chooses which leaf to lose. Return the leaf to the matching leaf space. If the worm doesn't have a leaf, the worm returns to the Start space.

If players land on a mole, their turn is over. They must roll a 4, 5, or 6 on their next turn to move. The worm can't leave the mole space until a 4, 5, or 6 is rolled. If they roll a 1, 2, or 3 they lose their turn.

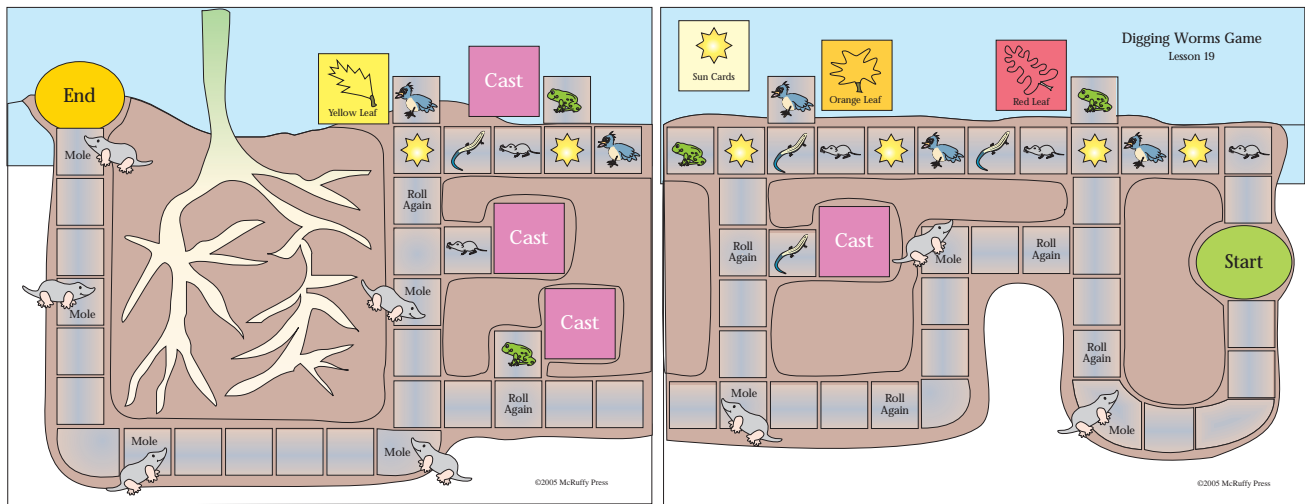
Move to the leaf spaces to collect a leaf. You do not have to reach the leaf spaces by an exact number.

After you have the three leaves (one of each color), move to a cast space and leave the cast card. You must reach the cast space by an exact number. Only one cast card can be left on a cast space (or two if 5 or 6 players are playing). You cannot leave the cast card until you have the three leaves. If you lose a leaf after placing the cast card, you do not need to take the cast card back.

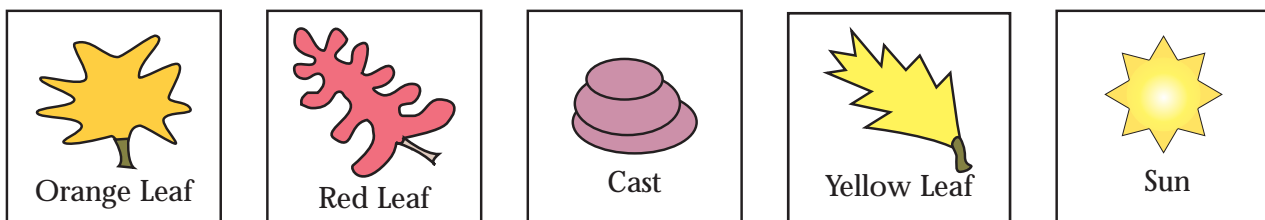
To Win: Be the first player to collect one of each color of leaf, place the cast card on an empty cast space, and dig a tunnel to the End space. You do not have to reach the end space by the exact number.

