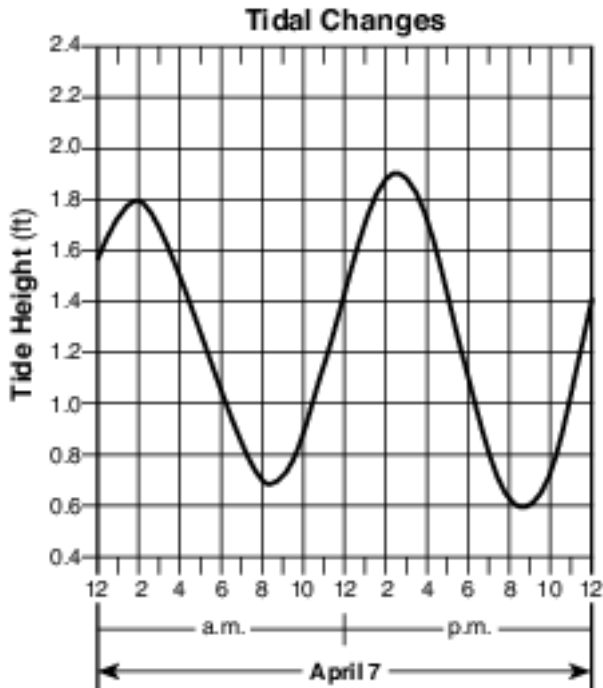


Tides

- 1 The graph below shows changing ocean tide heights in feet (ft) on April 7 for a coastal location.



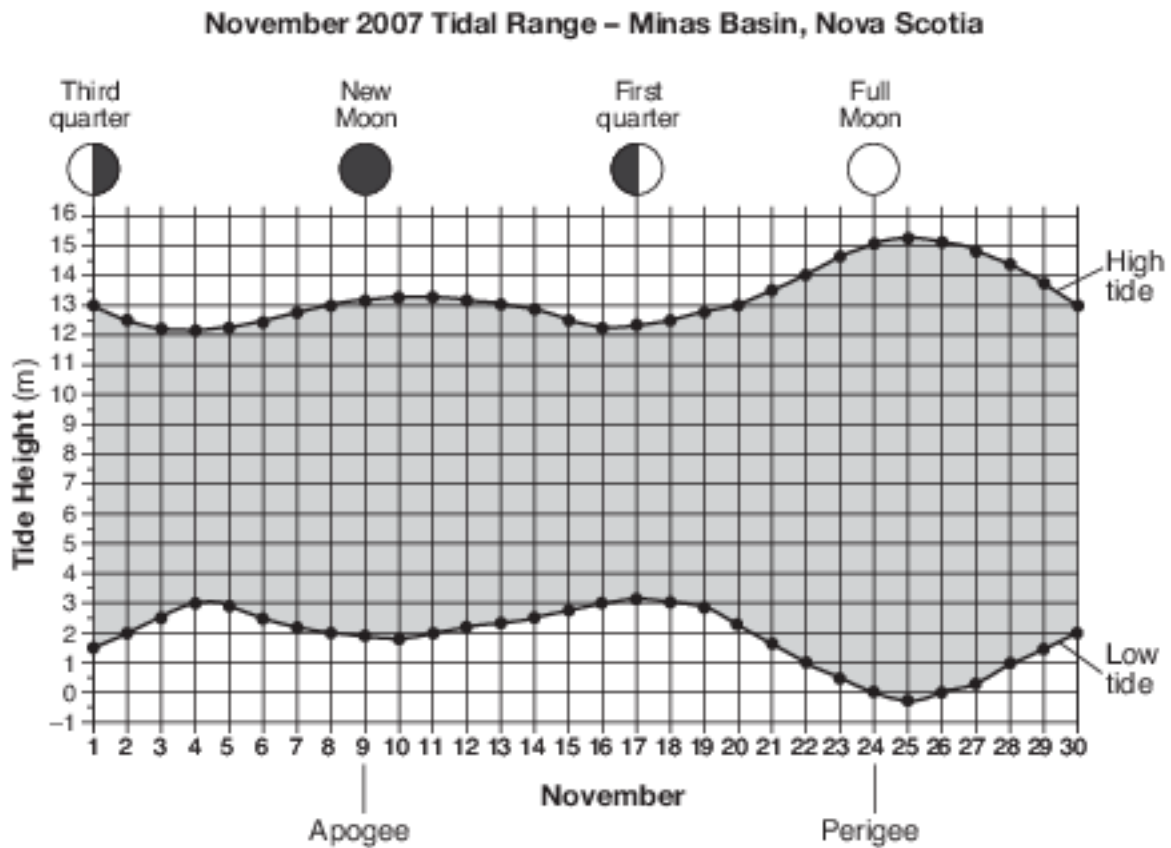
The next high tide will occur on April 8 at approximately

