

Name _____ Period _____ Score _____

2014 - 2015 Earth Science Mid Term Exam

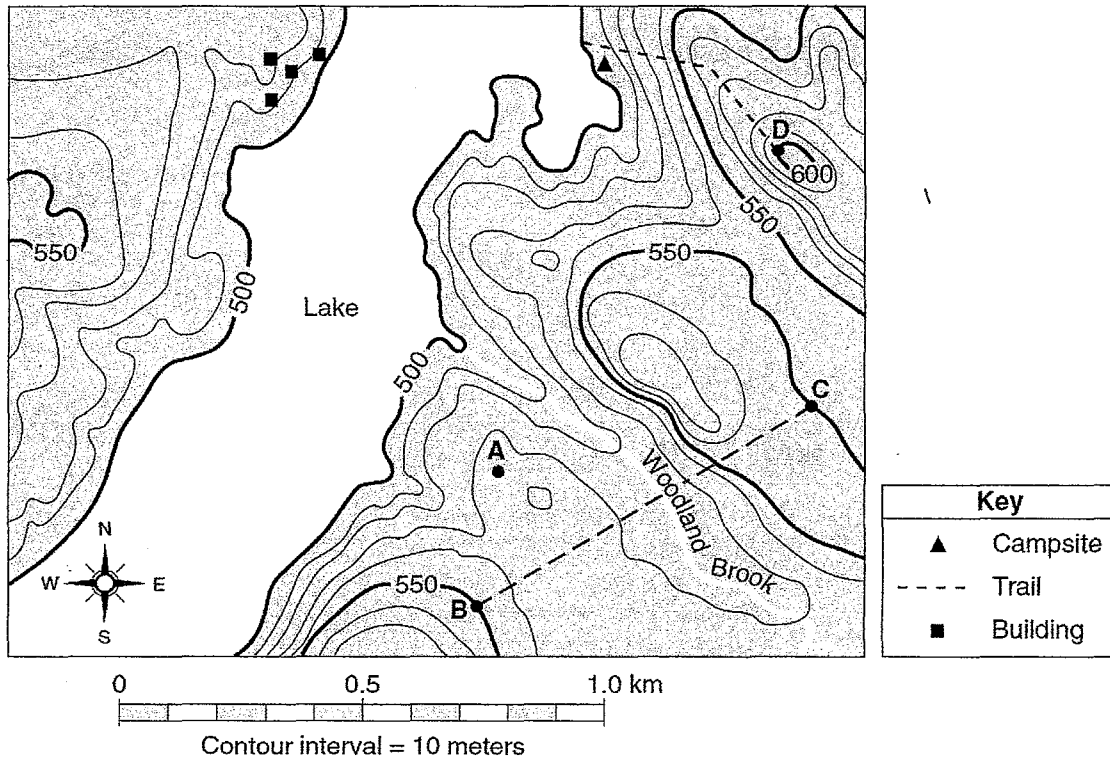
Multiple Choice: Questions 1 through 25

- | | |
|-----------|-----------|
| 1) _____ | 13) _____ |
| 2) _____ | 14) _____ |
| 3) _____ | 15) _____ |
| 4) _____ | 16) _____ |
| 5) _____ | 17) _____ |
| 6) _____ | 18) _____ |
| 7) _____ | 19) _____ |
| 8) _____ | 20) _____ |
| 9) _____ | 21) _____ |
| 10) _____ | 22) _____ |
| 11) _____ | 23) _____ |
| 12) _____ | 24) _____ |
| | 25) _____ |

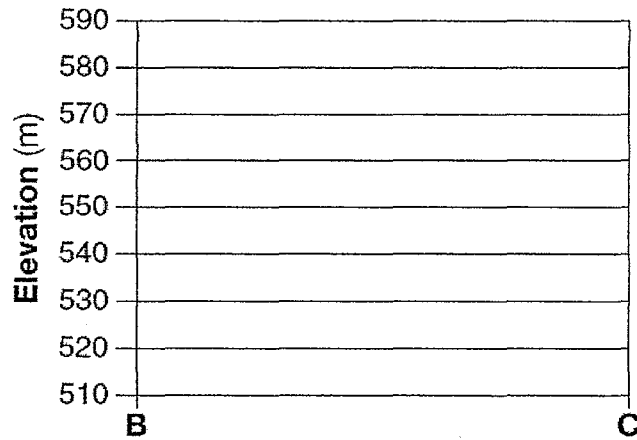
Free Response: Questions 26 through 45

ON BACK

26)



27)

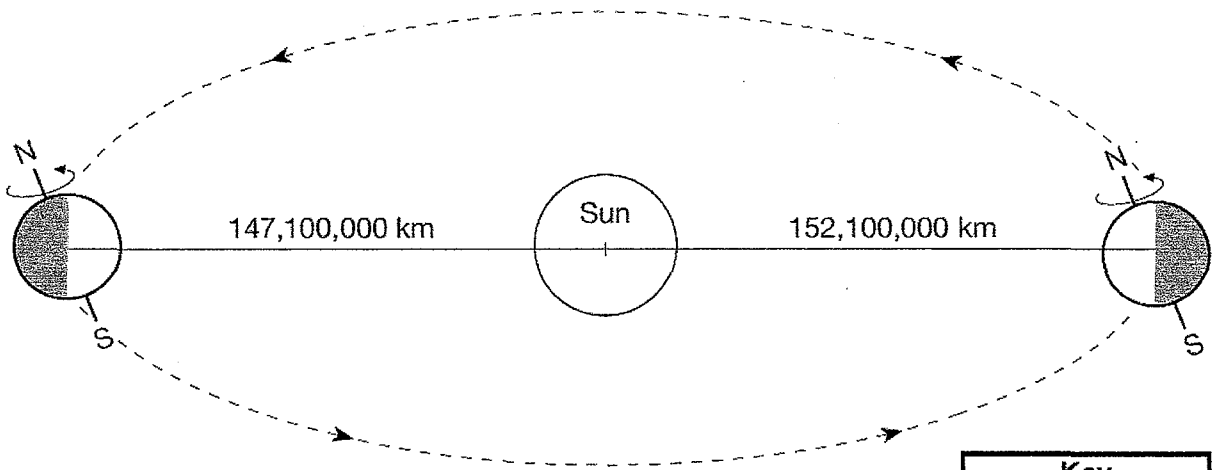


28) Circle one: into the lake out of the lake

Contour-line evidence:

29) _____ m/km

30)

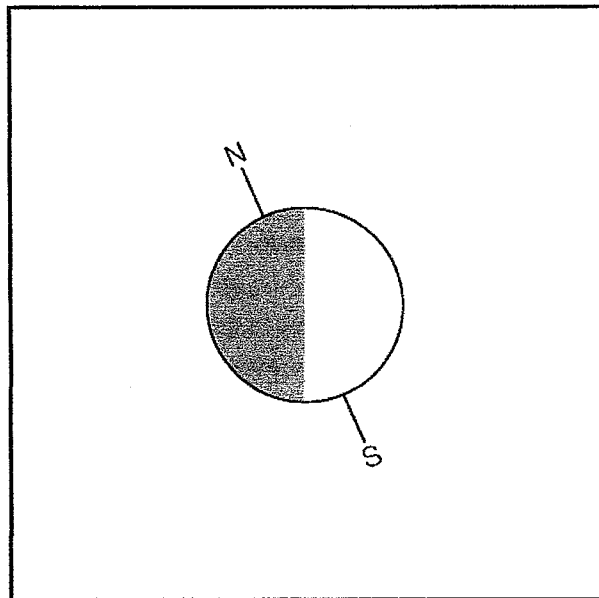


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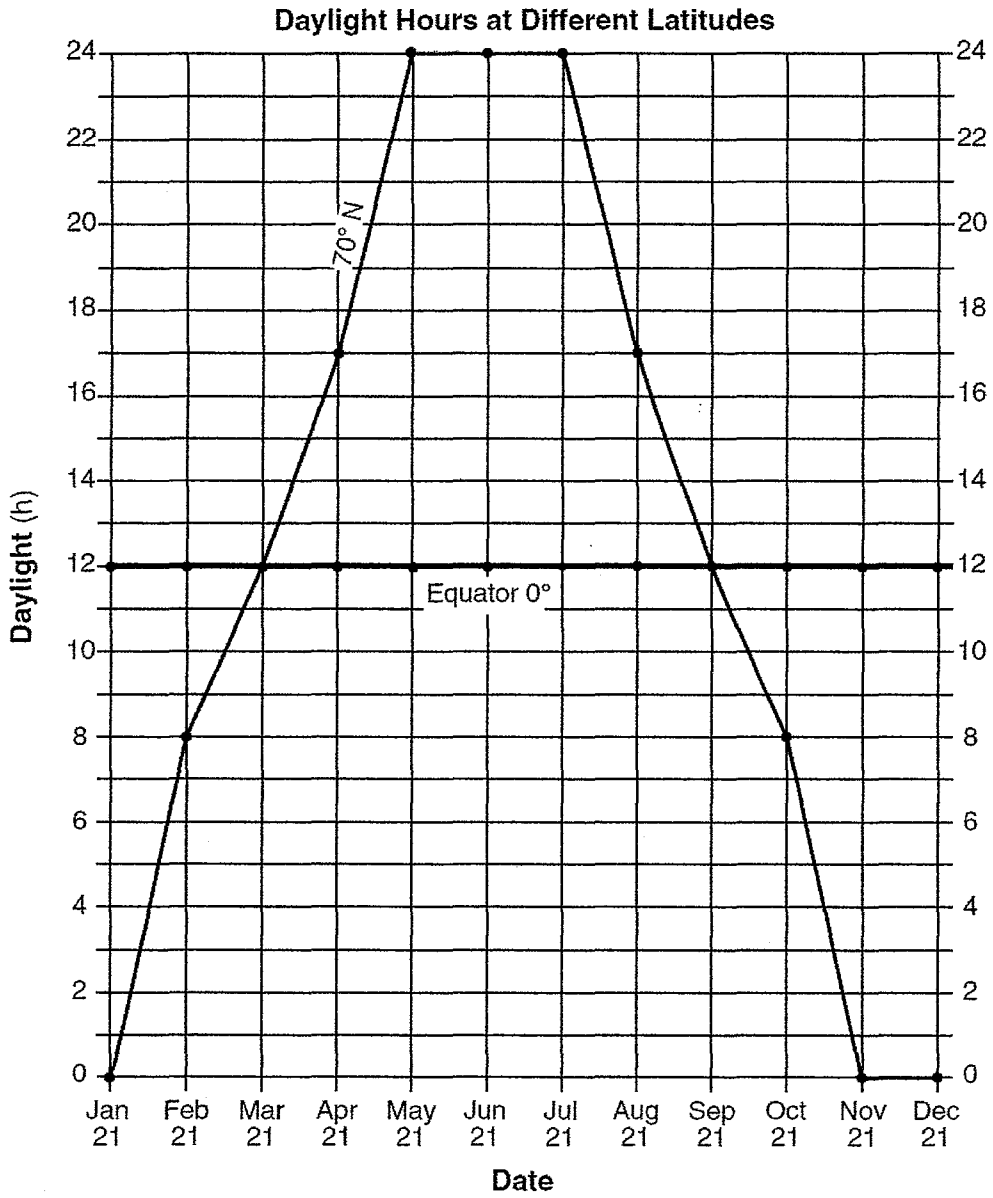
Key	
Earth motions:	
	Revolution
	Rotation

31) _____°

32)



33)



34)

35)

h

36) Color: _____

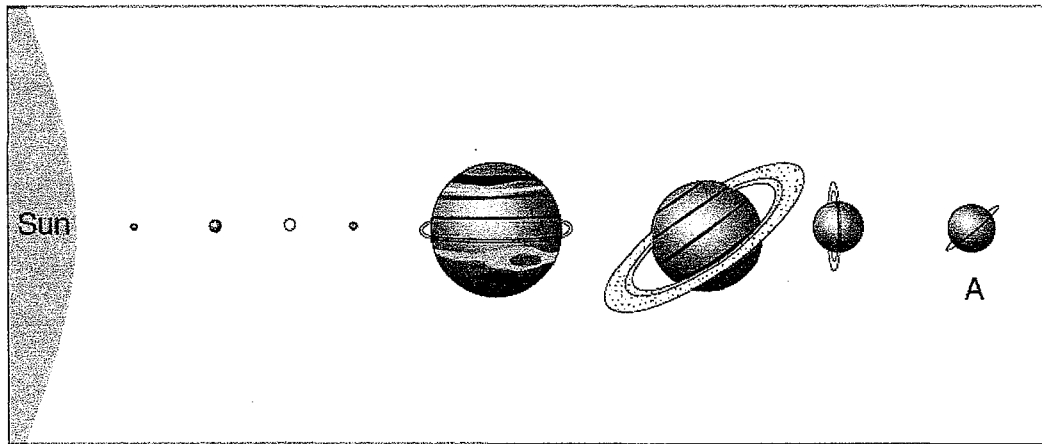
Texture: _____

37) _____ C°/h °C/h

38) (1) _____

(2) _____

39)



