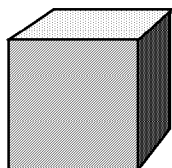
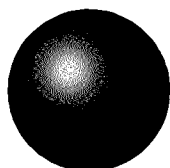


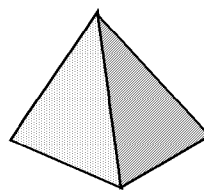
- 4) The diagrams below represent four solid objects made of the same uniform material. The accepted values for the volume and mass of each object are given, except for the volume of object A.

**A**

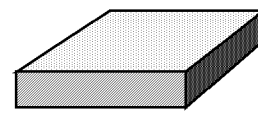
Mass = 8.00 g
Volume = ?

**B**

Mass = 6.30 g
Volume = 3.15 cm³
(not drawn to scale)

**C**

Mass = 4.00 g
Volume = 2.00 cm³

**D**

Mass = 3.50 g
Volume = 1.75 cm³

A student made four statements about the objects. Which statement was an observation?

- A) Object C is made of silicon and oxygen.
 B) Object B is a sphere.
 C) Object A is a piece of the mineral halite.
 D) Object D may be able to float due to its shape.
- 5) A scientist who is studying a stream would have the most difficulty determining the stream's
- A) age in years
 B) temperature
 C) transported sediment size
 D) velocity
- 6) The use of a triple-beam balance to determine the mass of a rock is an example of measuring by using
- A) inferences and interpretations
 B) all of the five senses
 C) a direct comparison with a standard
 D) a combination of dimensional quantities
- 7) A centimeter is 0.01 meter. This measurement can also be expressed as
- A) 1×10^{-1} m
 B) 1×10^0 m
 C) 1×10^2 m
 D) 1×10^{-2} m
- 8) The basic measurements used to describe stream velocity are
- A) time and direction
 B) distance and time
 C) mass and volume
 D) length and shape
- 9) What is the diameter of the Earth? [Refer to the *Earth Science Reference Tables*.]
- A) 12,740 km
 B) 6,370 km
 C) 63,700 km
 D) 127,400 km
- 10) The circumference of the Earth is about 4.0×10^4 kilometers. This value is equal to
- A) 400 km
 B) 400,000 km
 C) 4,000 km
 D) 40,000 km

- 11) Which statement about a mineral sample found in a field in New York State is most likely an inference?
- A) The sample is 8 cm long, 5 cm wide, and 3 cm high.
 - B) The sample is rectangular, with sharp, angular corners.
 - C) The sample is white in color.
 - D) The sample was transported by a glacier.
- 12) Which statement made during a weather report is most likely an inference?
- A) The current barometric pressure is 29.97 in.
 - B) Hot and humid conditions will continue throughout the week.
 - C) The record low temperature for this date was set in 1957.
 - D) The high temperature for the day was recorded at 2 p.m.
- 13) While walking on a glacier, an observer makes several statements. Which statement is an inference?
- A) "There are many cracks in this glacier."
 - B) "Some of the snow on this glacier is powdery."
 - C) "The rocks on this glacier are of different sizes."
 - D) "Some parts of this glacier will start melting this spring."
- 14) A person observes a sediment consisting of clay, sand, and pebbles and then states that this material was transported and deposited by an agent of erosion. This statement is
- A) a measurement
 - B) a fact
 - C) an inference
 - D) an observation
- 15) Which statement about an unidentified rock sample is most likely an inference?
- A) The rock is a metamorphic rock.
 - B) The rock has shiny, wavy mineral bands.
 - C) The rock has no visible fossils.
 - D) The rock is composed of large crystals.
- 16) Which statement about a rock sample is most likely an inference?
- A) The rock has flat sides and sharp corners.
 - B) The rock has thin, distinct layers.
 - C) The rock is made of small, dark-colored crystals.
 - D) The rock has changed color due to weathering.
- 17) Which information in the *Earth Science Reference Tables* is an inference rather than an observation?
- A) A P-wave travels 5,600 kilometers in 9 minutes.
 - B) Temperature decreases as elevation in the troposphere increases.
 - C) The Earth's outer core is made of iron.
 - D) Saturn's period of rotation is 10 hours 14 minutes.

Questions 18 through 22 refer to the following:

The table below shows data for a student's collection of rock samples *A* through *I*, which are classified into groups *X*, *Y*, and *Z*. For each rock sample, the student recorded mass, volume, density, and a brief description. The density for rock *D* has been left blank.

