Chemical Reactions

I. Chemical Reaction – a process in which the physical and chemical properties of the original substances change as new substances with different physical and chemical properties are formed.

Ex. Burning gasoline, the rusting of iron, and the baking of bread

A. Characteristics of Chemical Reactions

1. $A + B \longrightarrow AB$

2. $AB \longrightarrow A + B$

Chemical Reaction	Reactants	Products
$A + B \longrightarrow AB$		
$AB \longrightarrow A + B$		

B. Define:

Reactants –

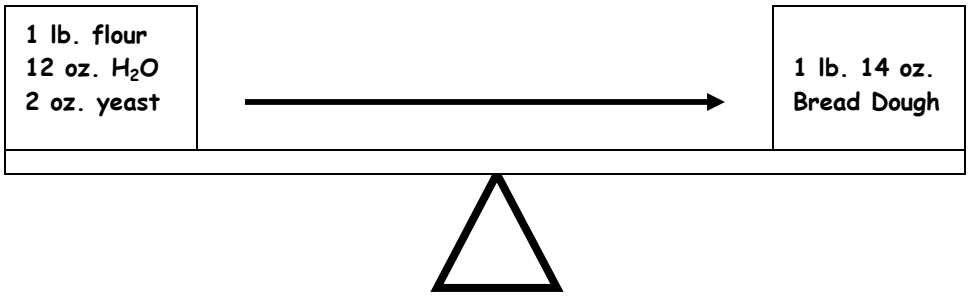
Products –

Chemical Reaction	Identify the Reactants	Identify the Products
$2\ H_2O \longrightarrow 2\ H_2 + O_2$		
$2Mg + O_2 \longrightarrow 2\ MgO$		

II. Conservation of Mass

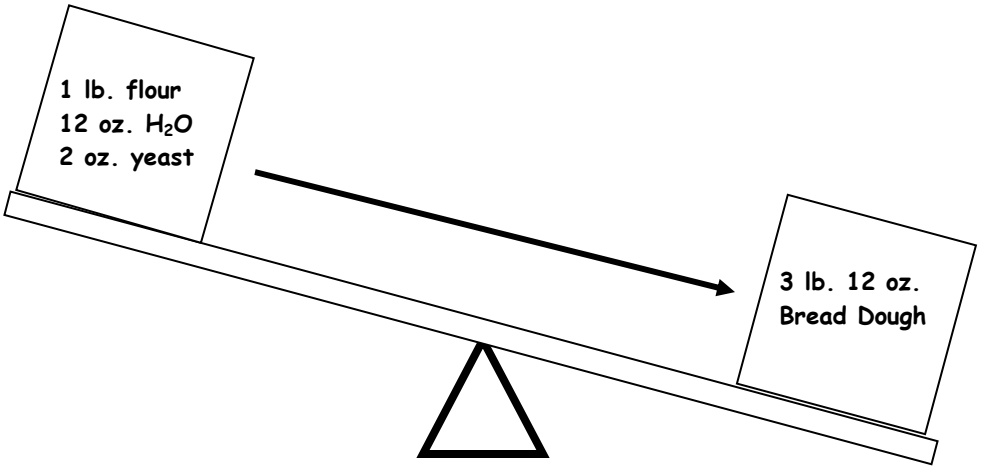
A. State an observation for each of the diagrams below.

1.



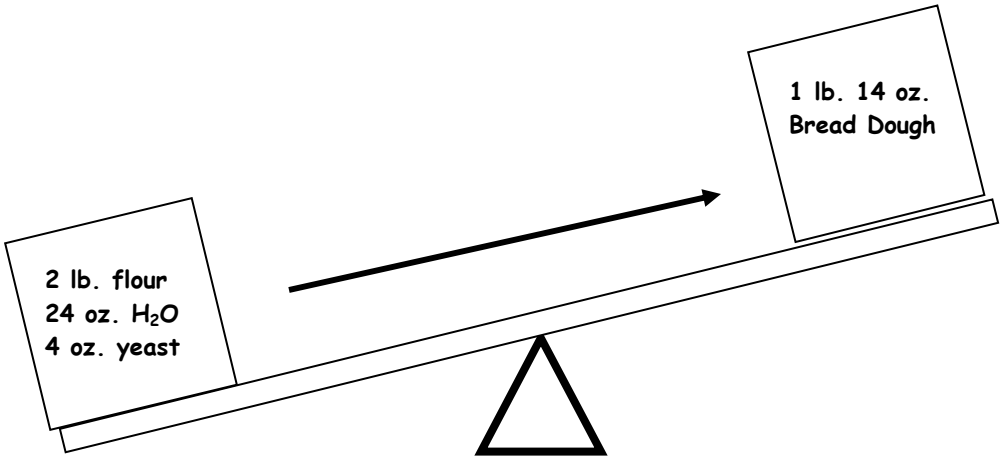
Observation:

2.