(Not drawn to scale)

40) _____

41) _____ million years ago

42) _____ times larger

43) _____

44)

45)

Action 1: _____

Action 2: _____

Name _____

Period _____

2014 – 2015 Earth Science Mid Term Exam

1 Which evidence best supports the theory that the universe was created by an explosion called the Big Bang?

- (1) impact craters found on Earth
- (2) cosmic background radiation
- (3) the different compositions of terrestrial and Jovian planets
- (4) the blue shift of light from distant galaxies

2 Which star is more massive than our Sun, but has a lower surface temperature?

- (1) *40 Eridani B*
- (2) *Sirius*
- (3) *Aldebaran*
- (4) *Barnard's Star*

3 Which color of visible light has the *shortest* wavelength?

- (1) violet
- (2) green
- (3) yellow
- (4) red

4 The table below shows the times of ocean high tides and low tides on a certain date at a New York State location.

Ocean Tides

Type of Tide	Time
high	4:45 a.m.
low	10:58 a.m.
high	5:15 p.m.
low	11:22 p.m.

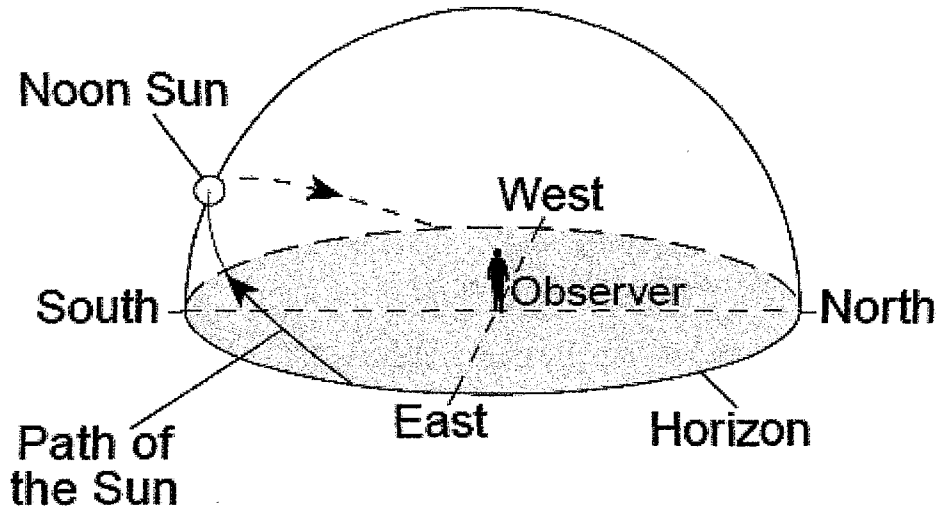
At approximately what time on the following day did the next high tide occur at this location?

- (1) 4:40 a.m.
- (2) 5:40 a.m.
- (3) 4:40 p.m.
- (4) 5:40 p.m.

5 The best evidence of Earth's rotation is provided by the

- (1) shape of Earth's orbit
- (2) shape of the Milky Way galaxy
- (3) changes in the total yearly duration of insolation at a location on Earth
- (4) apparent changes in the direction of swing of a Foucault pendulum

6 The model below shows the apparent path of the Sun as seen by an observer in New York State on the first day of one of the four seasons.



This apparent path of the Sun was observed on the first day of

- (1) spring
- (2) summer
- (3) fall
- (4) winter

7 During which phase change does water release the most heat energy?

- (1) freezing
- (2) melting
- (3) condensation
- (4) vaporization

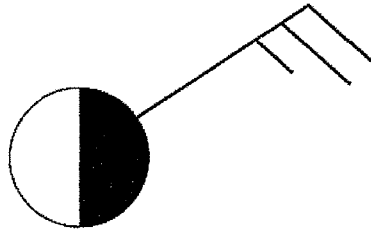
8 What is the average air pressure exerted by Earth's atmosphere at sea level, expressed in millibars and inches of mercury?

- (1) 1013.25 mb and 29.92 in of Hg
- (2) 29.92 mb and 1013.25 in of Hg
- (3) 1012.65 mb and 29.91 in of Hg
- (4) 29.91 mb and 1012.65 in of Hg

9 Which two processes lead to cloud formation in rising air?

- (1) compressing and cooling
- (2) compressing and warming
- (3) expanding and cooling
- (4) expanding and warming

10 The weather station model below shows some of the weather data for a certain location.



What is the wind speed shown on the station model and which instrument is used to measure the wind speed?

- (1) 15 knots, measured by a wind vane
- (2) 15 knots, measured by an anemometer
- (3) 25 knots, measured by a wind vane
- (4) 25 knots, measured by an anemometer

