

Physical Properties of Matter (6.P.2.3)

Name: _____

Date: _____

1. A student is given a sample of an unknown liquid to test in the laboratory. The student thinks that the liquid is water. Which of the following physical properties of the sample is *most* helpful to determine if the liquid is water?

- A. color of the liquid B. mass of the liquid
C. volume of the liquid D. boiling point of the liquid

2. The table below shows some information for four different elements.

Element	Classification	Density (g/cm ³)
barium (Ba)	metal	3.6
beryllium (Be)	metal	1.8
chromium (Cr)	metal	7.2
phosphorus (P)	nonmetal	1.8

A cube of an unknown element has a shiny, silvery color. The side of the cube measures 2.0cm and the cube has a mass of 14.56 g.

Based on the information in the table, which element makes up the cube?

- A. barium B. beryllium
C. chromium D. phosphorus

3. Many laboratory preparations of solutions call for stirring the solvent while adding the solute. Which of the following is always an effect of this procedure?

- A. It decreases the reactivity of the solute.
B. It decreases the solubility of the solute.
C. It brings the solute and solvent rapidly into contact.
D. It produces a double displacement reaction.

4. Which of the following samples of sugar will dissolve *fastest* in a pitcher of lemonade?

- A. 5 g of cubed sugar in 5°C lemonade
B. 5 g of cubed sugar in 20°C lemonade
C. 5 g of granulated sugar in 5°C lemonade
D. 5 g of granulated sugar in 20°C lemonade

5. Anita has a small sample of an unknown element that she is trying to identify. Anita divides the mass of the sample by its volume.

Which property of matter is Anita using to identify the element?

- A. Weight B. Density
C. Texture D. Freezing point

6. This chart lists the densities of various gemstones.

Densities of Gemstones

Gemstone	Density (g/cm ³)
Opal	2.20
Diamond	3.01
Garnet	3.15
Topaz	3.50

A gemstone has a mass of 6.24 g and a volume of 1.98 cm³. What is the identity of the gemstone?

- A. Opal B. Diamond C. Garnet D. Topaz

7. The solubility of a substance can be described in a variety of ways. Some references may use descriptive terms for solubility, such as those in the table illustrated below.

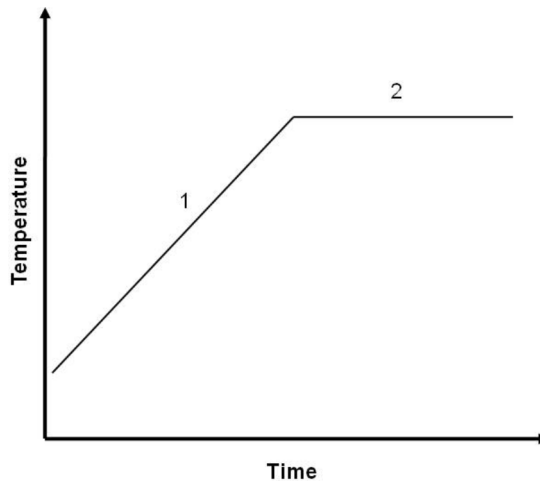
Descriptive terms	Parts of solvent needed for 1 part solute
Very soluble	<1
Freely soluble	1–10
Soluble	10–30
Sparingly soluble	30–100
Slightly soluble	100–1,000
Very slightly soluble	1,000–10,000
Practically insoluble or insoluble	>10,000

Using the table above as a reference, what descriptive term would be used for a medication that required 4,000 mg of water to dissolve 200 mg of the drug?

- A. soluble B. slightly soluble
C. sparingly soluble D. very slightly soluble

8. A solution that contains *less* solute than it can hold at a given temperature is
- A. disassociated. B. saturated.
C. supersaturated. D. unsaturated.
9. When stirred in 30°C water, 5 g of powdered potassium bromide, KBr, dissolves faster than 5 g of large crystals of potassium bromide. Which of the following best explains why the powdered KBr dissolves faster?
- A. Powdered potassium bromide exposes more surface area to water molecules than large crystals of potassium bromide.
B. Potassium ions and bromide ions in the powder are smaller than potassium ions and bromide ions in the large crystals.
C. Fewer potassium ions and bromide ions have been separated from each other in the powder than in the crystals.
D. Powdered potassium bromide is less dense than large crystals of potassium bromide.
10. Kareem wants to dissolve rock salt in a glass of water at room temperature.
- Which process will speed up the time it takes for the salt to dissolve?
- A. Add hot water to the glass.
B. Add cold water to the glass.
C. Pour the water into a larger container.
D. Pour the water into a smaller container.
11. Which will increase the solubility of *most* solid solutes?
- A. decreasing the temperature
B. decreasing the amount of solvent at constant temperature
C. increasing the amount of solute at constant temperature
D. increasing the temperature
12. Bromine (Br) is a liquid at room temperature. Oxygen (O) is a gas at room temperature. Room temperature is 25°C.
- Which of the following statements is true?
- A. The boiling point of oxygen is colder than room temperature.
B. The boiling point of bromine is colder than room temperature.
C. The melting point of oxygen is warmer than room temperature.
D. The melting point of bromine is warmer than room temperature.

13. Alex placed a small beaker of cold water on a hot plate and heated it for 10 minutes. He took the temperature of the water several times during those 10 minutes and recorded his data. Alex claims that the graph below shows the relationship between temperature and time when water is heated.



Which statement *best* explains why the temperature leveled off in section 2 of the graph?

