earth science

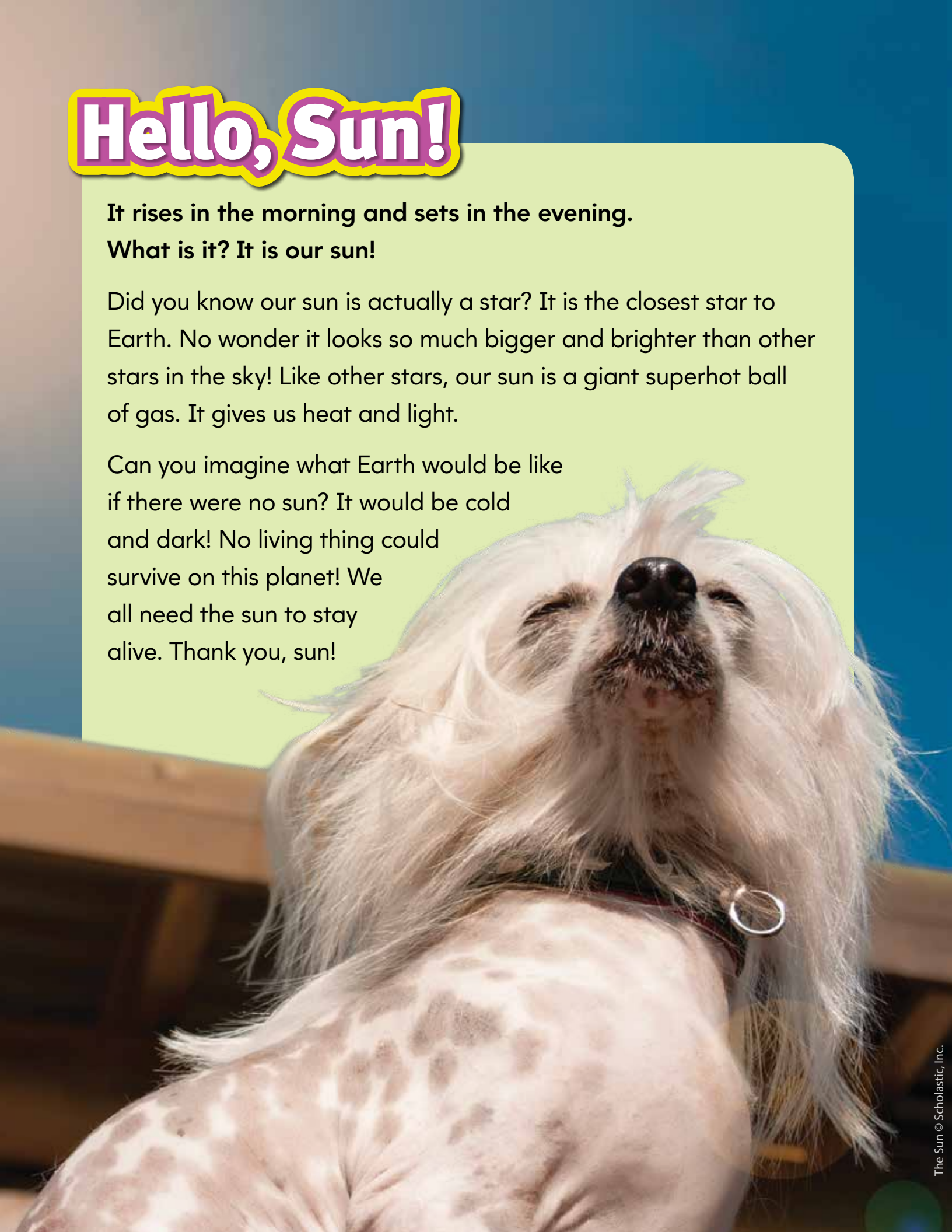
The Sun

Hello, Sun!

It rises in the morning and sets in the evening.
What is it? It is our sun!

Did you know our sun is actually a star? It is the closest star to Earth. No wonder it looks so much bigger and brighter than other stars in the sky! Like other stars, our sun is a giant superhot ball of gas. It gives us heat and light.

Can you imagine what Earth would be like if there were no sun? It would be cold and dark! No living thing could survive on this planet! We all need the sun to stay alive. Thank you, sun!



