



Student Inquiry Lesson Sheets
Grade 3

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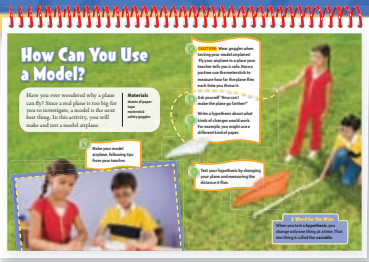
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Name _____

Essential Question

How Can You Use a Model?

Set a Purpose

What is the question you will try to answer with this investigation?

State Your Hypothesis

Write your hypothesis, or idea you will test.

Think About the Procedure

What is the variable you plan to test?

How will you know whether the variable you changed worked?

Record Your Results

Fill in the chart to record how far the plane flew each time you changed its design.

Change Made to the Model	Distance It Flew



SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.

SC.3.N.1.6 Infer based on observation.

SC.3.N.3.2 Recognize that scientists use models to help understand and explain how things work. **SC.3.N.3.3** Recognize that all models are approximations of natural phenomena; as such, they do not perfectly account for all observations.

Draw Conclusions

1. Which changes to your model worked best?

2. Was your hypothesis supported by the results? How do you know?

Analyze and Extend

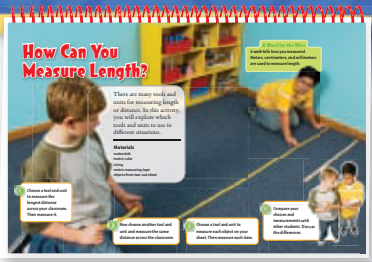
1. How is your model the same as a real airplane?

2. What did you learn about real airplanes from using a model?

3. How is your model different from a real airplane?

4. What can't you learn about real airplanes by using a paper airplane?

5. Think of another question you would like to answer about airplane models.



Name _____

Essential Question

How Can You Measure Length?



SC.3.N.1.1 Raise questions about the natural world... **SC.3.N.1.2** Compare the observations made by different groups...to explain the differences across groups. **SC.3.N.1.3** Keep records as appropriate... **SC.3.N.1.4** Recognize the importance of communication among scientists. **SC.3.N.1.7** Explain that empirical evidence is information, such as observations or measurements, that is used to help validate explanations of natural phenomena.

Set a Purpose

What will you be able to do at the end of this investigation?

How will you choose the units that are best for each item?

Think About the Procedure

What will you think about when choosing the measurement tool for each item?

Record Your Results

In the space below, make a table in which you record your measurements.

Draw Conclusions

1. How does choosing the best tool make measuring length easier?

2. How do units affect the quality of a measurement?

Analyze and Extend

1. Did groups who used the same tools as your group get the same results as you? Explain why or why not.

2. Why was it important to communicate your results with other groups? Explain.

3. When would someone want to use millimeters to find out who throws a ball the farthest? When would using millimeters not be a good choice? (1,000 mm = 1 m)

