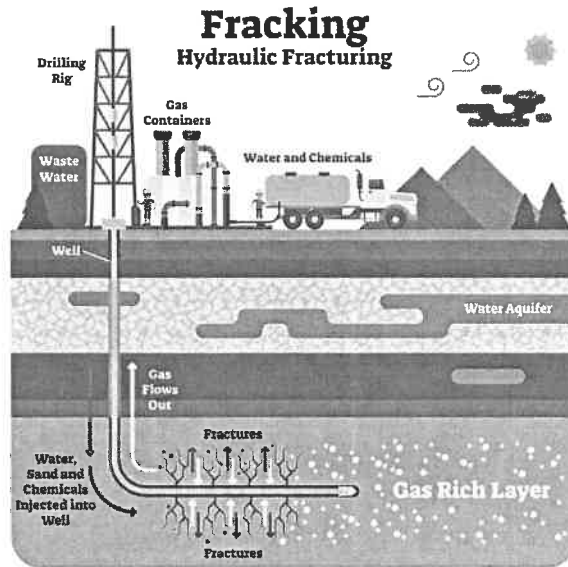


Name: \_\_\_\_\_

Date: \_\_\_\_\_

## Grade 8 Science



Dear Families,

In planning ahead for a long term closure the science department is posting the following assignment for the 8<sup>th</sup> grade. You can find the assignment on the school webpage and on individual teacher websites.

Regards,

GFMS Science Department

### **Directions:**

1. Complete the KWL chart on fracking found on the following page.
2. Watch both videos found on YouTube. Web addresses below.
  - a. TED-ED: Fracking explained: opportunity or danger
    - i. <https://www.youtube.com/watch?v=Uti2niW2BRA>
  - b. CNBC: Should the US Ban Fracking?
    - i. <https://www.youtube.com/watch?v=Y-OMydfBGvk>
3. Complete the reading assignment and questions on the following pages.

# KWL

Directions: Complete the chart below. Use the videos and reading to help you. If you don't know anything about fracking at the beginning of this assignment that's OK!

What do you <b>Know</b> ?	What do you <b>WANT</b> to know?	What did you <b>LEARN</b> ?

## Fracking and its Impacts

Fracking is the **controversial** process of **extracting** oil and gas from shale rock. This technique has produced a flood of new energy in the U.S. and Canada, lowered fuel prices and created tens of thousands of jobs. It has helped these two countries reduce their use of coal, the dirtiest fossil fuel. Fossil fuels like oil and coal are a **nonrenewable** natural source of energy formed over eons from fossils, or the remains of living things. Burning fossil fuels is one of the main causes of global warming. Fracking has also lessened dependence on **foreign energy** by the U.S. and Canada.

At the same time, the technique is associated with earthquakes, greenhouse-gas emissions, and water and air pollution. The question is whether the costs and benefits of fracking can be balanced by reducing the bad effects, or whether it presents a threat so grave it must be banned, which many communities have already done.

### The Situation

**Hydraulic** fracturing, known as fracking, was largely responsible for a 42 percent increase in the U.S. output of oil and natural gas from 2008 to 2014. It has made the country the world's biggest producer of the two. Fracking generates a little more than half the oil and natural gas the U.S. produces today.

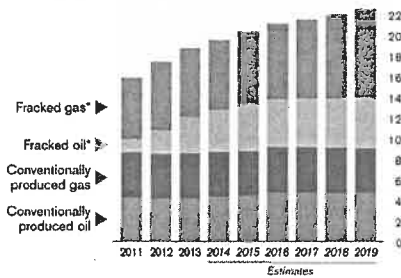
However, the practice has yet to take off outside North America. Environmental concerns have **provoked** a backlash. Bans or limits have been imposed by several European countries, Canada's Quebec province and hundreds of U.S. communities.

Because the price of oil is falling, some U.S. frackers are concerned about turning a profit and have scaled back their extractions. Total U.S. crude oil production is expected to decline by an estimated 7.4 percent in 2016.

The Obama administration in early 2015 issued the first **regulations** on fracking on public land, which accounts for about 11 percent of natural gas production and 5 percent of oil production. However, a federal judge said these regulations weren't made lawfully and struck down the rules in June 2016.

### Fracking Drives U.S. Energy Boom...

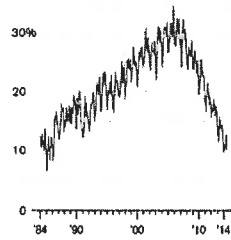
Million barrels of oil equivalent per day



\* Figures include a small portion of fuels produced through unconventional means other than fracking

### ... and Energy Independence

U.S. net energy imports as a share of energy consumption



## The Background

The first commercial use of fracking was in 1949 in Oklahoma. The technique involves forcing water mixed with sand and chemicals into a well to create gaps in shale rock. This allows the oil or gas trapped inside to escape. Horizontal drilling came in the early 1980s and provided access to

layers of shale deep underground. Later, oil and gas fracking in The Barnett Shale, a geological formation in Texas, proved large-scale fracking was highly profitable.

## The Argument

**Advocates** of fracking point out that abundant natural gas has allowed many U.S. electricity generators to abandon coal as a fuel. This has helped drive down carbon emissions 3.8 percent in 2012 and moderate increases during the cold winters of 2013 and 2014. Backers of fracking also note that U.S. energy imports as a share of **consumption** dropped to about 10 percent. This was a 29-year low and decreased U.S. dependence on oil imported from the Persian Gulf.

**Proponents** argue that the environmental risks of fracking can be mitigated. For example, operators can reduce leaks of the greenhouse gas methane by testing and repairing pressure safety valves. Pollution in water sources that are near fracking sites can be minimized by ensuring that wells are properly sealed with cement.

Fracking proponents also say the risks of small earthquakes can be lessened by mapping deep-rock formations and avoiding areas where tremors might result. Earthquakes have been linked to fracking mainly because wastewater is injected into underground wells. Additionally, proponents say frackers can trim their high consumption of fresh water by recycling wastewater, or by using foam or gel instead.

Opponents say fracking is inherently too hazardous to tolerate. They say that methane leaks not only offset the greenhouse-gas savings from fracking, but might even outweigh them. Critics say strictly enforced regulations nationwide are required before operators would make the costly investments that might curb environmental risks. Such comprehensive regulation would be hard to put in place, opponents argue, since the oil and gas industry is powerful enough to block it. They say that the abundance of fossil fuels that fracking produces will prove a curse. More oil and gas will delay the development of renewable energy sources like solar energy and wind. This will hurt efforts to slow global warming.

1. Pick 5 words that you feel do a good job at describing the overall message of what this article is trying to convey.

2. Explain how the process of fracking works.

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3. How can fracking be profitable?

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4. How does fracking negatively impact the environment?

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5. Do you support the idea of fracking, or are you against it? Explain your stance and in your summary and use two pieces of text evidence in your argument.

