

FORMULA CHART

for Middle School—Grade 8 Science Assessment

Work = force \times distance

$$W = Fd$$

$$\text{Speed} = \frac{\text{distance}}{\text{time}}$$

$$s = \frac{d}{t}$$

Force = mass \times acceleration

$$F = ma$$

Weight = mass \times acceleration due to gravity

$$\text{Weight} = mg$$

$$\text{Density} = \frac{\text{mass}}{\text{volume}}$$

$$D = \frac{m}{v}$$

Constants/Conversions

$$g = \text{acceleration due to gravity} = 9.8 \frac{\text{m}}{\text{s}^2}$$

$$\text{speed of light} = 3 \times 10^8 \frac{\text{m}}{\text{s}}$$

$$\text{speed of sound} = 343 \frac{\text{m}}{\text{s}} \text{ at sea level and } 20^\circ\text{C}$$

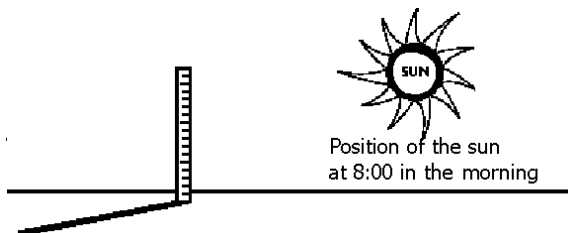
$$1 \text{ cm}^3 = 1 \text{ mL}$$

Centimeters

0
1
2
3
4
5
6
7
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10
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12
13
14
15
16
17
18
19
20

1. What causes day and night on Earth?
- (A) Earth's rotation on its axis.
 - (B) the Sun's revolution around Earth.
 - (C) Earth's revolution around the Sun.
 - (D) the Sun's rotation on its axis.
2. In order to reach orbit, a rocket must be designed to resist the forces holding it on Earth. Which is the strongest force a rocket must overcome to reach orbit?
- (A) Gravity
 - (B) Earth's rotation
 - (C) Wind
 - (D) Air resistance

3.

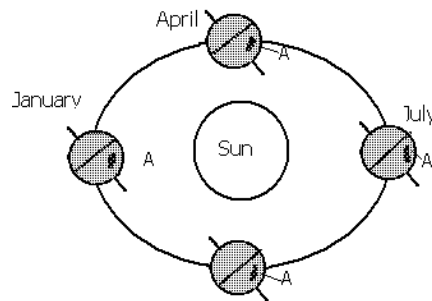


A student stuck a meter stick in the ground outside the school at 8:00 in the morning. How will the shadow of the stick at 2:00 in the afternoon compare to its shadow at 8:00 in the morning?

- (A) There will be no shadow at 2:00 in the afternoon.
- (B) The shadow will be longer and on the opposite side of the stick.
- (C) The shadow will be longer and on the same side of the stick.
- (D) The shadow will be shorter and on the opposite side of the stick.

4. Cooler weather and fewer hours of daylight signal the approach of fall. Which feature of Earth is MOST responsible for these changes?
- (A) The tilt of Earth's axis
 - (B) The strength of Earth's gravity
 - (C) The distance of Earth from the sun
 - (D) The direction in which Earth rotates

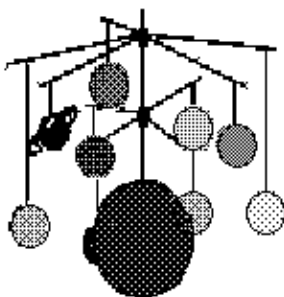
5.



According to the diagram above, during what months does location A have the MOST hours of daylight?

- (A) March-May
 - (B) September-November
 - (C) June-August
 - (D) December-February
6. A rocky object that measures 50 miles across is observed in space. It rotates once every 18 hours. The object is three times farther from the Sun than Earth is. The rocky object is MOST likely ____
- (A) Venus
 - (B) the moon
 - (C) Mars
 - (D) an asteroid

7.



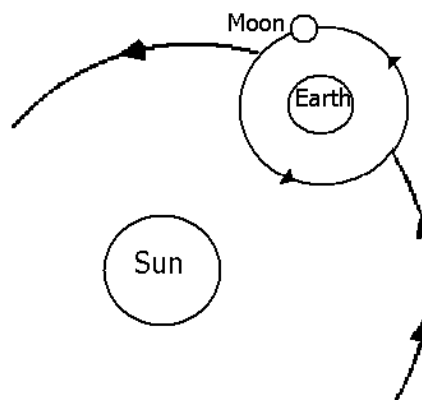
Students saw a model of the solar system like the one shown in the figure above. What is a limitation of this model?

- (A) The planets are not all shown in this model.
- (B) Actual planets are not all the same size.
- (C) The sun is not present in this model.
- (D) The planets can not orbit the sun in this model.

8. Which **BEST** explains why telescopes used for studying the planets and stars are often built on mountaintops away from cities?

- (A) to get as close as possible to the stars
- (B) to place the telescopes on special platforms
- (C) to get above smog, dust, light, and fog
- (D) to get away from the noise of large cities

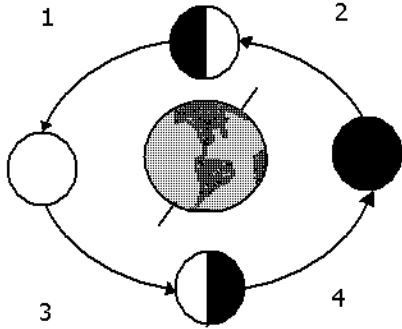
9.