Observation:

3.

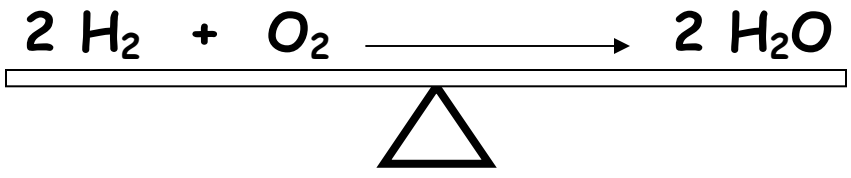


Observations:

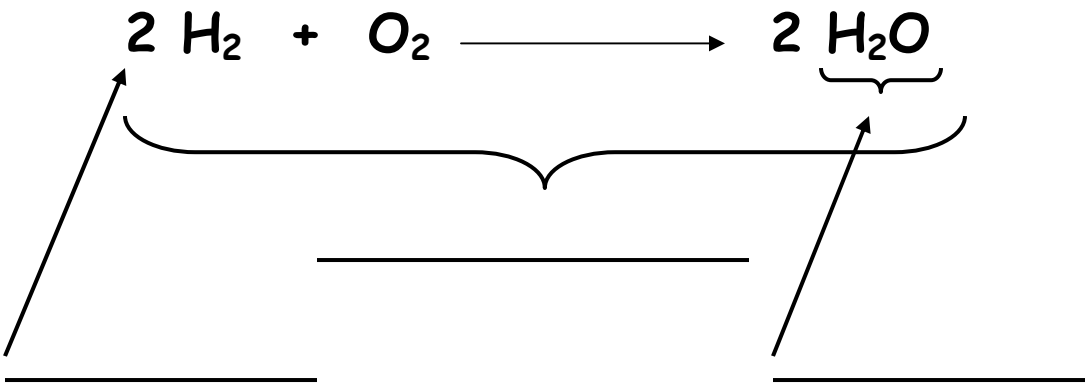
4. What diagram makes the most sense? Explain.

5. Define:

Law of Conservation of Mass –



B. Balancing Equations



1. **Working with a partner, create as many chemical equations as possible with the cut-outs in the envelope provided. Hint: Keep in mind the "Law of Conservation of Mass". Write the chemical equations below.**

2. **Rules for Balancing Equations – Describe the process you went through to balance the above equations. List each step in order.**

3. **Balance the following equations.**

a. _____ Si + _____ O_2 ⟶ _____ SiO_2

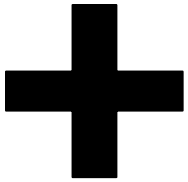
b. _____ P + _____ O_2 ⟶ _____ P_4O_{10}