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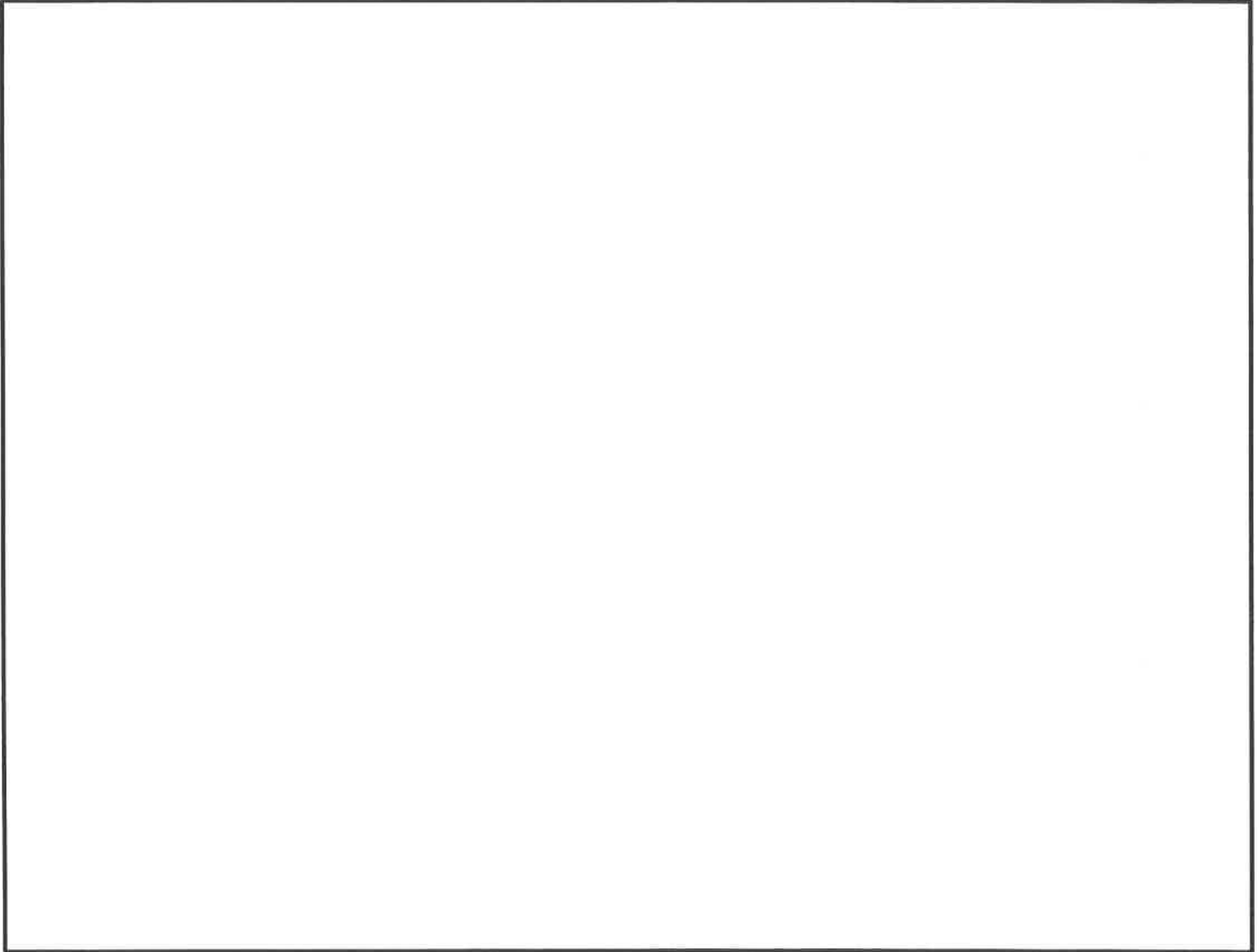
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## **Part 2:**

Look at the tasks below. Choose either task A or task B to complete.

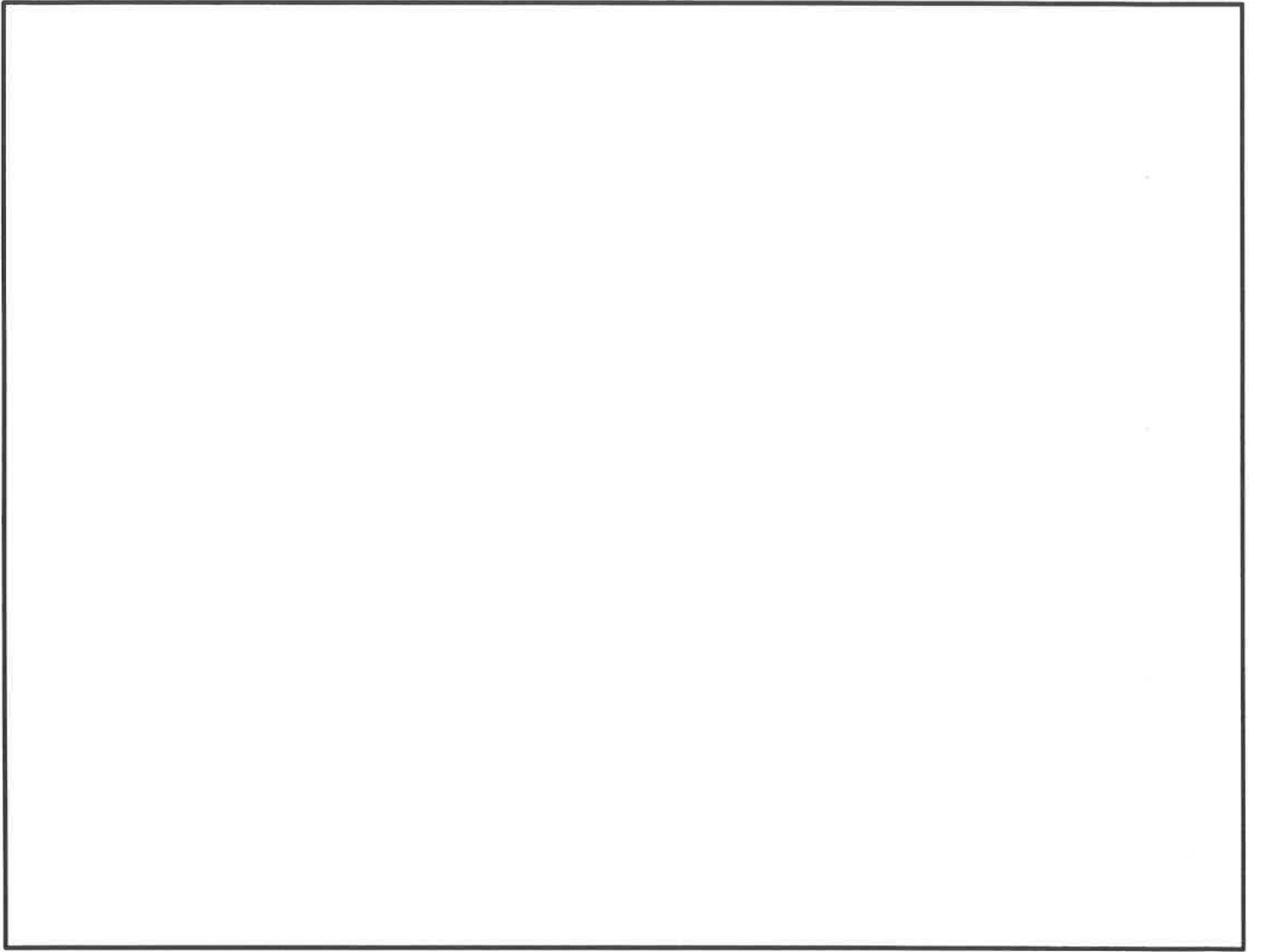
### **Task A:**

Depending on your stance, create an advertisement that raises awareness about fracking.