Sun Tracker

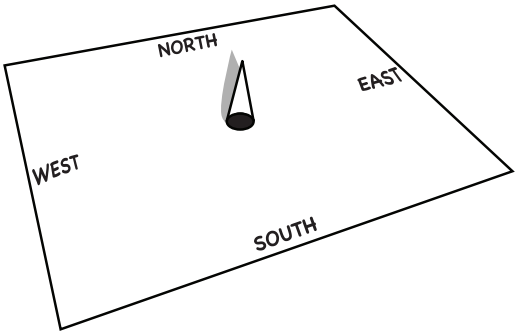
Track the sun's movement by looking at shadows!

Materials

- ★ scissors
- ★ masking tape
- ★ sunny day
- ★ compass
- ★ pencil
- ★ dark marker
- ★ "Sun Tracker" data sheet

1. Make a Sun Tracker. Follow the directions on your data sheet.

2. Take your Sun Tracker outside on a sunny day. Place it on a flat surface. Use a compass to find north. (Your teacher can help you.) Turn your paper so the word **North** points north. Tape your tracker down.



3. Find the shadow cast by your triangle. Use a dark marker to trace around the shadow. Write the time next to it.

4. Where do you think the shadow will be in 30 minutes? Use a pencil to draw your guess.

5. In 30 minutes, find the shadow again. Trace it with the dark marker. Write the time next to it.

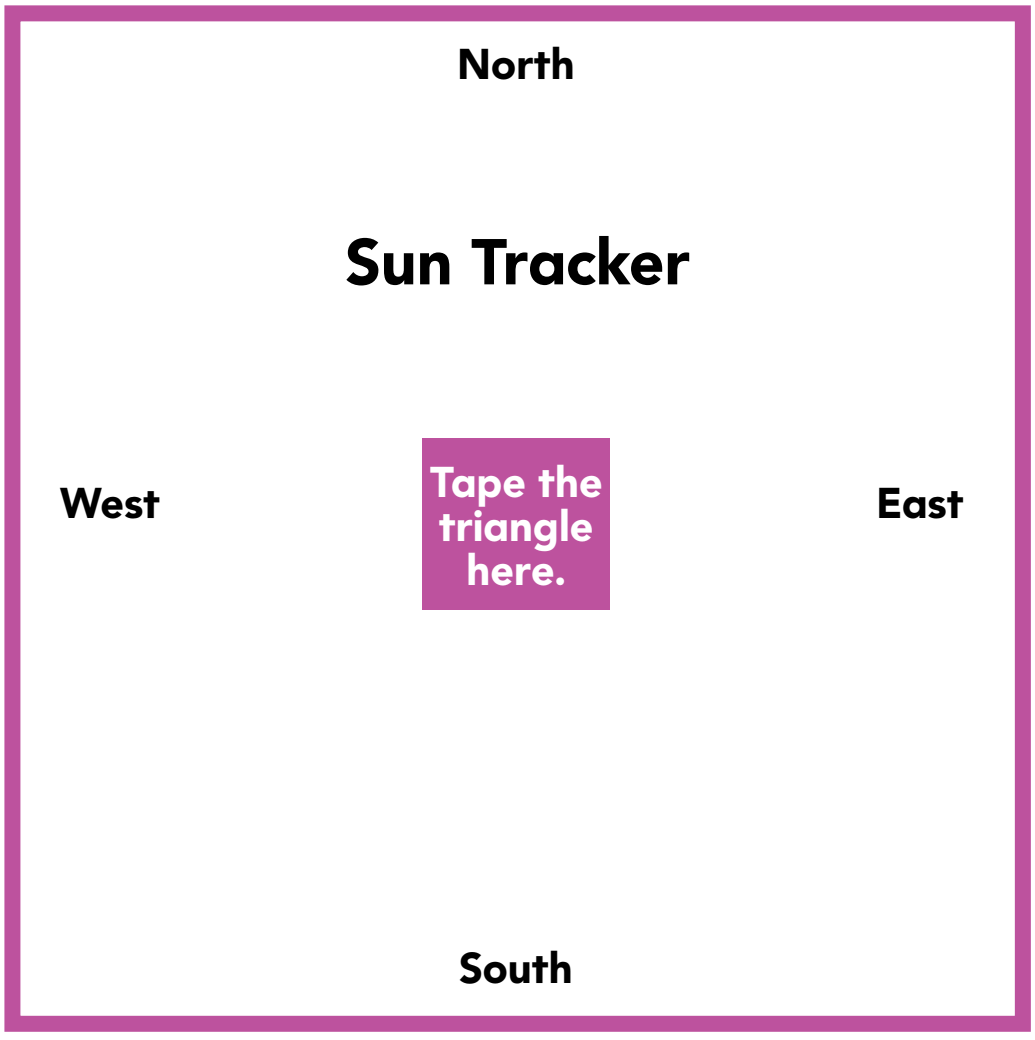
6. Do Steps 4 and 5 again. Which of your predictions was more correct? What do you think will happen to the shadow over the rest of the day?

