



K Science

McRuffy Kindergarten Science Sample Includes

- Scope and Sequence
- Alignment to national standards
- Sample lessons with worksheets
- Additional worksheet samples
- Resource Pack samples

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McRuffy K Science Curriculum

(Includes teacher's manual, student workbook,
and resource pack)

9781592690886

Items are also available separately

McRuffy K Science Teacher's Manual
McRuffy K Science Workbook
McRuffy K Science Resource Pack

9781592690893

9781592690923

9781592690909

Sixty-six lessons taught two per week

Scope and Sequence

Unit 1: Organizing by Size (I)	Lessons 1 - 3
Unit 2: Five Senses (L)	Lessons 4 - 9
Unit 3: Weather (E)	Lessons 10 - 11
Unit 4: Magnets (P)	Lessons 12 - 14
Unit 5: Color (I)	Lessons 15 - 20
Unit 6: People and Animals (L)	Lessons 21 - 23
Unit 7: Natural or Manmade (E)	Lessons 24 - 25
Unit 8: Length (P & I)	Lessons 26 - 28
Unit 9: Clown Card Attributes (I)	Lessons 29 - 32
Unit 10: Special Abilities (L)	Lessons 33 - 35
Unit 11: Seasons (E)	Lessons 36 - 37
Unit 12: Exploring Sound (P)	Lessons 38 - 40
Unit 13: Exploring Water (I)	Lessons 41 - 44
Unit 14: Plants (L)	Lessons 45 - 46
Unit 15: Things in the sky (E)	Lessons 47 - 48
Unit 16: Volume (P)	Lessons 49 - 50
Unit 17: Mirror cards (I)	Lessons 51 - 53
Unit 18: Life Cycles (L)	Lessons 54 - 57
Unit 19: Simple Systems (P)	Lessons 58 - 62
Unit 20: I Wonder (I)	Lessons 63 - 64
Unit 21: Weight (P)	Lesson 65
Unit 22: Pushing and Pulling (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 K Science Kit

Lessons

paper fasteners	11, 15, 63
magnet wand	12, 13, 14, 58, 60, 62
magnets (other shapes)	12, 13, 14, 58, 60, 62
magnet strip	14
jingle bell	8
iron filings & petrie dish	13
pattern block pieces (20)	17, 51, 52
magnifier	18, 22, 46
color chips	6, 10, 12, 14, 16, 17
rubber bands	40, 65
safety mirror	51, 52, 53
ping pong ball	58, 59, 60, 64, 66
plastic ball	59, 60, 64, 66
magnetic marble	12, 13, 60
small screw	12, 60
mini light bulb	61, 62
bulb holder	61, 62
wire, red	61, 62
wire, black	61, 62
paper clips (plastic coated)	13, 14, 62

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, 4, 5, 6, 7, 8, 9, 13, 14, 16, 17, 19, 20, 21, 23

Developing an understanding of scientific inquiry

Units 1, 5, 8, 9, 13, 14, 17, 20

Standard B Physical Science

Understanding of properties of objects and materials

Units 1, 4, 5, 12, 13, 16, 17, 20, 21, 22

Understanding the position and motion of objects

Units 12, 13, 17, 20, 21, 23

Understanding light, heat, electricity, and magnetism

Units 4, 13, 20

Standard C Life Science

Understanding the characteristics of organisms

Units 2, 5, 6, 8, 10, 11, 12, 14, 18, 21

Understanding the life cycles of organisms

Units 3, 18

Understanding organisms and environments

Units 6, 10, 14, 18, 21

Standard D Earth and Space Science

Understanding properties of earth materials

Units 2, 7, 13

Understanding objects in the sky

Units 15, 19

Understanding changes in earth and sky

Units 3, 11, 13, 15, 19

Standard E Science and Technology

Developing the ability for technological design

Units 9, 20

Understanding science and technology

Unit 20

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

Units 7, 14, 15

Standard F Science in Personal and Social Perspectives

Understanding about personal health

Units 2, 11

Standard U Unifying Concepts and Processes

Understanding systems, order, organization

Units 4, 5, 9, 12, 17, 19, 20, 21, 23

Using evidence, models, explanations

Units 4, 13, 17, 20

Understanding change, constancy, and measurement

Units 1, 3, 5, 8, 13, 14, 19, 22

Understanding form and function

Units 2, 9, 13, 17, 20, 21

More detailed information about National Science Standards (*Content Standards*) can be found on the web at: <http://www.nap.edu/readingroom/books/nses/html>

Objective

Students will learn about magnetic force. (P)

Materials

- * Magnetic wand
- * Magnets of other shapes
- * Iron Filings
- * Petri dish or other container to display iron filings
- * Paper clips
- * Short piece of string or thread
- * Workbook page

Preparation

Tie thread or string to one paper clip.

