

# Space Systems & Cycles

*Lesson Plan for Middle School*

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## OVERVIEW & PURPOSE

Students will develop a model Earth-Moon-Sun that describes the cyclical patterns of lunar phases, eclipses of the sun and moon, or seasons. Students will connect it with a Makey Makey and develop a Scratch program for further description.

## EDUCATION STANDARDS

(Next Gen. Science) MS-ESS1-1 Develop and use a model of the Earth-Sun-Moon to describe the cyclical patterns of lunar phases, eclipses of the sun and moon, and seasons.

## OBJECTIVES

1. Students will demonstrate the cyclical patterns of the Earth, Moon and Sun.
2. Students will create interactive programs within the Scratch program or other coding language.

## MATERIALS NEEDED

1. Computer with internet access
2. Access to an account at [scratch.mit.edu](http://scratch.mit.edu)
3. Makey Takey kit ([www.gvlibraries.org](http://www.gvlibraries.org))
  - 4 Makey Makey Circuit Boards
  - 4 USB Wires
  - 48 20" Alligator Clip Wires
  - 12 6' Alligator Clip Wires
  - 12 6' White Connector Wires
  - 12 6" Multicolored Connector Wire Sets (6 wires in each set)
  - 12 Graphite Pencils

- 10-pack PlayDough
  - Foam Craft Balls
4. Maker materials for building a model (Cardboard, Brass fasteners, etc.)

## ACTIVITY

Teachers will pre-teach the cyclical patterns of the Earth-Moon-Sun to gain a better understanding of the processes and patterns.

Teachers will pre-teach how to code using Scratch or a similar programming language that works with Makey Makey.

Students will design and build a physical model of the Earth, Sun and Moon that represent an aspect or all aspects of the cyclical patterns - this could be a model of the lunar phases, of how an eclipse happens, or how the seasons work.

Students will design a Scratch program to work with their model using Makey Makey to describe what is happening in the model. Students will include information in their Scratch program using either a voice recording or the written word.

## EVALUATION

1. Student creates a model conveying the cyclical patterns of the earth-moon-sun
2. Student creates an accurate program that works with Makey Makey

## RESOURCES

A 15-minute streaming video about the Phases of the Moon (found between minutes 07:04 and 09:27), and the Eclipses (between minutes 09:29 and 11:09)

<http://www.gvlibraries.org/content/exploring-earth-sun-and-moon>

A Bill Nye Episode about the Earth's Seasons. This video includes great experiments!

<http://www.gvlibraries.org/content/earths-seasons>