

Moon Pattern Detectives

Use observation data to find the Moon's repeating changes.

4.9.B “collect and analyze data to identify sequences and predict patterns of change in the observable appearance of the Moon from Earth.”

NAME _____

DATE _____

1 READ AND MARK _____

Read it twice

YOUR JOB Underline each phrase that tells how the visible lit part of the Moon changes. Circle the number that tells how long the pattern takes to repeat.

A Changing Moon

1 On clear evenings, a Moon watcher can collect data by recording the date and drawing the bright part that is visible. The Moon does not make its own light. Sunlight lights half of the Moon at all times, but from Earth we see different amounts of that sunlit half as the Moon travels around Earth.

MOON WATCHER OBSERVATION NOTES

Observation night	Visible lit part
2	Thin crescent
6	Half disk
10	More than half of the disk
14	Full disk
18	More than half of the disk

2 Scientists look for sequences in observation notes. When the visible lit part increases over several nights, the Moon is waxing. When it decreases, the Moon is waning. A prediction uses the order of the observations. For example, an increase that continues should lead to a larger visible lit part next.

- ③ A complete cycle of changing appearances takes about 29.5 days. Then the pattern begins again. The Moon changes because we view its sunlit half from changing positions, not because Earth's shadow covers it each night. Earth's shadow causes a lunar eclipse, which is a different, less common event.

2 ANSWER WITH EVIDENCE _____ Use the passage

- 1** What sequence does the table show from night 2 through night 14? Describe how the visible lit part changes.

- 2** Use the pattern in the table to predict the visible lit part on night 22. Explain your prediction.

- 3** Nights 10 and 18 both show more than half of the disk lit. How are these observations in different parts of the sequence?

- 4** If the Moon is full on night 14, about what night would you predict the next full Moon? Use the cycle length from the passage.

3 YOUR TURN

Your own words

Create a five-row prediction table for one Moon cycle. Choose five nights from 1 to 29 in order, and write the appearance you predict for each one. Include a growing appearance, a full disk, and a shrinking appearance. Then collect actual appearance data. Before class, teacher supplies five dated Moon observation photographs across one real cycle, including growing, full and shrinking appearances, with source and dates; keep a later sixth photograph hidden. Teacher checks the sequence and provides clear views. On extra paper inspect the first five photos and record each date, source and your drawing or description of the visible lit part. Order your records and label increasing or decreasing stretches. Predict the appearance on the sixth photo's date, which your teacher gives you. Cite two collected observations. Ask the teacher to reveal the sixth photo; record how it compares with your prediction. The passage table is a practice example, not your collected photo data.

NIGHT	PREDICTED VISIBLE APPEARANCE

PART 1 • READ AND MARK

Underline each phrase that tells how the visible lit part of the Moon changes. Circle the number that tells how long the pattern takes to repeat. Accept any marking that follows this job and points at the right text.

PART 2 • ANSWERS

#	QUESTION	ANSWER
1	What sequence does the table show from night 2 through night 14? Describe how the visible lit part changes.	The visible lit part grows from a thin crescent to a half disk, then to more than half, and finally to a full disk.
2	Use the pattern in the table to predict the visible lit part on night 22. Explain your prediction.	About half of the disk would be lit. After the full disk on night 14, the visible lit part is getting smaller.
3	Nights 10 and 18 both show more than half of the disk lit. How are these observations in different parts of the sequence?	Night 10 is before the full disk, so the lit part is increasing, or waxing. Night 18 is after the full disk, so the lit part is decreasing, or waning.
4	If the Moon is full on night 14, about what night would you predict the next full Moon? Use the cycle length from the passage.	About night 43 or 44, because one cycle takes about 29.5 days.

PART 3 • YOUR TURN (SAMPLE ANSWER)

NIGHT	PREDICTED VISIBLE APPEARANCE
2	Thin crescent, growing
7	Half disk, growing
14	Full disk
21	Half disk, shrinking
28	Thin crescent, shrinking

Accept equivalent descriptions of the visible lit part, such as half lit or last-quarter appearance for question 2. For question 4, accept an answer around night 43 or 44, and accept any scientifically accurate ordered cycle in the open table. Before use, arrange the six actual dated observation photos and source labels; do not substitute invented dates or only the supplied example table. Require five inspected-photo records with appearances/dates/source and correct chronological ordering. Check waxing/waning against the sequence, a prediction using two actual observations, and an honest comparison with the revealed sixth view. Appearance/date answers vary by supplied sequence; predictions need not be exact. Teacher may read labels aloud and scribe while the learner observes. The original five-row prediction model remains a separate hypothetical example.