Teaching

Say: **Do you believe my hand is a magnet? I can make a paper clip stick to my hand, just like it can stick to the magnet.** Pass the magnet wand so it will pick up a paper clip. **Now, my hand will pick up the paper clip in the same way.**

Use the paper clip with the thread. Pick up the end of the string with one hand. Slip the thread through outstretched fingers on the other hand. Pull the thread to make it look like the paper clip jumped to the hand.

Is my hand a magnet? (No) **Then how did the paper clip stick to my hand?** (You pulled the string or thread.) **How was the magnet able to pick up the paper clip without a string?**

Magnets have something invisible around them called a magnetic force. That force pulls iron objects to it just like the string. Although the magnetic force is invisible, we can use something to help us see where it is.

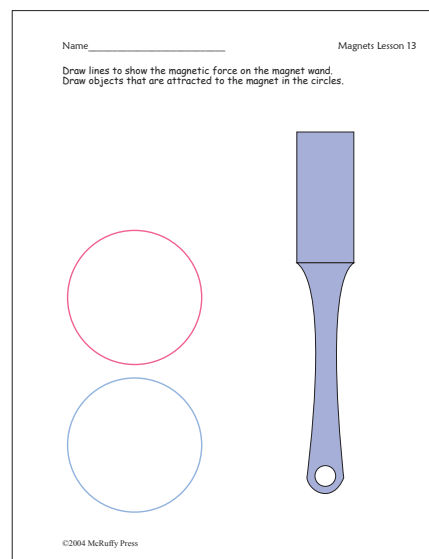
Use the iron filings. Place them in a the petri dish or other container. Inside this box are little pieces of iron. Put the magnet up to the box. The iron filings will show the magnetic force.

Ask students to describe what they see. Point out that the lines made by the iron filings show the lines of magnetic force. Repeat with other shapes of magnets.

Have students compare the patterns made by the iron filings.

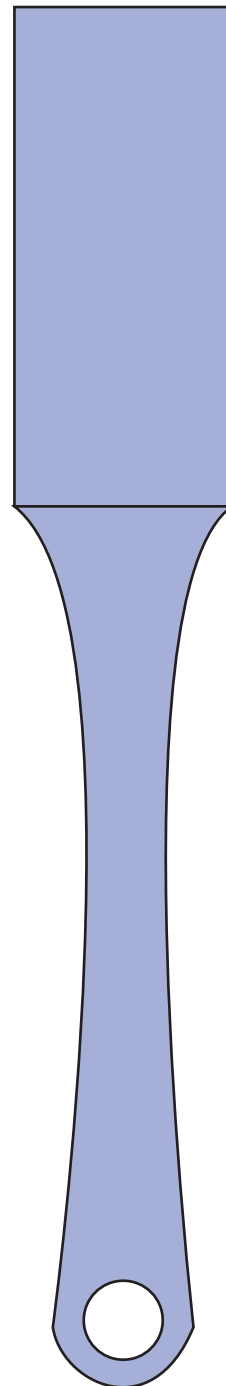
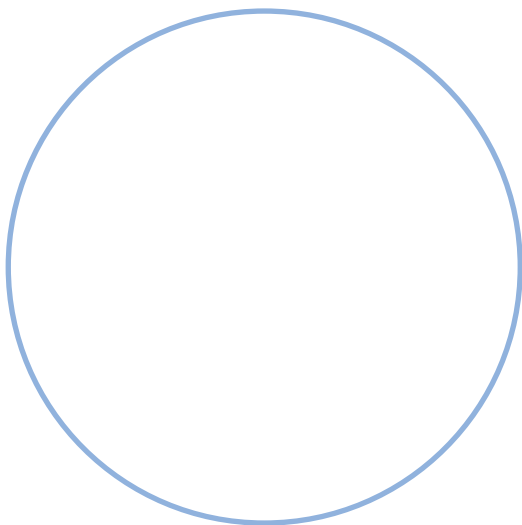
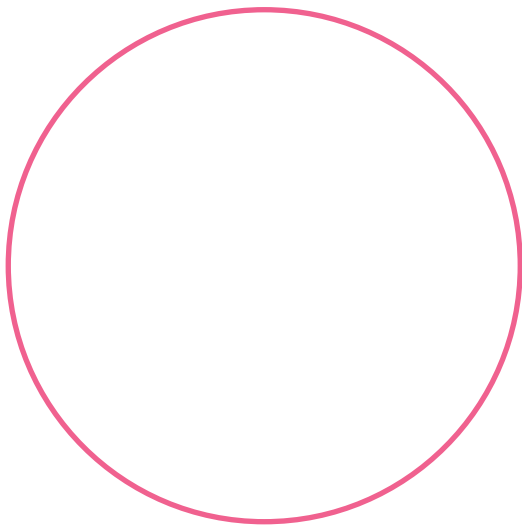
Conclusion

Have students look at the pictures of the magnet wand on the workbook page. Have students draw lines on the magnet to show the lines of magnetic force. In each circle, have students draw an object that would be attracted to the magnet.