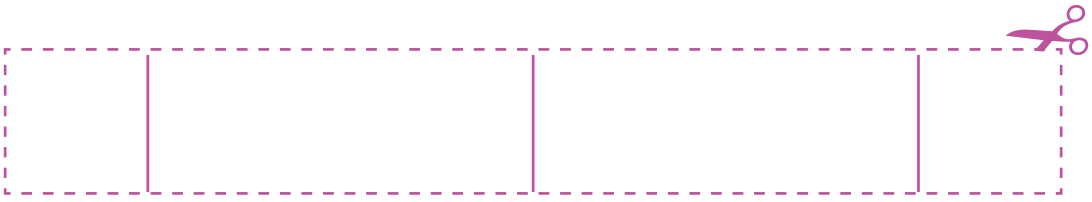
Name: _____

Sun Tracker

1. Make a Sun Tracker: Cut out the strip at the bottom of this sheet. Fold on the solid lines to make a triangle. Overlap the two ends. Tape the ends together. Tape the triangle to the middle of the Sun Tracker below.

2. Do Steps 2–6 of the Task Card. What do you think will happen to the shadow over the rest of the day? Record on the back of this sheet.





task card 2

Day and Night

Where does the sun go at night? Find out!

Materials

- a partner
- flashlight
- "Day and Night" data sheet

1. Have a partner hold the flashlight and turn it on. Your partner is the "sun."

2. Stand two steps away from the "sun." You are the "Earth." Your chest is the side of the Earth you live on. Have your partner point the flashlight at your body. Turn so that your left arm is toward the sun. How is this like sunrise? Record your answer on your data sheet.

3. Slowly turn to your left until you are facing the sun. Which part of the day is this like? Why do you think so?

4. Turn to your left again so your right arm is toward the sun. Which part of the day is this like?

5. Turn left again so your back is now toward the sun. How is this like nighttime?

6. Switch roles with your partner. Now you are the "sun," and your partner is the "Earth." Repeat Steps 1–5.

7. Does the sun go away at night? Why do we have day and night? Record your answers on your data sheet.

Name: _____

Day and Night

1. Do Steps 1 and 2 of the Task Card.
How is Step 2 like sunrise?

_____

2. Do Step 3 of the Task Card. Which part of the day is this like?
Why do you think so?

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_____

3. Do Step 4 of the Task Card. Which part of the day is this like?

_____

4. Do Step 5 of the Task Card. How is this like nighttime?

_____

_____

5. Does the sun go away at night? Why do we have day and night?

_____

_____

Next Generation Science Standards
ESS1.A The Universe and Its Stars
ESS1.B Earth and the Solar System

Background

The image on page 1 is the sun as seen by NASA's high-tech instruments. They record wavelengths of light that humans can't see, such as ultraviolet. NASA colorizes the images to make them more appealing and "sun colored."

Hands-On Hints

Task Card 1: Sun Tracker

Ahead of time, scope out a hard, flat surface that will not be in shadow during this activity. If the only open areas available aren't hard, have children tape their Sun Trackers to clipboards or pieces of cardboard. Masking tape is recommended because children can write on it. If you don't have a compass, try a compass phone app.

This activity can be adjusted to the flow of your day—for instance, it may be more convenient for you to check shadows every 45 minutes. The wonders of modern weather forecasting can help you choose a day with steady sun. However, if a band of clouds rolls in and prevents you from checking shadows at the appointed time, just check them when it gets sunny again. As a class, you can discuss how children's predictions (based on a half hour's sun movement) relate to your measurements.