- (1) 10 a.m. (3) 3 a.m.
 (2) 10 p.m. (4) 3 p.m.

- 2 Approximately which percentage of Earth's surface is exposed above water?

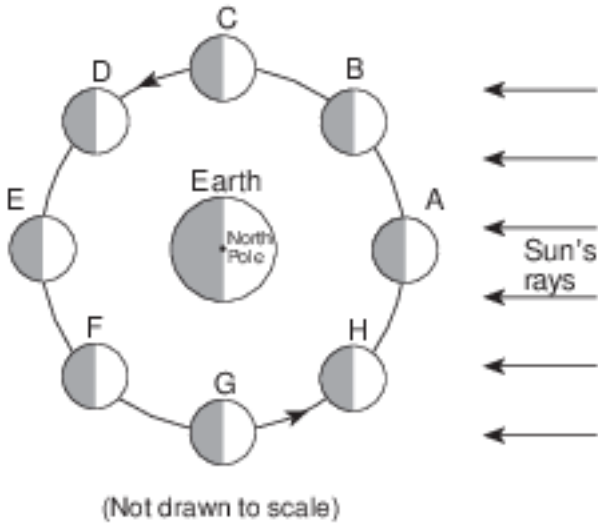
- (1) 30% (3) 70%
 (2) 50% (4) 90%

Base your answers to questions 3 on the graph below and on your knowledge of Earth science. The graph shows the tidal range (the difference between the highest tide and the lowest tide) recorded in Minas Basin, Nova Scotia, during November 2007. The phase of the Moon on selected days is shown above the graph. The dates that the Moon was farthest from Earth (apogee) and closest to Earth (perigee) are indicated under the graph.



- 3 The highest high tides and the lowest low tides occurred when the Moon was near
- | | |
|----------------------------------|-----------------------------------|
| (1) apogee and a new-Moon phase | (3) perigee and a new-Moon phase |
| (2) apogee and a full-Moon phase | (4) perigee and a full-Moon phase |

4 The diagram below represents eight positions of the Moon in its orbit.



Why are high tides on Earth greatest when the Moon is in position A and in position E?

- (1) The Moon is closer to the Sun.
- (2) The Moon is closer to Earth.
- (3) The Moon, the Sun, and Earth are aligned.
- (4) The Moon is in the same phase at both locations.

