

Lesson Plan Title

Earth, Sun, and Moon Stable

Grade Level

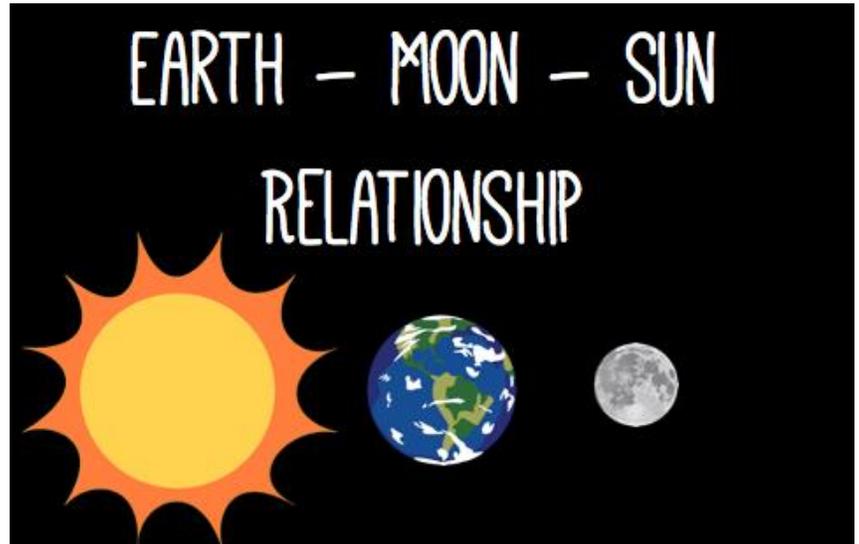
5th Grade

Subject Area

Science

MSCCRS Performance Objectives

- E.5.8B.1 - Analyze and interpret data from observations and research (e.g., from NASA, NOAA, or the USGS) to explain patterns in the location, movement, and appearance of the moon throughout a month and over the course of a year.
- E.5.8B.2 - Develop and use a model of the Earth-Sun-Moon system to analyze the cyclic patterns of lunar phases, solar and lunar eclipses, and seasons.
- E.5.8B.3 - Develop and use models to explain the factors (e.g., tilt, revolution, and angle of sunlight) that result in Earth's seasonal changes

**MSCCRS OBJECTIVES ESSENTIAL QUESTION:**

How do the movements of the Earth, Sun, and Moon impact life on Earth?

MSCCRS CORE IDEAS:

- The orbits of Earth around the sun and of the moon around Earth, together with the rotation of Earth about an axis between its North and South poles, cause observable patterns.
- These include day and night; daily changes in the length and direction of shadows; and different positions of the sun, moon, and stars at different times of the day, month, and year.
- This model of the solar system can also explain eclipses of the sun and moon.
- This also explains that seasons are a result of the Earth's tilt, leading to different intensity of sunlight on different areas of Earth throughout the year.

Art Form

Visual Art

MSCCR Visual Arts Standards

- VA: Cr2.1.5 - Organize and develop artistic ideas and work.
 - a. Experiment and develop skills in multiple art-making techniques and approaches through practice.
- VA: Cr2.2.5 - Organize and develop artistic ideas and work.
 - a. Demonstrate quality craftsmanship through care for and use of materials, tools, and equipment.
- VA: Pr6.1.5 - Convey meaning through the presentation of artistic work.
 - a. Cite evidence about how an exhibition in a museum or other venue presents ideas and provides information about a specific concept or topic.
- VA: Cn10.1.5 - Synthesize and relate knowledge and personal experiences to make art.

a. Apply formal and conceptual vocabularies of art and design to view surroundings in new ways through art-making

Duration

2 - 60-minute class sessions (minimum)

Materials

One Month Moon Phase Journal per Student

12 gauge armature wire

3 sizes of Styrofoam balls

foam brushes

Tempera paint (primary colors and black and white)

matchbox car

Objectives

The student will:

- Design and construct a stabile model of the Sun, Moon and Earth
- Explain the day and night cycle of the earth using the stabile model
- Write a detailed description of the day to night cycle

Visual Art Vocabulary

Stabile: a freestanding abstract sculpture or structure, typically of wire or sheet metal, in the style of a mobile but rigid and stationary

Sculpture in the round: a three-dimensional art piece that is freestanding and is meant to be viewed from all sides

Balance: refers to the ways in which the elements of visual art (lines, shapes, colors, textures, etc.) of a piece are arranged

Aluminum armature wire: heavy, dark aluminum wire which is stiff, but can be bent and twisted into shape without much difficulty

Primary colors: any of a group of colors from which all other colors can be obtained by mixing.