11 If air has a dry-bulb temperature of 2°C and a wet-bulb temperature of -2°C , what is the relative humidity?

- (1) 11%
- (2) 20%
- (3) 36%
- (4) 67%

12 Near which two latitudes are most of Earth's dry climate regions found?

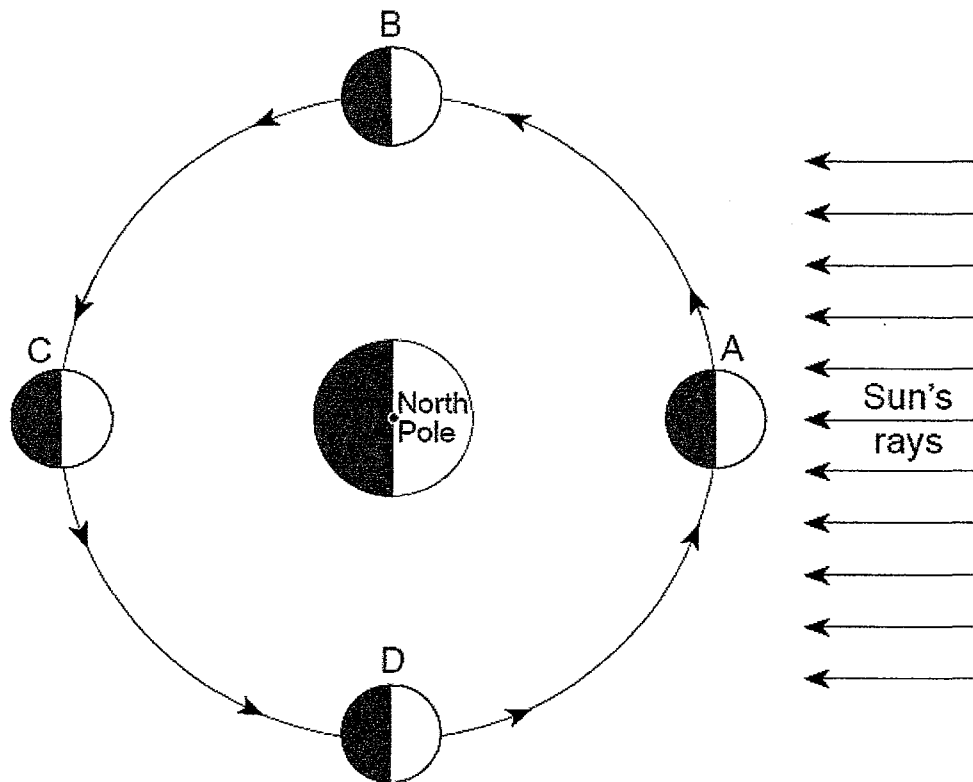
- (1) 0° and 60° N
- (2) 0° and 30° S
- (3) 30° N and 60° N
- (4) 30° N and 30° S

13 Which event followed a massive volcanic eruption and led to the cooling of global temperatures?

- (1) thunderstorms that developed near the eruption
- (2) the release of carbon dioxide and methane gases
- (3) the outflow of magma over Earth's surface
- (4) the addition of ash particles into the atmosphere

Base your answers to questions 14 and 15 on the diagram below and on your knowledge of Earth science.

The diagram represents the Moon at different positions, labeled *A*, *B*, *C*, and *D*, in its orbit around Earth.

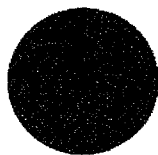


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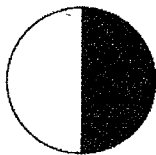
14 At which two Moon positions would an observer on Earth most likely experience the highest high tides and the lowest low tides?

- (1) *A* and *B*
- (2) *B* and *C*
- (3) *C* and *A*
- (4) *D* and *B*

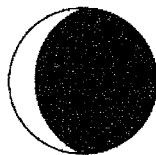
15 During which Moon phase could an observer on Earth see a lunar eclipse occur?



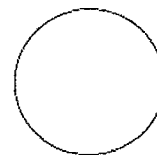
(1)



(2)

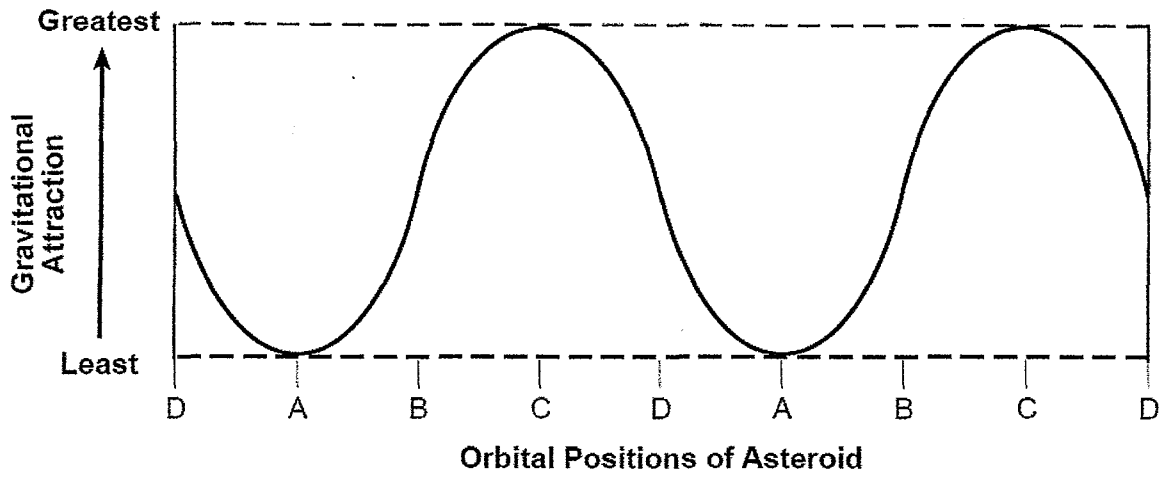


(3)

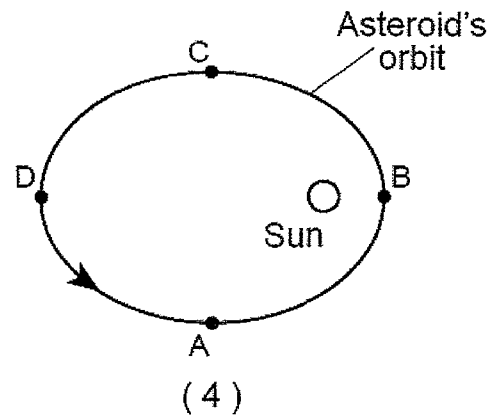
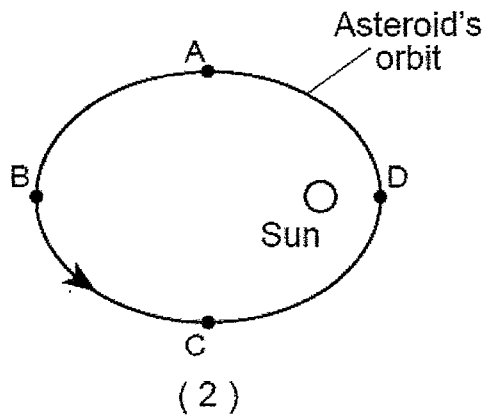
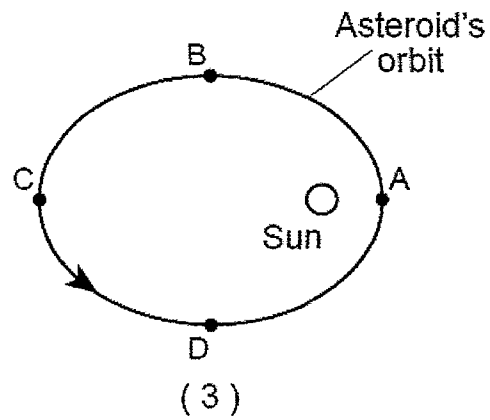
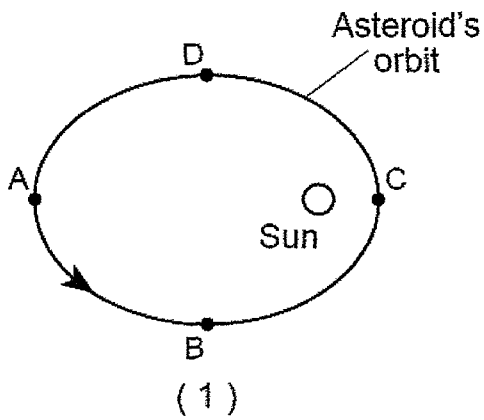


