

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

Period: \_\_\_\_\_

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

KIPP NYC College Prep  
Chemistry

General

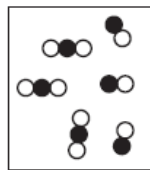
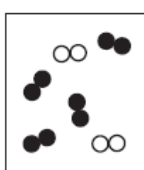
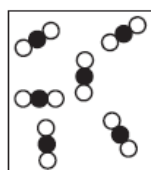
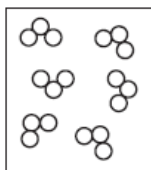
**UNIT 1: Introduction to Matter**

**Lesson 7: When one substance looks and acts differently**

**By the end of today, you will have an answer to:  
*What makes something a solid, liquid, or gas?***

**Do Now:**

1. A student is filtering a mixture of sand and salt water into a beaker. What will be found in the beaker after the filtration is completed?
  - (1) sand, only
  - (2) salt, only
  - (3) sand and salt
  - (4) salt and water
2. Which physical property makes it possible to separate the components of crude oil by means of distillation?
  - (1) melting point
  - (2) conductivity
  - (3) solubility
  - (4) boiling point
3. Classify each as an element, compound, or mixture. Be prepared to explain why.



\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_



**LET'S THINK ABOUT THIS:**

Think about punching your hand through either the air, water or a desk. Which substance would you feel the most resistance? Least resistance?

Most resistance: \_\_\_\_\_

Least resistance: \_\_\_\_\_

Considering this fact, what do you think about the atomic arrangement in these items. In other words, do you think that the atoms are close together or far apart? How do you know?

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You should know this, but let's review anyway!



<b>Melting Point</b>	The temperature at which a substance goes from a solid to a liquid.
<b>Boiling Point</b>	The temperature which a substance goes from a liquid to a gas.

**\*\*\*Important Point: STP = Standard Temperature and Pressure.**

These values help scientists measure at normal conditions.

**Standard Temperature:** \_\_\_\_\_

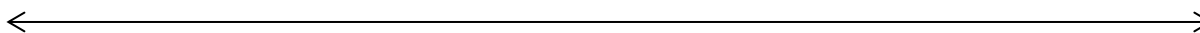
**Find on Table A.** Record values to the right

**Standard Pressure:** \_\_\_\_\_

**Example question:**

*A substance has a melting point of 230 K and a boiling point of 769 K.*

Think about it as a number line:






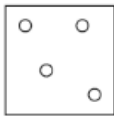
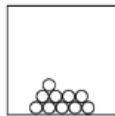
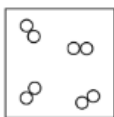
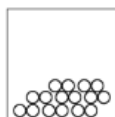


What state of matter is this substance in at:

- a) 300 K \_\_\_\_\_      b) 100 K \_\_\_\_\_      e) STP \_\_\_\_\_  
 c) 1000 K \_\_\_\_\_      d) 500 K \_\_\_\_\_

	<b>SOLID</b>	<b>LIQUID</b>	<b>GAS</b>
<b>Definite shape?</b>			
<b>Definite volume?</b>			
<b>Notation/ Symbol</b>			
<b>Characteristics</b>	<ul style="list-style-type: none"> <li>Tightly packed atoms</li> <li>Very organized</li> <li>Geometric pattern</li> <li>Strong <b>intermolecular forces</b></li> </ul>	<ul style="list-style-type: none"> <li><b>Weaker intermolecular forces</b></li> <li>Not very organized</li> <li>Particles can move around</li> </ul>	<ul style="list-style-type: none"> <li>Particles fill up entire space</li> <li><b>Very weak intermolecular forces</b></li> <li>Particles move around very fast in straight lines</li> </ul>
<b>Particle Diagram</b>			

Practice Questions:

