The Moon: Phases, Eclipses and Tides: Worksheet

Astronomy and Space Science · Worksheet for https://jugami.com/space-science/moon-phases-and-eclipses/ · For instant feedback, try the self-guided quiz online.

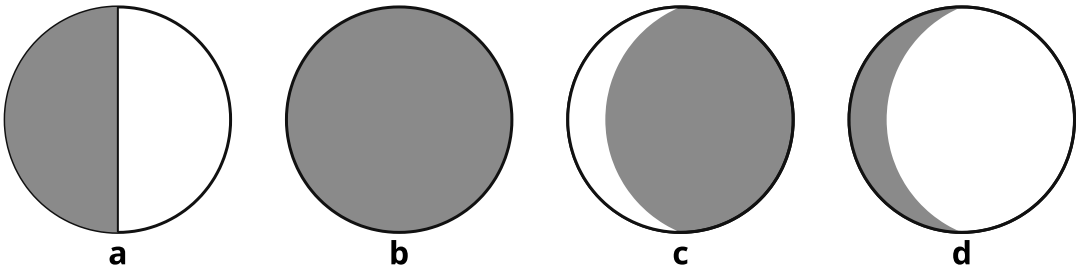
Jugami Astronomy and Space Science · Unit 3 · Grades 6–8 Unit page: https://jugami.com/space-science/moon-phases-and-eclipses/

Name: _____ Date: _____

Directions: Work the problems in order; they start easy and get harder. Show your arithmetic. A calculator is fine. All Moon drawings show the view from the Northern Hemisphere. "About" answers may be off by a little; explain how you got yours.

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1. **Name the phase (Figure A).**



Name the phase shown in each drawing. Then list the letters in the order they happen, starting with new moon.

a: _____ b: _____ c: _____ d: _____

Order: ____ → ____ → ____ → ____

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2. **A week, then two.** Tonight the Moon is full. Name the phase you would expect to see about one week from now, and about two weeks from now. Give a reason for each.

One week: _____ Two weeks: _____

Reason: _____

3. **A faint glow.** During a thin crescent Moon, you can sometimes see the "dark" part of the Moon glowing very faintly. Earth is lit by the Sun too. Explain where that faint light comes from, and why it shows up best near crescent phases.

_____

_____

4. **Build it to scale.** Earth is about 12,742 km across, the Moon is about 3,475 km across, and the average Earth-Moon distance is about 384,400 km. You make Earth a ball 12.7 cm across.

(a) About how wide should your Moon ball be? _____ cm

(b) About how far apart should you place the two balls? _____ cm (= _____ m)

5. **Predict full moons.** In a year that is not a leap year, there is a full moon on January 3. Using a cycle of 29.53 days, predict the dates of the next two full moons. (January has 31 days; February has 28.)

Next full moon: _____ The one after that: _____

6. **A Moon calendar.** A calendar made of 12 months, each one synodic month long (29.53 days), is used to count a year.

(a) How many days long is that 12-month year? _____ days

(b) How many days short of a 365-day year is it? _____ days

(c) After 3 years, about how far off would this calendar be? Why do some calendars add an extra month every few years?

_____

7. **What kind of eclipse?** Name the type of eclipse each observer describes (solar or lunar, and total, partial, annular or penumbral).

(a) "At midday the sky turned dusky, and a thin, bright ring of Sun circled a black disk." _____

(b) "A curved 'bite' was missing from one edge of the Sun, but the day never got dark." _____

(c) "The sky went dark like dusk, and a faint, pearly glow spread around a black disk." _____

(d) "The full Moon looked just slightly dimmer for a while, with no dark bite and no red color." _____

8. **Safe watching.** A friend plans to watch a partial solar eclipse through two pairs of dark sunglasses stacked together. Explain why that is unsafe, and describe two safe ways to watch instead.