A large, empty rectangular box with a black border, intended for the student to create an advertisement about fracking. The box is currently blank.

### **Task B**

On the following page, draw a model that explains the process of fracking. Be sure to include labels, captions and arrows.



Name: \_\_\_\_\_

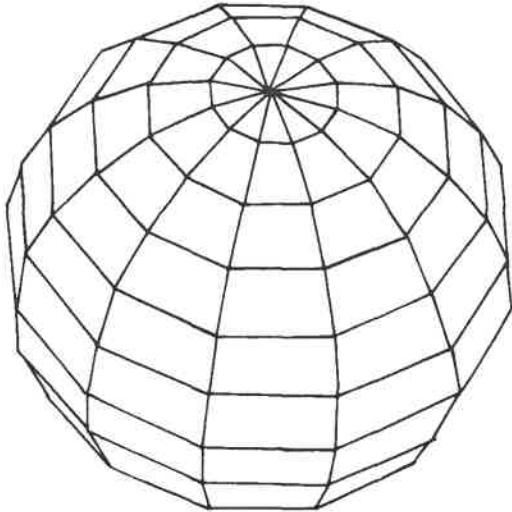
Date: \_\_\_\_\_

### Review

1. As a ship crosses the Prime Meridian, the altitude of Polaris is  $65^\circ$ . What is the ship's location?

- 1)  $0^\circ$  longitude,  $65^\circ$  South latitude
- 2)  $0^\circ$  longitude,  $65^\circ$  North latitude
- 3)  $0^\circ$  latitude,  $65^\circ$  West longitude
- 4)  $0^\circ$  latitude,  $65^\circ$  East longitude

Base your answers to questions 2 and 3 on the information and diagram below. The diagram represents a three-dimensional solid object of uniform material.



Mass = 80.0 grams  
Volume =  $25 \text{ cm}^3$

2. The mass of the object could best be determined by

- 1) using a balance
- 2) placing it in a beaker of water
- 3) calculating its circumference
- 4) counting the number of flat surfaces it contains

3. The object appears to have many flat surfaces, most of which are four-sided. This statement is best described as

- 1) an observation
- 2) a measurement
- 3) an inference
- 4) a prediction

\_\_\_\_\_

4. Which SI prefix means 1,000?

- 1) centi-
- 2) kilo-
- 3) milli-
- 4) deca-

5. The height of a diving board could be measured in

- 1) kilograms.
- 2) liters.
- 3) meters.
- 4) square meters.

6. Which diagram represents a graduated cylinder?

- 1)
- 3)



- 2)



- 4)



7. The latitude of a person traveling due east will

- 1) decrease
- 2) increase
- 3) remain the same

8. The amount of water needed to fill a bathtub could be measured in

- 1) kilograms.
- 2) liters.
- 3) meters.
- 4) square meters.

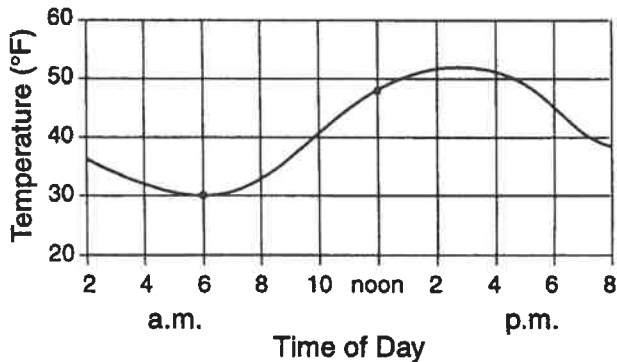
9. The mass of a large rock could be measured in

- 1) kilograms.
- 2) liters.
- 3) meters.
- 4) square meters.



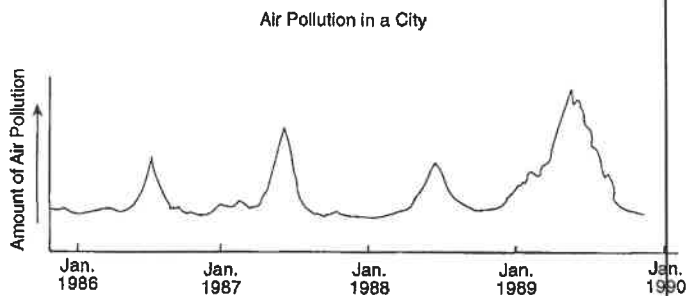
10. Which of the following reasons explains why you shouldn't work with live electrical wires?
- 1) It creates a safety hazard.
  - 2) It is too expensive.
  - 3) It is against the law.
  - 4) They do not carry any current.

11. The graph below shows the temperature during a day in April.



The temperature change between 6 a.m. and noon was

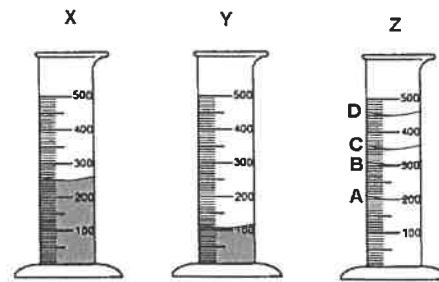
- 1) 6°
  - 2) 8°
  - 3) 3°
  - 4) 18°
12. The graph below shows the relative amount of air pollution over a city in the USA for several years.



Which statement about air pollution over this city is best supported by the graph?

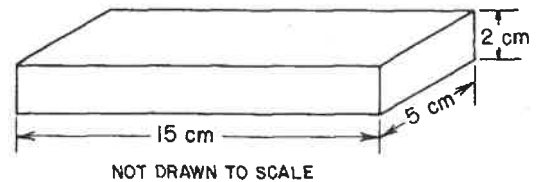
- 1) It is decreasing.
- 2) It is increasing.
- 3) It is greater in the summer.
- 4) It is constant.