4. Think of another question you would like to ask about measuring.

Materials

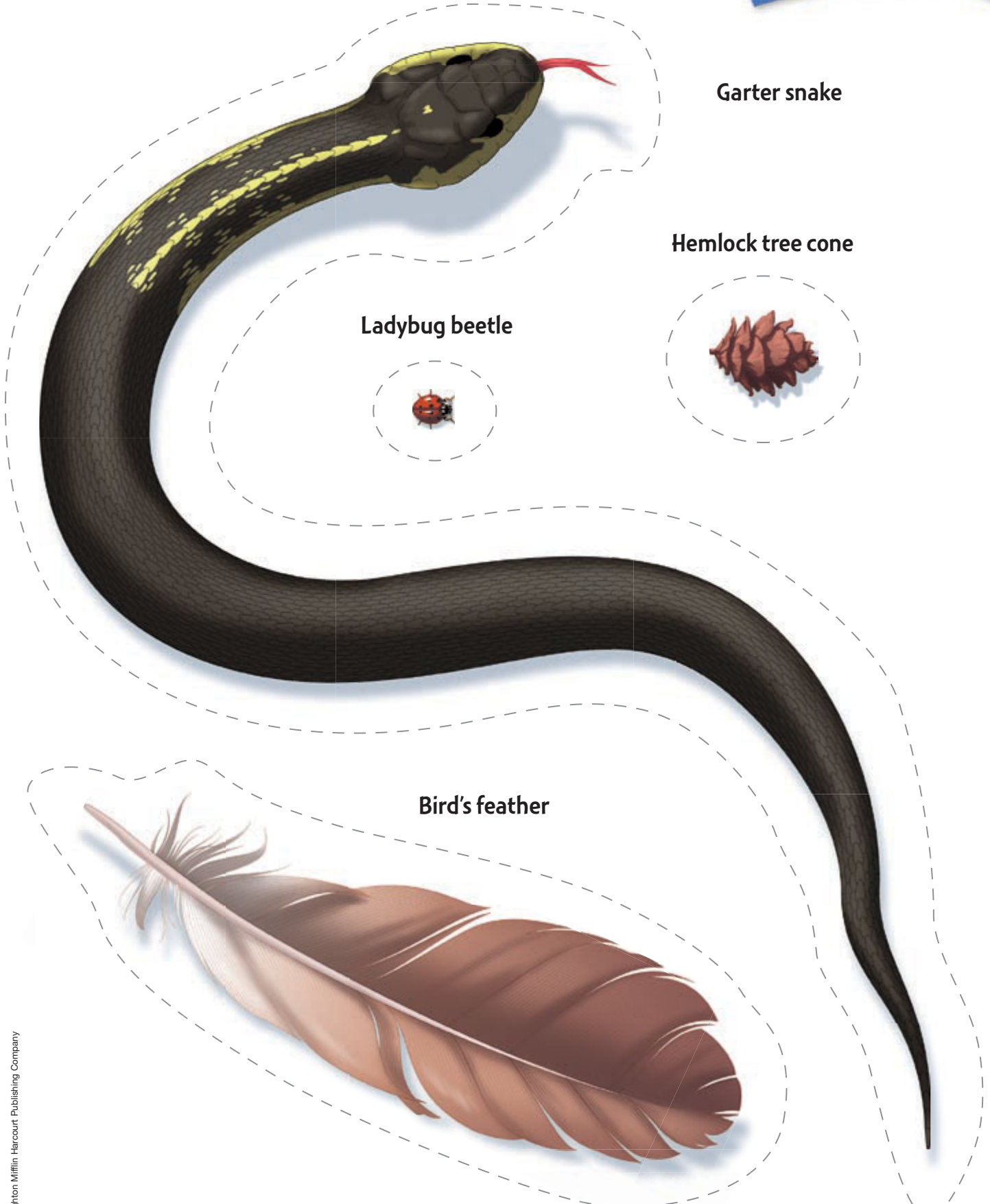
Which tools should you use?

Garter snake

Hemlock tree cone

Ladybug beetle

Bird's feather





Name _____

Essential Question

How Do Your Results Compare?

Set a Purpose

What will you learn from this investigation?

State Your Hypothesis

Tell how you think the height of bubbles in water relates to the amount of dishwashing liquid used.

Think About the Procedure

List the things you did that were the same each time.



SC.3.N.1.1 Raise questions about the natural world... **SC.3.N.1.2** Compare the observations made by different groups...to explain the differences across groups. **SC.3.N.1.3** Keep records as appropriate... **SC.3.N.1.4** Recognize the importance of communication among scientists. **SC.3.N.1.5** Recognize that scientists question, discuss, and check each others' evidence and explanations. **SC.3.N.1.7** Explain that empirical evidence is information...used to help validate explanations of natural phenomena.

Describe the variable, the one thing you changed each time.

Record Data

In the space below, make a table to record your measurements.