Name _____

Draw lines to show the magnetic force on the magnet wand.
Draw objects that are attracted to the magnet in the circles.



Objective

Students will learn how some animals have special abilities to survive in an environment. (L)

Materials

- * Worksheet 34
- * Crayons (red, blue, yellow, green, purple, orange)

Preparation

None

Teaching

In the last lesson we talked about some of the things people need to do to stay alive. Can you remember what some of them were? (We need to eat, drink, breathe, stay safe, and sometimes use shelter or protection.) Today we'll talk about some animals that do some special things to help them stay alive.

Have students turn to workbook page 34. **Put your finger on the rabbit. This is a special kind of rabbit called a snowshoe rabbit. Lots of animals are colors of the places they live. Some snakes have colors that look like brown leaves and brush that you find on the floor of a forest. This helps them to hide.**

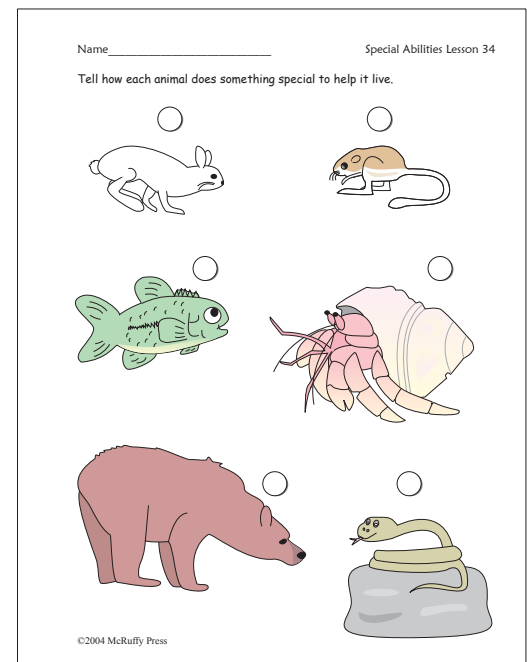
The snowshoe rabbit lives in areas that change color. In the winter, all the brown leaves and brush is covered with snow. The rabbit grows new fur for the winter. Snowshoe rabbits are brown and gray in the warm times of the year. In the winter, when it snows, the rabbit's fur is white. This helps it hide from animals that would try to eat it. The rabbit changes for its own protection.

Find the picture that looks like a mouse. Put your finger on it. This is called a kangaroo rat. How does this rat look like a kangaroo? (big back feet, long tail) Kangaroo rats hop using their big back feet like kangaroos. Kangaroo rats live in places where there is not a lot of water. Why would that be a problem for most animals? (They need water to drink.) The kangaroo rat is very special because it doesn't need to drink. It can make its own water by eating dry seeds.

Find the picture of the fish. What do people breathe? (air) We can't breathe air under water, so how do you think fish breathe? Fish can't breathe air. On the side of their body, behind their eyes and mouth is a flap. Inside is something called gills. The fish's gills allow them to breathe water. Fish can't breathe air.

What do you think the next picture is? This animal is called a hermit crab. What is on its back? (shell) Hermit crabs live on beaches. The part of their body that is in the shell is soft. They need something to protect their bodies. It's sort of like wearing a helmet when you ride a bike. Hermit crabs don't grow shells. Other animals grow shells. When they die, the shells are washed up onto beaches. The hermit crabs find the empty shell and move in.

Continued on the next page.



