

## Companion Guide for Parents and Educators - Activity 1 : Create A Simple Telescope

### Objective:

Introduce children to the concept of magnification and the historical significance of Galileo Galilei's improvements to the telescope.

### Background:

In 1609, Galileo did not invent the telescope, but he improved it dramatically. Using a combination of lenses, he built a telescope that magnified objects up to 20 times. With it, he observed the moon, sunspots, and Jupiter's moons-changing how we view the universe.

### Materials Needed:

- Two magnifying glasses (one small, one larger)
- Two cardboard tubes (one fits inside the other)
- Tape
- Markers or stickers

### Instructions:

1. Attach the smaller magnifying glass to one end of the narrow tube.
2. Attach the larger magnifying glass to one end of the wider tube.
3. Slide the narrow tube into the wider tube and adjust until a clear image forms.
4. Test the telescope on distant objects like trees or the moon.
5. Decorate the telescope for fun.

### Enhancements:

- Share Galileo's story and how he discovered Jupiter's moons.
- Have kids sketch what they see.

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- Discuss modern telescopes like the James Webb Telescope.
- Link with story passages from 'Galileo's Points of Light in the Night Sky.'
- Share Galileo's story and how he discovered Jupiter's moons:

### **Answers to the Enhancements -**

#### **- Share Galileo's story and how he discovered Jupiter's moons.**

Tell children that in the year 1610, Galileo Galilei turned his telescope toward the night sky and made a discovery that shook the scientific world. When he observed the bright planet Jupiter, he noticed four tiny points of light that seemed to move night after night. At first, he thought they were stars. But as he kept observing, he realized they were not stars at all. These were moons, orbiting Jupiter. He called them "Medicean Stars" after his patrons, the Medici family, but today we know them as Io, Europa, Ganymede, and Callisto. This was the first time anyone had seen moons orbiting a planet other than Earth. It proved that not everything revolved around our world—a bold idea that went against the teachings of the time.

#### **- Have kids sketch what they see:**

Encourage children to use a science notebook or a sketch pad to draw what they observe through their homemade telescope. If they cannot see much at first, suggest they observe during daylight and sketch trees, houses, birds, or clouds. At night, they might draw the moon and label its craters or shapes they recognize. Ask them to pretend they are early astronomers and to record their drawings as if they were making a scientific journal. This activity helps develop observation skills, attention to detail, and artistic expression.

#### **- Discuss modern telescopes like the James Webb Space Telescope:**

After building a simple telescope, talk about how far technology has come. Explain that the James Webb Space Telescope (JWST) is a massive, high-tech space observatory launched in 2021. Unlike Galileo's telescope, which magnified the night sky with lenses, JWST uses infrared light to peer into the oldest parts of

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the universe. It helps scientists learn about how galaxies formed, whether there are planets like Earth, and what distant stars are made of. Let children know that this modern telescope is like a time machine-it shows us light that left stars billions of years ago.

### **- Link with story passages from 'Galileo's Points of Light in the Night Sky':**

Pair this activity with selected scenes from the book where Jennifer, Daniel, and Dr. K witness Galileo's discoveries firsthand. Choose a passage where Galileo explains how he made his telescope or his astonishment upon seeing the moons of Jupiter. Invite children to step into the shoes of the characters. Ask them, "What would you say to Galileo if you were standing there with him?" This strengthens reading comprehension and connects science to storytelling.

### **Discussion Questions:**

1. Why was Galileo's telescope important?
2. What do you think Galileo felt when he made his discoveries?
3. What tool would you invent?
4. How do telescopes help us today?
5. What would you name a new planet?

### **Parent Explanations and Answers:**

1. Why was Galileo's telescope important?

Galileo's telescope was important because it opened up the heavens for observation. It was the first time humans had a tool powerful enough to study space in detail. He confirmed that Earth was not the center of the universe and laid the groundwork for astronomy.

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2. What do you think Galileo felt when he made his discoveries?

He likely felt wonder and amazement at seeing things no one had ever seen before, but also fear. Galileo knew his discoveries challenged powerful beliefs. His courage helped change the way we understand our universe.

3. What tool would you invent?

Let children imagine freely. A tool to see the deep sea, another planet, or even time travel are all valid ideas.

Guide their thinking by asking what problem their tool solves and how it helps people.

4. How do telescopes help us today?

Modern telescopes help us explore deep space, discover new planets, study stars, and even track asteroids.

They help scientists learn about the history and future of our universe.

5. What would you name a new planet?

Encourage creativity. Children might use names from mythology or invent brand-new words. Let them describe their planet-its size, colors, life forms, and weather. Ask them to draw it and tell its story.

### Parent/Educator Tips:

- Help kids focus the telescope through trial and error.
- Reinforce curiosity and observation as scientific tools.
- Use literature to deepen the learning experience.

### Resources:

#### Books:

- "I, Galileo" by Bonnie Christensen

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- "Galileo's Journal: 1609-1610" by Jeanne Pettenati
- "The Telescope" by Harry Brearley

### **Videos:**

- NASA's "Telescopes: Eyes on the Universe" (YouTube)
- Crash Course Kids: "Magnification" (YouTube)
- PBS Space Time: "How Galileo Changed the World" (YouTube)

### **Websites:**

- NASA Kids: <https://www.nasa.gov/kidsclub/index.html>
- ESA Space for Kids: <https://www.esa.int/kids>
- Galileo Biography for Kids: [https://www.ducksters.com/biography/scientists/galileo\\_galilei.php](https://www.ducksters.com/biography/scientists/galileo_galilei.php)