Question	Explanation of Answer						
<p>1. Which statement best describes the molecules of <math>\text{AlCl}_3</math> (s)?</p> <p>(1) They move slowly in straight lines                      (2) They move rapidly in straight lines                      (3) They are arranged in a random pattern                      (4) They are arranged in a regular pattern</p>	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>						
<p>2. Draw a particle model showing at least six particles for <math>\text{N}_2</math> (l) using the key below.</p> <p>● One particle of <math>\text{N}_2</math></p> <div style="border: 1px solid black; width: 150px; height: 100px; margin-left: 200px;"></div>	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>						
<p>3. Given the key:</p> <table border="1" style="margin-left: 20px;"> <tr><th colspan="2">Key</th></tr> <tr><td>○</td><td>= Atom of oxygen</td></tr> <tr><td>●</td><td>= Atom of carbon</td></tr> </table> <p>Which particle diagram represents a sample containing the compound <math>\text{CO(g)}</math>?</p> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>(1)</p> </div> <div style="text-align: center;">  <p>(3)</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;">  <p>(2)</p> </div> <div style="text-align: center;">  <p>(4)</p> </div> </div>	Key		○	= Atom of oxygen	●	= Atom of carbon	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>
Key							
○	= Atom of oxygen						
●	= Atom of carbon						
<p>4. Given the particle</p> <div style="text-align: center;">  </div> <div style="margin-left: 150px;"> <table border="1"> <tr><th colspan="2">Key</th></tr> <tr><td>●</td><td>atom</td></tr> </table> </div> <p>At 101.3 kPa and 298 K, which element could this diagram represent?</p> <p>(1) Rn                      (3) Ag                      (2) Xe                      (4) Kr</p> <p>diagram:</p>	Key		●	atom	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>		
Key							
●	atom						
<p>5. Which particle diagram represents the arrangement of <math>\text{F}_2</math> molecules in a sample of fluorine at 95 K and standard pressure?</p> <table border="1" style="margin-left: 20px;"> <tr><th colspan="2">Key</th></tr> <tr><td>○</td><td>= atom of fluorine</td></tr> </table> <div style="display: flex; justify-content: space-around; align-items: flex-start;"> <div style="text-align: center;">  <p>(1)</p> </div> <div style="text-align: center;">  <p>(3)</p> </div> </div> <div style="display: flex; justify-content: space-around; align-items: flex-start; margin-top: 10px;"> <div style="text-align: center;">  <p>(2)</p> </div> <div style="text-align: center;">  <p>(4)</p> </div> </div>	Key		○	= atom of fluorine	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>		
Key							
○	= atom of fluorine						

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Pd: \_\_\_\_\_


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

KIPP NYC College Prep

General Chemistry

**CW 1.10- States of Matter**

**10 points**

Question	Explanation of Answer		
<p>1. Draw a particle model showing at least six particles for a solid and gas using the key below:</p> <p style="text-align: center;">  One particle         </p> <table border="1" style="width: 100%; height: 80px;"> <tr> <td style="width: 50%; text-align: center; vertical-align: top;">Solid</td> <td style="width: 50%; text-align: center; vertical-align: top;">Gas</td> </tr> </table>	Solid	Gas	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>
Solid	Gas		
<p>2. Which set of properties does a substance such as CO<sub>2</sub> (g) have?</p> <p>(1) definite shape and definite volume            (2) definite shape but no definite volume            (3) no definite shape but definite volume            (4) no definite shape and no definite volume</p>	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>		
<p>3. Which substance has a definite shape and a definite volume at STP?</p> <p>(1) NaCl (aq)            (2) Cl<sub>2</sub> (g)            (3) CCl<sub>4</sub> (l)            (4) AlCl<sub>3</sub> (s)</p>	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>		
<p>4. As a substance changes from a liquid to a gas, the average distance between molecules</p> <p>(1) decreases            (2) increases            (3) remains the same            (4) none of the above</p>	<p>KEY WORDS AND SYMBOLS:</p> <p>EXPLANATION:</p> <hr/> <hr/> <hr/> <hr/>		

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

Pd: \_\_\_\_\_

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General Chemistry

HW 1.7- States of Matter

20 points

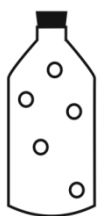
**BE SURE TO CLEAN UP YOUR BINDER! Binder quiz is coming soon!**

