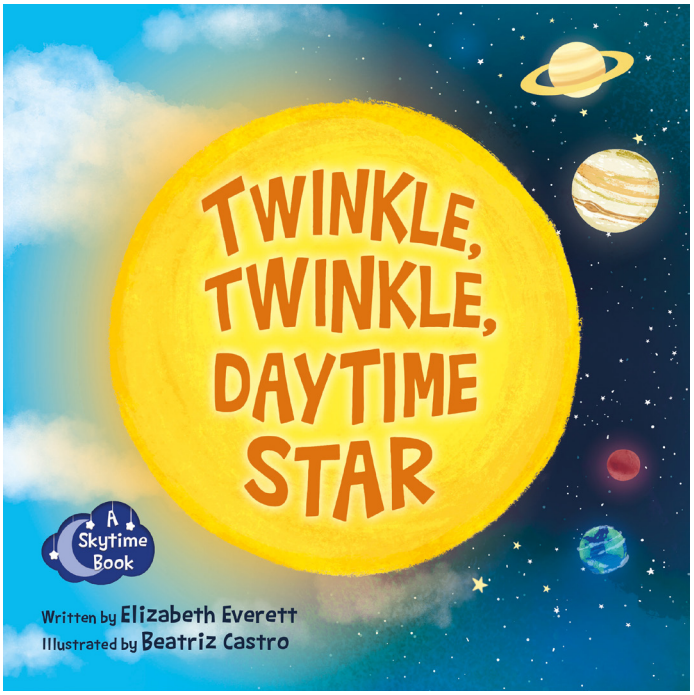
Twinkle, Twinkle, Daytime Star Teacher's Guide

Written and Designed by Marlee Brooks, Caitlin Burnham, Jennifer Coon, Claire Romine, Susan Stark, and Hannah Thelen



To be used with:
Twinkle, Twinkle, Daytime Star
Written by Elizabeth Everett
Illustrations by Beatriz Castro

English
Board Book: 978-1-938492-91-4
eBook: 978-1-938492-92-1

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Science, Naturally! – An imprint of Platypus Media, LLC
Sparking curiosity through reading
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About the Author

Elizabeth Everett spent 16 years as a clasroom teacher before venturing into writing. Inspired by her energeting youngster, Jalen, and his love for books, she took her background in education and meshed it with his childhood interests. The result was edu-tainment in the form of children's books! She currently lives in Colorado with her family where they love spending time outdoors in the Western sun. She is the author of This is the Sun and has several more titles coming soon. She can be reached at Elizabeth.Everett@ScienceNaturally.com.

About the Illustrator

Inspired by the natural world, **Beatriz Castro** has been drawing and writing fantastic stories since she was a little girl. She studied illustration at the chool of Arts in Logroño, Spain. Beatriz specializes in colorful images and funny character designs. Her fun and beautiful art appears in books published around the world. She likes classic stories and fairy tales and listens to rock and punk music. You can see more of her work at BeatrizCastroIllustracion.com.

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Introduction

The Sun is the most important star in the sky, lighting up our days and providing energy to all living things. We feel the Sun's effects every day, even if it's hiding behind the clouds!

The location of the Sun can mean the difference between getting a sunburn while playing outside or staying in and watching the snow fall. But no matter the season, the Sun is always shining brightly as the most important star in our galaxy. The enormous scale of the solar system can be hard for young students (and even adults) to understand, so this guide includes visual aids to deepen understanding.

Resources

The listed resources are a way for students to expand their knowledge about the subjects covered in *Twinkle, Twinkle, Daytime Star.*

YouTube videos to introduce solar concepts:
The Sun for Kids by Homeschool Pop
Earth's Rotation & Revolution: Crash Course Kids 8.1 by Crash Course Kids
Photosynthesis | Educational Video for Kids by Happy Learning English
Seasons and the Sun: Crash Course Kids 11.1 by Crash Course Kids
The Axis of Rotation by LIttleOrisek1

Books to foster curiosity:
Energy from the Sun by Allan Fowler
Under Alaska's Midnight Sun by Deb Vanasse
The Reason for the Seasons by Ellie Peterson
The Sun Shines Everywhere by Mary Ann Hoberman
What Makes a Shadow? by Clyde Robert Bulla

Websites to interact with:
https://spaceplace.nasa.gov/menu/sun.
https://kids.nationalgeographic.com/space/article/sun

Podcasts to listen to:
REACH: A Space Podcast for Kids
Everything Under the Sun: Apollo Under the Sun!