13. The diagram below shows 3 graduated cylinders. The contents of cylinders X and Y are poured into cylinder Z.



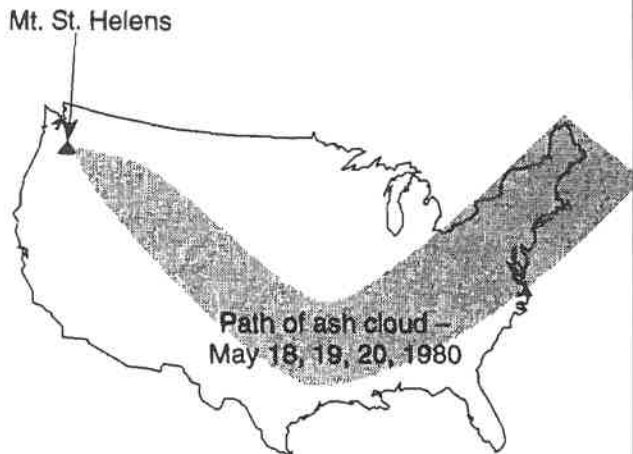
Which letter represents the amount of liquid that will be in container Z?

- 1) A
  - 2) B
  - 3) C
  - 4) D
14. To an observer on a ship at sea, at which latitude does the North Star appear closest to the horizon?
- 1) 5° N
  - 2) 20° N
  - 3) 50° N
  - 4) 85° N
15. Which of the following is *not* a safe laboratory procedure?
- 1) wearing goggles when working with chemicals
  - 2) wafting in order to smell chemical reactions
  - 3) pouring chemicals down the drain
  - 4) cleaning all equipment after it is used
16. The diagram below represents a rectangular object with a mass of 450 grams. What is the density of the object?



- 1) 1 gram per cubic centimeter
- 2) 2 grams per cubic centimeter
- 3) 3 grams per cubic centimeter
- 4) 4 grams per cubic centimeter

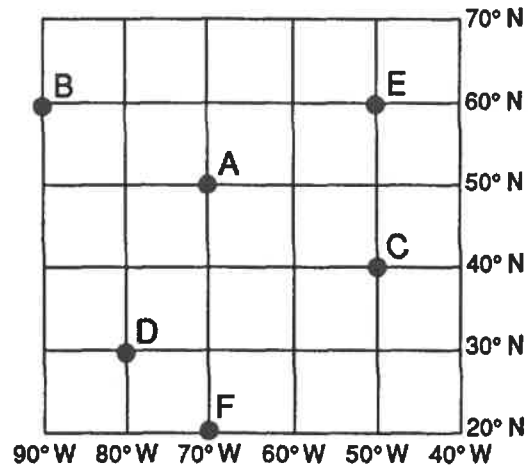
17. The map below shows the path of an ash cloud that resulted from the Mount St. Helens volcanic eruption.



The path of the ash cloud is

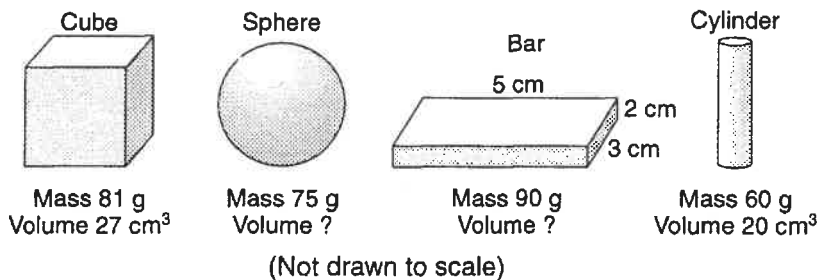
- 1) a hypothesis                      3) a theory  
2) an inference                      4) an observation
18. According to the data below, what is the exact shape of the Earth?
- | Actual Dimensions of the Earth |           |
|--------------------------------|-----------|
| Equatorial Radius              | 6,378 km  |
| Polar Radius                   | 6,357 km  |
| Equatorial Circumference       | 40,076 km |
| Polar Circumference            | 40,008 km |
- 1) a perfect sphere  
2) slightly bulging at the Poles  
3) slightly bulging at the Equator
19. During a laboratory activity, a student combined two solutions. In the laboratory report, the student wrote "A yellow color appeared." The statement represents the student's recorded
- 1) conclusion                      3) hypothesis  
2) observation                      4) inference
20. Compared to the density of liquid water, the density of an ice cube is
- 1) always less  
2) always greater  
3) always the same  
4) sometimes less and sometimes greater

Base your answers to questions 21 and 22 on the latitude and longitude system shown below. The map represents a part of the Earth's surface and its latitude-longitude coordinates. Points A through F represent locations in this area.



21. As a person travels from location B to location E the observed altitude of Polaris will
- 1) decrease                      3) remain the same  
2) increase
22. How are latitude and longitude lines drawn on a globe of the Earth?
- 1) Latitude lines are parallel and longitude lines meet at the poles.  
2) Latitude lines are parallel and longitude lines meet at the Equator.  
3) Longitude lines are parallel and latitude lines meet at the poles.  
4) Longitude lines are parallel and latitude lines meet at the Equator.
- 
23. The amount of matter in a substance is known as
- 1) density.                      3) mass.  
2) volume.                      4) weight.
24. At which latitude will Polaris be overhead?
- 1) 0°                      3) 90° S.  
2) 23 ½°N.                      4) 90° N.
25. Which term is a unit of length?
- 1) gram                      3) liter  
2) degree                      4) meter

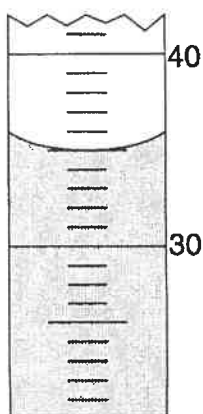
26. Base your answer to the following question on the diagrams below which represent four solid objects made of the same uniform material. The volumes of the sphere and the bar are not given.



What will occur when the sphere is heated and expands?

- 1) Its mass will increase and its volume will remain the same.
- 2) Its mass will decrease and its volume will remain the same.
- 3) Its mass will remain the same and its volume will increase.
- 4) Its mass will remain the same and its volume will decrease.

27. The diagram below represents a portion of a 100-milliliter graduated cylinder.



What is the volume measurement?

- 1) 35.0 mL
  - 2) 36.0 mL
  - 3) 44.0 mL
  - 4) 45.0 mL
28. In order to make observations, an observer must always use
- 1) experiments
  - 2) the senses
  - 3) proportions
  - 4) mathematical calculations
29. A unit of mass is the
- 1) liter
  - 2) kilogram
  - 3) centimeter
  - 4) watt

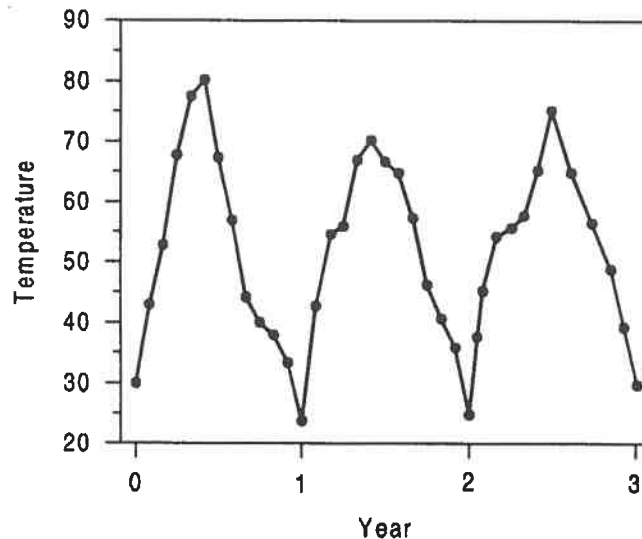
30. The table below which shows the relationship between the amount of rain in a 20 hour period and the rise of the water level at a dam.

