

# Moving from Hands-On to Active: Example Lessons

## About this Document

To go along with our [active learning flow chart](#), [active learning blog post](#), and [active learning video](#), here are two sample lessons that will help you see the differences between a hands-on project and one that utilizes active learning. Both of these lessons are similar, but the first one only engages in hands-on activity. The second is an upgraded version that helps students use both their hands to experience the project but also their minds as they think and reflect on what it means and why it is important.

## *Moon Phases Assignment – Example 1: Hands-On Learning*

### Standard:

[MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.](#)

Students use patterns observed from their model to provide causal accounts for events, including the following for moon phases:

- Solar energy coming from the sun bounces from the moon and is viewed on Earth as the bright part of the moon.
- The visible proportion of the illuminated part of the moon (as viewed from Earth) changes over the course of a month as the location of the moon relative to Earth and the sun changes.
- The moon appears to become more fully illuminated until “full” and then less fully illuminated until dark, or “new,” in a pattern of change that corresponds to what proportion of the illuminated part of the moon is visible from Earth.

### Learning Goals

Students will be able to:

- Create a model that reflects the phases of the moon and explain how each phase is formed.

## Key Questions

- What causes the phases of the moon to occur?

## Key Vocabulary

- New Moon
- Full Moon
- Waxing
- Waning

## Handouts and Materials Needed

- [Moon Phases Cookie Lab](#)
- Hydrox Cookies (4 per group)
- Paper plates
- Plastic knife or something similar to scrape
- KWL Chart

## Preparation

For this activity, students can work in small groups of 2-3. Have materials set up in sets for students to save time.

## Lesson Plan

### ***Engage (10-15 minutes)***

- Individually have students complete the K(**Know**) and W (**Want to Know/Wonder**) parts of the KWL. Give 2-3 minutes for the Know section; instruct students to write down anything that they know about the moon/moon phases. Next, give students 2-3 minutes to write anything that they want to know or wonder about the moon/moon phases.
- Spend a few minutes asking students to first share their **Knows** and then a few minutes for students to share their **Wonders**.

### ***Explore***

- Place students into groups of 2-3 for the Explore portion of the lesson. Hand out the materials needed for the activity.
- Instruct students that they will be sharing out their thinking from
- Give students 15 minutes for Part One of the activity. Ensure that students are following directions when opening Hydrox cookies and scraping off the cream portion. Once students have cookies completed, circulate making sure that you checked each groups work and that they can move forward in the lesson.
- Part Two (Diagram): Give students 15 minutes to complete the diagram portion of the activity.

### **Explain**

Use [think-pair-share protocol](#) to answer the following questions using evidence from the activity:

1. Why can we see all of the moon during a full moon?
2. What is happening as the moon moves from a new moon to a full moon?
3. What is happening as the moon moves from a full moon back to a new moon?

### ***Elaborate***

Students apply learned knowledge to the projects.

## ***Moon Phases Assignment – Example 2: Active Learning***

### **Standard:**

*MS-ESS1-1. Develop and use a model of the Earth-sun-moon system to describe the cyclic patterns of lunar phases, eclipses of the sun and moon, and seasons.*

Students use patterns observed from their model to provide causal accounts for events, including the following for the moon phases:

- Solar energy coming from the sun bounces from the moon and is viewed on Earth as the bright part of the moon.
- The visible proportion of the illuminated part of the moon (as viewed from Earth) changes over the course of a month as the location of the moon relative to Earth and the sun changes.
- The moon appears to become more fully illuminated until “full” and then less fully illuminated until dark, or “new,” in a pattern of change that corresponds to what proportion of the illuminated part of the moon is visible from Earth.

### **Learning Goals**

Students will be able to:

- Use a model that simulates the phases of the moon and explain how each phase is formed.

### **Key Questions**

- What causes each phase of the moon to occur?
- What are the predictable patterns caused by Earth’s movement in the solar system?

### **Key Vocabulary**

- New Moon
- Full Moon
- Waxing
- Waning

### **Handouts and Materials Needed**

- [Phases of the Moon Video](#)
- Phase One of the Lesson [Phases of the Moon Simulation](#)
- Phase Two of the Lesson [Moon Phases](#)
- [Phase Two Recording Document](#)
- Styrofoam ball or something similar
- Pencil or something similar
- A lamp to represent the Sun

## Preparation

Make sure to set expectations for working in small groups. Also, inform students that they will be working on two parts of the lesson.

## Lesson Plan

### Engage

Students will work individually during this section of the lesson.

Have students complete a [Notice-Wonder](#) chart as they watch the video.

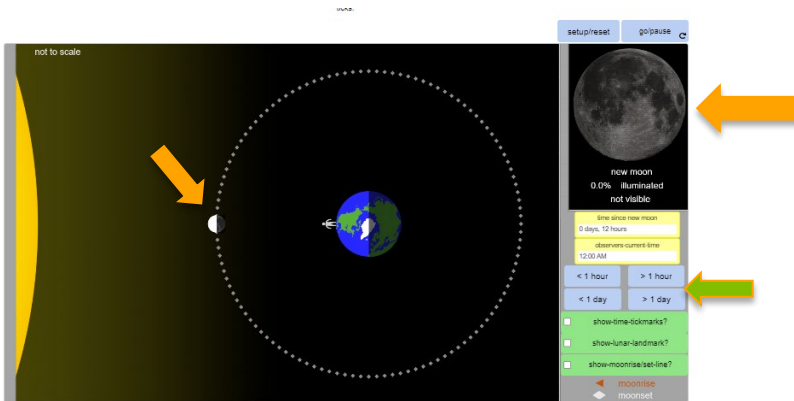
Show the video twice; First time is for students to complete the Notice portion of the chart and then spend a few minutes letting students share their Notices. The second time is for students to complete the Wonder portion of the chart and share their Wonderings.

### Explore

This lesson will have two parts for students to complete. Place students in small groups (2-3). Have all students start on Phase One of the lesson. As students are working on the Phases of the Moon Simulation, call small groups, one at a time, to complete Phase Two.

### Phase One:

Have students go to the Phases of the Moon Simulation.



Students will observe the pattern that occurs with the moon (orange arrows) as they add a day (green arrow). Have students add a day until the moon has completed a full orbit around the Earth. Students will complete the Moon Simulation handout.

**Phase Two:**

Have the Moon Phases set up in a dark place. Although the lesson states for students to complete individually, it can be performed in small groups with some fine-tuning. One student could act as the Earth and hold the moon, one student can observe, and one student could be the recorder of information.

As students move through the activity, have them complete page one of the Recording Document.

**Explain**

Students will complete page two of the recording document using evidence from Phase One and Phase Two of the lesson.

**Elaborate**

Students apply learned knowledge to the projects.