From the Resource Packet:

Digging Worms Game Board



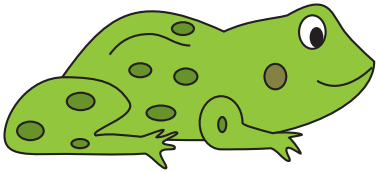
Shown smaller than actual size. A actual size is 8.5" x 22" with a spiral binding in the center that allows the board to fold to letter size for storing. Game Boards are laminated.



Game Cards (actual size)

Name _____

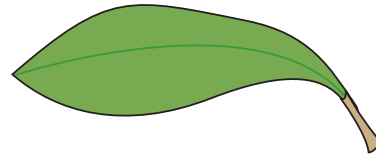
Fill in the circle if the object helps worms.
Fill in the square if the object hurts worms.



Frog

Helps

Hurts



Leaf

Helps

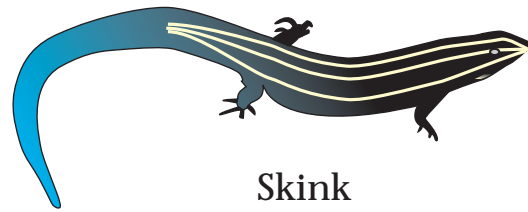
Hurts



Stem

Helps

Hurts



Skink

Helps

Hurts

The teacher will read the questions. Students will fill in the best answers.

How many worms might be in a cubic foot of soil?

100

25

1

The amount of soil turned over by 1 million worms a year weighs about the same as:

6 elephants

20 mice

12 cats

Lesson 56

Objective

Students will recognize the function of parts in structures. (I)

Materials

- * Retractable (click) pen
- * Important Parts cards
- * Worksheet for lesson 56
- * Crayons

Preparation

The pen should be able to be taken apart. The more parts on the pen, the better ñ such as a grip, pocket clip, etc.

Teaching

Let students take apart the pen. Ask students what each part of the pen does. **What parts are needed if you want to write? What parts are not needed to write? How do those parts help people to use the pen?**

If the pen has a pocket clip: **Does this help you write with the pen? What is it used for?**

If the pen has any decorative parts: **Does this part help you write? Why do you think it is a part of the pen?**

What do the other parts of the do? (The spring and top button make the ink stick to retract.)

In the last lesson we looked at things with different parts, just like the pen. The parts of some things are important for different reasons. Some things won't work at all without a certain part. Other things will work, but not as well without a part. Some parts are added just to make something look nicer or work better.

Use the four Important Parts cards. Each part has a different color to help discuss the objects. Ask students to identify the parts of each object and how that part helps people to use that object.

Vacuum cleaner: Yellow-cord, red-bag, green-wheel, blue-motor, gray-handle, purple-switch.

Truck: Black-tires, red-hubcaps, orange-box, yellow-cab, green-side window, blue-windshield.

Basketball goal: orange-rim, blue-backboard, green-post, purple-stand, net

Camera: Orange-strap, green-flash, blue-view finder, gray-lens, purple-button

Conclusion

Students will complete the workbook page. They will need crayons. Have students identify the parts of the go-cart. Make sure students identify each part correctly by having them fill in the circles with the color coding below. Check answers before continuing with the page.

Look at the go-cart on the top of the page. The go-cart has lots of parts that have different purposes. Some of the parts have arrows pointing to them. At the other end of the arrows are circles. Color the circles to the parts the arrows are pointing to using the colors I tell you.

Color the circle pointing to the tires black.

Color the circle pointing to the seat yellow.

Color the circle pointing to the engine green.

Color the circle pointing to pointing to the safety bars red.

Color the circle pointing to the bumper blue.

Color the circle pointing to the gas and brake pedals brown.

