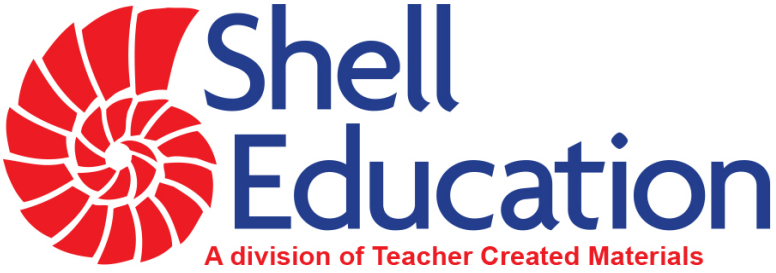
Sample Pages from



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Shell Education

180 Days of PRACTICE

GRADE K

HANDS-ON STEAM

Science | Technology | Engineering | Arts | Mathematics

Table of Contents

Warmth from the Sun Teaching Support

Overview of Unit Activities

Students will learn about and explore how sunlight warms Earth through the following activities:

- reading about and studying pictures of sunlight hitting Earth
- reading about heat given off by the sun
- experimenting with ice cubes in the sun and shade
- creating paintings with daytime and nighttime colors
- analyzing data of sunlight hours in different seasons
- building shade structures

Materials Per Group

Week 1

- ice cubes
- paint
- paintbrushes

STEAM Challenge

- basic school supplies
- construction paper (2 sheets)
- craft sticks (10+)
- masking tape
- rock (1)
- thick and thin pieces of fabric (4–5 pieces)
- tissue paper (2 pieces)

Setup and Instructional Tips

- **Week 2 Day 1:** Read this challenge introduction to students. "The sun shines on everything around us. The sun gives off heat. It makes us hot. Shade is an area that is blocked from getting direct sunlight. Because shade blocks the sunlight, it is cooler. A tree can provide shade. So can an umbrella. You will build a structure to provide shade." Explain the challenge, the criteria, and the constraint.
- **Testing Days:** When testing shade structures, place them in open areas where they will receive direct sunlight in the morning, midday, and afternoon. Students will need to check their designs in the morning, midday, and afternoon.

Discussion Questions

- What is sunlight? When do you see it?
- When have you used shade to protect yourself from the sun?
- How can you tell if a surface is hotter than another?
- What types of shade are better than others?
- How and when does sunlight warm Earth's surface?
- What happens when an ice cube is left in the sun?

Additional Notes

- **Possible Misconception:** The sun isn't out on cloudy days.
  Truth: The sun is still in the sky, but the clouds are too thick for the same amount of light to get through.
- **Possible Student Design Solutions:** Students might build shade structures that are flat and only block the sun from directly above. Encourage them to consider the apparent movement of the sun.

Scaffolding and Extension Suggestions

- Support students with understanding the challenge by discussing where the sun will be in the sky in the morning, midday, and afternoon.
- Challenge students by placing ice cubes in the sun and under each shade structure. Compare how long it takes for the ice cubes to melt.

Answer Key

Week 1 Day 1

1. A
2. A

Week 1 Day 2

1. the sun
2. Responses may include land, water, air, or anything warmed by the sun.
3. Drawings should include something being warmed by sunlight.

Week 1 Day 3

Drawings should show ice melting faster in the sun and slower in the shade.

Week 1 Day 5

1. summer
2. winter
3. 12

Weeks 2 & 3

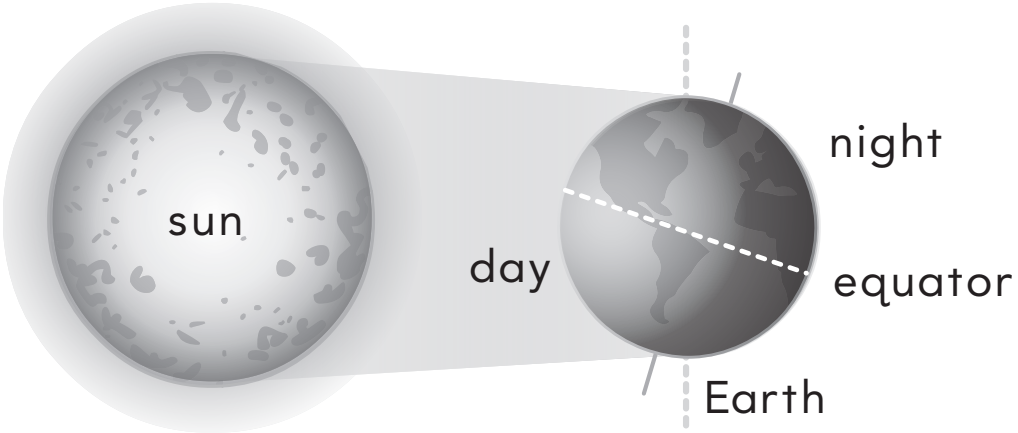
See STEAM Challenge Rubric on page 221.

Name: _____ Date: _____

Directions: Read the text. Answer the questions.

Sunlight

The sun shines. This means it gives off light. The light makes it bright during the day. Earth spins. When it turns away from the sun, it is night. It is dark at night.