Draw Conclusions

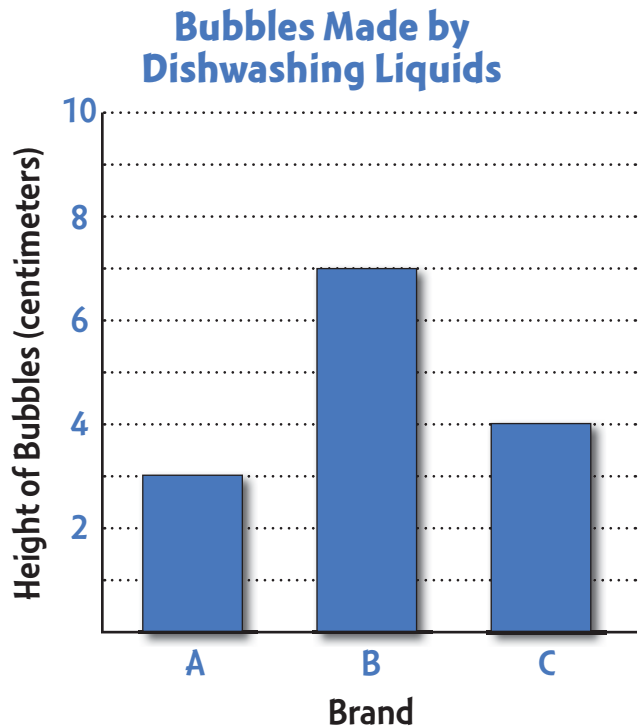
Look back at your hypothesis. Did your results support it? Explain your answer.

Analyze and Extend

1. Why is it helpful to compare results with others?

2. What would you do if you found out that your results were very different from those of others?

3. The bar graph below shows the height of the column of bubbles produced by equal amounts of three brands of dishwashing liquid. What does this data show?



4. Think of other questions you would like to ask about bubbles.



Name _____

Essential Question

How Many Stars Do You See?



SC.3.N.3.2 Recognize that scientists use models... **SC.3.N.3.3** Recognize that all models are approximations...

SC.3.E.5.1 Explain that stars can be different; some are smaller, some are larger, and some appear brighter than others; all except the Sun are so far away that they look like points of light. **SC.3.E.5.5** Investigate that the number of stars that can be seen through telescopes is dramatically greater than those seen by the unaided eye.

Set a Purpose

What do you think you will learn from observing the box with pinholes?

Record Your Data

In the space below, make a data table to record what you observe. Compare your data with data collected by your classmates.

Think About the Procedure

Why do you think you are observing the points of light from different distances?

Draw Conclusions

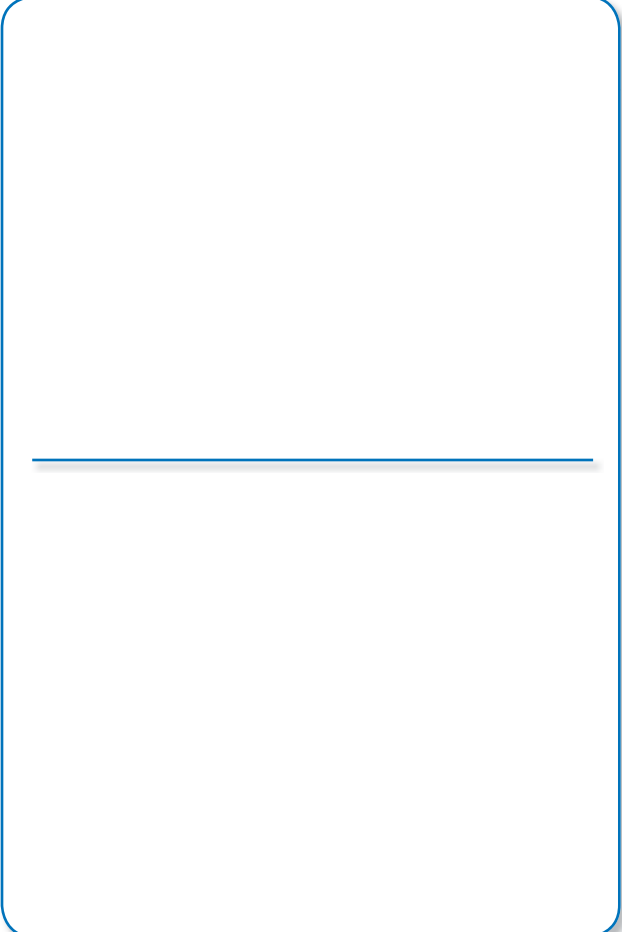
How were the points of light you observed different from far away, from close up, and through the hand lens?

