





### Moon Phase Questions

1. What phase is low in the western horizon at around 2:00 am?

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2. Where is the full moon at 7:00 pm?

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3. Based on today's phase, what moon phase will it be in about 15 days?

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4. At what time will you see a waxing crescent moon directly south?

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5. At 4:00 pm, which moon phase is the most illuminated, and where is it visible?

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6. Which phases can be seen at noon?

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## Moon Phase Calculator

Can you see the moon during the day? How long does it take to complete the cycle of the moon's phases? What time of the day or night would you be able to see a full moon? Construct a simple Moon Phase Calculator that helps you understand the apparent motion of our closest celestial neighbor.

### National Science Content Standards

Grades K-4: Content Standard D – Students understand objects in the sky

Grades 5-8: Content Standard D – Students understand Earth in the solar system

### Background Information

The phases of the moon are caused by the relative positions of the Earth, Sun, and Moon. A complete lunar cycle starts with a new moon, then progresses through seven more distinct phases, and returns to the new moon. A complete cycle takes about 29.5 days to complete.

At the new moon, the near side of the Moon is under shadow since the Moon lies between the Sun and Earth. As it orbits Earth, viewers see the illuminated face of the Moon change in size and shape. In order of appearance, viewers next see a waxing crescent, the first quarter, a waxing gibbous, a full moon, a waning gibbous, the third quarter, a waning crescent, and finally, a return to the new moon.

### Materials

- One pair scissors
- 1" brass flat-prong paper fastener
- Single-hole paper punch

### Directions

1. Starting at "Day 0," fill in the blank moons to show the eight phases of the lunar cycle
2. Cut out the Horizon Dial
3. Punch one hole in the Horizon Dial
4. Use the brass fastener to attach the Horizon Dial to the calculator

### How to Calculate the Moon Phase

The calculator shows various types of information: the phases, the time of day, the day of the lunar cycle, and the relative position of the moon in the sky. Turn the Horizon Dial to a particular phase of the moon in the visible sky, day or night. The "Hour" pointer indicates the time of day that phase is visible.

For example, to see the full moon as it sets in the western horizon, viewers need to be awake before 6:00 am! It is easier to wait for the full moon to rise in the eastern horizon at about 6:00 pm. Also, given a particular date, counting forward or backward in time calculates past or future phases. Use the dial to answer the attached questions.