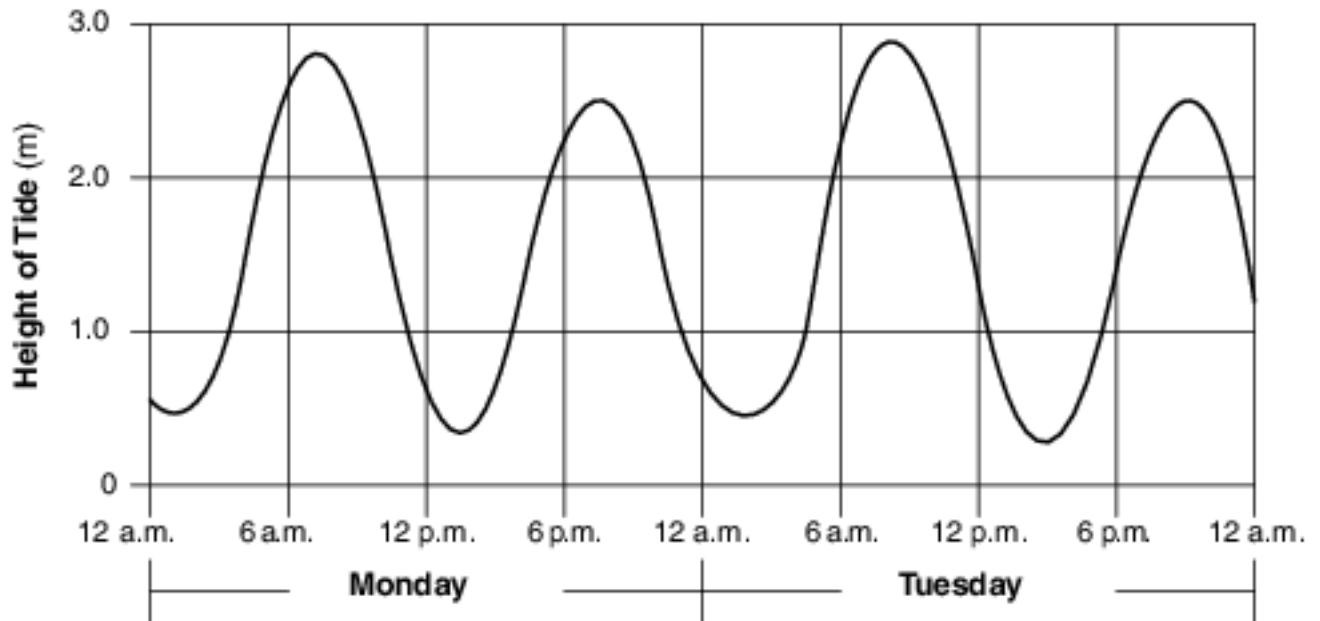
5 The hydrosphere covers approximately what percentage of Earth's lithosphere?

- | | |
|----------|---------|
| (1) 100% | (3) 50% |
| (2) 70% | (4) 25% |

6 The frequency of Earth's cycle of ocean tides is primarily controlled by

- (1) Earth's rotation and the Moon's rotation
- (2) Earth's rotation and the Moon's revolution
- (3) Earth's revolution and the Moon's rotation
- (4) Earth's revolution and the Moon's revolution

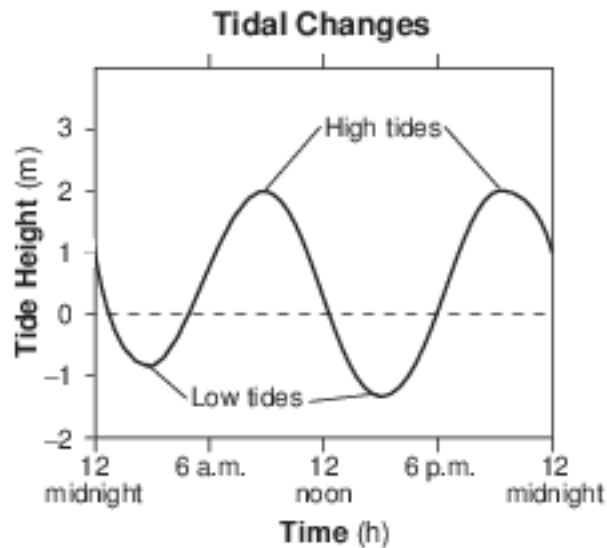
7 The graph below shows the change in the heights of tides for two days.