Pre-Reading: Experiencing the Sun

Grades: Preschool – 3rd Grade

Materials: *Twinkle, Twinkle, Daytime Star*

Subject: Sunlight

NGSS: 1-ESS1-1 Earth's Place in the Universe, K-PS3 Energy

Skills: Making inferences, critical thinking

Background: *Twinkle, Twinkle, Daytime Star* introduces kids to the incredibly important powers of the Sun. The Sun influences planets, seasons, plants, animals, and so much more. Before you start to read with your students, find out what they already know about the Sun.

Activity:

1. On a sunny day, take your students outside. If you like, have them take a paper and pencil so they can jot down their observations about the Sun.

2. If you are doing this activity with older students, give them a few minutes to walk around indepndently. Ask them to use their paper and pencil to make observations about what they see, especially as it relates to the Sun.

3. When they are done exploring, gather your students in a group. Ask them the following questions:

- What do you know about the Sun?
- What do you see outside?
- How do you feel when you stand in the Sun? What happens to you?
- What kinds of plants and animals do you see in the sunny and shady areas?
- How would you feel if it was sunny all the time and never dark? What do you think would happen?
- What do you think happens to the Sun at night?
- What season is it right now?
- How is the Sun different when it's not the current season?

Discussion: The Sun may be a constant presence in our lives, but its effects are far from singular. The above questions may guide your discussion, but feel freee to expand based on what your students see and the kinds of questions they have. Guide your students through the questions provided to help them make connections about the position of the Sun, the seasons, and the way plants grow. For younger students, this could be as simple as guiding them into thinking about how the Sun moves across the sky or the difference in the temperature during the night and day.

After Reading: What Are Seasons?

Grades: Preschool – 2nd Grade

Materials: *Twinkle, Twinkle, Daytime Star*, flashlight, orange, marker, pencil, pushpin

Subject: Seasons

NGSS: 1-ESS1 Earth's Place in the Universe, K-PS3 Energy

Skills: Observation, critical thinking

Background: Earth sits on an axis, an imaginary line that goes through the top and bottom of the spinning planet. Earth's axis is tilted so light from the Sun hits the Earth at different angles depending on the season. At any given moment, each half of the Earth (called a hemisphere) gets more or less sunlight than the other half. The hemisphere that receives less sunlight subsequently receives less heat, meaning that the hemisphere is experiencing winter. This hands-on activity will help your students visualize the tilt of the Earth.

Activity:

1. Read *Twinkle, Twinkle, Daytime Star* out loud to your class.

2. Use the marker to label your orange (this will be the Earth) with the equator and the Northern and Southern hemisphers. Put the pencil through the center of the orange; this will be the Earth's axis. Put the pushpin approximately where you live.

3. Turn out the lights in your classroom. Ask one student to hold the flashlight in the center of the room. They are the Sun.

4. Ask another student to hold the "Earth" and move in a circle around the "Sun." Make sure that the student holding the Earth is keeping it tilted slightly with the top toward them and the bottom titlted away from them. The flashlight should stay pointed at the Earth the whole time.

5. As the Earth moves around the Sun, have the students note which hemisphere is receiving more light and which seasons the hemispheres are experiencing.

    a. If your students are older, you can ask whoever is holding the Earth to rotate it on its axis (spin the pencil with the orange on it), demonstrating night and day.

    b. If your students are younger or are having trouble coordinating their movements, you can spin a globe instead of an orange and have one student shine a flashlight on your location.

Discussion: Was this an easier way to visualize the seasons? Ask your students to demonstrate the current season. Is your side of the Earth getting a lot of Sun or little Sun? if your students are older, you can ask them which season they are experiencing or if it is daytime or nighttime during the activity.

After Reading: Sunscreen

Grades: Preschool - Third Grade

Subject: Sunshine

Materials: *Twinkle, Twinkle, Daytime Star*, dark colored construction paper (black, blue, purple), white crayons, sunscreen

NGSS: K-PS3-2 Energy

Skills: Observation, analysis

Background: *Twinkle, Twinkle, Daytime Star* teaches students that the Sun is powerful and essential for all life on Earth. But it is possible to have too much of a good thing—thus, sunscreen! Sunscreen blocks harmful UVA radiation from the Sun and prevents damage to the skin. This simple experiment will show your students why it's so important to always wear sunscreen when spending time outdoors.

