

# Chemical Reactions Study Guide

Answers

1. When an object's temperature increases, what happens to the molecules?

The molecules begin to move more. This means that the molecules have a greater kinetic energy, which increases the temperature of the object.

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2. What are some indicators that a chemical change has occurred?

- Change in Odor
  - Change in Color
  - Formation of a Precipitate
  - Release of Energy
  - Irreversible Change
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3. If an object has a volume of 25 mL and a mass of 150 g; what is its density?

D =

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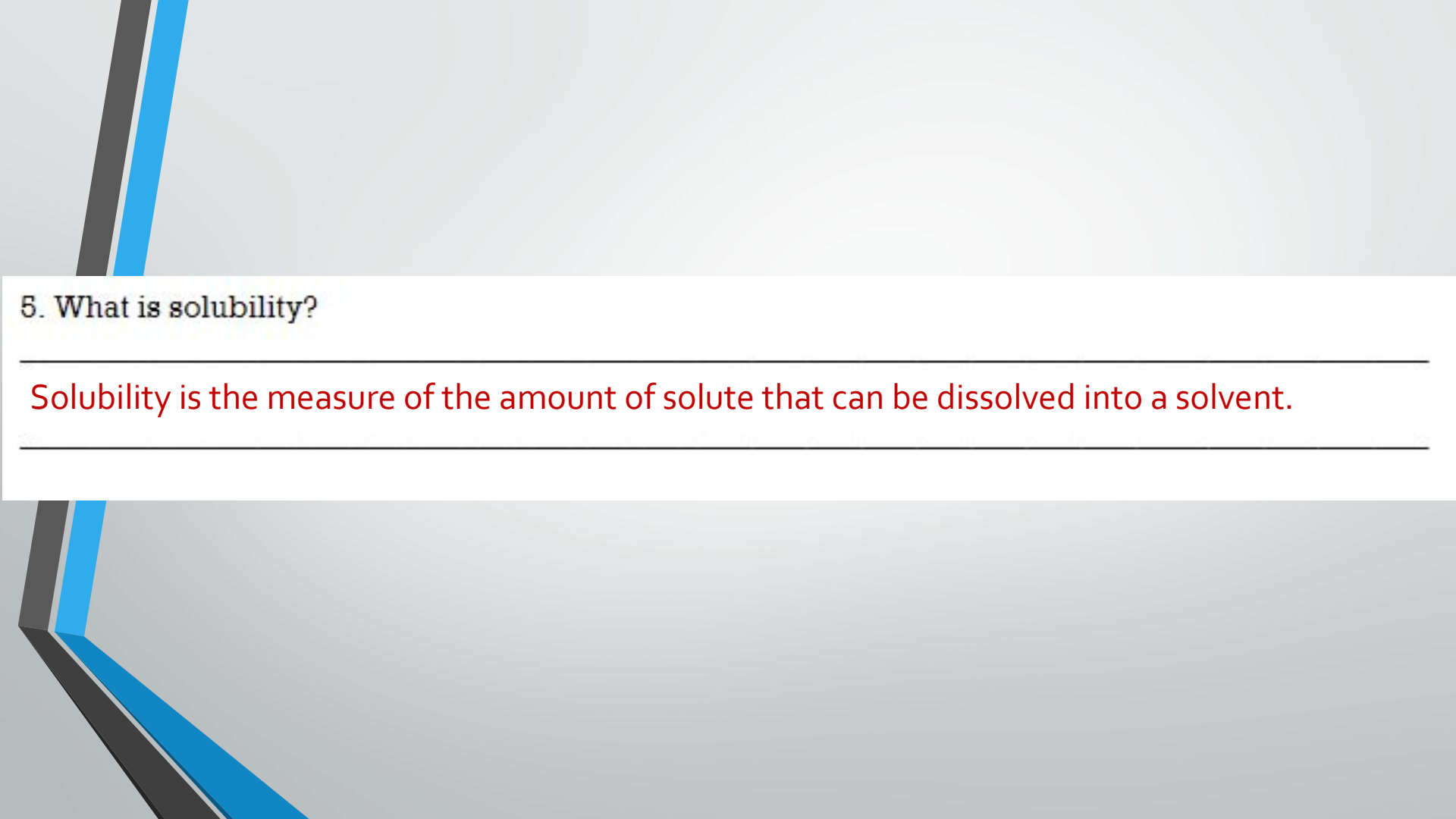
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4. Think back to the Law of Conservation of Mass/Matter Lab. If matter cannot be destroyed what does happen to it?

Matter cannot be created or destroyed, but it can change forms. The baking soda and vinegar changed forms, and some of it became Carbon Dioxide.

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5. What is solubility?

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Solubility is the measure of the amount of solute that can be dissolved into a solvent.