Lesson 34

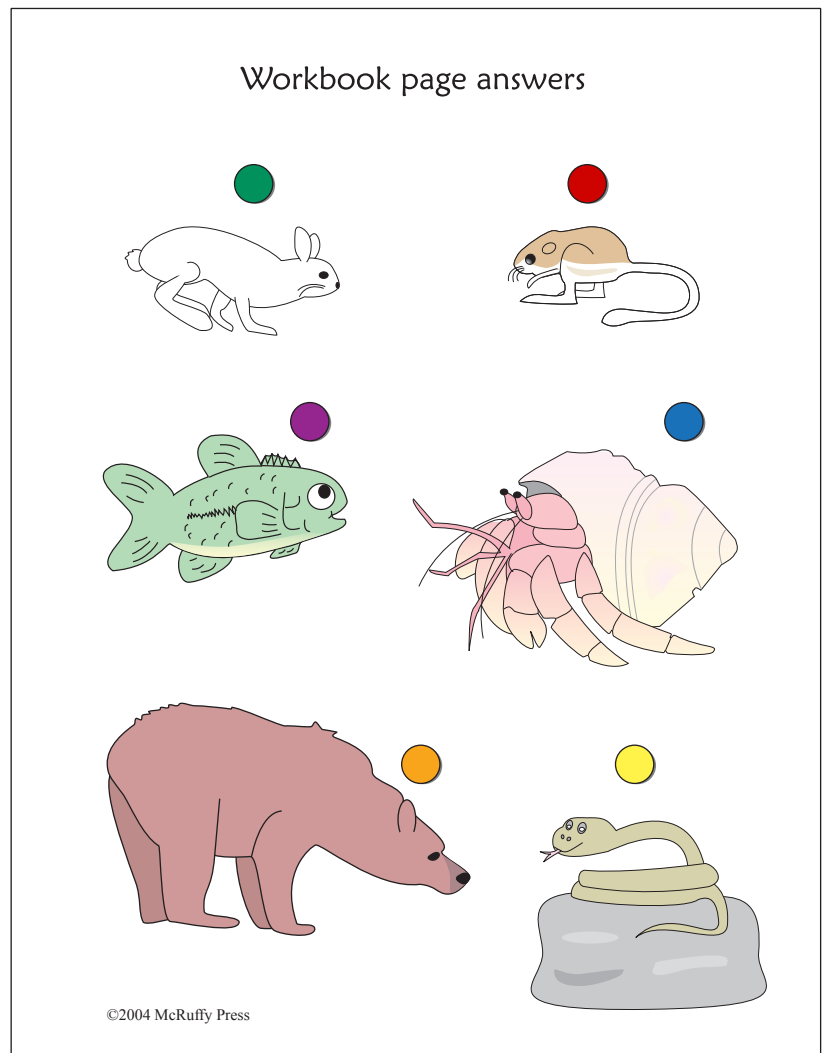
What's the big animal at the bottom of the page? (bear) Bears are big animals that need lots of food. They eat mostly berries, insects, fish, and plants. Bears live in places where there isn't a lot of food to eat in the winter. Bears hibernate during the winter. What do you think the word hibernate means? It means that bears sleep a lot of the time in the winter. When they sleep, they don't need to eat very much. They eat a lot of food and get fat in the summer and fall, so they don't starve while they sleep.

What's the last animal? (snake) Squeeze your face with your hands. Do your hands feel warm? When you run you get hotter. Our bodies make heat. If you put on a coat you get warmer because the heat your body makes is staying close to your body. Snakes, lizards, frogs, and some other animals are not like that. Their bodies don't make heat. They have to go to places to get warm or cool. Snakes find places underground such as holes or caves to spend the winter. Some snakes will hibernate together to stay warm. At other times of the year, snakes will lay on warm rocks in the sun on cooler days. When it gets too hot, snakes have to find cool places in rocks or in shade to keep from getting too hot.