Primary colors consist of red, yellow, and blue

Color mixing: mixing together a number of colors to create new colors or shades

Shade/tint: the darkness or coolness of a color

Earth, Sun, and Moon Essential Vocabulary

Season

Tilt

Hemisphere

Winter

Spring

Summer

Fall

Equinox
Solstice
Shadow

Lesson Description

- Introduce the work of Alexander Calder using this site: <http://the189.com/sculpture/mobiles-stables-and-sculptur>
- Teacher can show an example of a completed Stabile using this site: <https://www.brainpop.com/science/space/moon/>

PROCESS:

In this project, each student will be given a calendar to record moon phase observations for one month. Each student will create a field journal. They will use this journal and their recordings on their calendar to create illustrations depicting the phases of the moon, adding a written description.

Part 1:

- Facilitate a whole group discussion of how day and night happen.
- Discuss the relationship between the Earth, Moon and Sun, including relative proportion, size and distance.
- Discuss scale models and use a matchbox car as an example because it is 1/64 the size of the real car it represents (real-world example). Explain that this is why the 3 Styrofoam balls need to be different sizes. Ask which ball would represent each element.
- Discuss the process of creating a model out of armature wire and styrofoam balls.
- Discuss the role of color in the sculpture and review color mixing.

Part 2:

- Students will build the three-dimensional stabile of the Earth, Moon and Sun using wire, paint and Styrofoam balls.
- Determine which ball will represent each element.
- Paint each ball to represent the Sun, Moon and Earth, making thoughtful color choices and allow to fully dry.
- Build the structure using the armature wire, adding the Styrofoam balls to represent the relationship between the elements.

Part 3:

- Students will complete an informational writing piece answering the following question: Should the Sun cease to exist, what is your predicted outcome for the Earth and the Moon? This works well done in small groups.

Recommended Resources

Earth, Sun, Moon Student Video: <https://study.com/academy/lesson/interactions-in-the-sun-earth-moon-system.html>

Moon Phase Observation Sheet for Students:

<https://www.hpschools.org/cms/lib/NY01913715/Centricity/Domain/117/Moon%20Phases%20Observation%20Sheet.pdf>

Alexander Calder Presentation: <https://the189.com/sculpture/mobiles-stables-and-sculptures-by-alexander-calder/>

Out of This World Rubric: <https://artsnowlearning.org/wp-content/uploads/2017/10/Grade-4-Out-Of-This-World-Project-2-Rubric.pdf>

Prezi (accelerated accommodation)

Extended Learning Activities

Options for accelerated students:

- Create a virtual stabile for the Earth, Sun, Moon and the eight phases of the moon. Students can use Prezi to create the virtual model. With each segment, students must write an explanation of each process. Students will then present their Prezi's in class. A three-point rubric will be used to assess the presentation.
- Write a script that could be used by a tour guide of an exhibit that demonstrates the day and night cycle caused by the revolution of the earth around the sun. The script should include statements referencing the stabile that was created for class addressing the standards.
- Write a song that describes the movement of the Moon, Sun, and Earth. The pitch of the music could change relative to the size of the object (for example – the Sun is the largest, so it would be represented by the lowest pitch since bigger instruments make lower sounds).
- Research how the days would be different on different planets in the solar system (longer/shorter) and write an informational essay to compare and contrast the day/night cycle of Earth vs. another planet.

ELL, IEP, or Promising 25%:

- Create a stabile using the provided materials. However, with teacher assistance, students will work in a group to complete a Circle Map discussing Rotation.

Sources

<https://artsnowlearning.org/project/grade-4-out-of-this-world/>

Tips

This has proven to be one of the most difficult concepts for 5th graders to fully understand. The more approaches you take to teaching it, the more successful the students will be.

To engage kinesthetic learners, have students model the relationship between the earth, sun, and moon with their bodies in groups of threes.

Adapted by:

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