Activity and discussion guide

Galileo Galilei

History Science Theatre ON DEMAND
A production of Matheatre

Galileo Galilei

Dear Teacher,

Thank you for bringing Matheatre's *History Science Theatre ON DEMAND* into your classroom or home learning curriculum. Matheatre's mission is to use live theatre to tell stories that inspire excitement about math and science. We hope that the personal storytelling and character interpretations in this video series will make the many faces of science relatable and alive for modern students.

In this guide you will find:

- A brief biography of the historical figure
- A summary of key concepts presented in the video story
- Suggested discussion questions
- Suggested activities
- Suggested reading

We believe that *stories* hold immense power to engage the imagination, foster empathy, encourage creative and critical thinking, and educate by way of entertainment. We hope the stories in this series inspire lively conversation, exploration, experimentation, curiosity, and perspective for each of your students as they make history in their own way.

Sadie Bowman
Co-founder, Managing Director
Matheatre

Who was Galileo?

GALILEO GALILEI (1564-1642) was a mathematician, physicist and engineer, best known for arguing that the solar system is heliocentric, or sun-centered, challenging and disproving the prevailing scientific notions of his day.

In a time when science was firmly linked to philosophy, Galileo was a pioneer of something present-day scientists take for granted-- experimentation. Rather than taking truths to be self-evident, he tested the rules of physics, studying velocity, gravity, inertia, and projectile motion, laying the groundwork for the physical "laws" that we accept today.

As a science communicator, Galileo wrote all his books in modern Italian rather than academic Latin, rendering his writings on science more accessible to common people who were literate but not educated in the formal strictures of the time. He wrote books in dialogue, with characters questioning and arguing with one another, a style of science communication that was centuries ahead of his time.

Galileo was convicted of heresy for his assertions about the solar system, and was pardoned by the Catholic Church in 1992, 330 years after his death.

Key lesson concepts:

Motion of falling objects

Phases of the moon

Optics of refractor telescopes

Science as a search for truth

Galileo's father,musician Vicenzo Galilei

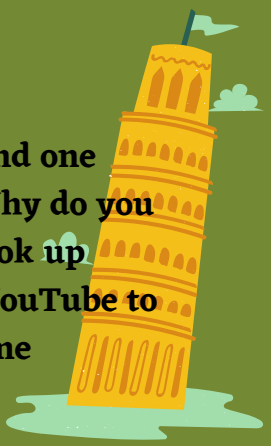
Suggested discussion questions

- Galileo got into big trouble for challenging the dominant ideas of his time. Would you challenge something you know is wrong, even if it means you get into trouble?
- Did you expect the different sized objects to land at different times? Did that surprise you and if so, why? If not, why?
- Aristotle was a very respected astronomer whose ideas were later proved wrong by Copernicus and Galileo because they had more information than he did. Do you think that means Aristotle was a bad scientist?

Galileo did experiments at the famous Leaning Tower of Pisa

Suggested activities

- **Try Galileo's falling object experiment yourself! Drop two objects of different weights to the ground and test out whether they always land at the same time. Now take two balls of different weights and roll them down a ramp. Does one roll faster than the other?**



- **Now try one heavy thing and one feather! What happens? Why do you think it went that way? Look up "Galileo Proven Right"on YouTube to see an astronaut do the same experiment on the moon!**

The University of Padua, where Galileo worked in the 1600s, is still open today!

Suggested discussion questions

- With the world's first telescope, Galileo looked at the sky and discovered there are moons orbiting the planet Jupiter. If you had the chance to be the first person ever to get a look at something in the sky, where would you point your telescope? *(for more about telescopes and astronomical discoveries, see our History Science Theatre ON DEMAND program on Caroline Herschel!)*

- Galileo reminds us to never look directly at the sun. Why is that dangerous?

- Galileo was put on house arrest so he couldn't share his ideas. What do you think makes an idea dangerous?

Galileo as a younger man

Suggested activities

- **In the presentation, Galileo pretended to have conversations with puppets that represented Aristotle and Copernicus, so he could tell them about new discoveries in science. Make your own puppet of Galileo and another scientist you admire. Put on a show where the two of them tell each other about their experiments!**

- **You can make your own very simple refractor telescope! ASK AN ADULT if there are any old eyeglasses around your house they don't need anymore. WITH THEIR PERMISSION, figure out a way to attach the lenses to the two ends of a paper towel tube or empty mailing tube. Experiment with the positions of the lenses and see what you can see!**

Suggested reading

I, Galileo	*Starry Messenger*	*Astrophysics for Young People In A Hurry*	*Many Moons*
BY BONNIE CHRISTENSEN	BY PETER SIS	BY NEIL DEGRASSE TYSON	BY RÉMY COURGEON

HISTORY SCIENCE THEATRE ON DEMAND

Modern day Galileos!

Galileo said the universe is a great book written in the language of mathematics, and mathematicians, astronomers and physicists are still learning to read it today!

It's hard to know what Galileo would be up to if he were around today, but many, many people are using math to understand the universe near and far.

Mathematicians like Brittany, pictured here, use math every day. Brittany says *"math helps us do so much! From science to cooking to money to video games to sports, math is everywhere! I love finding all the ways that math shows up in our daily lives, and I'm still finding new ways every day even though I'm all grown up :) Math helps us make sense of the world around us, helps us do things more efficiently, and teaches us how to solve all kinds of problems!"*

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