(4)

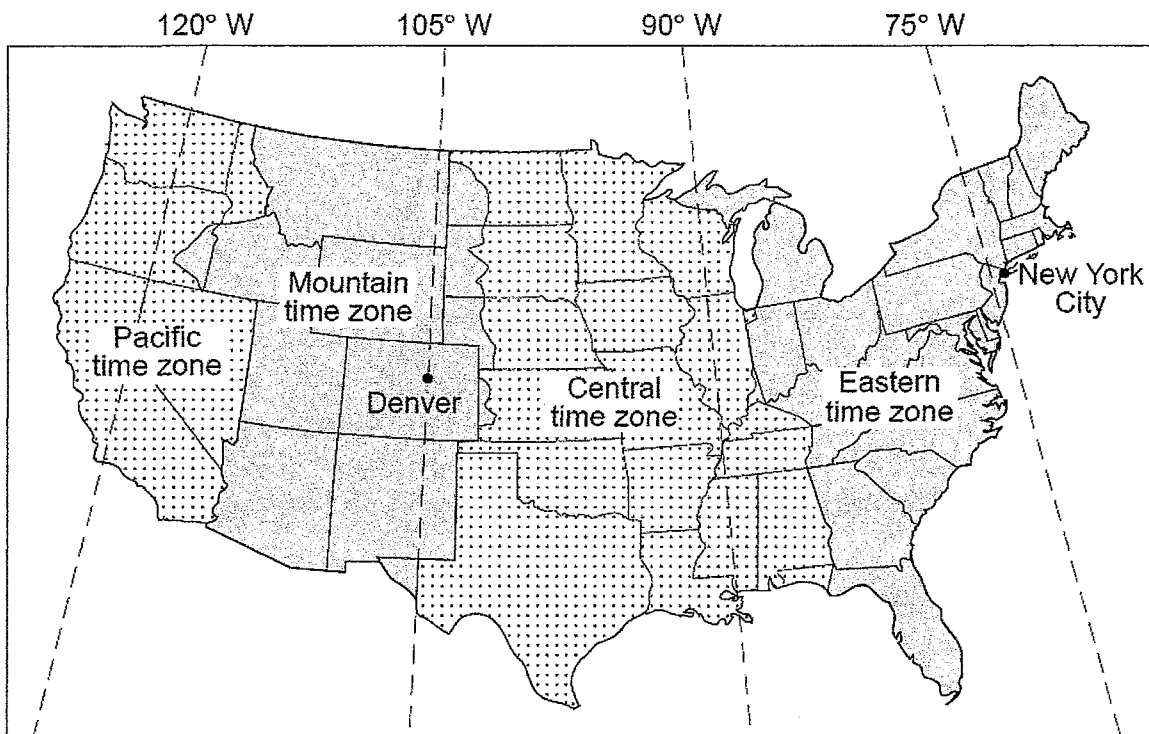
16 The graph below shows the varying amount of gravitational attraction between the Sun and an asteroid in our solar system. Letters A, B, C, and D indicate four positions in the asteroid's orbit.



Which diagram best represents the positions of the asteroid in its orbit around the Sun? [Note: The diagrams are not drawn to scale.]



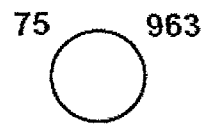
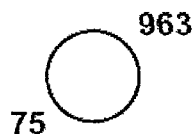
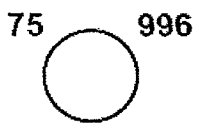
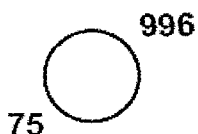
17 The map below shows four major time zones of the United States. The dashed lines represent meridians of longitude. The locations of New York City and Denver are shown.



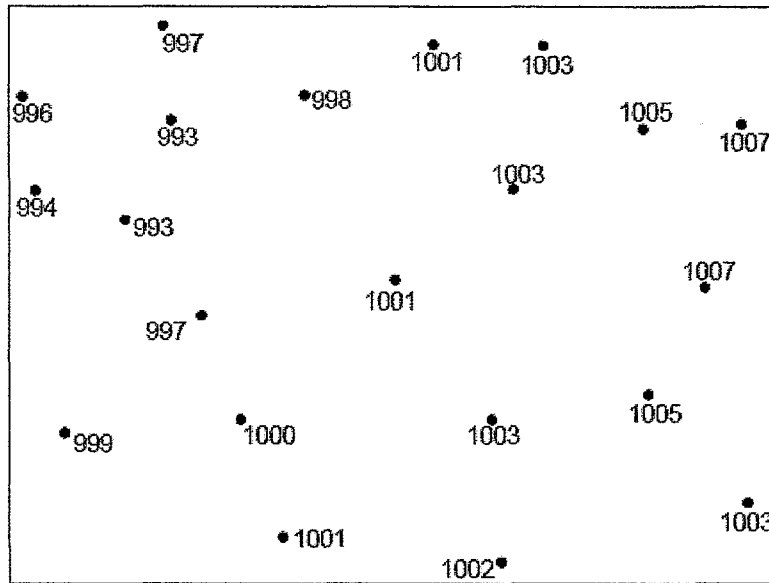
What is the time in New York City when it is noon in Denver?