Conclusion

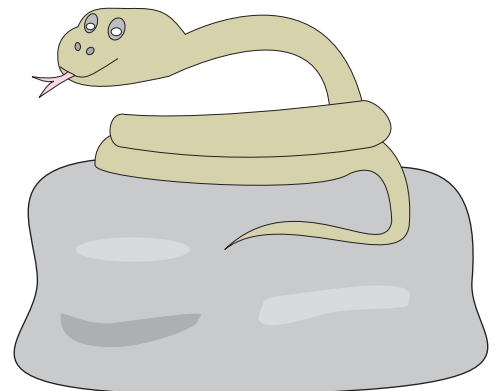
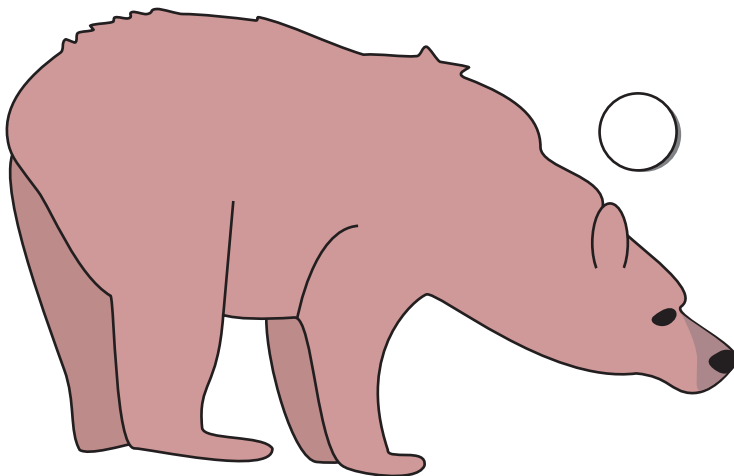
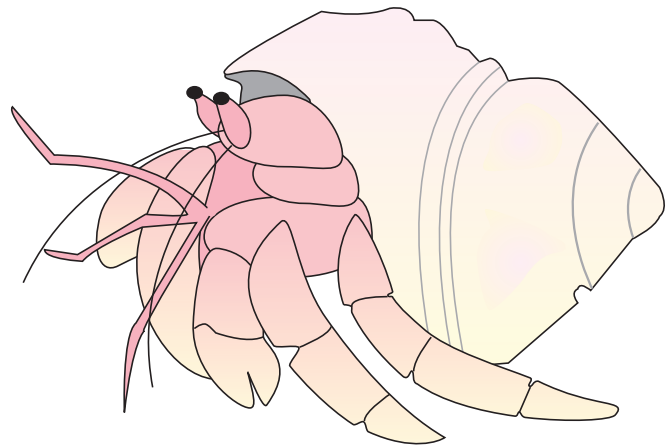
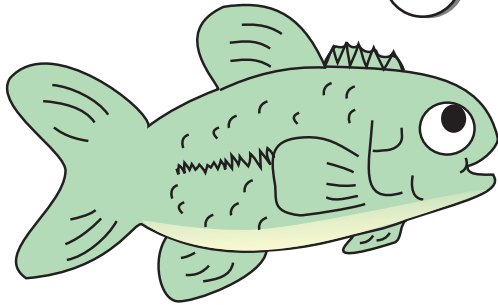
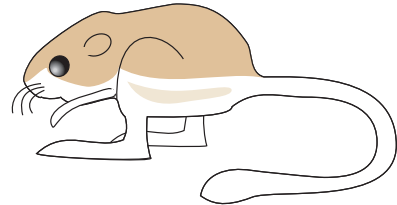
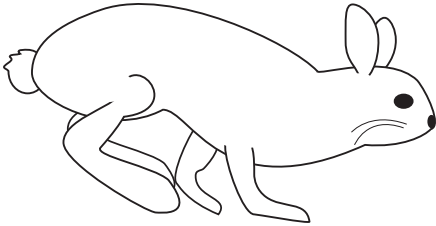
Students will use the crayons and workbook page 34. Above each picture is a circle. Students will color the circle to follow directions.

1. Find the animal that finds a home made by another animal to protect its soft body. Color the circle above it blue. (crab)
2. Find the animal that changes color to help keep it safe. Color the circle above it green. (rabbit)
3. Find the animal that hibernates or sleeps at times of the year where it's hard for animals to find food. Color the circle orange. (bear)
4. Find the animal that needs to find warm or cool places to keep its body at a good temperature. Color the circle yellow. (snake)
5. Find the animal that can make its own water from dry seeds. Color the circle red (kangaroo rat)
6. Find the animal that can breathe water, but not air. Color the circle purple. (fish)



Name _____

Tell how each animal does something special to help it live.



Lesson 48

Objective

Students will classify things in the sky. (E)

Materials

- * Sky Picture Cards
- * Paper
- * Crayon
- * Worksheet 48

Preparation

Use picture cards 2, 3, 4, 7, 8, 9, 10, 11, and 12.

Teaching

Review the terms natural and manmade. **What is the difference between natural and manmade things?**

When we look in the sky, we see natural and manmade things. Can you think of some natural things you see in the sky?

Show the students pictures 11 and 12. **These pictures were taken from outer space. What do you think the first picture is (show picture 11)? This is a picture of the sun.**

Look at the other picture. This is a planet called Mars. When we look at Mars in the sky it looks like a bright star.

Show picture 4. **What is the round object in this picture? (Moon) The moon looks like it is making light, but what we see is the sun shining on the moon. The way the moon looks like in the sky also changes. Sometimes all the moon looks bright. Sometimes, just a part of it looks bright. Sometimes it looks completely dark.**

Show picture 2. **Can you find the sun in this picture?**

Show picture 3. **What do you see in the sky in this picture? (clouds)**

Show students the rest of the pictures. Have students look at the pictures. Have students look at the objects in the sky in each picture and decide if it is natural or manmade.

Conclusion

Have students look at the drawings on workbook page 48. Students will need a red crayon and a green crayon.