Analyze and Extend

1. Did you count more points of light from far away or from close up?

2. Infer what you would see if you moved even closer to the box.

3. In the box below, draw what a point of light looked like from a distance. Then draw what it looked like when it was closer.



4. For what tool is the hand lens a model? How is the model like that tool?



Name _____

Essential Question

How Does the Sun Heat Earth?

Set a Purpose

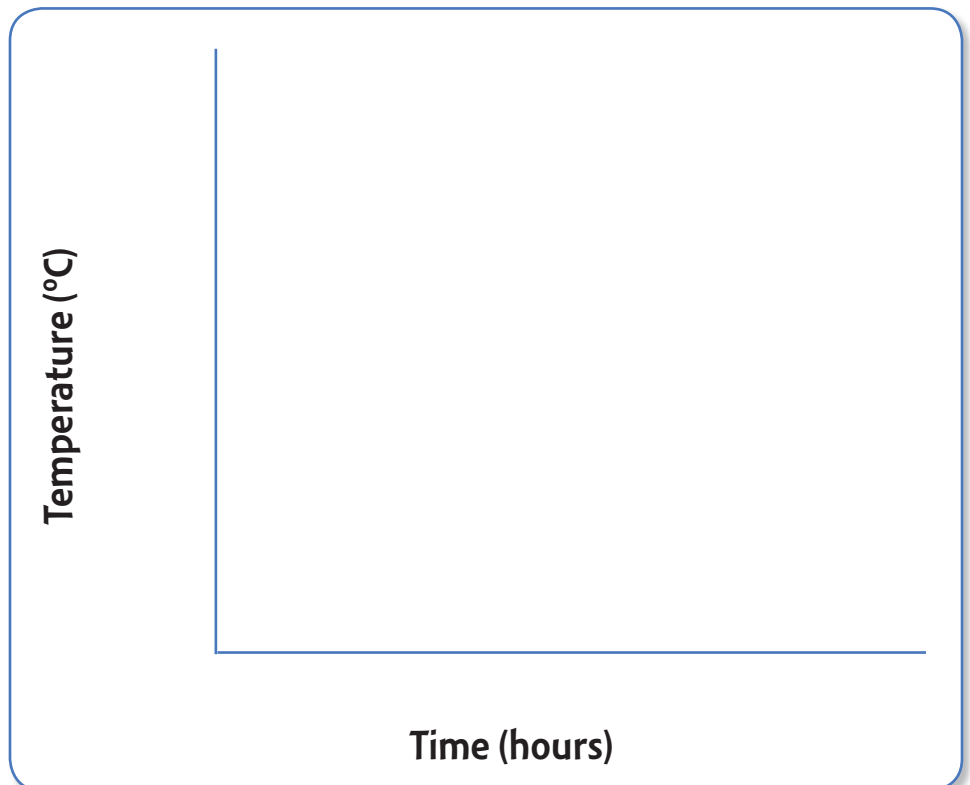
What will you learn from this activity?

Think About the Procedure

Why do you think some students moved their cup from the sunny spot into the shade?

Record Your Data

Use your Science Notebook. Record the temperatures in a data table. Use it to make a bar graph here.



SC.3.N.1.5 Recognize that scientists question, discuss, and check each others' evidence and explanations.

SC.3.E.6.1 Demonstrate that radiant energy from the Sun can heat objects and when the Sun is not present, heat may be lost.