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

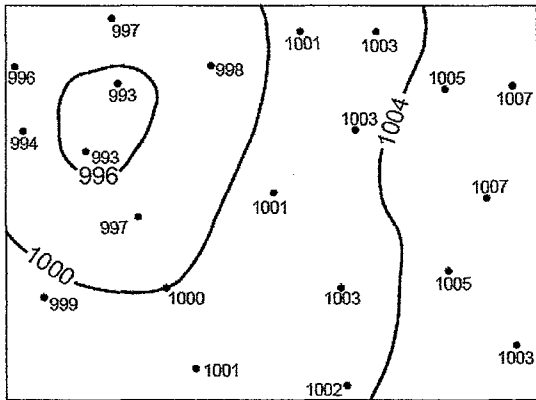
18 Which station model shows an air temperature of 75°F and a barometric pressure of 996.3 mb?



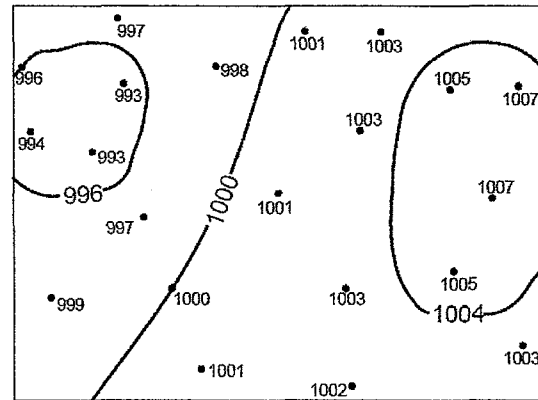
19 The map below shows air pressures recorded in millibars (mb).



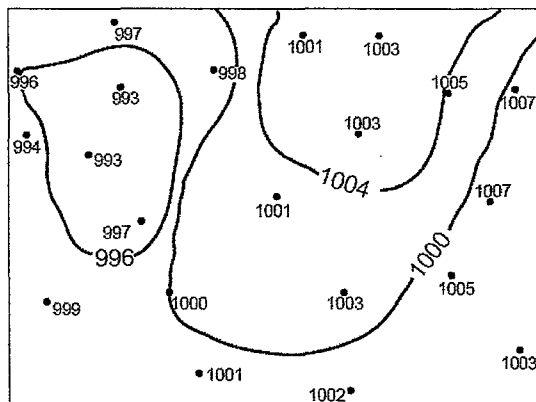
Which map shows the correct location of the 996-mb, 1000-mb, and 1004-mb isobars?



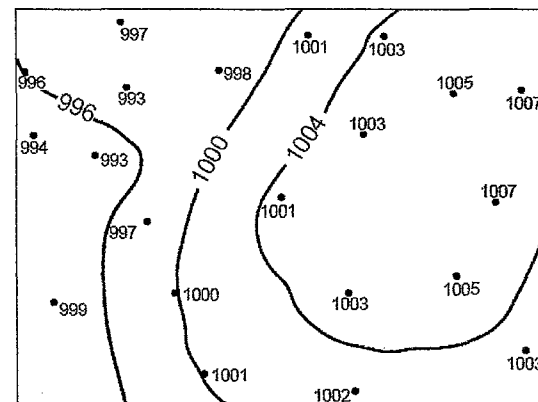
(1)



(3)

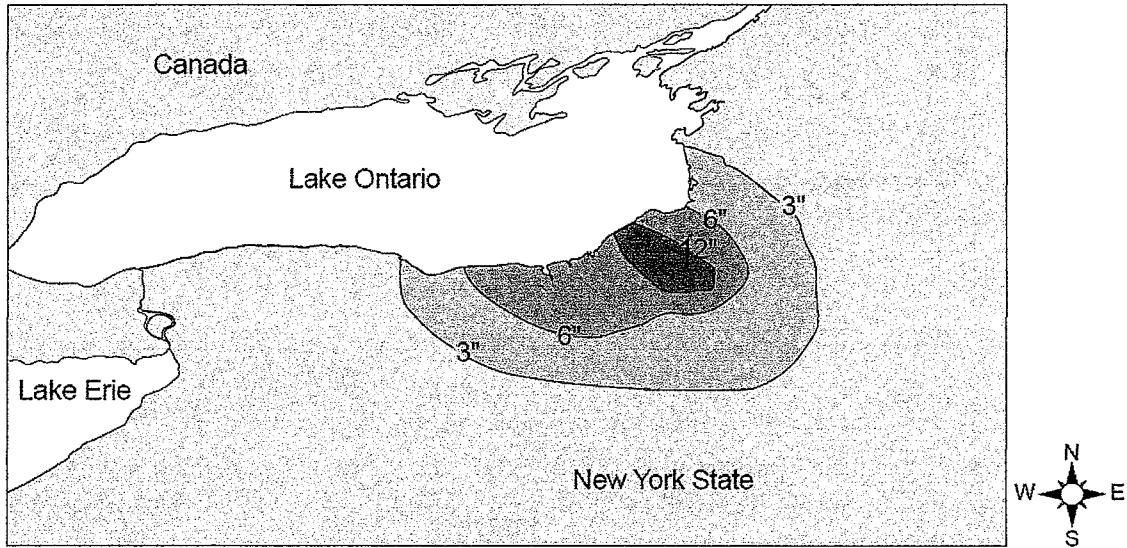


(2)



(4)