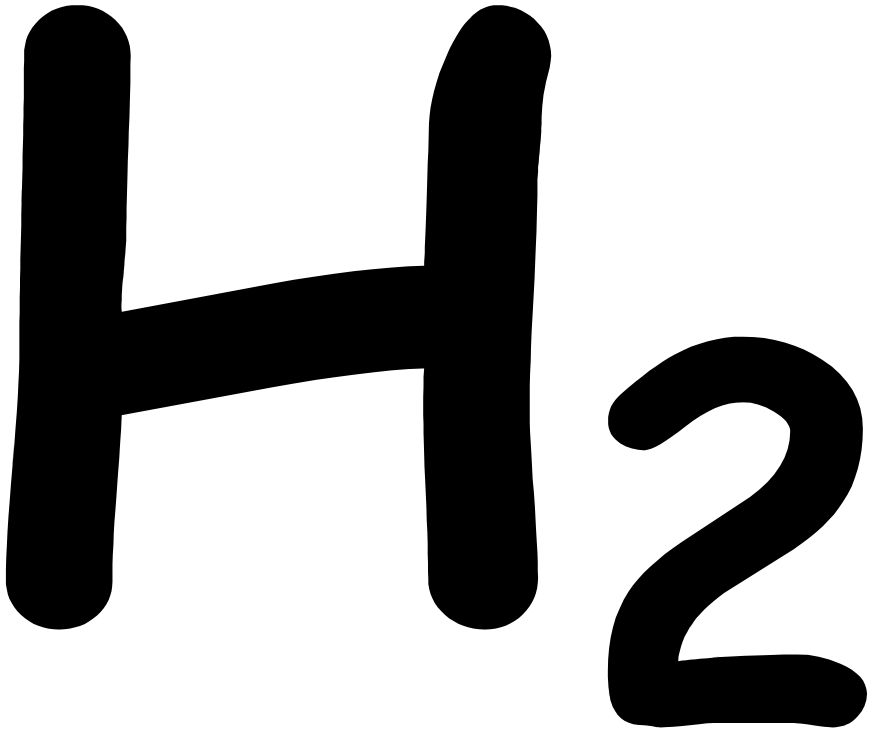
c. _____ Na + _____ Cl_2 ⟶ _____ NaCl

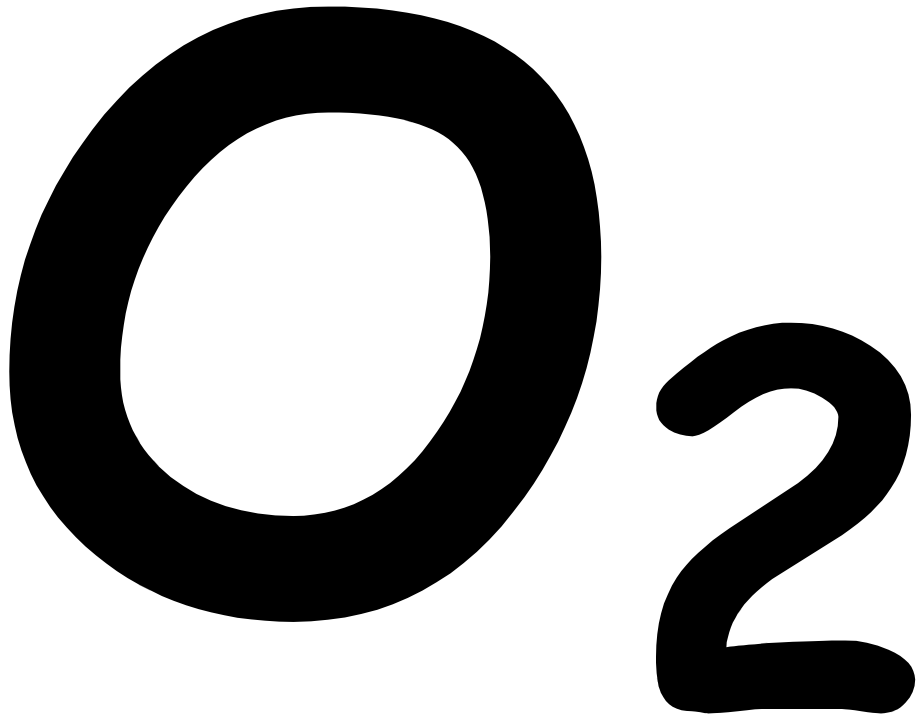
d. _____ H_2 + _____ N_2 ⟶ _____ NH_3

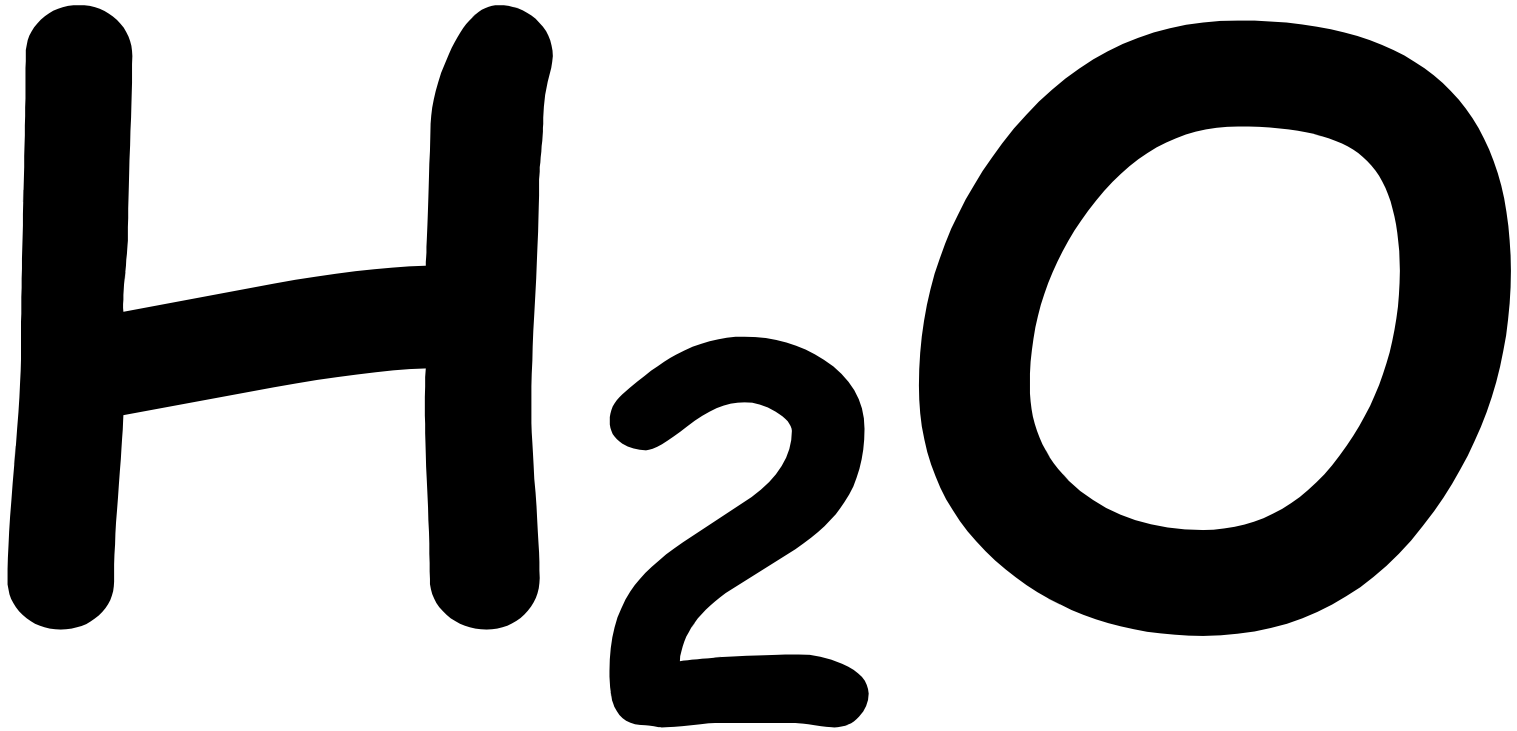
e. _____ S + _____ O_2 ⟶ _____ SO_2

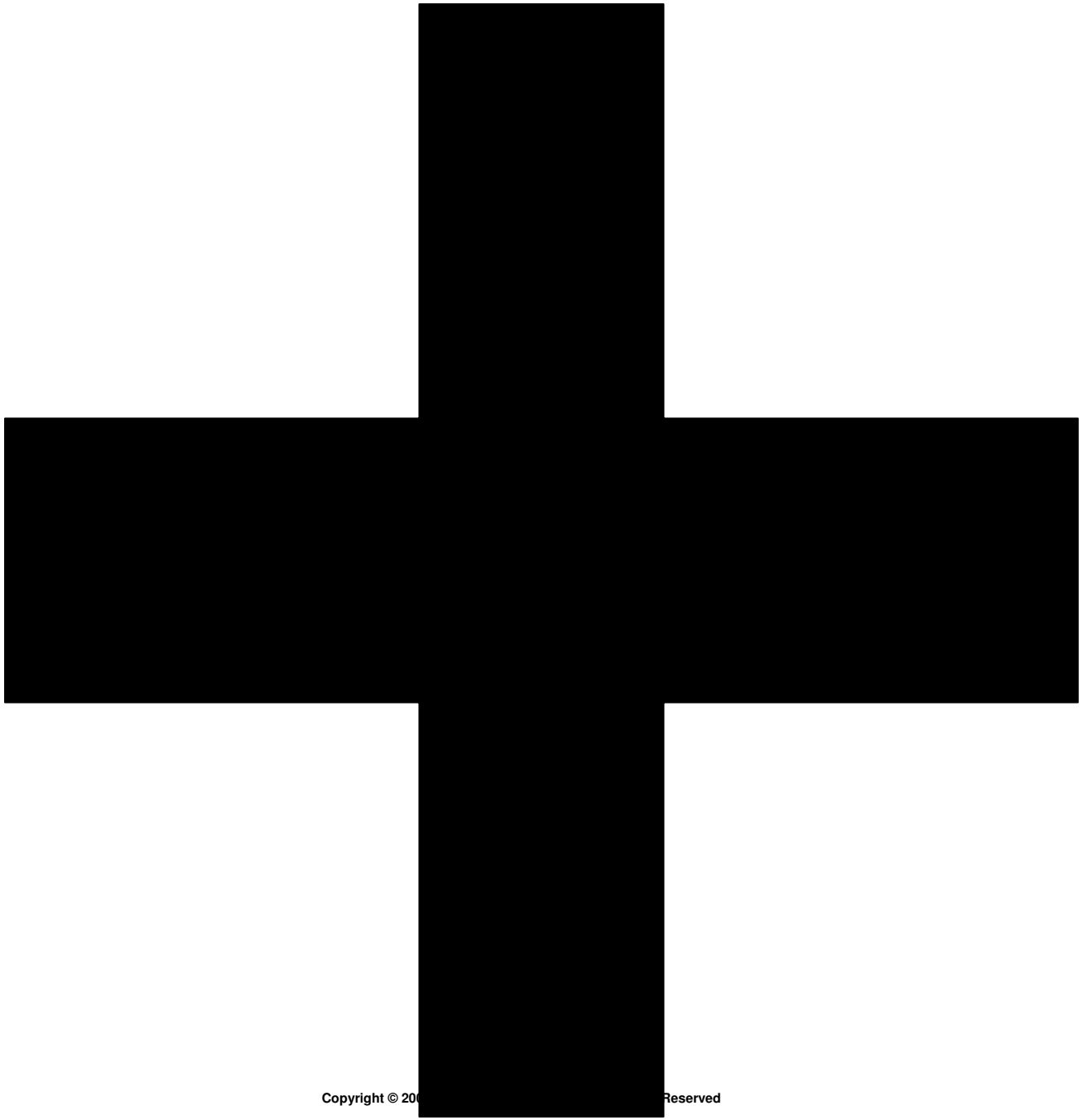