- A. Alex turned off the hot plate so the water did not get any warmer.
B. The water reached the boiling point, so the temperature no longer increased.
C. An experimental error caused the graph to level off, because the water temperature should keep increasing over time.
D. Cold water heats faster than warm water, so once the cold water was room temperature, it took more than 10 minutes to make it hot.
14. When the temperature of a sample of water is -5°C , the water is
- A. a gas. B. a liquid. C. a solid. D. a vapor.
15. Laura adds 50 mL of boiling water to 100 mL of ice water. If the 150 mL of water is then put into a freezer, at what temperature will the water freeze?
- A. 0°C B. 15°C C. 37°C D. 50°C
16. Heating and cooling water change the state of matter of water.
- What happens when a block of ice is heated to 10° Celsius?
- A. It melts to form liquid water.
B. It condenses to form liquid water.
C. It freezes to become heavier ice.
D. It evaporates to become a vapor (gas).

17. Lenora had a block of wax that has a melting point of 60 degrees Celsius ($^{\circ}\text{C}$). She dropped it into a beaker of boiling water. What will happen to the block of wax?

- A. The wax will freeze. B. The wax will melt.
 C. The wax will evaporate. D. The wax will condense.

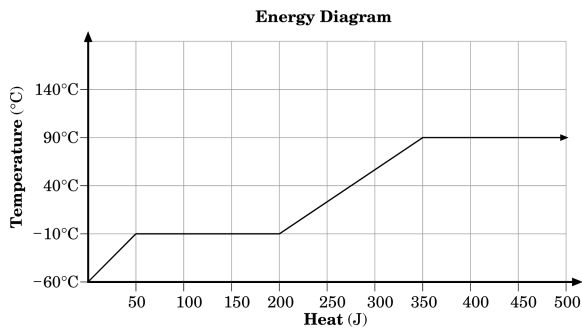
18. What happens at the melting point of a substance?

- A. The substance begins to turn from a solid into a gas.
 B. The substance begins to turn from a liquid into a gas.
 C. The substance begins to turn from a gas into a liquid.
 D. The substance begins to turn from a solid into a liquid.

19. Which term describes when a substance is changed from a liquid to a gas?

- A. Condensation B. Evaporation
 C. Filtration D. Precipitation

20. A solid substance is heated at a uniform rate. This graph shows how the temperature of the substance changes as heat is added.



According to the energy diagram shown, the substance will boil at what temperature?

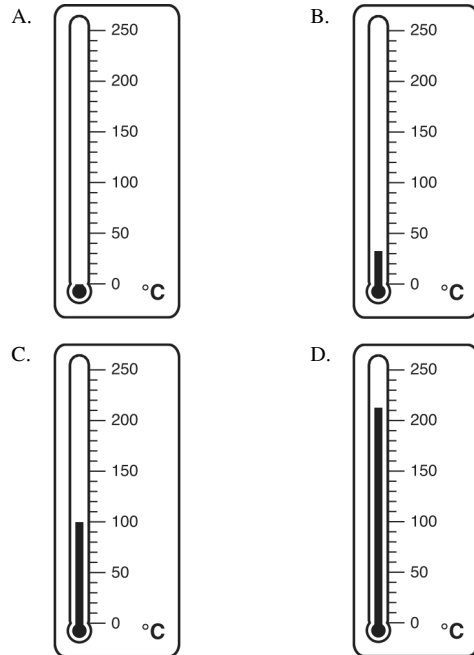
- A. -60°C B. -10°C C. 90°C D. 140°C

21. A container is filled with 100 mL of liquid and placed in a freezer. The liquid in the container freezes at 0°C . A second container filled with 120 mL of the same liquid and placed in the freezer.

At what temperature will the liquid in the second container freeze?

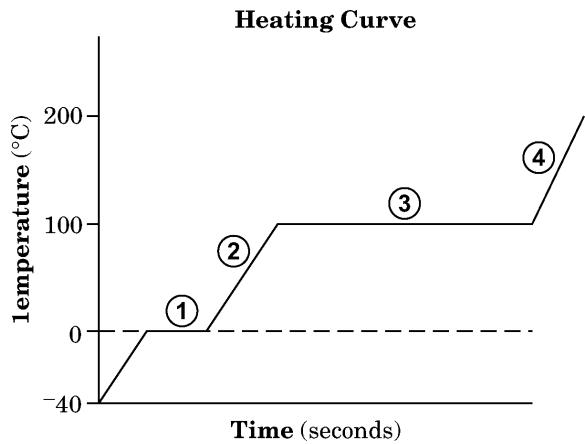
- A. -10°C B. -1°C C. 0°C D. 10°C

22. Which thermometer shows the temperature in degrees Celsius ($^{\circ}\text{C}$) at which water boils?



23. The graph shows the temperature changes as a sample of ice is heated.

What is happening during time ①?



- A. The liquid is evaporating. B. The liquid is freezing.
 C. The solid is freezing. D. The solid is melting.

24. This chart represents the melting points and boiling points for four substances.

**Melting and Boiling
Points of Substances**

Name	Melting Point ($^{\circ}\text{C}$)	Boiling Point ($^{\circ}\text{C}$)
Chlorine	-101	-35
Nitrogen	-210	-196
Oxygen	-218	-183
Hydrogen	-259	-253

Which substance is a solid at -200°C ?

- A. Chlorine B. Nitrogen C. Oxygen D. Hydrogen