If: Rainfall in 20 hours equals ____ (cm)	Then: The water level at the dam rises ____ (m)
10	1.0
15	1.5
20	2.0
25	2.5
30	*

Based on this data, how much will the water level increase 20 hours after an upstream rainfall of 30 centimeters?

- 1) 1.5 m
  - 2) 2.0 m
  - 3) 3.0 m
  - 4) 5.2 m
31. Any substance that has mass and takes up space is called
- 1) matter.
  - 2) energy.
  - 3) force
  - 4) work
32. Under the same conditions of temperature and pressure, three different samples of the same uniform substance will have the same
- 1) shape
  - 2) density
  - 3) mass
  - 4) volume

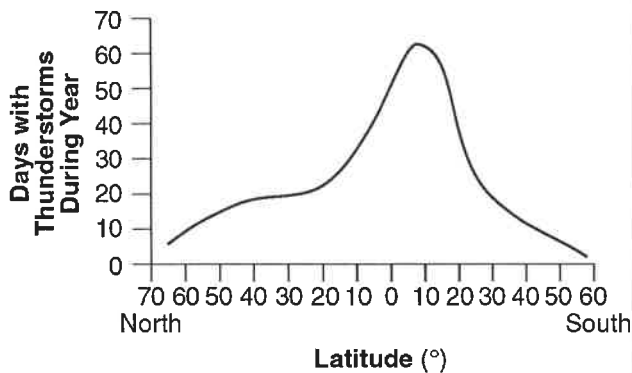
33. The graph below shows the average monthly temperatures at one location on Earth over a three year period.



What was the highest recorded temperature?

- 1) 25°F                      2) 30°F                      3) 70°F                      4) 80°F

34. The graph below shows the average number of days each year that thunderstorms occur at different latitudes on Earth.



According to the graph, what is the approximate number of days each year that thunderstorms occur at 40°N latitude?

- 1) 8 days                      2) 18 days  
3) 24 days                      4) 32 days

35. While performing an experiment involving colors and heat, a student noticed that the black piece of paper was warmer than the white piece of paper. This is known as a(n)

- 1) hypothesis.                      2) observation.  
3) conclusion.                      4) control.

36. The device below is used for directly measuring which of the following?



- 1) length                      2) mass  
3) time                      4) volume

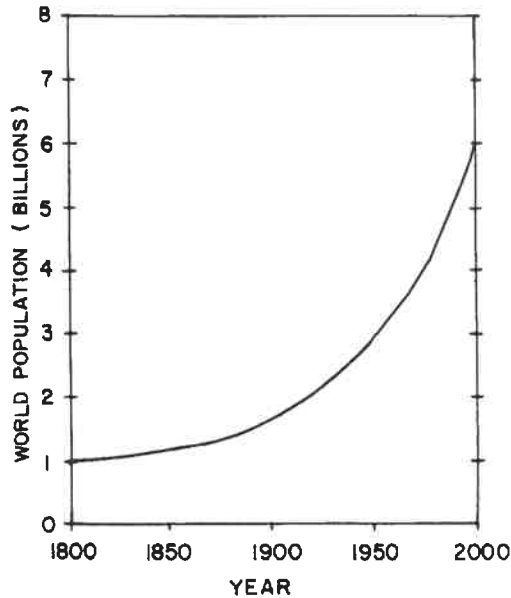
37. All of these activities are examples of safe laboratory practices *except*

- 1) wearing goggles and aprons.  
2) leaving boiling water unattended.  
3) cleaning glassware before storing them in labeled cabinets.  
4) rinsing glassware with distilled water after washing.

38. The latitude of a point in the Northern Hemisphere may be determined by measuring the

- 1) apparent diameter of Polaris  
2) altitude of Polaris  
3) distance to the Sun  
4) apparent diameter of the Sun

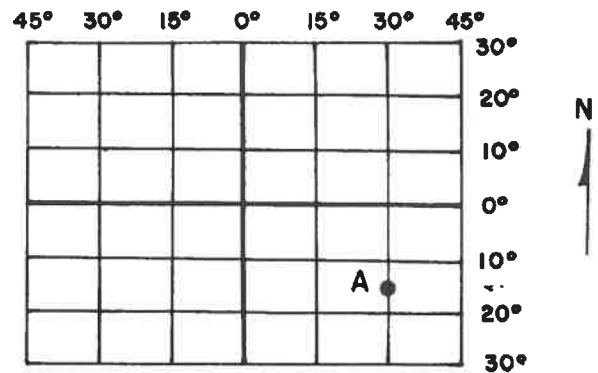
39. The graph below shows world population from 1800 to 2000.



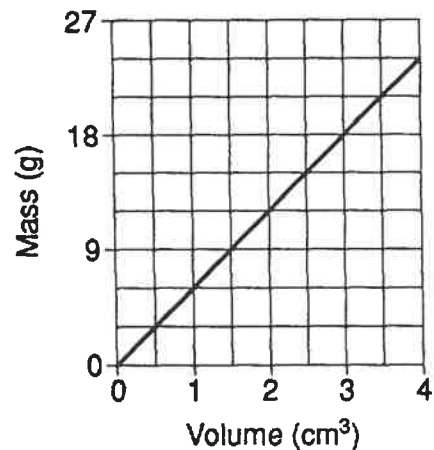
The graph shows the greatest increase in population between

- 1) 1825 and 1850      3) 1925 and 1950  
 2) 1875 and 1900      4) 1975 and 2000
40. A sign in a chemistry lab says "Never drink from the glassware." What is the most likely reason for this warning?
- 1) Many of the chemicals used are poisonous.  
 2) The chemicals are reused.  
 3) It could spread germs.  
 4) The glassware could have broken pieces of glass in it.
41. At what latitude would an observer on the Earth find the altitude of Polaris to be  $37^\circ$ ?
- 1)  $37^\circ$  South      3)  $37^\circ$  North  
 2)  $53^\circ$  North      4)  $90^\circ$  North
42. After looking at a rock, a student wrote four statements about the rock. Which statement about the rock is an observation?
- 1) The rock formed deep inside the Earth.  
 2) The rock cooled very rapidly.  
 3) The rock was formed during the time of the dinosaurs.  
 4) The rock is black and shiny.

43. The diagram below represents a portion of a map of the Earth's grid system. What is the approximate latitude and longitude of point A?



