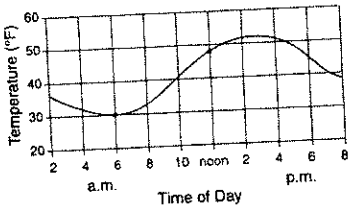
1. The temperature of water in a container was 60°C. Ten minutes later, the water temperature was 35°C. What was the rate of cooling of the water?

(1) 25°C/min
(2) 2.5°C/min
(3) 35°C/min
(4) 3.5°C/min

1_____

2. The graph below shows temperature readings for a day in April. The average rate of temperature change, in Fahrenheit degrees per hour, between 6 a.m. and noon was



(1) 6°F/hr
(2) 8°F/hr
(3) 3°F/hr
(4) 18°F/hr

2_____

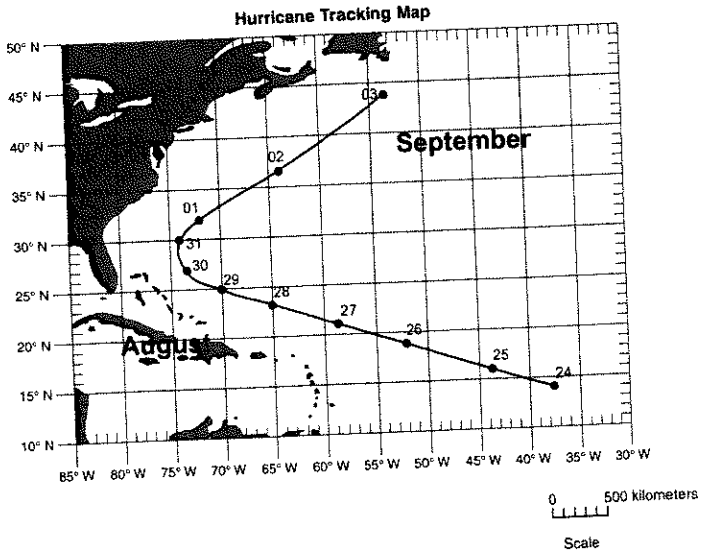
3. The rate of temperature change for the water in cup *A* for the first 10 minutes was approximately

	Temperature of Water (°C)	
Minute	Cup *A*	Cup *B*
0	90	20
1	88	20
2	86	20
3	85	21
4	83	21
5	82	22
6	81	22
7	80	22
8	79	22
9	78	23
10	77	23

(1) 0.77°C/min
(2) 1.3°C/min
(3) 7.7°C/min
(4) 13.0°C/min

3_____

4. Calculate the average daily rate of movement of the hurricane from August 24 to August 28. Follow the directions given below.



a) Write the equation used to determine the rate of change.

b) Substitute data into the equation.

c) Calculate the average daily rate of movement of hurricane and label it with the proper units.

5. The highest elevation of Mt. Zembat in Alaska 40 years ago was measured at 7600 feet. Today the highest elevation is 7598 feet. What is the rate of change in elevation for this mountain.

(1) 0.05 ft/yr
(2) 0.6 ft/yr
(3) 0.45 ft/yr
(4) 20 ft/yr

5_____

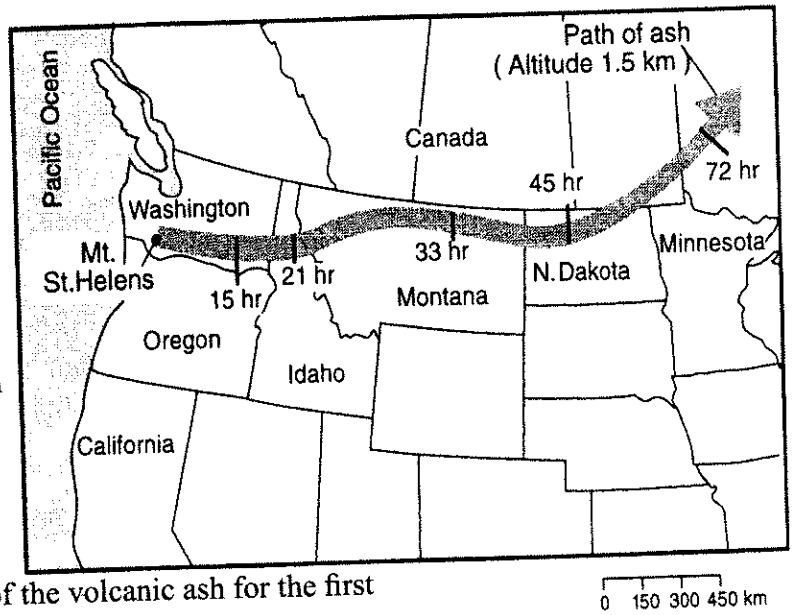
6. A 25-gram sample of halite was placed in a jar with five other mineral samples and water. The jar was shaken vigorously for 5 minutes. The halite sample was then found to have a mass of 15 grams. What was the rate of weathering of the halite sample?

(1) 0.50 g/min
(2) 2.0 g/min
(3) 3.0 g/min
(4) 10. g/min

6_____

Base your answers to question 7 on the information and the accompanying map.