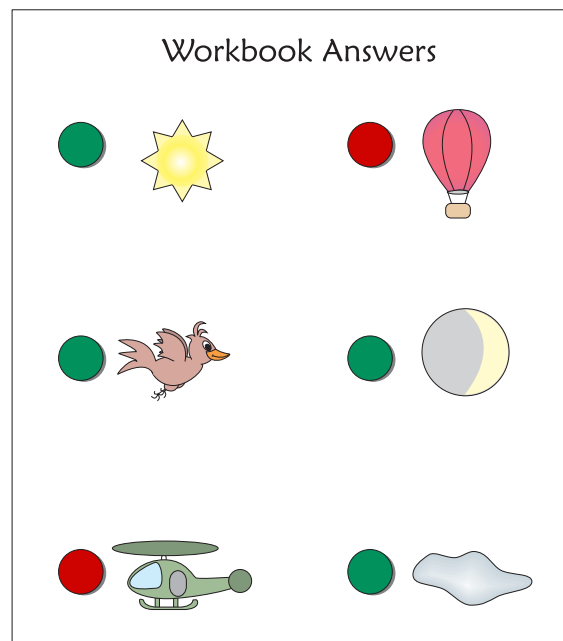
The drawings on this page are of things that are natural or manmade that you might see in the sky. If the object is natural, color the circle beside it green. If it is manmade, color the circle red.

The first picture is a drawing of the sun. Is the sun natural or manmade? Color the circle green if it is natural. Color the circle red if it is manmade.

Give the same instructions with the other pictures: balloon, bird, moon, helicopter, cloud.

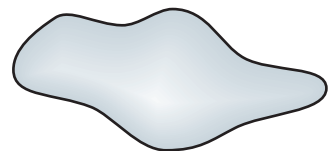
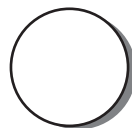
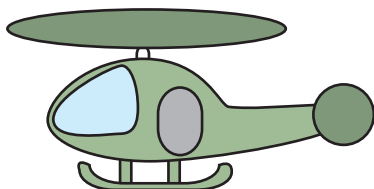
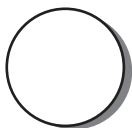
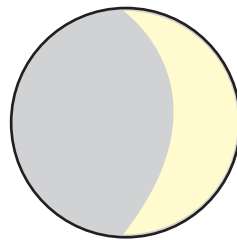
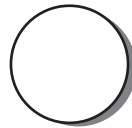
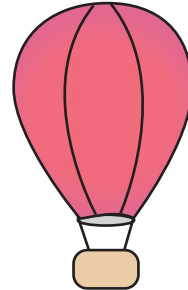
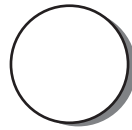
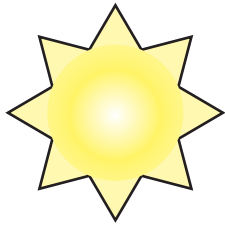
Evaluation of Unit 15

Students will recognize the differences between day and night.
Student will be able to classify things in the sky as natural or manmade.



Name _____

Which things in the sky are natural? Which ones are manmade?
Color the circles green next to the natural things. Color the circles
red next to the manmade things.



Unit 21 Weight

Lesson 65

Objective

Students will compare weights of objects. (P)

Materials

- * Spring scale or materials to make a scale:
 - Disposable cup
 - Rubber bands
 - String
 - Books or heavy object to use as a weight
 - Ruler
 - Yard stick or tape measurer
- * Things to weigh, such as several coins, ping pong ball, solid ball about the same size as the ping pong ball (such as a super ball or solid plastic ball), battery, magnet wand, string, fruit, etc. Objects should be small enough to fit in the cup. Find objects with various weights.
- * Worksheet 65
- * Glue and scissors

Preparation

A spring scale can be made by poking two holes on opposite sides under the rim of a cup. Tie one end of a 12" long string through each hole.

Tie three rubber bands in a chain to make a spring. Tie the rubber bands onto the center point of the string that is tied to the cup. The cup should hang evenly. Adjust the rubber band if needed.

Position a ruler so one end hangs off a table. Weight the other end down with books or similar heavy object.

Slip the other end of the rubber band chain over the end of the ruler so that the cup dangles freely. The tape measurer or yard stick will be used to see how much the cup drops when different objects are placed in the cup.

If you have a spring scale, you will still need a container that can hold objects. You may also want to hang the scale so the container can dangle freely.

Other scales may also be used, such as a postage scale that is sensitive to tenths of an ounce.

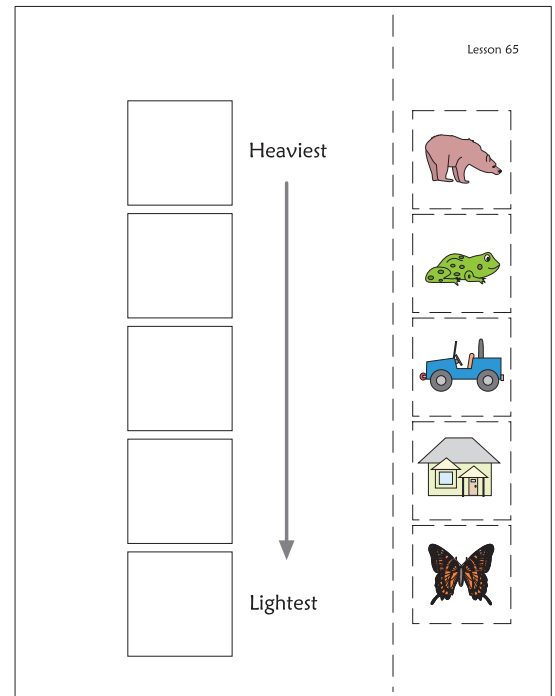
Teaching

We've measured things in the past. How have we measured things? (We've measured length and volume.) Review that volume is a way to measure how much space something takes. **What are some things we used to measure?** (ruler, string, measuring cup)