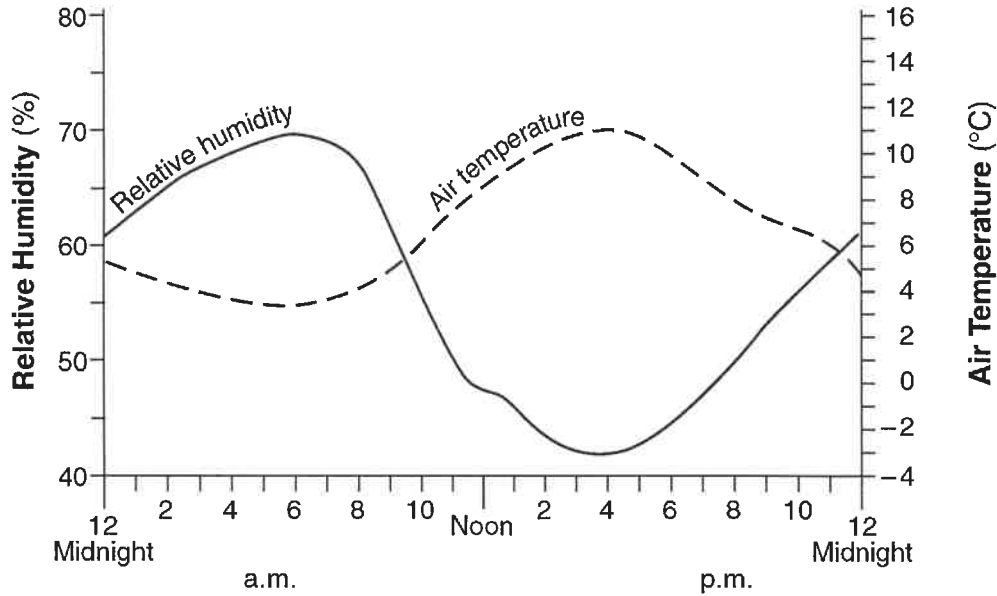
- 1)  $15^\circ\text{N. } 30^\circ\text{W.}$       3)  $15^\circ\text{N. } 30^\circ\text{E.}$   
 2)  $15^\circ\text{S. } 30^\circ\text{W.}$       4)  $15^\circ\text{S. } 30^\circ\text{E.}$
44. Which action can be performed most accurately using only the human senses?
- 1) tearing a sheet of paper into squares whose sides measure 1 centimeter  
 2) adding 10 grams of salt to a cup of water  
 3) measuring the air pressure of a room  
 4) counting 28 shells from a beach
45. The graph below shows the relationship between the mass and volume of a mineral.



What is the density of this mineral?

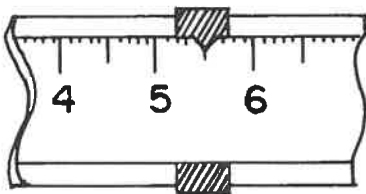
- 1)  $6.0 \text{ g/cm}^3$       3)  $3.0 \text{ g/cm}^3$   
 2)  $9.0 \text{ g/cm}^3$       4)  $4.5 \text{ g/cm}^3$

Base your answers to questions 46 and 47 on the graph below, which shows the changes in relative humidity and air temperature during a spring day in Washington, D.C.



46. What were the relative humidity and air temperature at noon on this day?
- 1) 47% and 32°F
  - 2) 65% and 32°F
  - 3) 47% and 48°F
  - 4) 65% and 48°F
47. Which statement best describes the relationship between relative humidity and air temperature as shown by the graph?
- 1) Relative humidity decreases as air temperature decreases.
  - 2) Relative humidity decreases as air temperature increases.
  - 3) Relative humidity increases as air temperature increases.
  - 4) Relative humidity remains the same as air temperature decreases.

48. A piece of copper metal is correctly placed on a triple beam balance. The riders are all at the zero mark except for the rider on 0-10 gram beam which is located at the position shown.



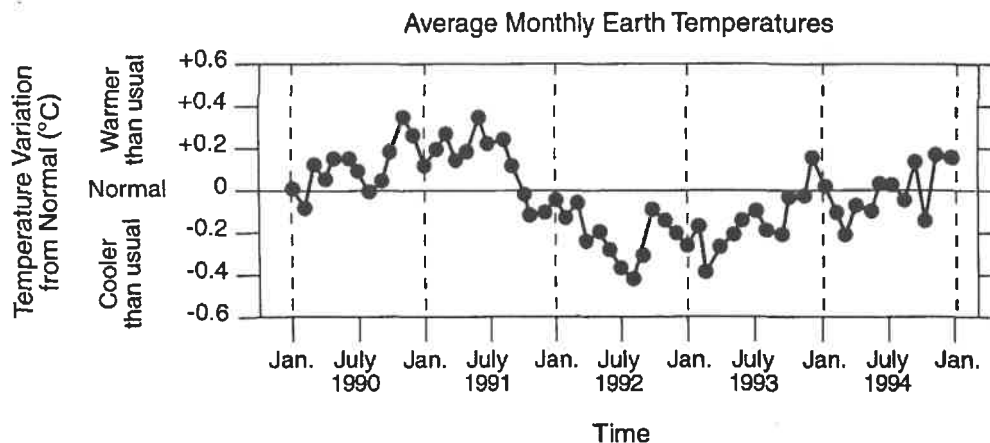
What is the mass of the copper metal?

- 1) 0.455 g
- 2) 4.56 g
- 3) 0.55 g
- 4) 5.50 g

49. Which line segment has a length of 3.0 centimeters?

- 1)
- 2)
- 3)
- 4)

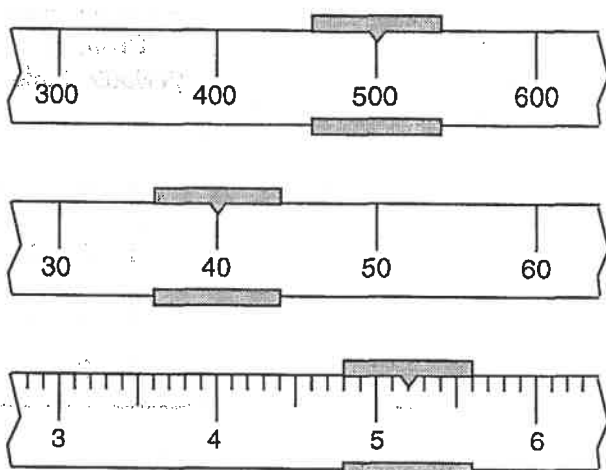
50. The graph below which shows the variations in Earth's monthly temperatures from normal Earth temperatures between January 1990 and January 1995.



According to the graph, the longest length of time that average Earth temperatures were warmer than normal was approximately

- 1) 8 months                      2) 14 months                      3) 26 months                      4) 30 months

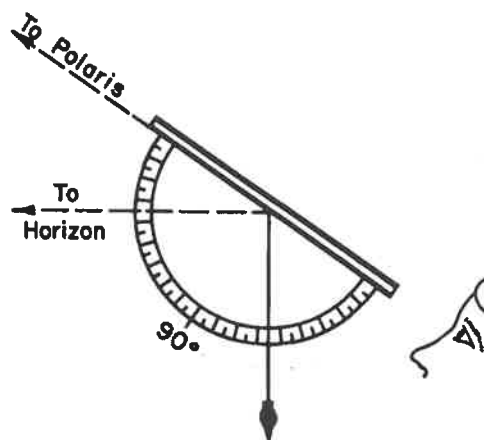
51. The diagram below represents a portion of a triple-beam balance.