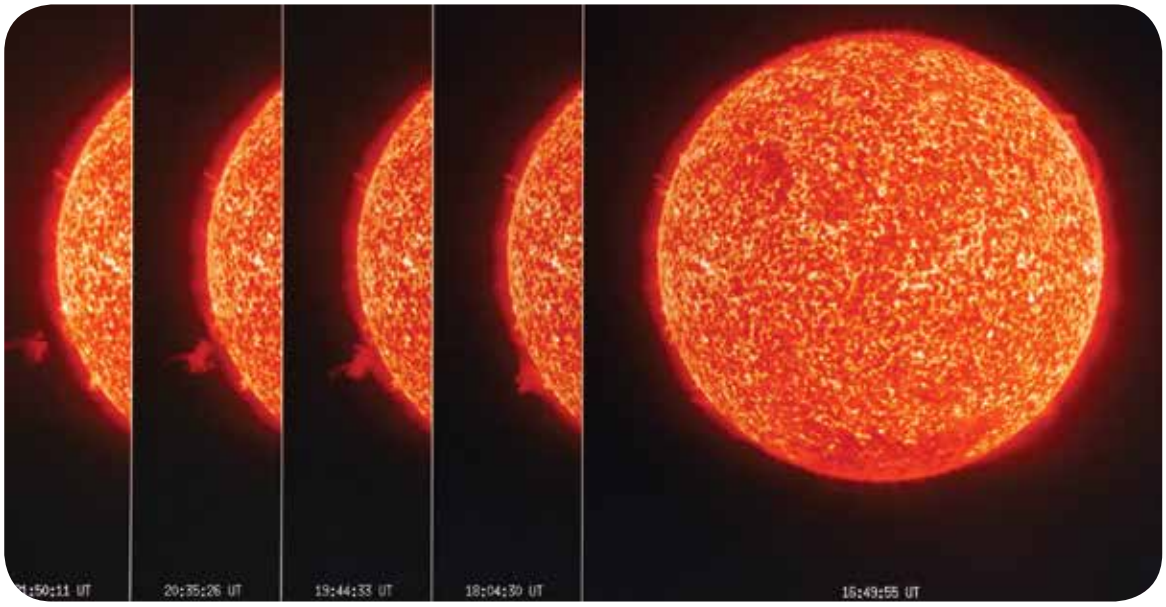
Children's first "prediction" (Step 4) can be a flat-out guess. They have no information other than where the shadow is right then. When they make a second prediction (Step 6), they will have evidence of the direction and the speed of the shadow's movement. They may be able to use this to make a more accurate prediction. Once they have a third measurement, they can be more certain that the shadow will keep moving in that direction for the rest of the day.

Task Card 2: Day and Night

Before starting the activity, ask children: *Why do we have day and night?* Record their responses on the board or on chart paper so you can revisit their answers at the end of the activity and discuss any changes in their understanding.

You may wish to dim or turn off your classroom lights for this activity. Children will need light for reading and recording their answers, but dimmer lights will help them see the "sunlight" on their bodies better. Tell children not to point the flashlight at each other's faces.

Guide students in making connections between the activity in Task Card 1, where the sun seems to move across the sky, and this activity, which demonstrates that the Earth turns to make day and night.



For optimal results, we suggest following these steps:

1. Introduce the topic by reading aloud the nonfiction acticle. The article helps build background knowledge and provides context for the hands-on activities. You can project it onto your interactive white-board as you read it aloud. There is also a printable version that you can distribute to students so they can read along.

2. Divide the class into small groups. Hand each group a Task Card, and give each student a Data Sheet. (We recommend starting with Task Card 1.) Together with the class, read aloud the steps of the activity to ensure everyone understands what to do. You may also want to have each group conduct an inventory of their materials to make sure they have everything they need.

3. Have students do the activity and record on their Data Sheets.

4. Make sure to leave enough time before the end of the period so you can have a class discussion about the activity. Invite groups to share their findings and results, including any challenges they may have faced.

5. Gather students' data sheets to assess for understanding.

If you plan to continue the unit in your next lesson with the second Task Card, you might want to review the article with the class. In some cases, Task Card 2 builds upon Task Card 1, so you may want to quickly go over the first activity as well.

At the end of a unit, consider asking students to evaluate the topic and activities. This can be as simple as a thumbs-up or thumbs-down. Engage them in a discussion about what they liked or did not like and why. You might find this feedback useful for future lessons.