Have students compare the ping pong ball and the solid ball. **Are these balls about the same size? Would they have the same volume? If we measured their lengths would it be about the same?**

Continued on the next page.

Workbook page



Are they the same? How are they different? They're a different color. Is there something about them that we could measure to describe their differences?

Have students feel the two balls. Students may be able to state that the solid ball is heavier.

One of the balls may weigh more than the other one. Has anyone ever measured how much you weigh? There are lots of different kinds of ways to measure weight. We use something called a scale to measure weight.

We'll use a spring scale to measure things today.

Have students compare the weight of several objects. Include two things that are the same length such as the magnet wand and the piece of string. Ask student to predict which one is heavier. Sample questions might include:

What happens when something is put on the scale? (Rubber band cup – the cup lowers, Spring scale – the scale points to higher numbers)

Which weighs more, five pennies or five quarters?

Which one of the balls weighs more?

What's the heaviest object?

What's the lightest object?

Conclusion

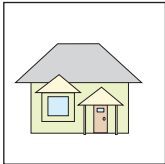
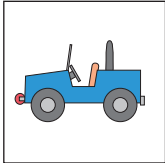
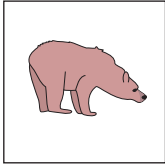
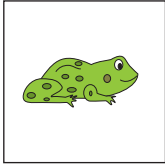
Have students cut out the pictures on the worksheet. Glue them on the boxes from heaviest to lightest. The pictures are: bear, frog, car (jeep), house, and butterfly. Answers: house, car, bear, frog, butterfly

Evaluation of Unit 21

Students will understand that weight is a way to measure objects.

Students will understand that weight is different from length and volume.

Workbook answers


Heaviest



Lightest

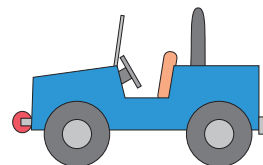
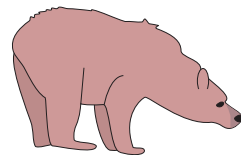
Name _____

Glue the pictures in order from heaviest to lightest.

Heaviest



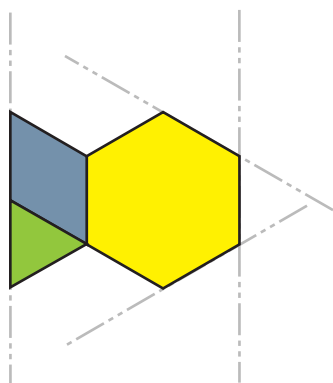
Lightest



Resource Pack Samples

Cut apart cards printed 6 per page (shown actual size):

Color Mirror Cards (Unit 17)



3

Color Mirror Cards (Unit 17)

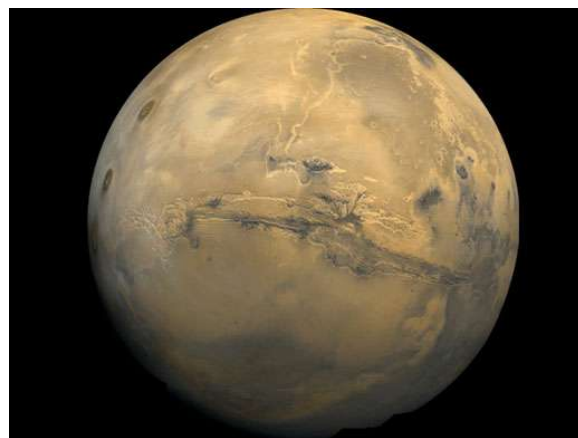
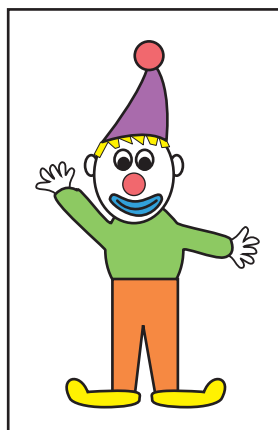
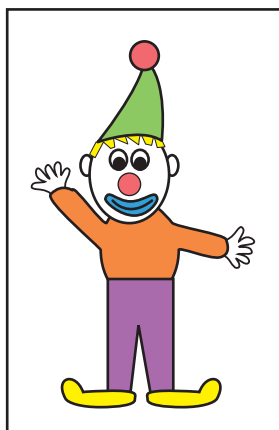