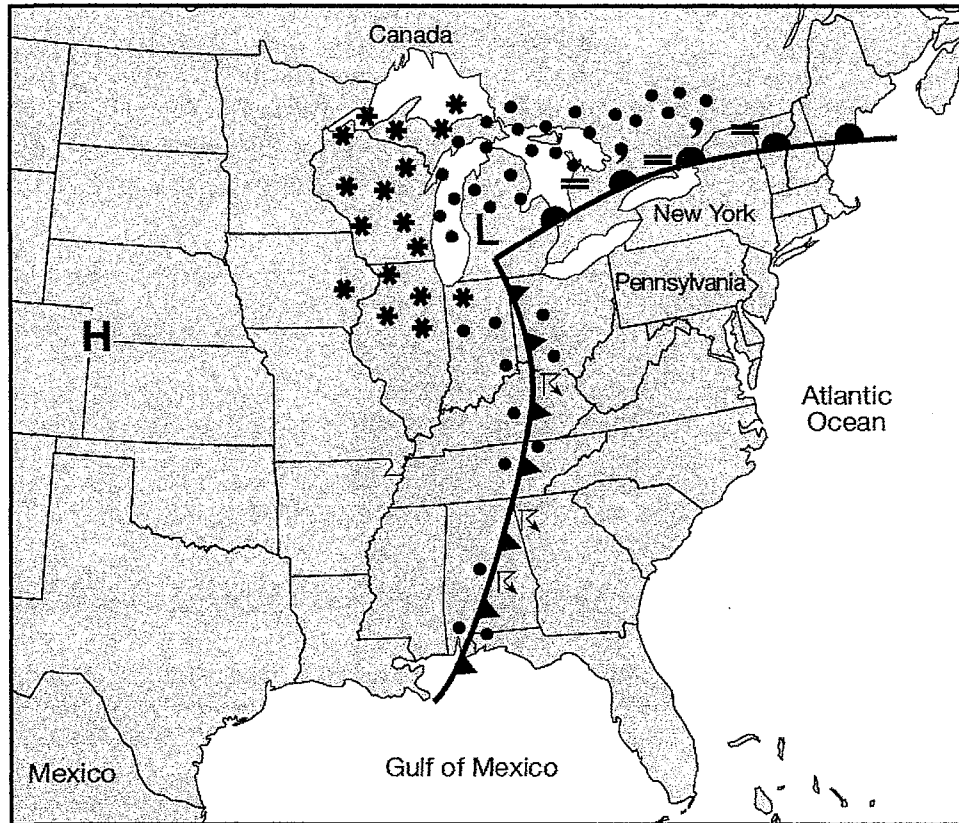
20 The map below shows the amount of snowfall, in inches, produced by a lake-effect snowstorm in central New York State.



The wind that produced this snowfall pattern most likely came from the

- (1) northeast
- (2) northwest
- (3) southeast
- (4) southwest

Base your answers to questions 21 through 23 on the weather map below and on your knowledge of Earth science. The map of a portion of eastern North America shows a high-pressure center (H) and a low-pressure center (L), frontal boundaries, and present weather conditions.



21 Which weather condition is shown along the cold front?

- (1) fog
- (2) snow
- (3) haze
- (4) thunderstorms

22 What was the most likely source region for the air mass over Pennsylvania?

- (1) New York State
- (2) Pacific Ocean
- (3) Gulf of Mexico
- (4) Canada

23 The general surface wind circulation associated with the high-pressure center (H) is most likely

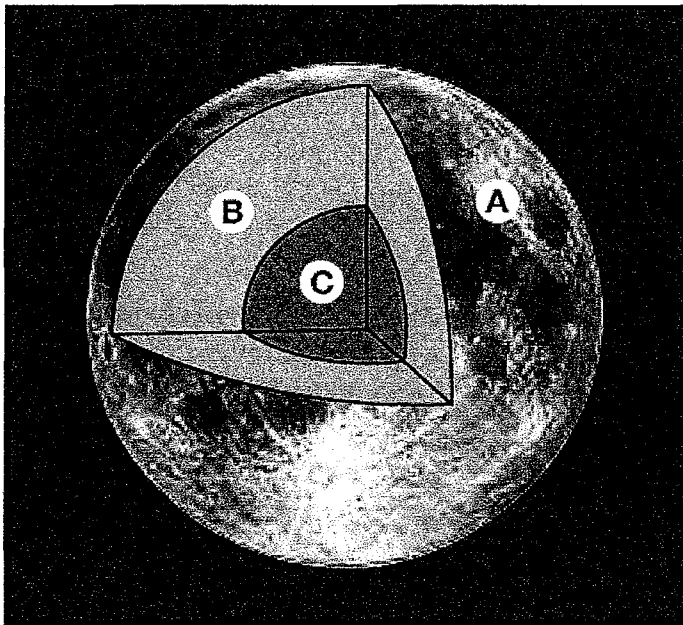
- (1) clockwise and outward
- (2) clockwise and inward
- (3) counterclockwise and outward
- (4) counterclockwise and inward

Base your answers to questions 24 and 25 on the passage and diagram below and on your knowledge of Earth science. The passage describes geologic studies of the Moon. The diagram represents the Moon's surface and interior, showing the inferred depth of each layer below the Moon's surface.

Moon Studies

Scientific instruments left on the Moon's surface recorded 12,558 moonquakes in eight years. Most of these moonquakes originated between 700 km and 1200 km below the Moon's surface. Scientists infer that most moonquakes are caused by the gravitational forces between the Moon, Earth, and the Sun.

Layers of the Moon



Key
Inferred Depth Below the Surface:
A Crust: 0 km to 60 km
B Mantle: 60 km to 1100 km
C Core: 1100 km to 1738 km

(Not drawn to scale)

24 What is the inferred thickness of the Moon's mantle?

- (1) 60 km
- (2) 638 km
- (3) 1040 km
- (4) 1738 km

25 Which planet has an average density most similar to the average density of the Moon?

- (1) Mercury
- (2) Mars
- (3) Jupiter
- (4) Neptune

Base your answers to questions 26 through 29 on the topographic map *in your answer booklet* and on your knowledge of Earth science. The map shows an area of New York State that includes a campsite, trail, and buildings near a lake. Points *A*, *B*, *C*, and *D* represent locations on the map.

26 Point *A* on the topographic map *in your answer booklet* indicates a certain elevation on the east side of the lake. Place an **X** at the same elevation on the west side of the lake.

27 On the grid *in your answer booklet*, construct a topographic profile along line *BC*. Plot the elevation of *each* contour line that crosses line *BC*. Connect *all seven* plots with a line to complete the profile.

28 *In your answer booklet*, circle the phrase that indicates the direction of flow of Woodland Brook. Describe the contour-line evidence that supports your answer.

29 Campers hiked along the trail from the shoreline of the lake to point *D* to view the landscape. Determine the average gradient, in meters per kilometer, of the route they took on their hike.

Base your answers to questions 30 through 32 on the diagram in your answer booklet and on your knowledge of Earth science. The diagram represents a model of Earth's orbit around the Sun. Arrows represent two motions of Earth. Distances from the center of the Sun to the center of Earth are indicated in kilometers. Earth is represented when it is closest to the Sun and when it is farthest from the Sun.

30 On the diagram *in your answer booklet*, place an **X** on Earth's orbit at *one* location where Earth's Northern Hemisphere is in winter.

31 How many degrees is Earth's axis tilted to a line perpendicular to the plane of Earth's orbit?

32 The diagram *in your answer booklet* represents Earth at one position in its orbit around the Sun. Starting at the North Pole, draw a straight arrow that points to the location of *Polaris*.