Draw Conclusions

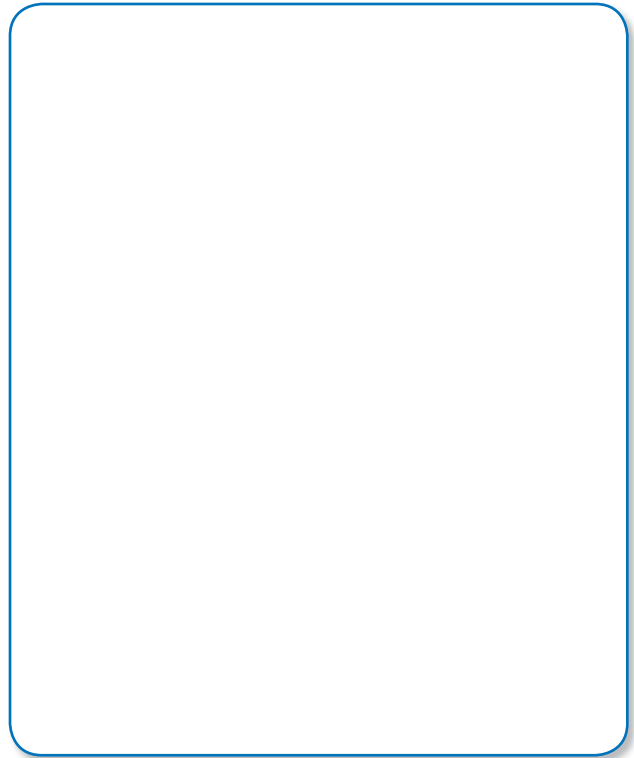
How did the heat from the sun affect the soil in the cups?

Analyze and Extend

1. Share the data in your bar graphs. Which thermometer showed the greatest increase in temperature? How do you know?

2. What happened to the thermometer that was moved into the shade? Why do you think this happened?

3. In the box below, draw a way that radiant energy from the sun affects organisms on Earth.



4. How did the bar graphs help you communicate your data?

5. What other question would you like to ask about how the sun heats Earth?

Draw Conclusions

When you used water to find the volume of one or more of the objects, how did the volumes of the objects and the water compare?

How did their masses compare?

Analyze and Extend

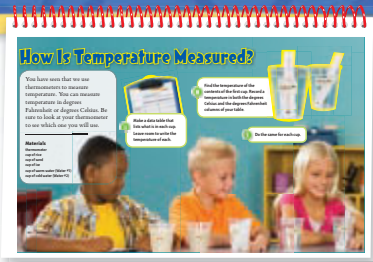
1. Suppose you have two cubes. They are made of the same material, but one has a greater volume than the other. Does the larger cube have more mass? Explain your answer.

2. A friend collects rocks that fit in the same-sized space in a tray. Could these rocks each have a different volume?

3. When would you have to use a measuring cup to find the volume of a solid?

4. Did all the groups in your class have the same results? How can you explain any differences?

5. Think of other questions you would like to ask about measuring mass and volume.



Name _____

Essential Question

How Is Temperature Measured?

Set a Purpose

What skills will you learn from this investigation?

Think About the Procedure

How can you find the temperature of a solid?

Record Your Data

Record your results in the table below.

Material	Temperature



SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.

SC.3.N.1.6 Infer based on observation.

SC.3.P.8.1 Measure and compare temperatures of various samples of solids and liquids.

Draw Conclusions

Some of the objects you tested felt warm and some felt cool. How did this compare with the temperatures you measured?

Analyze and Extend

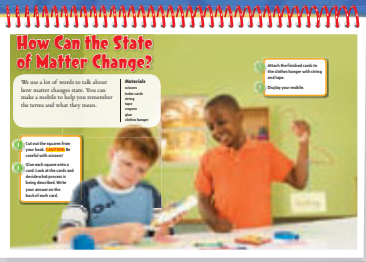
1. How did the temperatures you measured compare with the temperatures measured by other students? Why?

2. Why is it important to put the thermometer bulb all the way into the liquid or directly in contact with the solid you are measuring?

3. Why do you think cooks use thermometers in the kitchen?

4. How could you find out if the air temperature given in your local weather report is correct?

5. Think of other questions you would like to ask about measuring temperature.



Inquiry Flipchart page 16

Name _____

Essential Question

How Can the State of Matter Change?

Set a Purpose

What will you learn from this investigation?

Think About the Procedure

How can you show how matter changes state?

Record Your Data

Complete the table below by filling in the missing terms or the missing descriptions of changes in state.

Term	Description of Change
melting	
freezing	
	liquid to gas at 100 °C
evaporation	
	gas to liquid



SC.3.N.1.3 Keep records as appropriate, such as pictorial, written, or simple charts and graphs, of investigations conducted.