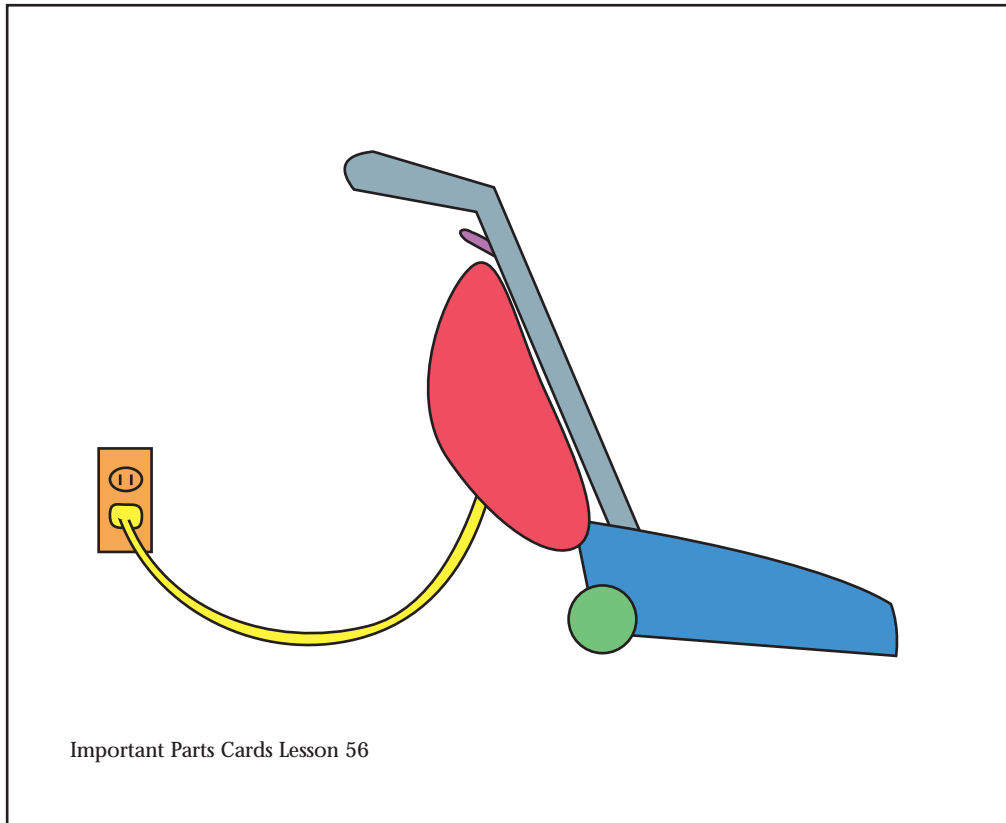
Color the circle pointing to the steering wheel purple.

The second part of the worksheet shows six go-carts. One part on each is gray. Students will answer the question yeas or no by filling in the square or triangle. **Could the go-cart go wherever the driver wanted it to go if the gray pieces were missing?** Answers: first row - no, no, yes. Second row ñ yes, yes, no

Discuss the answers and the reasons why the cart will or will not go. You may also discuss the purpose of the other parts.

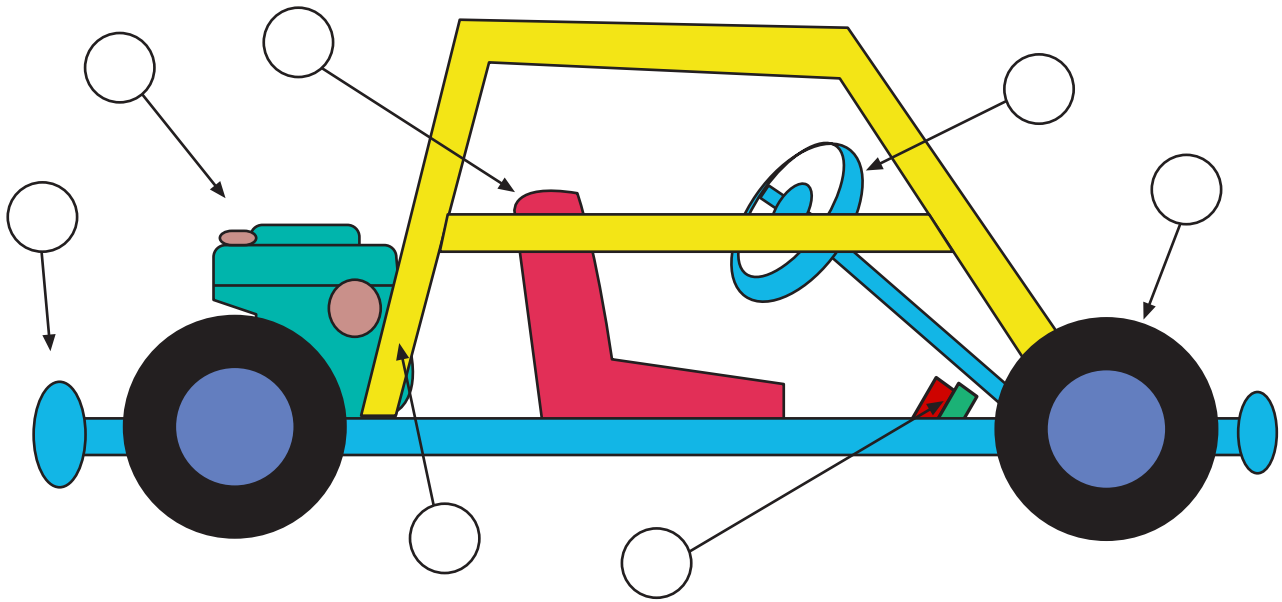
From the Resource Packet:

Sample Important Parts Card (actual size)

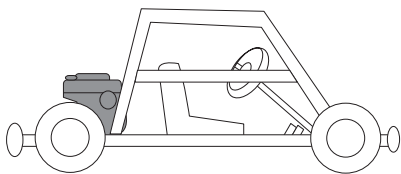


Name _____

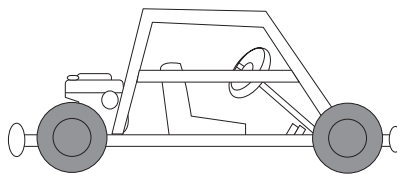
Find the parts of the go-cart.



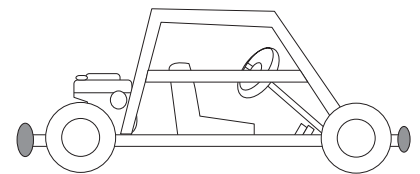
Could the go-cart go wherever the driver wanted it to go if the gray pieces were missing?



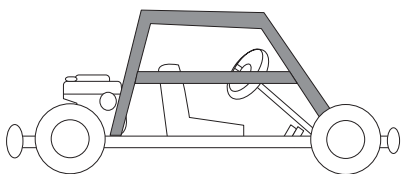
Yes No



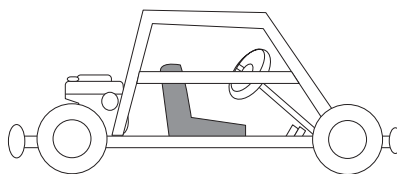
Yes No



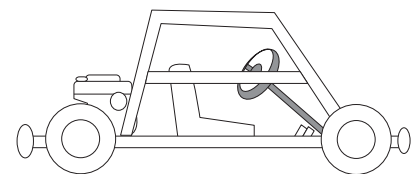
Yes No



Yes No



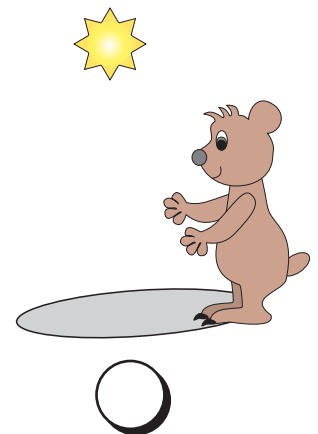
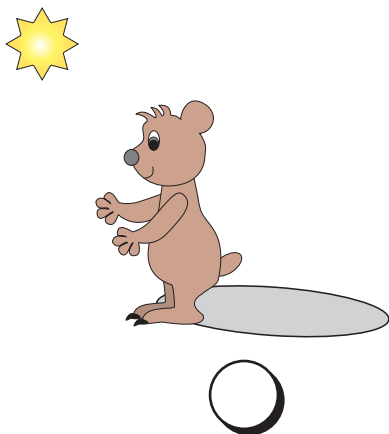
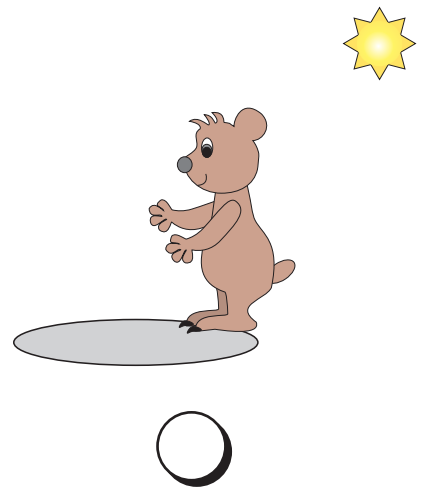
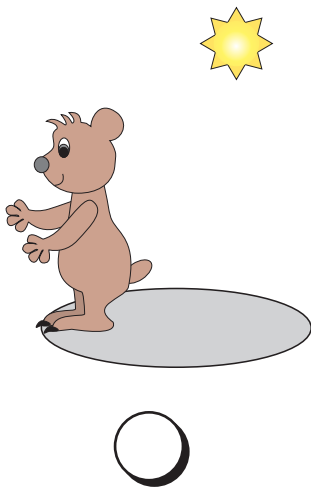
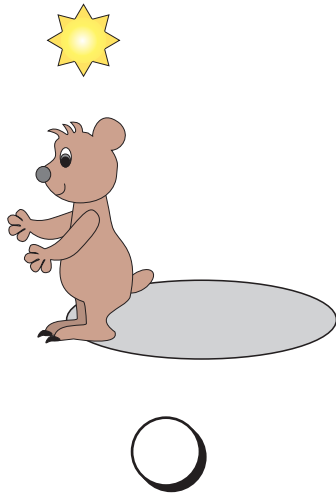
Yes No



Yes No

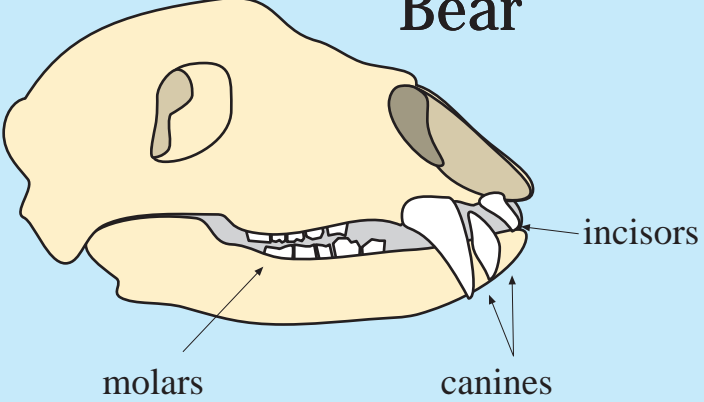
Name _____

Look at each row. Which picture shows the shadow in the correct place?