Photo by NASA Public Domain

12

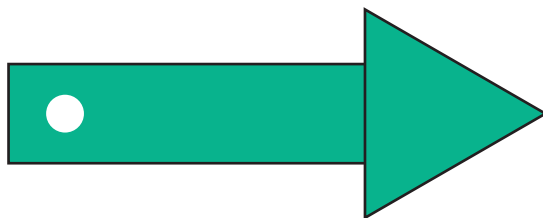
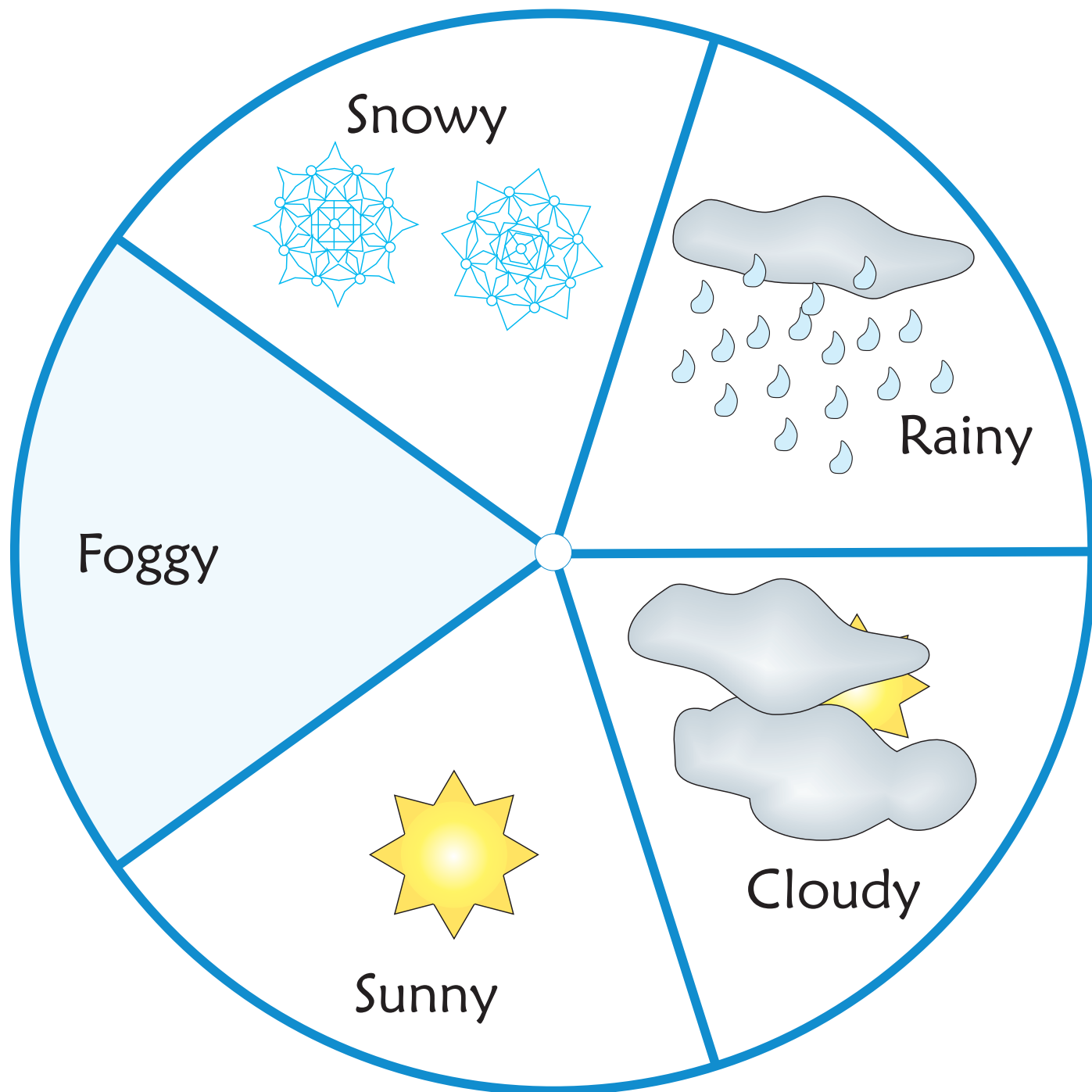


Clown Card Attributes
from Unit 9 Shown actual size

27 Clown cards plus 6 additional
cards printed on one sheet

From Unit 3,
used daily to
monitor weather

Weather Dial



Butterfly Life Cycle