SC.3.P.9.1 Describe the changes water undergoes when it changes state through heating and cooling by using familiar scientific terms such as melting, freezing, boiling, evaporation, and condensation.

Draw Conclusions

Write the terms from the table that describe the change from one state to another state.

gas → liquid → solid

solid → liquid → gas

Analyze and Extend

1. A person wearing eyeglasses leaves an air-conditioned store on a hot day. Her glasses fog up. What change of state happened?

2. Give an example of how freezing affects your everyday life during the summer.

3. A recipe for cookies calls for melted butter. In what state must the butter be?

4. What happens to the volume of liquid water when it boils?

5. A summer rain gets your bike wet. The hot sun comes out. Soon the bike is dry. What happened?

6. Write a question you would like to ask about how matter changes state.

Materials

Cut out these boxes along the dotted lines and use them for your mobile.

1. Water cooling at 0 °C

2. Water at 100 °C

3. Pond water drying up on a hot summer day

4. Ice heated at 0 °C

5. Water appearing on the outside of a cold milk carton on a hot summer day



Name _____

Essential Question

What Surfaces Reflect Light Best?



SC.3.N.1.2 Compare the observations made by different groups... **SC.3.N.1.7** Explain that empirical evidence is information...that is used to help validate explanations of natural phenomena. **SC.3.P.10.3** Demonstrate that light travels in a straight line until it strikes an object or travels from one medium to another. **SC.3.P.10.4** Demonstrate that light can be reflected, refracted, and absorbed.

Set a Purpose

What will you learn from this experiment?

Why should you use the same light source with each object?

State Your Hypothesis

Write your hypothesis, or testable statement.

Record Your Data

Record your setup and results in the boxes below and on the next page. Use one box for each object tested.

Think About the Procedure

What is the tested variable?

2. Why do you think some objects did not reflect light onto the wall?

3. What similarities, if any, did you observe in the way the objects responded to the light?

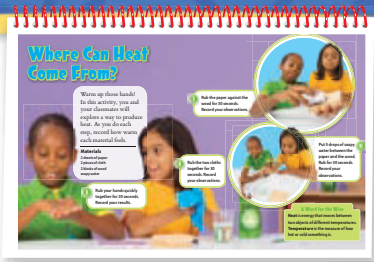
4. Think of other questions you would like to ask about things that reflect light.

Draw Conclusions

What can you conclude about the way shiny and dull objects respond to light?

Analyze and Extend

1. Can you think of a real-life situation that supports your conclusion?



Name _____

Essential Question

Where Can Heat Come From?

Set a Purpose

What do you think is the purpose of this investigation?

Think About the Procedure

Why are you using different items to rub together?

Record Your Data

Record your results in the table below.

Setup	Hot?	Observations
hands rubbed against each other		
cloths rubbed against each other		
paper rubbed against wood with nothing between them		
paper rubbed against wood with dish soap between them		



SC.3.N.1.1 Raise questions about the natural world...generate appropriate explanations based on those explorations.

SC.3.N.1.2 Compare the observations made by different groups...to explain the differences across groups. **SC.3.N.1.7** Explain that empirical evidence is information...that is used to help validate explanations of natural phenomena. **SC.3.P.11.2** Investigate, observe, and explain that heat is produced when one object rubs against another, such as rubbing one's hands together.

Draw Conclusions

Compare your results with the other groups. What do you find?

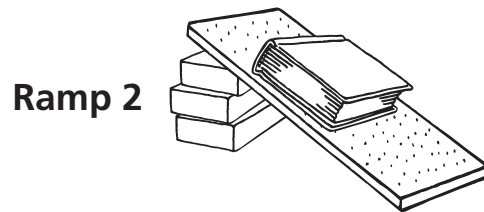
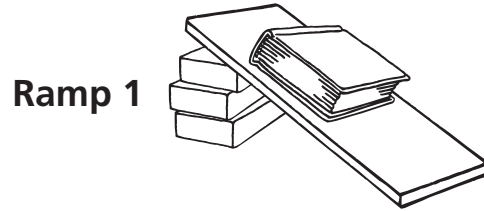
Why might this be the case?