If this pattern continues, during the first six hours on Wednesday, tidal height will

- (1) decrease, only
- (2) decrease, then increase
- (3) increase, only
- (4) increase, then decrease

8 The graph below shows the tidal changes in ocean water level, in meters, recorded at a coastal location on a certain day.








Approximately how many hours apart were the two high tides?

- (1) 6 h
- (2) 12 h
- (3) 18 h
- (4) 24 h

earth science worksheet

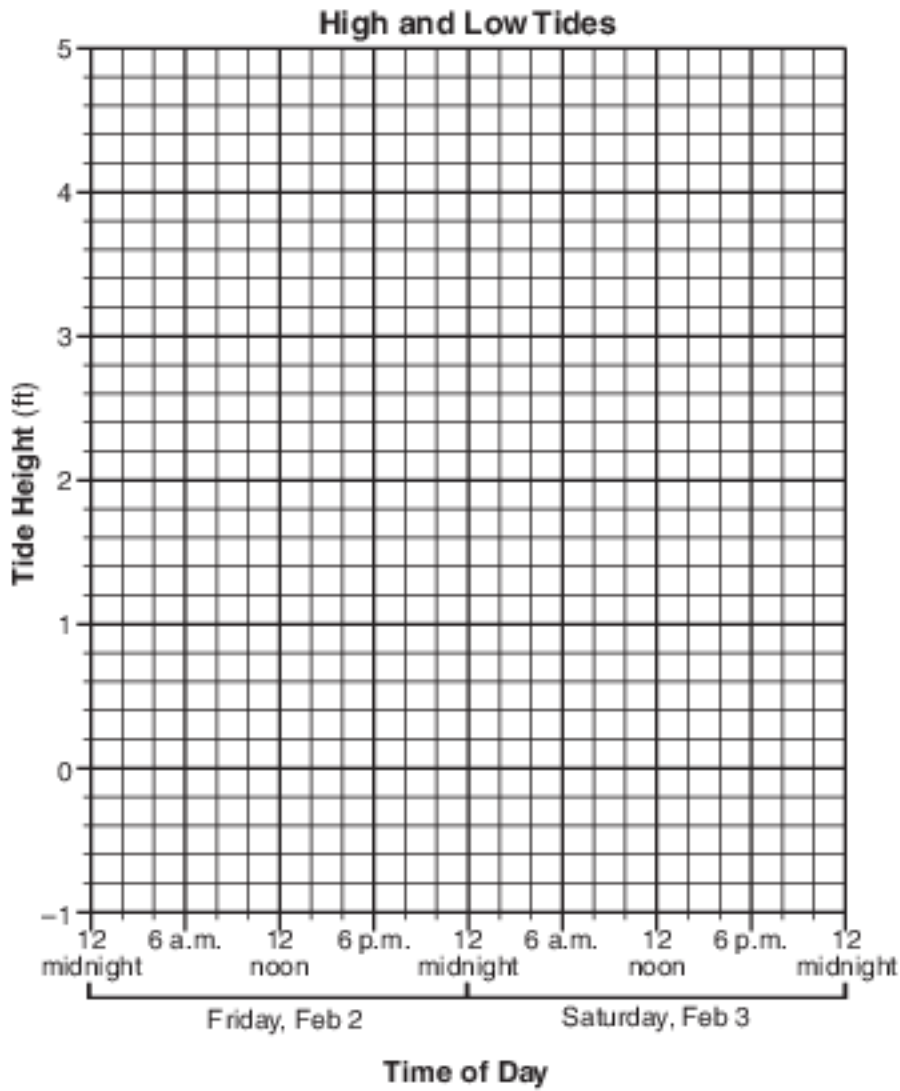
Base your answers to questions 12 on the calendar and data table below. The calendar shows the month of February 2007, indicating the dates when some lunar phases occurred. February 24 lists only the name of the Moon phase that occurred on that day. The data table shows the highest and lowest tides (in feet) recorded for the Hudson River at Kingston, New York, over a 2-day period in February 2007.