If the beams are in balance with the riders in the positions shown, what is the total mass of the object?

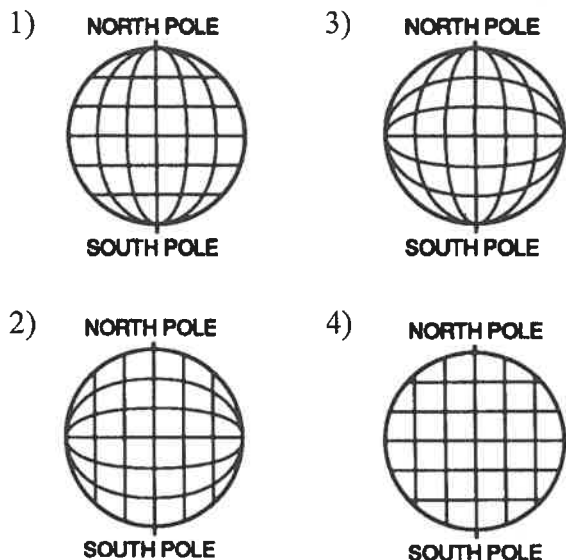
- 1) 540.20 g                      3) 545.20 g  
 2) 540.52 g                      4) 545.52 g
52. An observer on Earth measures the altitude of Polaris and finds it to be 0 degrees. This observer must be at the
- 1) North Pole                      3) Tropic of Cancer  
 2) Arctic Circle                      4) Equator

53. What is the latitude of the observer shown below?



- 1) 35° N.                      3) 90° N.  
 2) 55° N.                      4) 125° N.
54. Which statement made by a student after examining a rock specimen is an inference?
- 1) The rock was formed by a volcano.  
 2) The rock has rounded edges.  
 3) The rock is light-colored.  
 4) The rock contains large crystals.

55. The diagrams below represent four systems of imaginary lines that could be used to locate positions on a planet. Which system is most similar to the latitude-longitude system used on the Earth?



56. If a wooden block were cut into eight identical pieces, the density of each piece compared to the density of the original block would be

- 1) less
- 2) greater
- 3) the same

57. Which of the following units could you use to measure the volume of a liquid?

- 1) grams
- 2) liters
- 3) meters
- 4) degrees

58. Which statement about a cloud is an inference?

- 1) The cloud appears white.
- 2) The cloud has an irregular shape.
- 3) The cloud formed over a lake.
- 4) The cloud is large.

59. The best evidence of the Earth's nearly spherical shape is obtained through

- 1) observations of other planets
- 2) photographs of the Earth from a satellite
- 3) observations of the Sun's altitude
- 4) observations of the Moon

60. A student collected and recorded measurements of the amount of carbon monoxide in the air at the same location each day for one week. The data are shown below.

Day	Time	Carbon Monoxide (parts per million)
1	9:10 a.m.	0.20
2	3:10 p.m.	0.38
3	10:45 a.m.	0.40
4	7:20 a.m.	1.15
5	6:00 a.m.	0.95
6	6:00 p.m.	0.65
7	7:15 p.m.	0.14

The student concluded that the amount of carbon monoxide in the air increased and then decreased during the week. A source of error in the student's investigation is that the student failed to

- 1) identify the days of the week
- 2) identify the month
- 3) collect data at the same time each day
- 4) state the method of measurement

61. Why is it important to accurately record the procedures and results of an experiment?

- 1) So that you know what you did.
- 2) So that others can admire your work.
- 3) So that others can check to see if you did your experiment correctly.
- 4) So that others can repeat your experiment to see if they get the same results.

62. The true shape of the Earth is best described as a

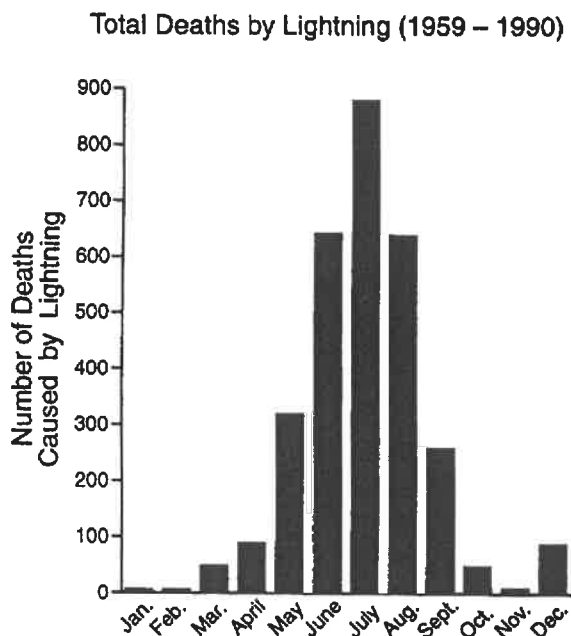
- 1) perfect sphere
- 2) perfect ellipse
- 3) slightly oblate sphere
- 4) highly eccentric ellipse

63. An interpretation based upon an observation is called

- 1) a fact
- 2) an inference
- 3) a classification
- 4) a measurement



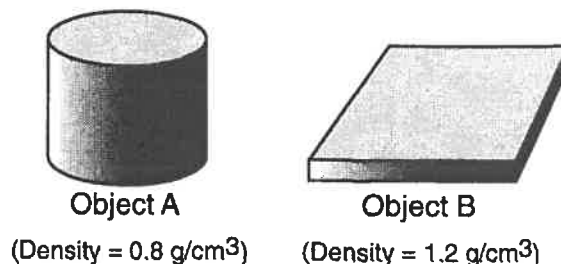
64. The graph below shows the total number of deaths per month in the United States caused by lightning between 1959 and 1990.



Based on the graph, which prediction about lightning deaths in the United States in the year 2000 would be most accurate?

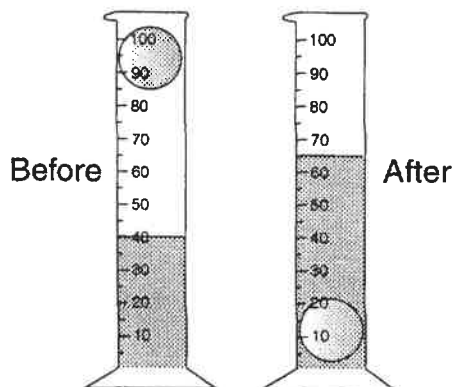
- 1) Most deaths will occur along the eastern coastline.
  - 2) The number of deaths will exceed 900.
  - 3) The greatest number of deaths will occur during summer.
  - 4) Most deaths will be the result of hurricanes.
65. Which shows units of volume from smallest to largest in the correct order?
- 1) milliliter, liter, kiloliter
  - 2) liter, milliliter, kiloliter
  - 3) kiloliter, milliliter, liter
  - 4) liter, kiloliter, milliliter
66. When heating liquid materials in laboratory glassware, a student should always
- 1) wear safety goggles
  - 2) use Benedict's solution
  - 3) stopper the test tube
  - 4) record the temperature of the liquid

67. The diagrams below represent two solid objects, *A* and *B*, with different densities.



What will happen when the objects are placed in a container of water (water temperature = 4°C)?