_____

_____

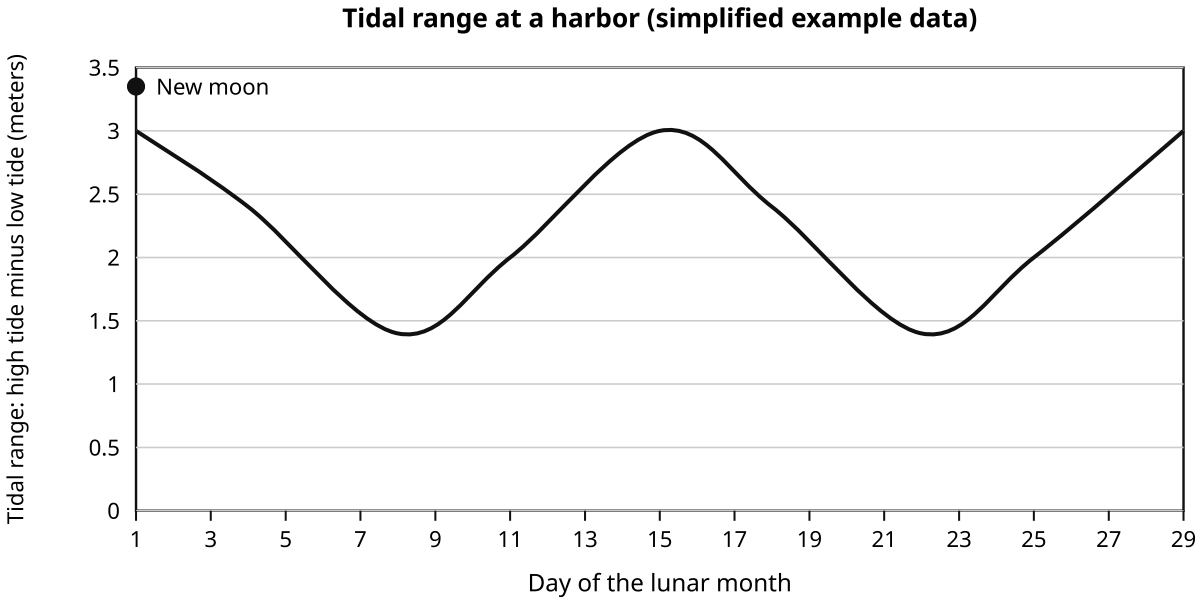
9. **Read a tide table (Figure B).**

Harbor tide log (simplified example)

Tide	Time
High tide	2:10 AM
Low tide	
High tide	
Low tide	
High tide (next day)	

Use NOAA's pattern for a coast with two highs and two lows: the water takes about 6 hours 12½ minutes to go from high to low (or low to high). Fill in the four blank times. Round to the nearest minute.

10. Spring or neap? (Figure C).



(a) On which two days in the first 28 days are the spring tides? _____ and _____

(b) On which two days are the neap tides? _____ and _____

(c) Name the Moon's phase on day 8, day 15 and day 22.

(d) Explain, using the positions of the Sun, Earth and Moon, why the range on day 15 is about twice the range on day 8.

_____

11. **Near and far.** NASA's Moon Fact Sheet lists a mean perigee (closest point) of about 363,300 km and a mean apogee (farthest point) of about 405,500 km.

(a) How many kilometers closer is the Moon at perigee than at apogee? _____ km

(b) That difference is about what percent of the apogee distance? _____ %

(c) Use your answer to explain why one solar eclipse can be total while another, just as centered, is annular.

_____

12. **An eclipse pair.** NASA lists a total solar eclipse on August 12, 2026 and a partial lunar eclipse on August 28, 2026 (both UTC dates).

(a) How many days apart are they? _____ days

(b) Half a synodic month is about 14.8 days. Compare your answer with that, and explain why a solar eclipse and a lunar eclipse can come as a pair about two weeks apart.

_____

13. **The next season.** NASA lists the next solar eclipse after August 12, 2026 as an annular eclipse on February 6, 2027 (UTC).

(a) Count the days from August 12, 2026 to February 6, 2027. _____ days

(b) The midpoints of eclipse seasons are about 173 days apart on average. Is your count close? Give one reason a single pair of eclipses need not be exactly 173 days apart.

_____

14. **Where do the 50 minutes come from?** Measured from the Sun's direction, the Moon goes all the way around (360°) in one synodic month, 29.53 days.

    (a) About how many degrees does the Moon move each day compared with the Sun's direction? _____ °/day

    (b) Earth turns about 15° per hour compared with the Sun. About how many extra minutes must Earth turn each day to face the Moon again? _____ minutes

    (c) Compare your answer with the lunar day of 24 hours 50 minutes. Why is your answer a little smaller? (Hint: what does the Moon do during those extra minutes?)

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