The two Task Cards feature hands-on activities that incorporate the following eight science and engineering practices—identified by the NGSS as essential for all students to learn:

1. Asking questions and defining problems
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing and interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating, and communicating information

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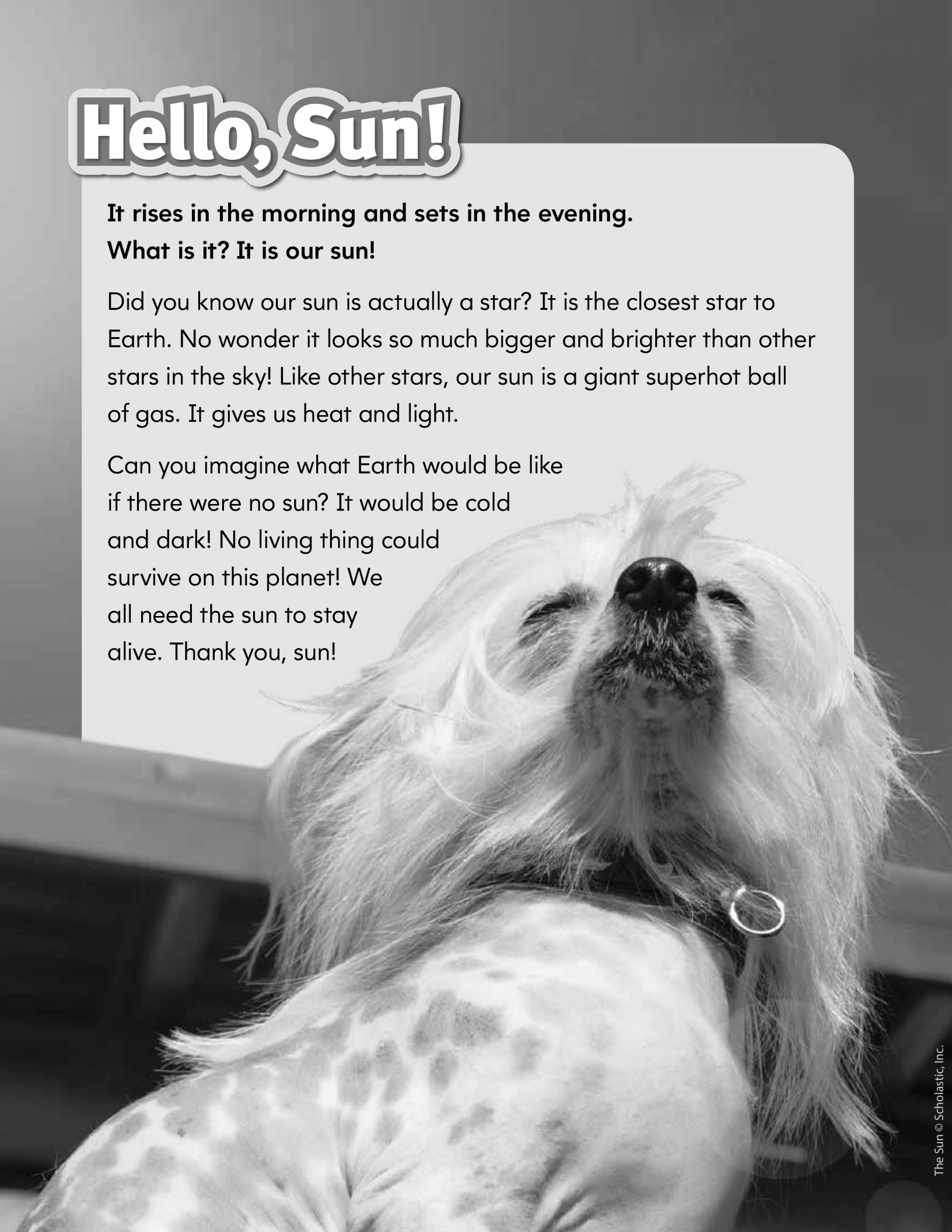

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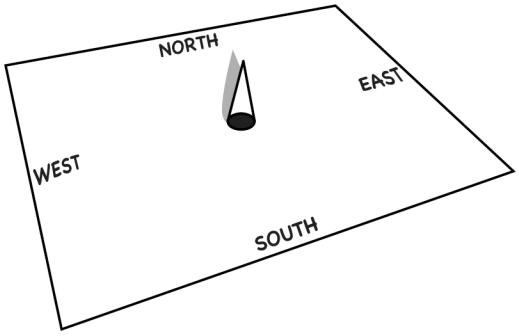