Analyze and Extend

1. If two parts of a machine rub together, what could you do to keep them from getting as hot?

2. How would you plan an investigation to find possible materials to reduce friction?

3. Look at the setup below. Ramp 1 has a smooth surface. Ramp 2 has a sandpaper surface. Will the book on either ramp move? Explain.



4. What other questions would you like to ask about how heat can be produced?



Name _____

Essential Question

How Do Plants Respond to Light?



SC.3.N.1.3 Keep records as appropriate...

SC.3.N.1.4 Recognize the importance of communication among scientists.

SC.3.N.1.5 Recognize that scientists question, discuss, and check each others' evidence and explanations. **SC.3.N.1.6** Infer based on observation. **SC.3.L.14.2** Investigate and describe how plants respond to stimuli (heat, light, gravity), such as the way plant stems grow toward light and their roots grow downward in response to gravity.

Set a Purpose

In this investigation, you will share your results with other groups.

Why do you think scientists share their results?

Predict what will happen to the seedlings.

Think About the Procedure

Why does each group face the opening in its shoebox in a different direction?

Record Your Data

In the space below, draw how the seedlings responded to light.

Draw Conclusions

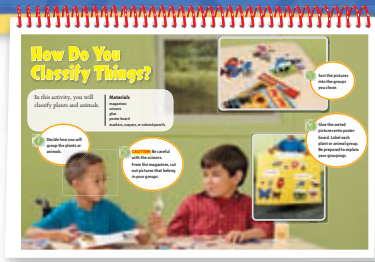
What did you observe? Infer why the seedlings responded as they did.

Analyze and Extend

1. Compare your observations with those of other groups. Did all groups have the same results? Why or why not?

2. Plants respond to temperature as well as light. How could you design an experiment to find out how temperature affects plants?

3. Think of other questions you would like to ask about the way plants grow.



Name _____

Essential Question

How Do You Classify Things?

Set a Purpose

What are some ways that you can group plants or animals?

Think About the Procedure

How will you show the different groupings on your poster?

What characteristics will you use to classify the plants or animals?

Record Your Data

Describe your categories in the space below.



SC.3.N.1.1 Raise questions about the natural world, investigate them...in teams through free exploration and systematic investigations... **SC.3.N.1.7** Explain that empirical evidence is...used to help validate explanations of natural phenomena. **SC.3.L.15.1** Classify animals into major groups...according to their physical characteristics and behaviors. **SC.3.L.15.2** Classify flowering and non-flowering plants into major groups such as those that produce seeds, or those like ferns and mosses that produce spores, according to their physical characteristics.

Draw Conclusions

Why is classifying plants and animals by their characteristics helpful?

Analyze and Extend

1. Compare your groupings with those of other student groups. How were they the same? How were they different? Why were they different?

2. If scientists discovered a new animal in a rain forest, what might be the first question to ask in order to classify the animal?

3. What might make it difficult to classify some types of plants or animals using photos?

4. Think of other questions you might like to ask about classifying plants or animals.



Name _____

Essential Question

What Do Plants Need?

Set a Purpose

What do you think you will learn from this experiment?

State Your Hypothesis

What do you predict will happen to each plant?

Think About the Procedure

Why is it important to place one plant in light and one plant in darkness and keep everything else the same?

Which variable are you testing?

What kinds of things will you observe about the plants?



SC.3.N.1.1 Raise questions about the natural world, investigate them...

SC.3.N.1.3 Keep records as appropriate... **SC.3.N.1.6** Infer based

on observation. **SC.3.L.17.2** Recognize that plants use energy from the Sun, air, and water to make their own food.

Record Your Data

In the space below, make a data table and record your observations.

2. Explain how this experiment answers your hypothesis.

3. Why did you give both plants the same amount of water?

Draw Conclusions

How did the amount of light affect the plants?

4. What can you conclude about plants after this experiment?

Analyze and Extend

1. What did you observe about plant "A"? What did you observe about plant "B"?

5. Think of other questions you would like to ask about the needs of plants.