Rock Collection

Group	Rock	Mass (g)	Volume (cm ³)	Density (g/cm ³)	Description
<i>X</i>	<i>A</i>	82.9	34.4	2.41	Grey, smooth, rounded
	<i>B</i>	114.2	42.6	2.68	Brown, smooth, rounded
	<i>C</i>	144.7	63.2	2.29	Black, smooth rounded
<i>Y</i>	<i>D</i>	159.4	59.7		Black and grey crystals, angular
	<i>E</i>	87.7	33.1	2.65	Clear and pink crystals, angular
	<i>F</i>	59.6	21.0	2.84	White, grey, and black crystals, angular
<i>Z</i>	<i>G</i>	201.1	68.4	2.94	Grey, shiny, flat
	<i>H</i>	85.1	39.8	2.14	Brown, sandy feel, flat
	<i>I</i>	110.2	47.3	2.33	Dark grey, flaky, flat

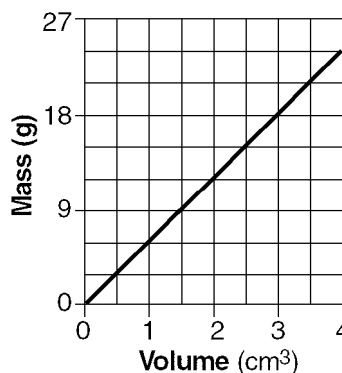
- 18) The student's classification system is based on
 A) shape B) mass C) color D) density
- 19) Which statement is an inference rather than an observation?
 A) Rock *E* has a volume of 33.1 cm³.
 B) Rock *H* is flat.
 C) Rock *B* has been rounded by stream action.
 D) Rock *G* is the same color as rock *I*.
- 20) To obtain the data recorded in the column labeled "Description," the student used
 A) her senses C) a calculator
 B) a triple-beam balance D) an overflow can
- 21) The approximate density of rock sample *D* is
 A) 3.75 g/cm³ C) 2.75 g/cm³
 B) 3.32 g/cm³ D) 2.67 g/cm³
- 22) The student broke rock *G* into two pieces. Compared to the density of the original rock, the density of one piece would most likely be
 A) greater B) less C) the same
- 23) A pebble has a mass of 35 grams and a volume of 14 cubic centimeters. What is its density?
 A) 4.0 g/cm³ C) 0.4 g/cm³
 B) 2.5 g/cm³ D) 490 g/cm³

- 24) The table below identifies four density groups.

Group	Density g/cm ³
A	1.0-3.9
B	4.0-7.9
C	8.0-11.9
D	12.0-15.9

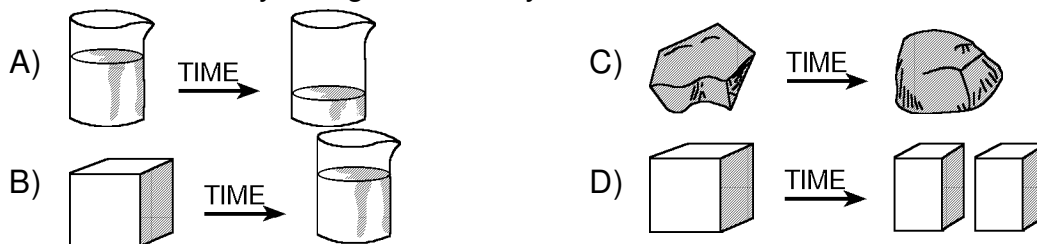
According to this classification system, a sample of quartz with a mass of 27 grams and a volume of 10 cubic centimeters should be placed in group

- A) A B) B C) C D) D
- 25) A mineral sample is found to have a density of 3.0 grams per cubic centimeter. It is then broken into two pieces, with one piece twice as large as the other. The *smaller* of the two pieces will have a density of
- A) 1.0 g/cm³ C) 1.5 g/cm³
 B) 6.0 g/cm³ D) 3.0 g/cm³
- 26) The graph below shows the relationship between the mass and volume of a mineral. What is the density of this mineral?