February 2007						
Sun	Mon	Tue	Wed	Thu	Fri	Sat
				1	Full 	2 3
4	5	Old gibbous 	6	7	8	9 Last quarter 
11	12	13	14	15	16	New 
18	19	New crescent 	20	21	22	23 First quarter 24
25	26	27	28			

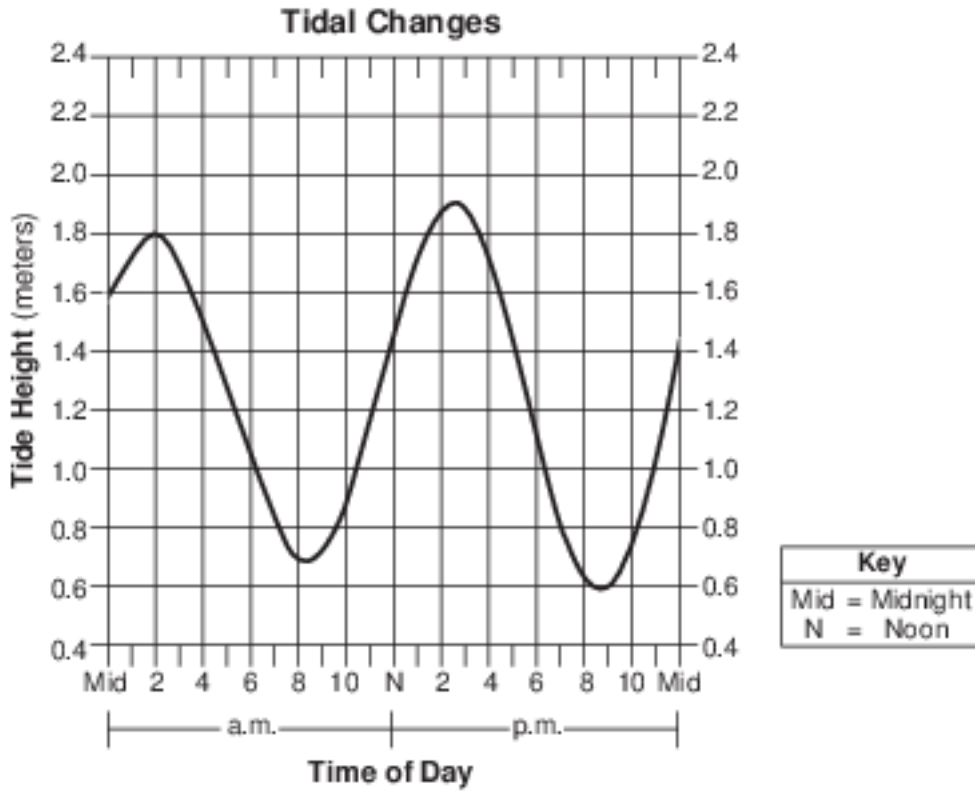
High and Low Tides for Kingston, New York

Date	Time of Day	Tide Height (ft)
Friday, February 2	1:30 a.m.	3.5
	7:30 a.m.	-0.2
	1:30 p.m.	4.1
	8:00 p.m.	-0.4
Saturday, February 3	2:00 a.m.	3.6
	8:30 a.m.	-0.2
	2:00 p.m.	4.0
	9:00 p.m.	-0.4

12 On the grid in the image provided, plot the tide height for each time of day listed in the data table. Connect the plots with a line. [1]



Base your answers to questions 13 on the graph below and on your knowledge of Earth science. The graph shows the changes in ocean tide height at a New York State location during 1 day.