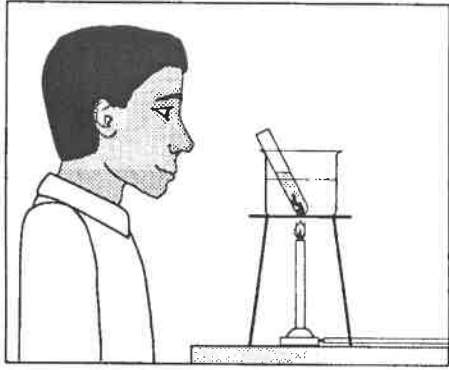
- 1) Both objects will sink.
  - 2) Both objects will float.
  - 3) Object *A* will float, and object *B* will sink.
  - 4) Object *B* will float, and object *A* will sink.
68. The sphere was dropped into water in a graduated cylinder as shown below.



What is the volume of the sphere?

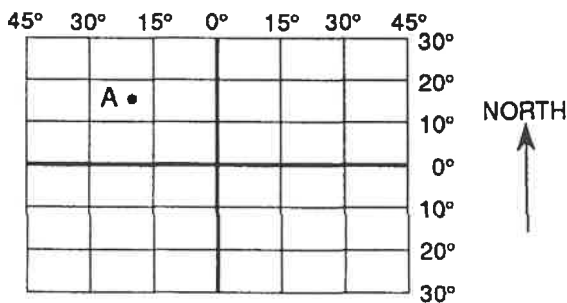
- 1) 15 mL
  - 2) 25 mL
  - 3) 40 mL
  - 4) 65 mL
69. An observer watching a sailing ship at sea notes that the ship appears to be "sinking" as it moves away. Which statement best explains this observation?
- 1) The surface of the ocean has depressions.
  - 2) The Earth has a curved surface.
  - 3) The Earth is rotating.
  - 4) The Earth is revolving.

70. Base your answer on the diagram below and on your knowledge of biology.



Which statement describes *two* unsafe laboratory practices represented in the diagram?

- 1) The flame is too high and the test tube is unstoppered.
  - 2) The opening of the test tube is pointed toward the student and the student is not wearing goggles.
  - 3) The test tube is unstoppered and the student is not wearing goggles.
  - 4) The beaker has water in it and the flame is under the tripod.
71. The diagram below represents a portion of the Earth's latitude and longitude system.

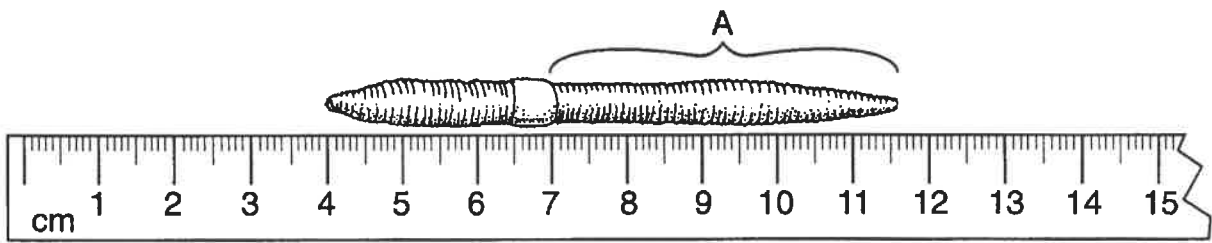


What are the approximate latitude and longitude of point *A*?

- 1) 15° S 20° W
- 2) 15° S 20° E
- 3) 15° N 20° W
- 4) 15° N 20° E

72. A meterstick (100 centimeters) can be balanced on your finger by placing your finger exactly in the middle. What is the reading at the middle?
- 1) .5 cm
  - 2) 50 cm
  - 3) 500 cm.
  - 4) 5000 cm.
73. An observer on a moving ship notices that the altitude of Polaris increases each night. Local solar noon occurs at the same time each day. In what direction is the ship moving?
- 1) due east
  - 2) due south
  - 3) due west
  - 4) due north

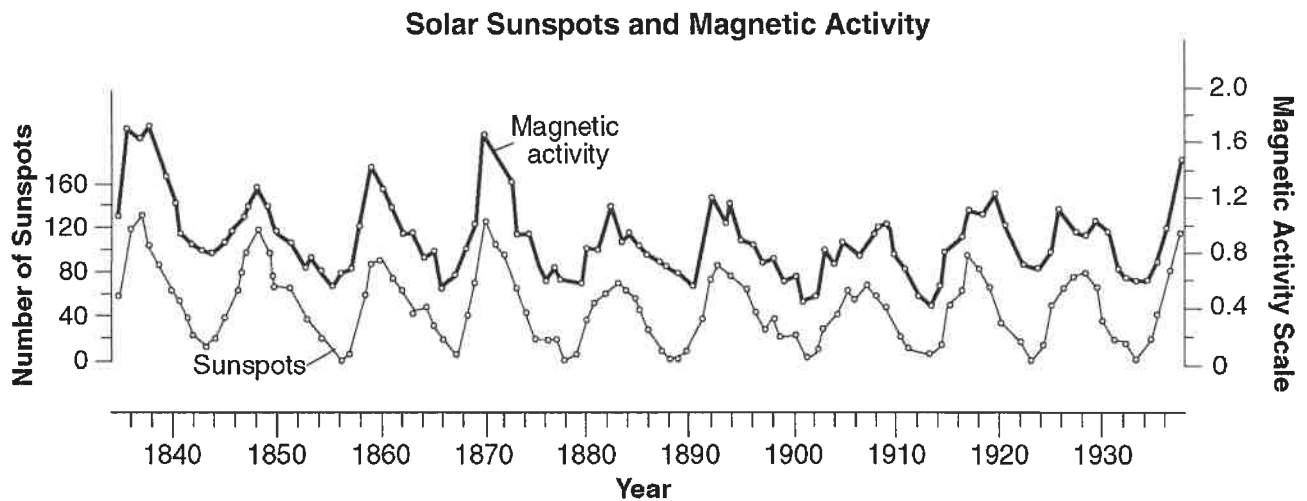
74. A student measured an earthworm using a metric ruler, as shown in the diagram below.



What is the length of *only* section A? (Note: Answers have different units)

- 1) 7.6 cm                      2) 11.6 cm                      3) 4.5 cm                      4) 23 mm

75. Base your answer to the following question on the graph below, which shows changes in the Sun's magnetic activity and changes in the number of sunspots over a period of approximately 100 years. Sunspots are dark, cooler areas within the Sun's photosphere that can be seen from Earth.



The graph indicates that years having the greatest number of sunspots occur

- 1) randomly and unpredictably  
2) precisely at the beginning of each decade  
3) in a cyclic pattern, repeating approximately every 6 years  
4) in a cyclic pattern, repeating approximately every 11 years