Activity:

1. Read *Twinkle, Twinkle, Daytime Star* to your students.
2. On a sunny day, pass out one sheet of dark colored construction paper (blue, black, or purple) to each student. Use a white crayon to draw a line down the middle of the paper. On one side, write "sunscreen;" on the other side, write "no sunscreen." You can also have the students write their names if you wish.
3. Have each student lightly coat their hand with sunscreen, then make a handprint on the side of the paper labeled "sunscreen." Take your students and their papers outside and leave them in a sunny spot for a few hours. You may want to do this just before recess or at the beginning of the day so that students can collect their papers before the Sun sets.

Discussion: After the students collect their paper, they will notice that the Sun bleached the side of the paper without suncreen, but not the handprint they made earlier. Ask your students why they think we wear sunscreen. What effect did it have on the paper? What do they think happens to people if we are in the Sun for too long without sunscreen?

After Reading: Explore Our Solar System

Grades: Preschool – 3rd Grade

Materials: *Twinkle, Twinkle, Daytime Star*, The Solar System worksheet, Solar System Fact Sheet, markers/crayons

Subject: Astronomy

NGSS: 1-ESS1-1 Earth's Place in the Universe

Skills: Critical thinking, analysis, organization, research

Background: We live on planet Earth, which is one of the eight planets in our solar system. The solar system is so named because all eight planets revolve around the same star, the Sun. The planets are Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, and Neptune. We are lucky because Earth is just the right distance from the Sun, neither freezing cold like Neptune or boiling hot like Venus. Our solar system is a part of the Milky Way, a galaxy that includes billions of stars and thousands of other planets that are not a part of our solar system.

Activity:

1. Read *Twinkle, Twinkle Daytime Star* to your students.

2. To help your students understand the scale of the solar system, download the app Solar Walk and allow your students to play with the app. On Solar Walk, students look at different traits and the locations of each planet. If you don't have access to a tablet, use the website https://www.solarsystemscope.com. If you don't have access to the internet or would prefer not to use it for this activity, print and pass out the Solar System Fact Sheet in this guide.

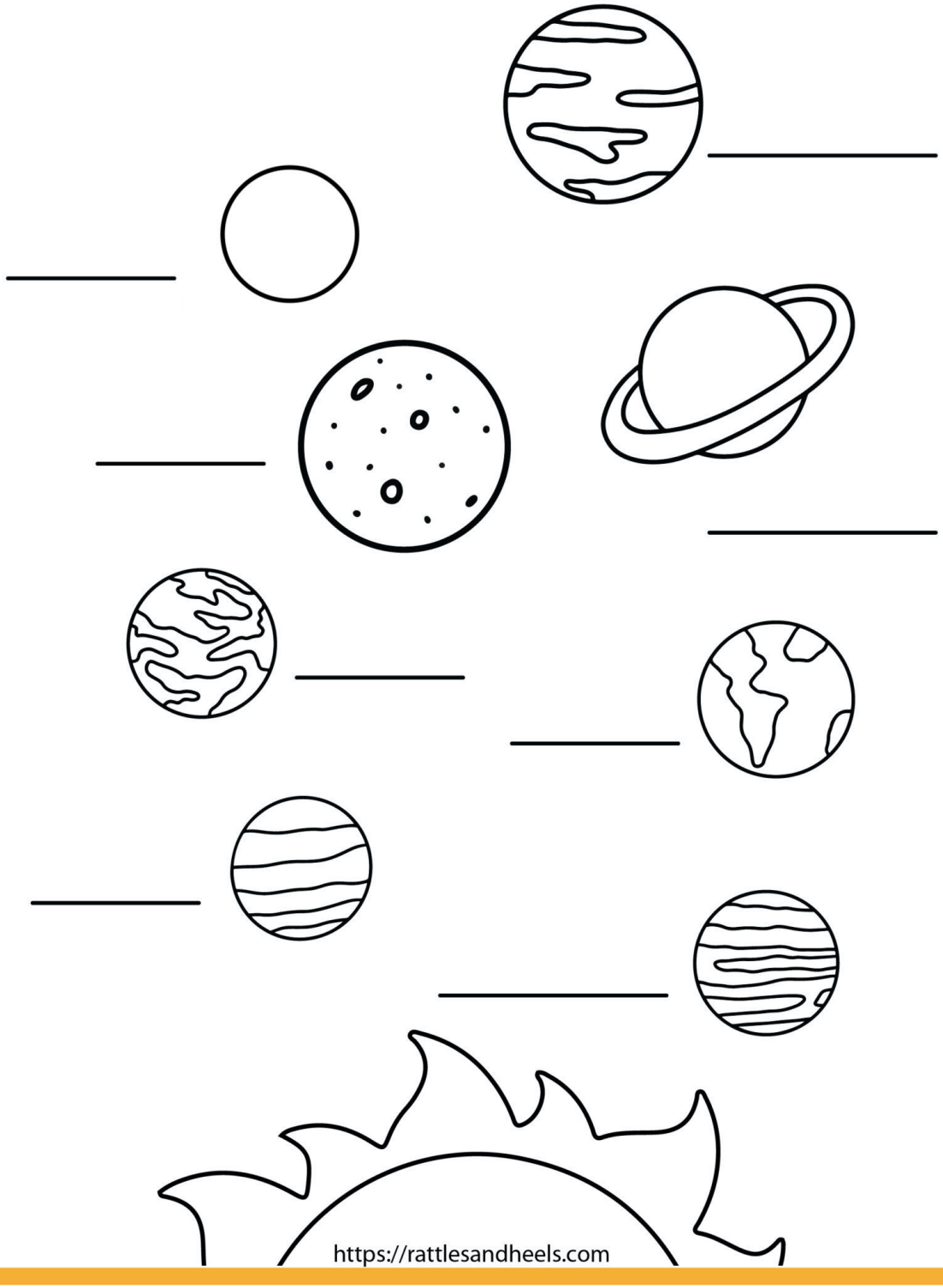
3. Discuss the characteristics of each planet with the students, going over the order of them and how close or far they are from the Sun. To help them remember the order the planets, teach them a mnemonic device such as My Very Excellent Mom Just Served Us Noodles (Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune).