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Word Bank

Melting

Freezing

Vaporization

Condensation

Deposition

Sublimation

**Gas**

**Liquid**

**Solid**

Word Bank

Melting

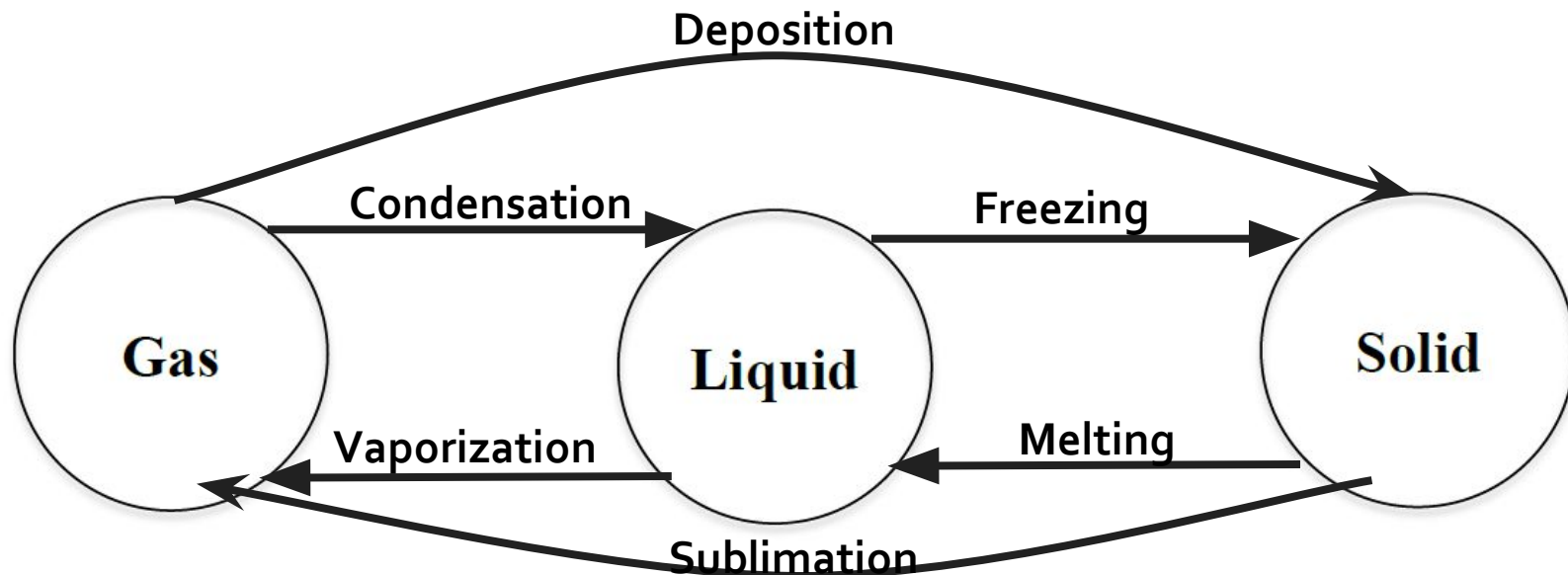
Freezing

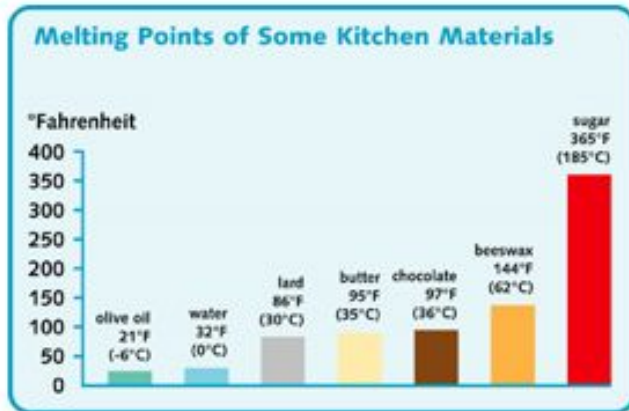
Vaporization

Condensation

Deposition

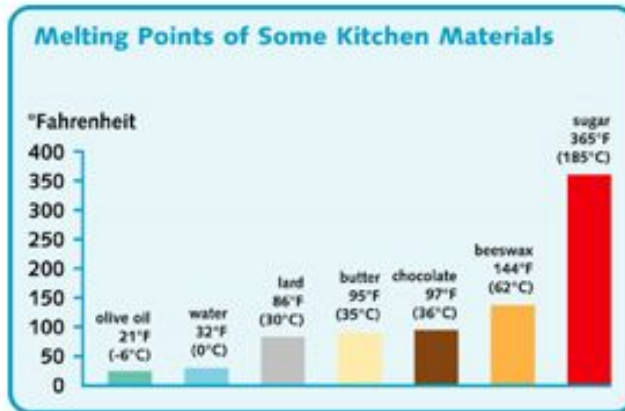
Sublimation





7. Which Comparison is accurate, based on the graph above?

- a) Sugar has a lower melting point than lard.
- b) Water has a lower melting point than olive oil.
- c) Butter has a higher melting point than sugar.
- d) Butter has a higher melting point than water.