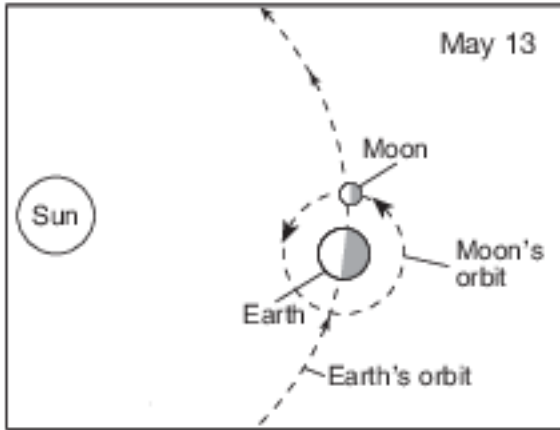
13 Determine the tide height and time of day for the lowest tide shown on the graph. Include a.m. or p.m. in your answer for the time of day. [1]

Tide height:

Time:

Base your answers to questions 14 on the diagrams and tables below and on your knowledge of Earth science. Each diagram represents the Moon's orbital position and each table lists times of high and low tides and tide heights, in meters, at New York City for the date shown.

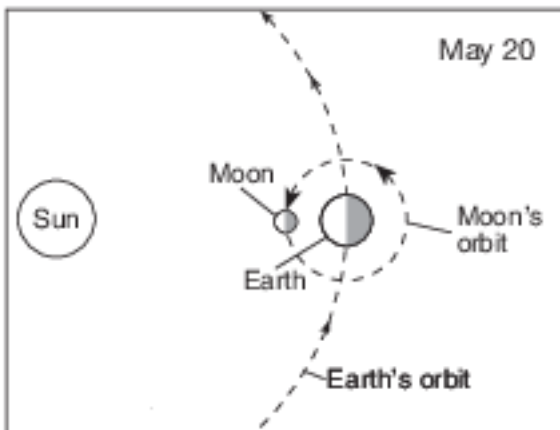
Moon's Orbital Position and Tide Data on May 13



(Not drawn to scale)

Tide	Time	Height (m)
high	12:59 a.m.	1.92
low	7:15 a.m.	0.37
high	1:32 p.m.	2.07
low	7:59 p.m.	0.27

Moon's Orbital Position and Tide Data on May 20



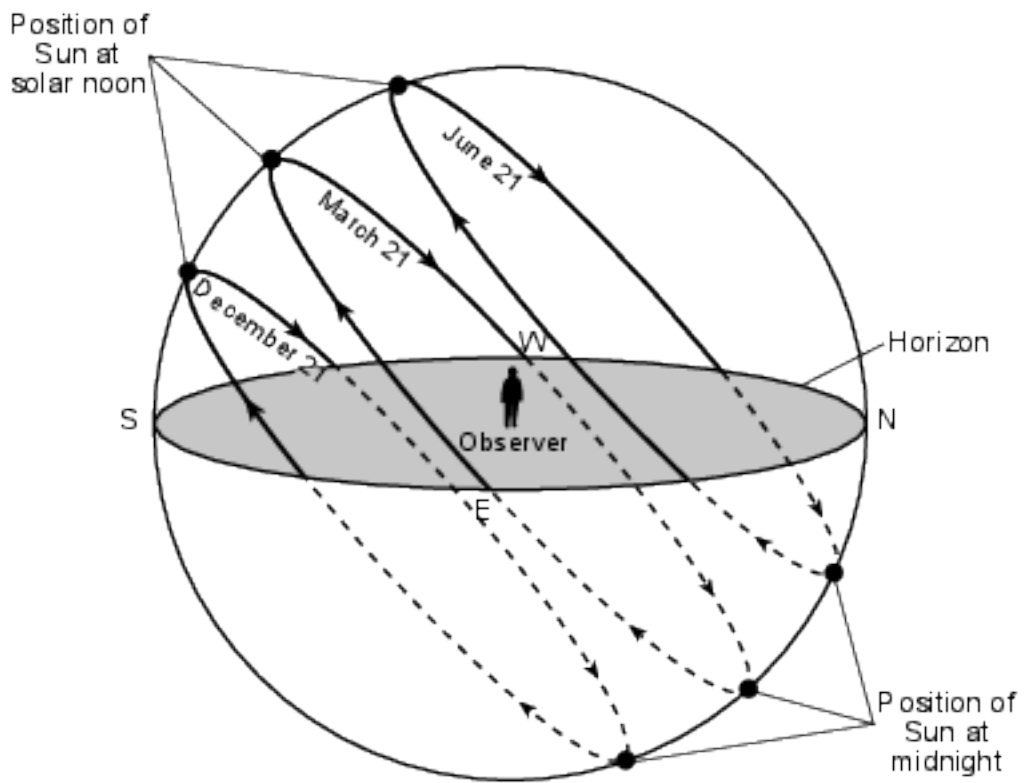
(Not drawn to scale)