Fill in the circle under the correct answer.



Look at the drawings of animal skulls. Notice the different shapes of teeth. Teachers and parents can read the information to students.

Bear



Some animals like bears and people eat lots of different kinds of foods. They eat plants or animals (omnivores).

Their canines are smaller. Molars are flatter with some ridges.

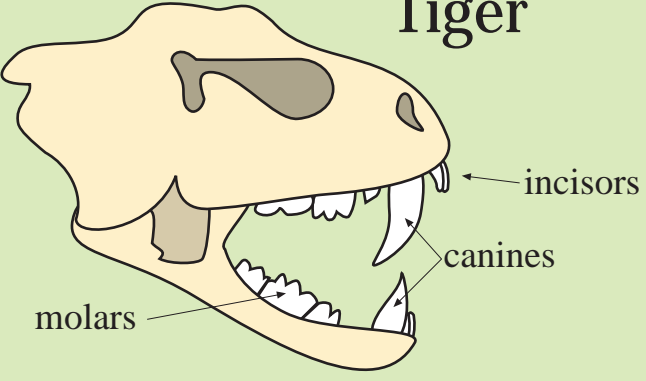
They have incisors for cutting plants or meat.

Shrew



Moles, shrews, and hedgehogs (insectivores) have sharp points on their teeth. These animals eat insects. The outside of insects is hard. The sharp points help animals rip insects apart.

Tiger



Meat eaters (carnivores) have long, sharp canines for fighting and killing.

Their incisors can bite their prey and hold it so it can't get away.

The molars are jagged. This helps cut up food.