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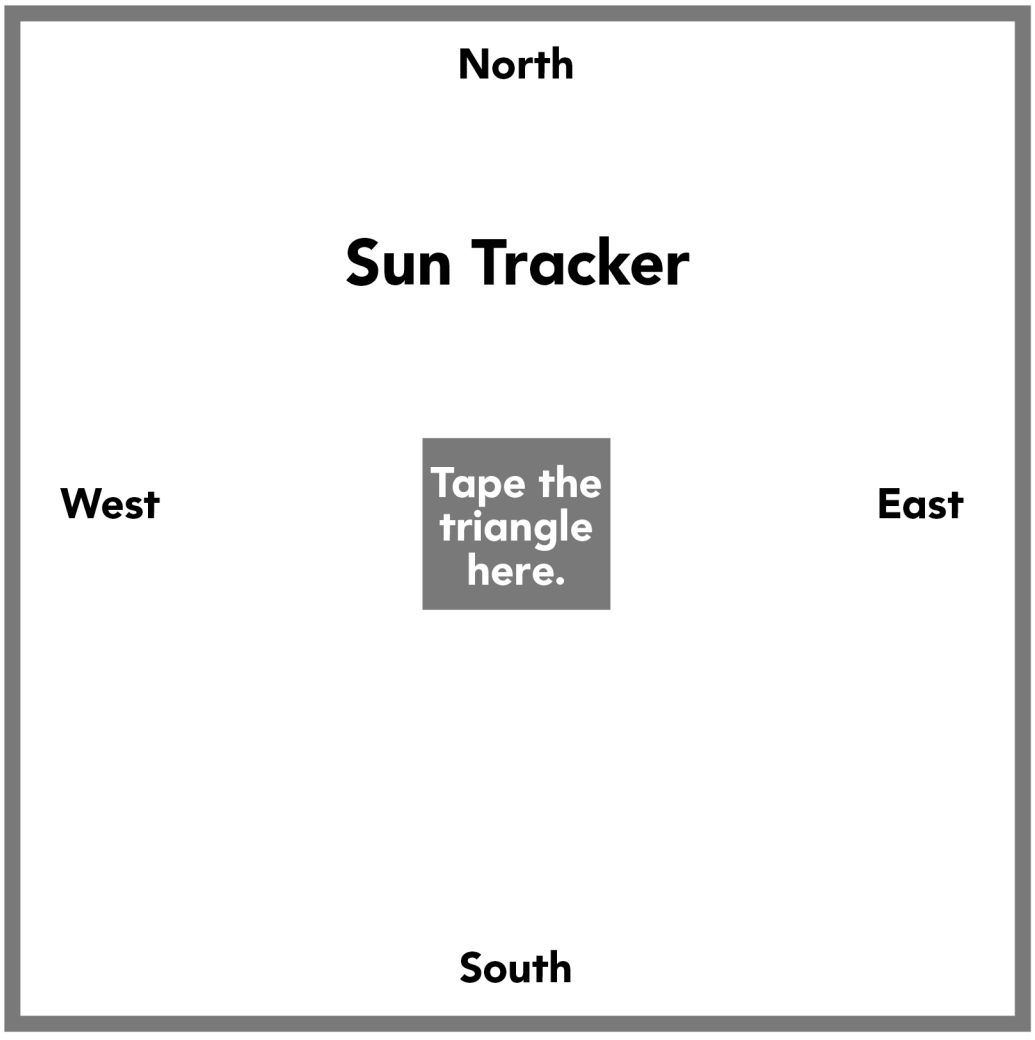

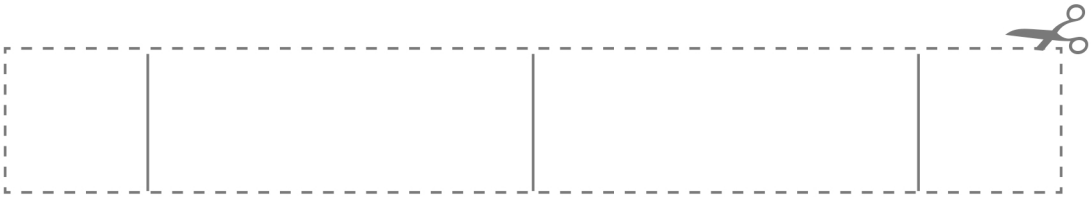

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