7. Which Comparison is accurate, based on the graph above?

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8. Draw a very simple model of an atom and label the nucleus, protons, neutrons, and electrons.

9 Complete the T-Chart below—focusing on the characteristics of each state of matter.

Solid	Liquid	Gas
<ul style="list-style-type: none"><li>• Definite Shape</li><li>• Definite Volume</li><li>• Molecules vibrate back and forth</li><li>• Low Kinetic Energy</li></ul>	<ul style="list-style-type: none"><li>• No Definite Shape</li><li>• Definite Volume</li><li>• Molecules slide past each other</li><li>• Increased Kinetic Energy</li></ul>	<ul style="list-style-type: none"><li>• No Definite Shape</li><li>• No Definite Volume</li><li>• Molecules hit into each other</li><li>• High Kinetic Energy</li></ul>

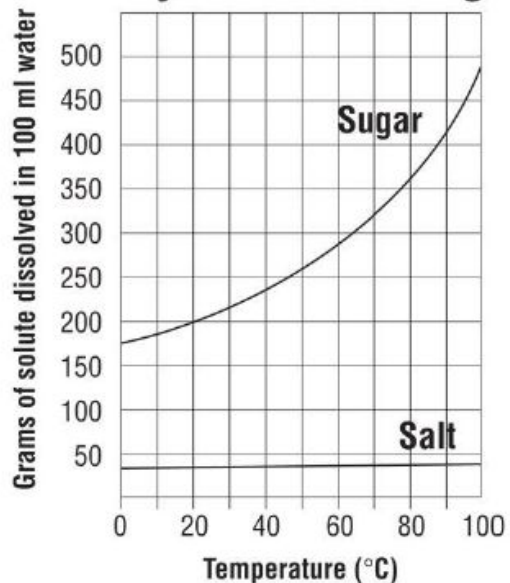
10. Based on the graph below identify approximately how many grams of salt was dissolved in 100 mL of water at 90 degrees Celsius.

Approximately 48 grams of salt can be dissolved at 90 degrees Celsius.

11. Based on the graph below identify approximately how many grams of sugar was dissolved in 100 mL of water at 70 degrees Celsius.

Approximately 320 grams of sugar can be dissolved at 70 degrees Celsius.

### Solubility of Salt and Sugar

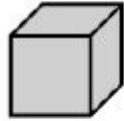


12. The Boiling and Melting Point of Water is a Size Independent property. Explain what this means.

A size independent property does not change based on the size of the object. This means it does not matter how much water you have, it will always boil and melt at the same temperature, as long as it is pure water.

12. Find the density of each block below.

F



$$D = M/V$$

$$D = 9/9$$

$$D = 1 \text{ g/cm}^3$$

Mass = 9 grams

Volume = 9 cubic centimeters

G



$$D = M/V$$

$$D = 10/12$$

$$D = 0.83 \text{ g/cm}^3$$

Mass = 10 grams

Volume = 12 cubic centimeters

H



$$D = M/V$$

$$D = 11/4$$

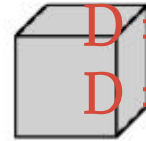
$$D = 2.75$$

$$\text{g/cm}^3$$

Mass = 11 grams

Volume = 4 cubic centimeters

J



$$D = M/V$$

$$D = 12/15$$

$$D = 0.8 \text{ g/cm}^3$$

Mass = 12 grams

Volume = 15 cubic centimeters

14. Which of the blocks above could float in water if water has a density of  $1\text{g/cm}^3$ ? Why?

Blocks G & J would both float because they have a density that is less than  $1\text{g/cm}^3$ .

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## Physical and Chemical Changes

Label each as a Physical (P) or Chemical (C) Change.

1.	P	An ice cube is placed in the sun. Later there is a puddle of water. Later still the puddle is gone.
2.	C	Two chemicals are mixed together and a gas is produced.
3.	C	A bicycle changes color as it rusts.
4.	P	A solid is crushed to a powder.
5.	C	Two substances are mixed and light is produced.
6.	C	A piece of ice melts and reacts with sodium.
7.	P	Mixing salt and pepper.
8.	P	Chocolate syrup is dissolved in milk.
9.	C	A marshmallow is toasted over a campfire.
10.	P	A marshmallow is cut in half.

Find the mass of the water produced in the chemical reaction below.

<b>Mass of Reactants</b>	<b>Mass of Products</b>
Ethane + Oxygen	Carbon Dioxide + Water
75.0 g + 225.0 g	162.5 g + <u>137.5</u> g