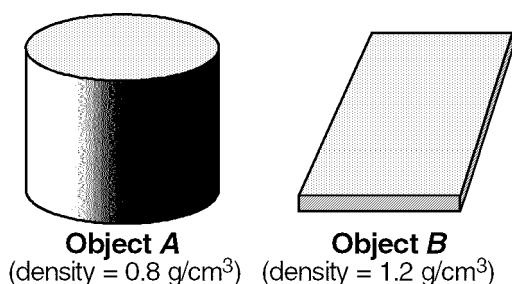


- A) 6.0 g/cm³ C) 4.5 g/cm³
 B) 30 g/cm³ D) 9.0 g/cm³
- 27) Water has its *greatest* density at a temperature of
- A) 4DC B) 10DC C) -6DC D) 32DC
- 28) Water has the *greatest* density at
- A) 0DC in the solid phase
 B) 4DC in the solid phase
 C) 4DC in the liquid phase
 D) 100DC in the gaseous phase
- 29) Compared to the density of liquid water, the density of an ice cube is
- A) always the same
 B) always less
 C) always greater
 D) sometimes less and sometimes greater

- 30) The diagrams below show physical changes in four materials after a period of time. Chemical composition of each material remained the same. Which material most likely changed in density?



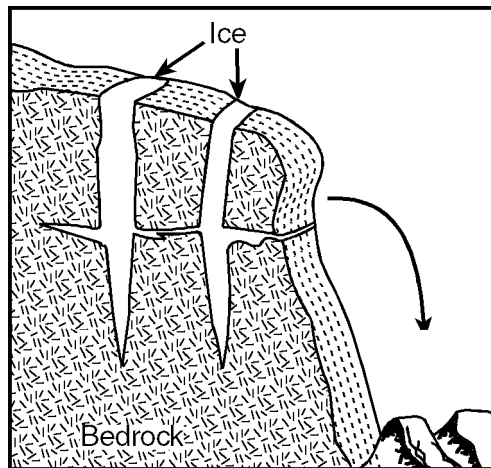
- 31) Under the same conditions of temperature and pressure, three different samples of the same uniform substance will have the same
 A) volume B) shape C) density D) mass
- 32) The diagrams below represent two solid objects, *A* and *B*, with different densities.



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

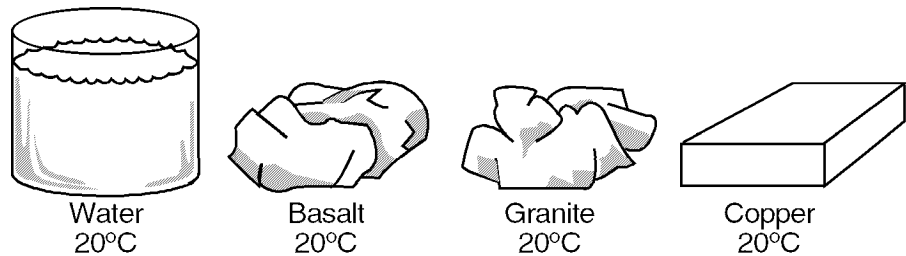
- A) Both objects will sink.
 B) Object *A* will float, and object *B* will sink.
 C) Both objects will float.
 D) Object *B* will float, and object *A* will sink.
- 33) A quantity of water is frozen solid and then heated from 0°C to 10°C . Which statement *best* describes the properties of the water during this time?
- A) Mass changes but volume remains constant.
 B) Volume changes but density remains constant.
 C) Volume and density change.
 D) Mass and volume change.

- 34) The diagram below shows a process of weathering called frost wedging.



Frost wedging breaks rocks because as water freezes it increases in

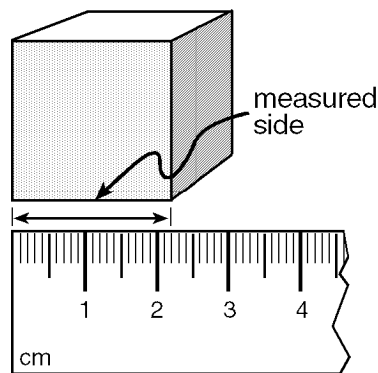
- A) mass
 B) specific heat
 C) density
 D) volume
- 35) The diagrams below represent 100-gram samples of four different Earth materials at room temperature. Each material has an initial temperature of 20°C.



What happens when the four substances are heated?

- A) Their volume and mass both decrease.
 B) Their volume and mass both increase.
 C) Their volume decreases but their mass remains constant.
 D) Their volume increases but their mass remains constant.

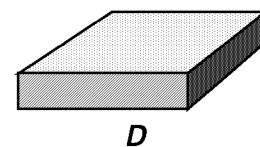
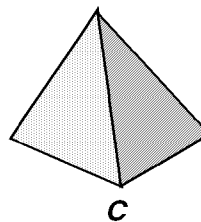
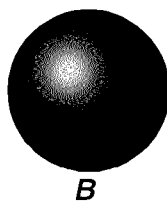
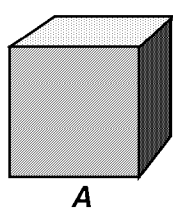
- 36) If each side of the cube shown below has the same length as the measured side, what is the approximate volume of the cube?