1. When do you see sunshine?

(A) during the day

(B) at night

2. What does the light do?

(A) makes it bright

(B) makes it dark

Name: _____ Date: _____

Directions: Read the text. Answer the questions.

Light from the sun warms Earth. This is called *sunlight*. It warms the land. It warms the water. It warms the air. This is why things are warmer when they are in the sun.

1. Where does sunlight come from?

_____

_____

2. What is something that is warmed by sunlight?

_____

_____

3. Draw something being warmed by sunlight.

Name: _____ Date: _____

Directions: Place one ice cube in the sun. Place another in the shade. Draw the ice cubes. Wait a few minutes. Draw them again.

At First

In the Sunlight	In the Shade

After a Few Minutes

In the Sunlight	In the Shade

Name: _____ Date: _____

Directions: Make a day and night painting. Check off the items as you go.

- ☐ Fold a large sheet of white paper in half.
- ☐ Use a black marker. Draw a line down the middle.
- ☐ Choose a side to be day. Use warm colors to paint the sunlight.
- ☐ On the other side, use cool colors to paint the nighttime sky.
- ☐ Stand back, and look at what you made.

Warm Colors	Cool Colors
red	green
orange	blue
yellow	purple

Name: _____ Date: _____

Directions: Read the text. Look at the chart. Answer the questions.

Daylight hours change as the seasons change. Noah and his mom wrote how long the sun was out each season. Here is what they wrote.

Daylight Hours	
Winter (January)	10
Spring (April)	12
Summer (July)	14
Fall (October)	12

1. Which season has the most hours of daylight?

_____

2. Which season has the fewest hours of daylight?

_____

3. How many hours of daylight were there in October?

_____

Name: _____ Date: _____

Directions: Read the text. Then, label the picture.

The Challenge

Make a shade structure that protects a rock from the sun.

- **Criteria**—It should give shade in the morning, midday, and afternoon.
- **Constraint**—You may use only fabric, paper, craft sticks, and tape.

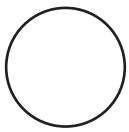
Word Bank

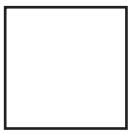
shade sun sunlight

Name: _____ Date: _____

Directions: Read the questions. Circle the options you like. Answer the questions.

1. What shape will you make your structure?


circle


square

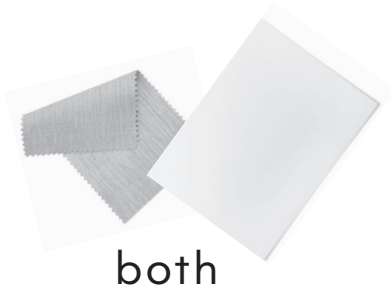

rectangle


triangle

2. What will it be made of?

paper


fabric


both

3. How will your structure stay up? Draw some ideas.

Name: _____ Date: _____

Directions: Sketch your shade structure. Label the parts.

Word Bank

craft stick fabric paper tape

Name: _____ Date: _____

Directions: Build your shade structure. Check off the steps as you go.

- ☐ Look at your design sketch.
- ☐ Gather the materials you need.
- ☐ Build the top of your shade structure.
- ☐ Build the sides of your shade structure.
- ☐ Attach the top and sides.
- ☐ Check that all parts are taped well.
- ☐ Check that the structure is stable.

Quick Tip!

It is okay to change your design as you go!

Name: _____ Date: _____

Directions: Put your structure in a sunny spot. Place a rock under your shade. Draw what you see three times in the same day. Answer the question.

Morning

Midday

Afternoon

1. Did it shade the rock all day?

yes **no**

Name: _____ Date: _____

Directions: Think about your shade structure. Answer the questions.

1. How well did your design work?

2. Did your structure block all the sun?

yes **no**

3. Draw two shade designs that you saw from others. Put a checkmark by your favorite.

☐ **Design 1**	☐ **Design 2**

Talk About It!

Which materials blocked the sun best? Do thick or thin materials work better?

Name: _____ Date: _____

Directions: Plan your new design. Then, sketch your new design.

1. Will you change the shape of your structure?

   yes **no**

2. Will you change the size of your structure?

   yes **no**

3. Will you use different materials?

   yes **no**

Try This!

Be creative! See how different you can make this design.

Name: _____ Date: _____

Directions: Build your shade structure. Make it work better. Check off the steps as you go.

- ☐ Look at your design sketch.
- ☐ Look at your first shade structure.
- ☐ Tell a friend how you will make it better.
- ☐ Gather the materials you need.
- ☐ Make the changes you want.
- ☐ Check that all parts are taped well.
- ☐ Check that the structure is stable.

Name: _____ Date: _____

Directions: Put your structure in a sunny spot. Place a rock under your shade. Draw what you see three times in the same day. Answer the questions.

Morning

Midday

Afternoon

1. Did it shade the rock all day? **yes** **no**
2. Did your structure work better this time?

   yes **no**

Name: _____ Date: _____

Directions: Draw yourself as an engineer. Show how you tested your shade structure design.

Talk About It!

What surprised you about this challenge?
What was hard about this challenge?