f. _____ Na + _____ O_2 ⟶ _____ Na_2O

Mg	O_2
MgO	
	
2	3
2	2
2	2
B	Cl_2
BCl_3	C
CBr_4	Br_2









III. Types of Chemical Reactions

A. Describe what is happening to the reactants and products in each of the following chemical reactions.

1. $A + B \longrightarrow AB$ _____

2. $AB \longrightarrow A + B$ _____

3. $A + BX \longrightarrow AX + B$ _____

4. $AX + BY \longrightarrow AY + BX$ _____

B. Classify the following chemical reactions.

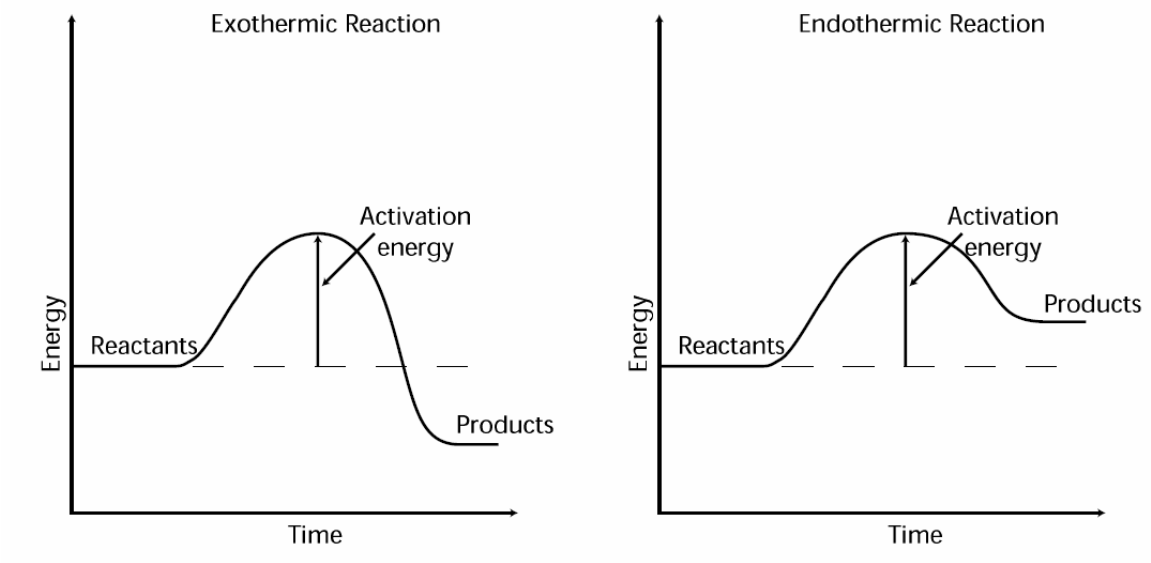
$2Na + Cl_2 \longrightarrow 2NaCl$ _____