Tide	Time	Height (m)
low	1:22 a.m.	0.06
high	7:50 a.m.	2.47
low	2:10 p.m.	0.09
high	8:10 p.m.	2.21

14 Determine the length of time between the two high tides shown for May 13. [1]
 _____ h _____ min

Base your answers to questions 15 on the diagram in image provided and on your knowledge of Earth science. The diagram represents the Sun's apparent daily path for the first day of three seasons at 43° North latitude. The solid lines represent daytime paths as seen by an observer at this latitude. The dashed lines represent the nighttime paths that can not be seen by the observer.

- 15 On the diagram in the image provided, draw an X to represent the solar noon position of the Sun as seen by the observer on April 21. [1]



Answer Keys

1 3

2 1

3 4

4 3

5 2

6 2

7 2

8 2

9 3

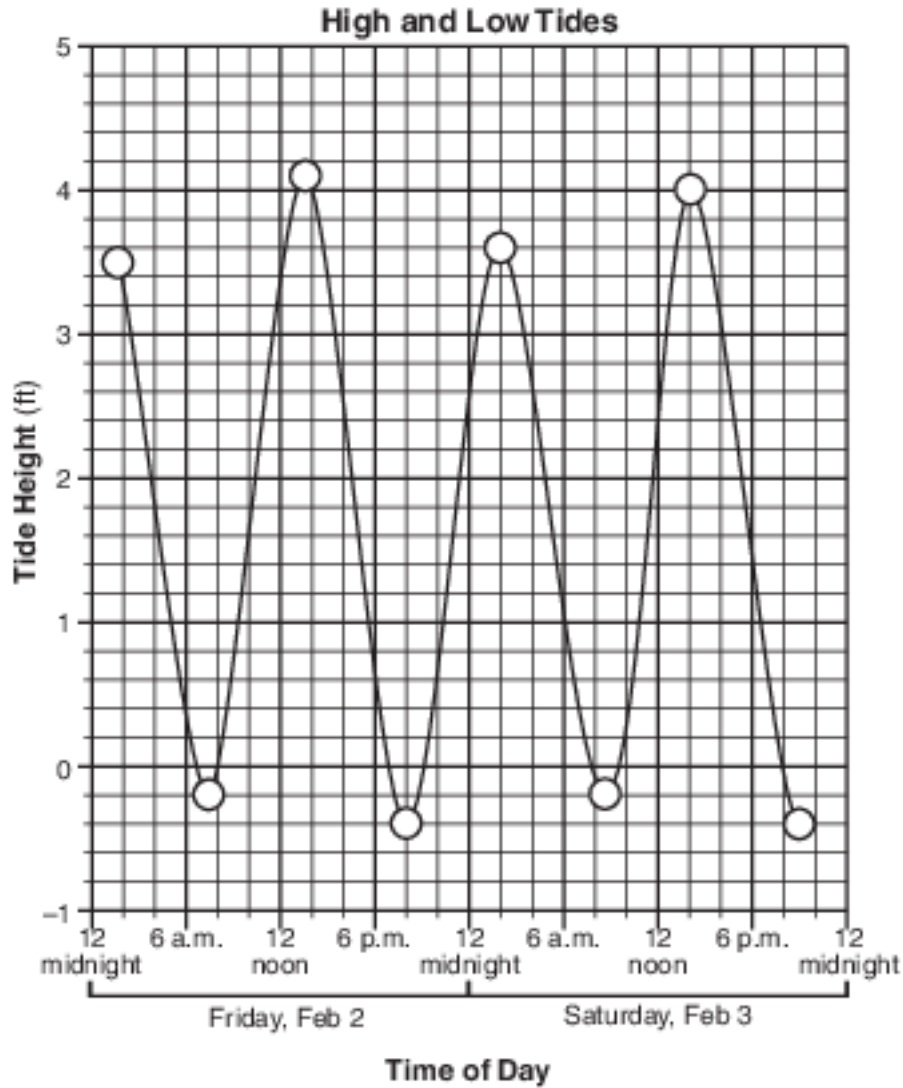
10 2

11 Allow 1 credit. Acceptable responses include, but are not limited to:

- — The Moon is closer to Earth so gravity is greater.
- — The Sun is much farther away.

12 Allow 1 credit if the centers of all eight plots are located within the circles shown below and are connected with a line that passes within each circle.

- Note: It is recommended that an overlay of the same scale as the student answer booklet be used
- to ensure reliability in rating.
-



13 Allow 1 credit if both the tide height and time of day, including p.m., are correct.

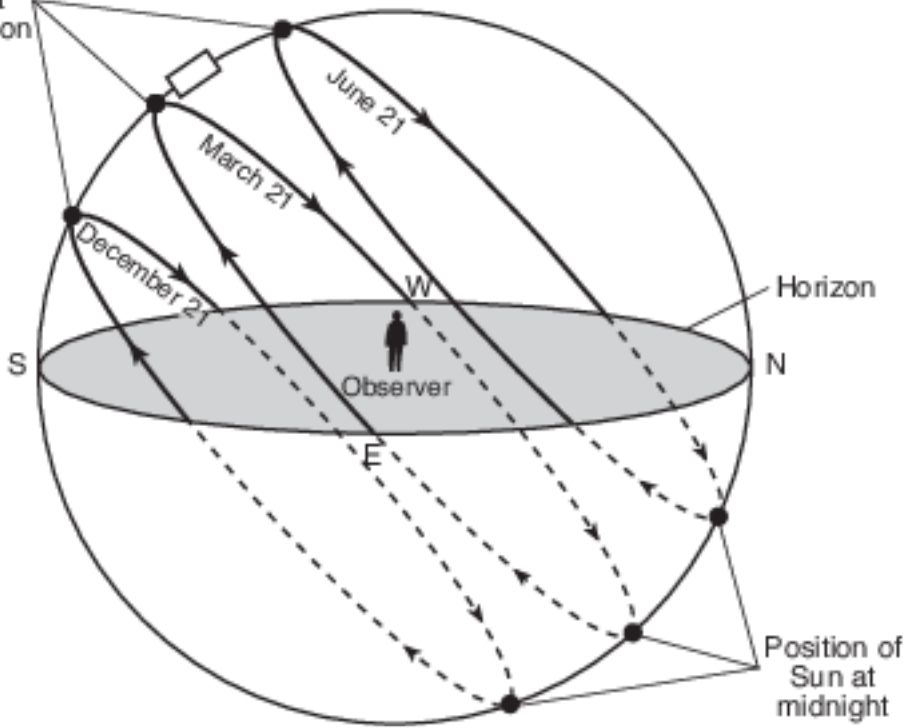
- Tide height: any value from 0.58 m to 0.6 m.
- Time: any value from 8:30 p.m. to 9:00 p.m.

14 Allow 1 credit for 12 h 33 min.

15 Allow 1 credit if the center of the X is within or touches the boxed area shown below.

- Note: It is recommended that an overlay of the same scale as the student answer booklet be used
- to ensure reliability in rating.
- Position of

Sun at
solar noon



Position of
Sun at
midnight