- A) 10.65 cm^3 C) 2.20 cm^3
 B) 4.84 cm^3 D) 6.60 cm^3

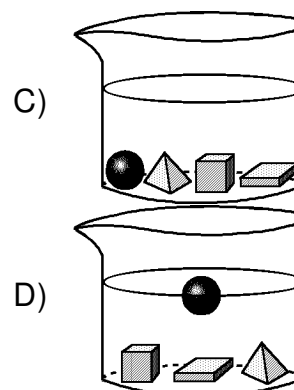
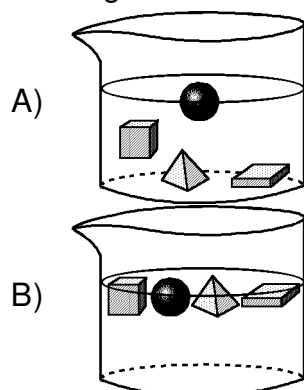
Questions 37 through 39 refer to the following:

The diagrams below represent four solid objects made of the same uniform material. The accepted values for the volume and mass of each object are given, except for the volume of object A.



Mass = 8.00 g Mass = 6.30 g Mass = 4.00 g Mass = 3.50 g
 Volume = ? Volume = 3.15 cm^3 Volume = 2.00 cm^3 Volume = 1.75 cm^3
 (not drawn to scale)

- 37) Which diagram *best* shows what would happen if the four objects were placed in a large beaker of water at room temperature?

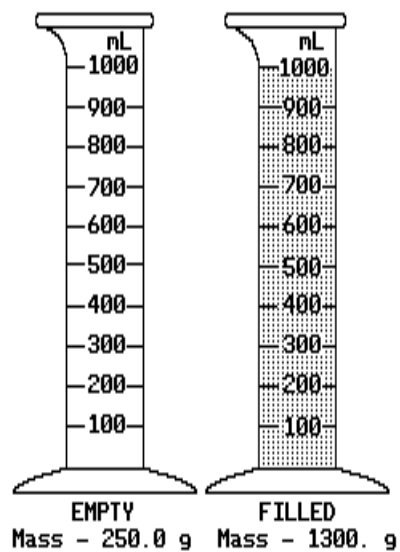


- 38) What is the volume of object A?

- A) 2.00 cm^3 C) 8.00 cm^3
 B) 4.00 cm^3 D) 1.00 cm^3

- 39) A sample having a volume of 1 cubic centimeter was cut from each object. Which is an accurate statement about the samples?
- A) Each sample has the same mass.
 - B) Each sample has the same shape.
 - C) The sample from object *B* has the greatest volume.
 - D) The sample from object *D* has the greatest density.
- 40) What is the mass of a rock that has a density of 2.5 grams per cubic centimeter and a volume of 4.0 cubic centimeters?
- A) 6.2 g
 - B) 10.0 g
 - C) 4.0 g
 - D) 1.6 g
- 41) A number of objects are grouped on the basis of common properties. What is this process called?
- A) observation
 - B) inference
 - C) measurement
 - D) classification
- 42) An interpretation based upon an observation is called
- A) a measurement
 - B) an inference
 - C) a classification
 - D) a fact
- 43) The grouping of objects or events based on similar characteristics is called
- A) observation
 - B) measurement
 - C) classification
 - D) interpretation
- 44) Using a ruler to measure the length of a stick is an example of
- A) measuring the rate of change of the stick by making inferences
 - B) calculating the percent of error by using a proportion
 - C) predicting the length of the stick by guessing
 - D) extending the sense of sight by using an instrument
- 45) In which phase (state) do most Earth materials have their *greatest* density?
- A) solid
 - B) gaseous
 - C) liquid
- 46) As a volume of air expands due to heating, the density of this air will
- A) remain the same
 - B) increase
 - C) decrease

- 47) As shown below, an empty 1,000.-milliliter container has a mass of 250.0 grams. When filled with a liquid, the container and the liquid have a combined mass of 1,300. grams.



What is the density of the liquid?

- A) 1.00 g/mL
B) 1.05 g/mL
C) 0.95 g/mL
D) 1.30 g/mL