



5-Minute Refresher: Daily Observable Patterns in the Sky

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Daily Observable Patterns in the Sky

– Key Ideas

- *Daily Observable Patterns in the Sky* include the occurrence of day and night, the appearance of the moon, the location of shadows and the placement of the stars. These patterns, which occur daily, also influence and create patterns that occur weekly, monthly and annually.
- These patterns stem primarily from the movements of the moon and Earth and how they relate to each other. Earth, our sphere shaped home, revolves around the sun while simultaneously rotating on its axis.
- While Earth is rotating on its axis and making a revolution around the sun, the moon is making a revolution around Earth.

Daily Observable Patterns in the Sky

– Key Ideas

- The first major daily pattern is the occurrence of day and night on Earth. This is caused by Earth's counter-clockwise rotation on its axis every twenty-four hours. The light and darkness occurs when Earth is facing towards or turned away from the sun, respectively. The counter-clockwise motion creates the pattern of the sun rising in the east and setting in the west.
- The appearance of shadows is directly related to the sun's position in the sky. If a person faces north in the morning, the sun will be on his right (rises in the east). Consequently, his shadow will be on his left. Furthermore, when the sun is high in the sky (noontime), a shadow will be shorter. When the sun is low in the sky, shadows are longest.

Daily Observable Patterns in the Sky – Key Ideas

- As the moon orbits the earth every 28 days, its position relative to the sun changes. This, along with the moon's distance from the earth, creates the pattern of moon *phases*- called crescent moons, quarter moons and full moon.
- The repetitive phases of the moon occur in a monthly pattern. The moon phases repeat themselves and can be predicted accurately over the course of the year.

Daily Observable Patterns in the Sky – Key Ideas

- Stars, which are comprised primarily of hydrogen gas, are much like the sun and give off heat and light. They are also similar to the sun in that they rise in the east and set in the west.
- Stars create observable patterns in the form of “dots”, which can be created to make pictures. These are called constellations. The constellations can move in position or location across the sky, but each “piece” in the constellation does not move because stars do not move or change position in relation to other stars.

Daily Observable Patterns in the Sky – Prior Knowledge

- Students will have an understanding of Earth's position in the sky relative to the moon and sun. They will know that the earth moves around the sun.
- Students will be familiar that the sun, moon and Earth cause the occurrence of day and night.
- Students will know that the moon takes on different appearances.

Daily Observable Patterns in the Sky – Learning Objectives for Grades K-3

- Describe and draw the movement of Earth around the sun and how it creates day and night.
- Observe shadows at different points of the day and describe how the sun affects the placement of shadows.
- Observe and diagram the moon's phases over a given period of time.

Daily Observable Patterns in the Sky – Learning Objectives for Grades 4-6

- Diagram and describe the movement of Earth, moon and sun and how these movements impact day and night.
- Create a model to represent the placement of Earth, moon and sun and four phases of the moon- crescent, quarter, three quarters, and full.
- Make and confirm predictions about shadows and their locations and size. Diagram findings.

Daily Observable Patterns in the Sky – Common Misconceptions

- Seasons are caused by the change in distance from Earth to the sun in different locations on Earth.

Reality: Seasons are caused primarily because of the axial tilt of the earth. The change in distance from the earth to the sun has a smaller impact than the axial tilt.

- The moon's phases are caused by the shadow of Earth on the moon.

Reality: The phases stem from the position of the sun, moon and Earth relative to one another and how the sun illuminates the moon.

Daily Observable Patterns in the Sky – Common Misconceptions

- The sun is the center of our universe and does not move.
Reality: The sun is the center of our solar system. It and all of our planets orbit around our Milky Way galaxy. This galaxy is one of a number of infinite galaxies in the universe.

Daily Observable Patterns in the Sky – Additional Information

- The sun is a moving gas, but doesn't move in the way most people think. While the sun can appear to move as it rises in the east and sets in the west, its movements actually are similar to the movements of Earth and sun. The sun, along with all of the planets and everything in our solar system, orbits around the Milky Way. At the pace of this orbit, it will take hundreds of millions of years to complete a full orbit.