**REGENTS PRACTICE: [5 points]**

1. As a substance changes from a liquid to a gas, the average distance between molecules
  - (1) Decreases
  - (2) Increases
  - (3) remains the same
  - (4) none of the above
2. At STP, fluorine is a gas and iodine is a solid. This observation can be explained by the fact that fluorine has
  - (1) weaker intermolecular forces of attraction than iodine
  - (2) stronger intermolecular forces of attraction than iodine
  - (3) lower average kinetic energy than iodine
  - (4) higher average kinetic energy than iodine
3. Which of the following does not have definite shape but has definite volume?
  - (1) Solid
  - (2) Liquid
  - (3) Gas
  - (4) Colloid
4. At which Celsius temperature does lead change from a solid to a liquid?
  - (1) 874°C
  - (2) 601°C
  - (3) 328°C
  - (4) 0°C

**CRITICAL THINKING: [5 points]**

Two students are arguing over what the particle diagram of a gas looks like for oxygen in a bottle. Chanelle argues that a gas in a bottle looks like bottle A below while Adriana argues that a gas in a bottle looks like bottle B below. Who is correct and why? Give examples to support your ideas!



Bottle A



Bottle B

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**Glossary: [5 points]**

Add the following words to your glossary sheets:

- Melting point
- Boiling Point
- Solid
- Liquid
- Gas

Continue on the back...

**Compare the arrangement of individual particles in solids, liquids and gases:**

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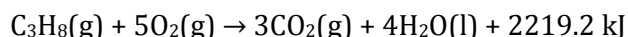
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***IT MAY LOOK HARD, BUT IT'S ACTUALLY REALLY AN EASY QUESTION:***

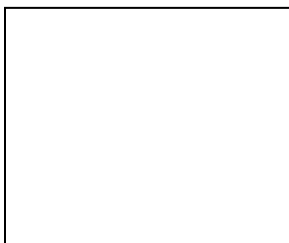
**Test-taking Strategy:**

- 1) Before reading the passage, skip to the end of the second paragraph and underline the two sentences that tell you to do something and tell you what information your answer must include.
- 2) Read the paragraphs. If there is important information, annotate it.

Propane is a fuel that is sold in rigid, pressurized cylinders. Most of the propane in a cylinder is liquid, with gas in the space above the liquid level. When propane is released from the cylinder, the propane leaves the cylinder as a gas. Propane gas is used as a fuel by mixing it with oxygen in the air and igniting the mixture, as represented by the balanced equation below.



A small amount of methanethiol, which has a distinct odor, is added to the propane to help consumers detect a propane leak. In methanethiol, the odor is caused by the thiol functional group (-SH). Methanethiol, CH<sub>3</sub>SH, has a structure that is very similar to the structure of methanol. Draw a particle diagram to represent propane in a pressurized cylinder using the key in your answer booklet. Your response must include at least six molecules of propane in the gas phase and at least six molecules of propane in the liquid phase. [1]



KEY	
●	Propane

5. Write a multiple choice question below that is ACCURATE that uses this question stem: "Which element is a liquid at \_\_\_\_\_ K?". You must also create four multiple choice options of elements, one of which is the correct answer.

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

KIPP NYC College Prep

General Chemistry

**Exit Ticket Quiz 1.7: States of Matter****3 points****Directions:** Answer all questions based on your knowledge of chemistry.

- In which sample are the particles arranged in a regular geometric pattern?
  - $\text{HCl}(l)$
  - $\text{NaCl}(aq)$
  - $\text{N}_2(g)$
  - $\text{I}_2(s)$
- Under the same conditions of temperature and pressure, a liquid differs from a gas because the particles of the liquid
  - are in a constant straight line motion
  - take the shape of the container they occupy
  - have no regular arrangement
  - have stronger forces of attraction between them
- Which 5.0-milliliter sample of  $\text{NH}_3$  will take the shape of and completely fill a closed 100.0-milliliter container?
  - $\text{NH}_3(s)$
  - $\text{NH}_3(l)$
  - $\text{NH}_3(g)$
  - $\text{NH}_3(aq)$

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

Pd: \_\_\_\_\_

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

KIPP NYC College Prep

General Chemistry

**Exit Ticket Quiz 1.7: States of Matter****3 points****Directions:** Answer all questions based on your knowledge of chemistry.

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  - $\text{NH}_3(g)$
  - $\text{NH}_3(aq)$