Which of the following shows how the moon appears to be by an observer on Earth, when it is in the position shown in the diagram above?

- (A)
- (B)
- (C)
- (D)

10.



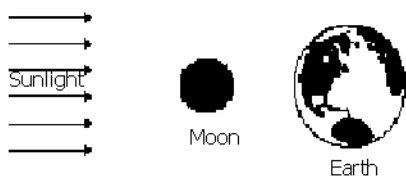
At which position on the diagram above does the waning gibbous phase of the moon occur?

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

11. Astronauts test their equipment to check for many things. Which of the following would an astronaut MOST LIKELY check for by wearing his or her spacesuit under water?

- (A) To see if it is too hot
 (B) To make sure that it does not leak
 (C) To see if it is too heavy
 (D) To make sure that it carries enough food

12.



The diagram shows the conditions for which phase of the Moon?

- (A) full (B) crescent
 (C) quarter (D) new

Use this table for the next 2 questions

13.

Planetary Data

Planet	Distance from the Sun (AU)	Diameter Compared to Earth
Mercury	0.4	0.38
Venus	0.7	0.95
Earth	1	1
Mars	1.5	0.53
Jupiter	5.2	11.19
Saturn	9.5	9.41
Uranus	19.2	3.98
Neptune	30.1	39.6
Pluto	39.5	0.27

Which of these is an accurate conclusion that can be drawn from this data?

- (A) The farther a planet is from the sun, the larger it is.
 (B) Planets farther from the sun are usually larger.
 (C) Only planets closer to the sun are smaller.
 (D) Planets close to the sun are all the same size.

14.

Students are working on a scale model of the solar system. They are planning to use a table tennis ball (ping pong) to show Earth. Which of the following would be the BEST choice to model Jupiter?

- (A) Softball (B) Golf ball
 (C) Baseball (D) Soccer ball

15. Which list contains only things that are part of our solar system?

- (A) planets, moons, comets
- (B) galaxies, quasars, asteroids
- (C) black holes, novas, stars
- (D) clusters, asteroids, meteors

16. Students are looking at plans for new spacecraft. Which of the following would be the **BEST** evidence that the spacecraft are designed to carry astronauts?

- (A) Powerful rocket engines
- (B) Tanks to carry oxygen
- (C) Long pointed shape
- (D) Many small wings

17. The phase of the moon you see depends on ____.

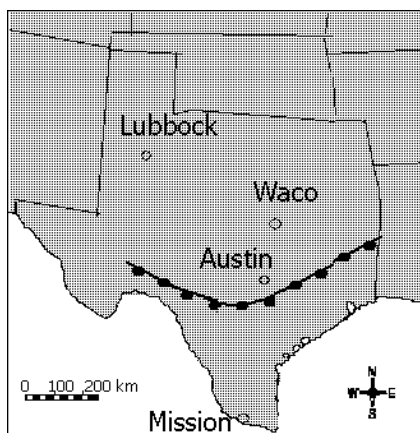
- (A) where you are on Earth's surface.
- (B) how much of the sunlit side of the moon faces Earth.
- (C) how much of the moon's surface is lit by the sun.
- (D) whether or not an eclipse is occurring

18. It is necessary to add a day to the calendar every four years because ____.

- (A) the axis of Earth is tilted.
- (B) the gravitational pull of the Sun affects Earth's revolution.
- (C) the revolution of Earth is not exactly 365 days.
- (D) the Moon crosses the orbit of the Sun every 28 days.

19. **Typical Sky Conditions**

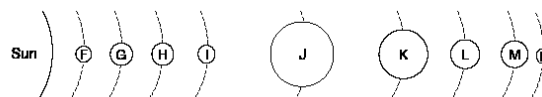
Location in Relation to Front	Distance from Front (km)	Sky Conditions
Ahead	1000	High clouds
Ahead	500	Middle clouds
Ahead	50	Low clouds
Behind	500	Clear



The cloud conditions above are typical of locations near a warm front. According to these data, what are the most likely sky conditions for Lubbock?

- (A) High clouds
- (B) Middle clouds
- (C) Low clouds
- (D) Clear skies

20. The diagram below represents the Sun and planets of our solar system.

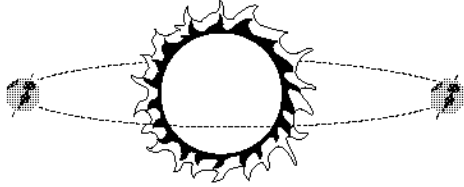


Earth and other planets revolve around the Sun and make up the solar system. Which planet on the above diagram represents Earth?

- (A) G
- (B) H
- (C) K
- (D) N

Free Response

21. Explain two main causes of seasons on Earth. Look at the diagram below to help with your written explanation.



22. Scientists spot an unknown object in a photograph of space. They cannot decide whether it is a comet or an asteroid.
1. Explain one reason why scientists might confuse a comet and an asteroid.
 2. Describe three differences that would help the scientists decide whether the object is a comet or an asteroid.