$2H_2O \longrightarrow 2H_2 + O_2$ _____

$2Na + 2H_2O \longrightarrow 2NaOH + H_2$ _____

$MgCO_3 + 2HCl \longrightarrow MgCl_2 + H_2CO_3$ _____

IV. Exothermic vs. Endothermic Reactions



A. State a conclusion for each of the above graphs.

B. Define:

Exothermic Reaction –

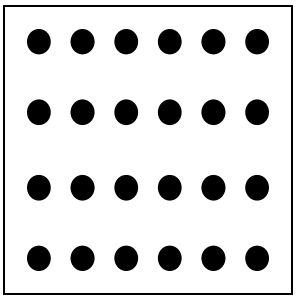
Endothermic Reaction –

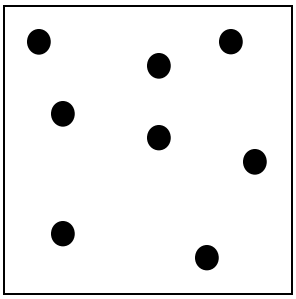
Activation Energy –

V. Rates of Chemical Reactions

A. Collision Theory

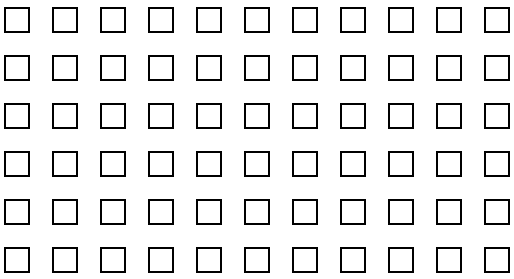
B. Concentration – What diagram below is more concentrated?





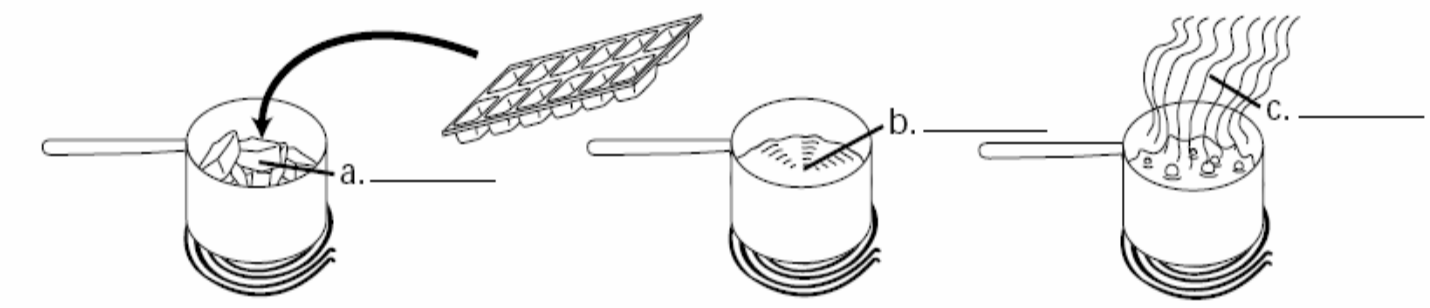
C. Surface Area – What diagram below has more surface area?

Block of Wood



Small pieces of Wood

D. Temperature – Describe what happens as the temperature increases in the diagram below.



E. Catalyst – Observe the demonstration and state a conclusion.

State a conclusion based on the graph below.