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Moon  
phases

TIDES

& eclipses

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(oh my)



Acting out celestial events

**Developed by:** Betsy Mills, UCLA NSF GK-12 Fellow

**Title of Lesson:** Moon Phases, Tides, & Eclipses (oh my)

**Grade Level:** 8<sup>th</sup> grade

**Subject(s):** Astronomy

**Summary:** Students will work in groups to act out solar and lunar eclipses, tides, and the phases of the moon.

**Time Required:** 45 minutes

**Group Size:** Groups of 3–4 students

**Cost to implement:** Nominal cost to make copies of worksheet, and for supplies (tape, construction paper, etc.) if students wish to make additional visuals for their presentation

**Learning Goals:**

- Students understand that tides are primarily caused by the moon
- Students understand that the tides changing each day is because the earth is spinning (which takes 24 hours), not because the moon is moving around the earth (which takes 1 month).
- Students know the relative positions of the sun and moon for lunar and solar eclipses
- Students understand that moon phases occur due to the motion of the moon around the earth
- Students understand that one side of the moon is always light, and one is always dark.

**Level of Inquiry:**

This activity incorporates inquiry by having students develop their own explanation of a phenomenon, using sources of their choosing (anything from their own prior knowledge to a textbook, to just acting it out for themselves) and by having students form the arguments they will use to explain their phenomenon to the class.

**Materials List:**

Groups investigating eclipses and moon phases might benefit from having a flashlight, and groups investigating moon phases could also benefit from having a small foam ball to more clearly see the changing phases.

**Introduction:**

To demonstrate what is expected of the students, have the class direct you (and, if necessary, another volunteer student) to act out another phenomenon. Ask them to tell you what you should be doing, and how you should be moving. For example, for the seasons:

- Ask the students where the person acting out the earth and the person acting out the sun should be, and which goes around which.
- Ask the students, how does the earth go around the sun? Does it get much closer in the summer?
- How should the earth be tilting?
- What does winter look like in the Northern Hemisphere? In the Southern Hemisphere?

**Procedure:**

- Assign each group a phenomenon (eclipses, moon phases, tides)
- Have students follow the attached worksheets, and answer the questions related to their phenomena.
- Students should determine how they will act out their phenomenon and demonstrate the answers to these questions for the class.
- Once a group has a plan, they may construct additional props to aid with their explanation.

**Safety Issues:** None

**Lesson Closure:**

To wrap up the activity, there are several possibilities:

- Have all groups act out each phenomenon one last time, forcing students to be familiar not just with the phenomenon they taught the class, but the other two phenomena they saw presented
- Select random groups of students to act out a phenomenon from their memory of what they just saw presented
- Quiz groups using the worksheet questions about the phenomena they saw presented.

**References:** None

**CA Science Standards addressed:**

4e: Students know the appearance, general composition, relative position and size, and motion of the objects in the solar system, including planets, planetary satellites, comets, and asteroids.

**Attachments:** See below for worksheets for each of the three phenomena

# MOON PHASES

*“One of these days Alice, straight to the Moon!”*

You will be acting out moon phases for the class! Each person in your group needs to pick one of the following roles:

Starring:

- \_\_\_\_\_ as the **Moon**: You are the center of attention here!
- \_\_\_\_\_ as the **Sun**: You and your flashlight light it up
- \_\_\_\_\_ as the **Earth**: You have a front row seat to watch how the moon changes!
- \_\_\_\_\_ as the **Director**: You help control how everyone else moves

**Get ready! You need to work together by acting out these roles to find the answers to these questions. Then, you will act out those answers for your classmates so that they understand moon phases too!**

Why do we only see one side of the moon from the earth?

Where are the moon and the sun when there is a full moon?

Where are the moon and the sun when there is a new moon?

When do Waxing and Waning moon phases occur?

Bonus question: What time of day does a first quarter moon rise?

# TIDES

*"Tide goes in, Tide goes out. " You CAN explain that!*

You will be acting out tides for the class! Each person in your group needs to pick one of the following roles:

Starring:

\_\_\_\_\_ as the **Moon**: You and the Sun help make tides!

\_\_\_\_\_ as the **Sun**: You and the moon help make tides!

\_\_\_\_\_ as the **Earth**: The moon and the Sun pull on you, and distort your shape.

\_\_\_\_\_ as the **Director**: You help control how everyone else moves

**Get ready! You need to be able to act out how tides work to demonstrate the answers to these questions for your classmates!**

The right hand of the person playing the earth represents East, and the left hand represents West. Which way does the earth spin?

Who controls the tides, the Moon or the Sun?

Why?

Why are there two tides a day?

Bonus question: When do the highest tides of the year occur? Why?

# ECLIPSES

*"The clouds I can handle, but I can't fight an eclipse"*

You will be acting out eclipses for the class! Each person in your group needs to pick one of the following roles:

Starring:

\_\_\_\_\_ as the **Moon**: You and the Sun have to work together to make an eclipse

\_\_\_\_\_ as the **Sun**: You and your flashlight are the center of the action

\_\_\_\_\_ as the **Earth**: You are the only one who can see the eclipse and determine if the alignment is right!

\_\_\_\_\_ as the **Director**: You help control how everyone else moves

**Get ready! You need to work together by acting out these roles to find the answers to these questions.**

**Then, you will act out those answers for your classmates so that they understand eclipses too!**

Where does the moon have to be for there to be a lunar eclipse?

What time of day do these occur?

Where does the moon have to be for there to be a solar eclipse?

What time of day do these occur?

Bonus question: Why don't eclipses happen every month?