4. Hand out the Solar System worksheet to each student and have them label and color each planet. If they need to, they can refer back to the app, the Internet, or the Fact Sheet.

Discussion: Ask your students why they think it's important to be exactly the right distance from the Sun. What would happen if we were closer or farther away? Do they think we could live on any other planets?

Name: _____

The Solar System



https://rattlesandheels.com

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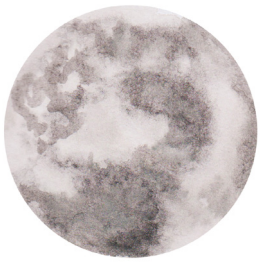
Solar System Fact Sheet

**These planets are not to scale.*

The Sun
is the center of the solar system. The Sun is the brighest object in the sky.

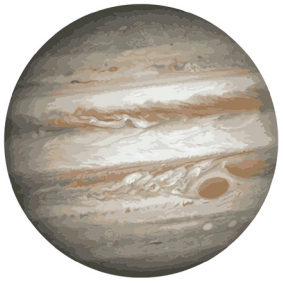


Mercury
is the closest planet to the Sun. It is the smallest planet in the solar system, and it is gray in color.

Venus
is the second planet from the Sun. It is yellow/orange in color, and it is the hottest planet in the solar system.

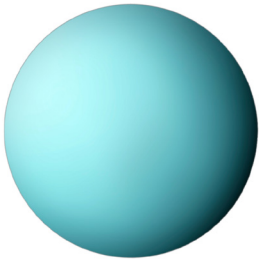
Earth
is the next planet in the solar system, and it's the planet we live on! Earth has the most life forms on it of all the solar system's planets.

Mars
is the fourth planet from the Sun. This planet is red, which is where it gets its nickname of "The Red Planet."

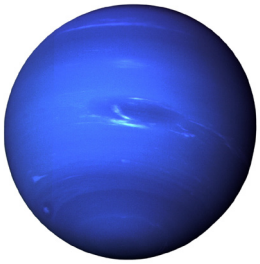


Jupiter
is the fifth planet from the Sun. It has brown and orange stripes around it. Jupiter is the biggest planet in the solar system.

Saturn
is the sixth planet from the Sun. It is a yellow planet, and this planet is so light that it could float on water.



Uranus
is the seventh planet in the solar system. Uranus is blue in color, and it is the only planet that rotates on its side.



Neptune
is the eighth and furthest planet from the Sun. Neptune is dark blue and one of the coldest planets.

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