Base your answers to questions 33 through 35 on the data table below and on the graph in your answer booklet and on your knowledge of Earth science. The data table lists the number of daylight hours for a location at 50° N on the 21st day of each month for 1 year. The graph shows the number of daylight hours on the 21st day of each month for a location at 70° N and for the equator, 0°.

Daylight Hours at 50° N

Date	Daylight (h)
January 21	8.4
February 21	10.0
March 21	12.0
April 21	13.8
May 21	15.5
June 21	16.2
July 21	15.5
August 21	14.0
September 21	12.0
October 21	10.2
November 21	8.4
December 21	7.5

33 On the graph *in your answer booklet*, plot the number of daylight hours for the 21st day of *each* month listed on the data table. Connect *all* of your plotted data with a line.

34 Explain why the number of daylight hours for all three latitudes was 12 hours on March 21 and September 21.

35 Predict the number of daylight hours that occur at 70° S on June 21.

Base your answers to questions 36 through 38 on the data table below and on your knowledge of Earth science. The table shows air temperatures recorded under identical conditions at 2-hour intervals on a sunny day. Data were recorded 1 meter above ground level both inside and outside of a glass greenhouse.

Data Table

Time	Inside Air Temperature (°C)	Outside Air Temperature (°C)
8 a.m.	15	15
10 a.m.	18	16
12 noon	21	17
2 p.m.	24	18
4 p.m.	24	17

36 Describe the color and texture of the surfaces inside the greenhouse that would most likely absorb the greatest amount of visible light.

37 Calculate the rate of change in the outside air temperature from 8 a.m. to 2 p.m. in Celsius degrees per hour.

38 Most atmospheric scientists infer that global warming is occurring due to an increase in greenhouse gases. State the names of *two* greenhouse gases.

Base your answers to questions 39 through 43 on the side-view model of the solar system in your answer booklet and on your knowledge of Earth science. The planets are shown in their relative order of distance from the Sun. Letter A indicates one of the planets.

39 The center of the asteroid belt is approximately 503 million kilometers from the Sun. *In your answer booklet*, draw an X on the model between two planets to indicate the center of the asteroid belt.

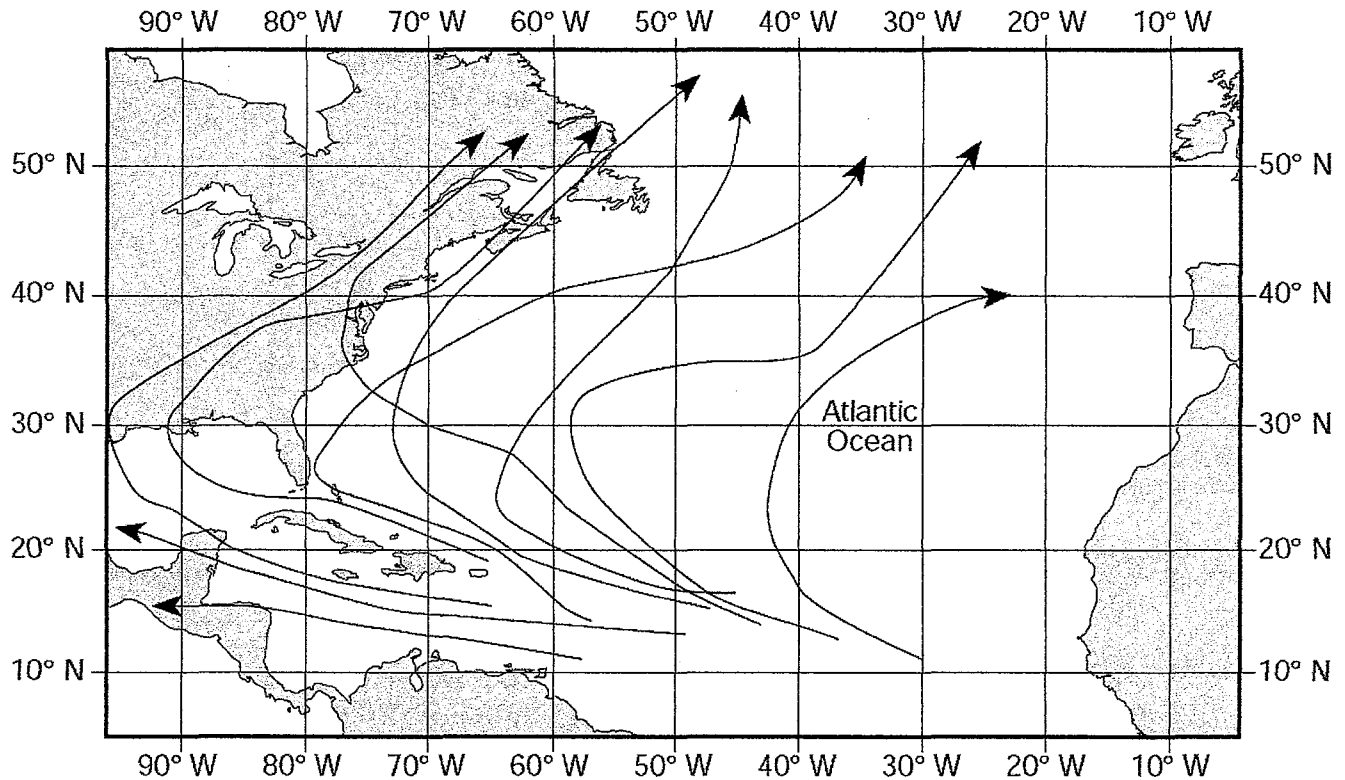
40 State the period of rotation at the equator of planet A. Label your answer with the correct units.

41 How many million years ago did Earth and the solar system form?

42 Calculate how many times larger the equatorial diameter of the Sun is than the equatorial diameter of Venus.

43 Identify the process that occurs within the Sun that converts mass into large amounts of energy.

Base your answers to questions 44 and 45 on the Atlantic hurricane map below and on your knowledge of Earth science. The arrows on the map show the tracks of various hurricanes that occurred during late summer and early fall.



44 Describe *one* ocean surface condition or atmospheric condition that makes the area over the Atlantic Ocean between 10° N latitude and 20° N latitude ideal for these hurricanes to form.

45 Several of these hurricanes have affected land areas. Describe *two* actions that people who live in hurricane prone areas should take in order to prepare for future hurricanes.