The eruption of Mt. St. Helens in 1980 resulted in the movement of volcanic ash across the northwestern United States. The movement of the ash at 1.5 km above sea level is shown as a shaded path on the map. The times marked on the path indicate the length of time the leading edge of the ash cloud took to travel from Mt. St. Helens to each location.



7. Calculate the average rate of movement of the volcanic ash for the first 15 hours, following the directions below.

a) Write the equation used to determine the average rate of the volcanic ash movement.

b) Substitute values into the equation.

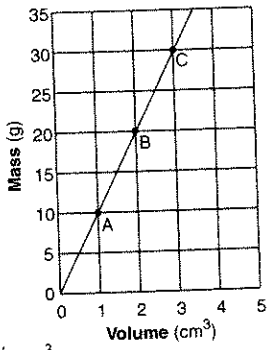
c) Solve the equation and label the answer with the correct units.

Set 1 — Density of a Substance

1. A rock sample has a mass of 16 grams and a volume of 8 cubic centimeters. When the rock is cut in half, what is the volume and density of each piece?

   (1) 8 cm^3 and 0.5 g/cm^3
   (2) 8 cm^3 and 1.0 g/cm^3
   (3) 4 cm^3 and 2.0 g/cm^3
   (4) 4 cm^3 and 4.0 g/cm^3 1_____

2. The accompanying graph shows the relationship between mass and volume for three samples, *A*, *B*, and *C*, of a given material. What is the density of this material?



   (1) 1.0 g/cm^3
   (2) 5.0 g/cm^3
   (3) 10.0 g/cm^3
   (4) 20.0 g/cm^3 2_____

Note that question 3 has only three choices.

3. As air on the surface of Earth warms, the density of the air

   (1) decreases
   (2) increases
   (3) remains the same 3_____

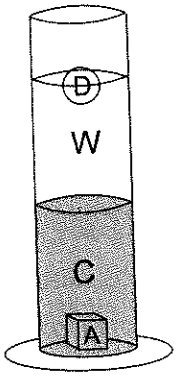
4. If the mass of a spinel crystal is 9.5 grams, what is the volume of this spinel crystal?

Table 1

Gemstone Mineral	Composition	Hardness	Average Density (g/cm^3)
emerald	$Be_3Al_2(Si_6O_{18})$	7.5–8	2.7
sapphire	Al_2O_3	9	4.0
spinel	$MgAl_2O_4$	8	3.8
zircon	$ZrSiO_4$	7.5	4.7

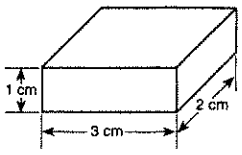
   (1) 0.4 cm^3
   (2) 2.5 cm^3
   (3) 5.7 cm^3
   (4) 36.1 cm^3 4_____

5. Liquid *W* was added to the graduated cylinder containing liquid *C*. Objects *A* and *D* were then dropped into the cylinder. Which statement is correct?



   (1) Liquid *W* is denser than liquid *C* and object *D*.
   (2) Liquid *C* is denser than liquid *W* and object *A*.
   (3) Liquid *C* is less dense than object *A*, but more dense than liquid *W* and object *D*.
   (4) Object *A* is denser than liquid *C*, but not as dense as liquid *W* and object *D*. 5_____

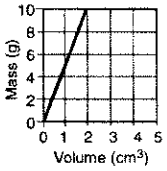
6. The diagram below represents a solid object with a density of 3 grams per cubic centimeter. What is the mass of this object?

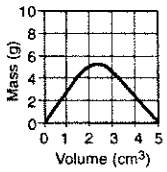


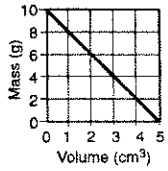
(Not drawn to scale)

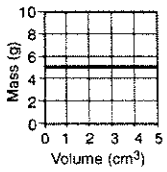
(1) 0.5 g (3) 18 g
(2) 2 g (4) 36 g 6_____

7. Which graph best represents the relationship between mass and volume of a material that has a density of 5 grams per cubic centimeter?

(1)


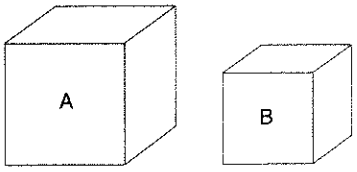
(2)


(3)


(4)


7_____

Base your answers to questions 8, 9, and 10 on the diagrams below, and your knowledge of Earth science. The diagrams represent two different solid, uniform materials cut into cubes *A* and *B*.



Mass of A = 320 g
Volume of A = 64 cm^3

Density of B = 3 g/cm^3
Volume of B = 27 cm^3

(Not drawn to scale)

8. What is the density of cube *A*?

(1) 0.2 g/cm^3
(2) 5.0 g/cm^3
(3) 12.8 g/cm^3
(4) 64.0 g/cm^3 8_____

9. What is the mass of cube *B*?

(1) 3 g (3) 27 g
(2) 9 g (4) 81 g 9_____

Note that question 10 has only three choices.

10. Assume cube *B* was broken into many irregularly shaped pieces. Compared to the density of the entire cube, the density of one of the pieces would be

(1) less
(2) greater
(3) the same 10_____

11. Explain how heat would change the density of a parcel of air.

_____

_____