Name: _____ Date: _____

CHEMISTRY
Activity: Chemical Reaction Rates

In this assignment, students will observe chemical reactions and how fast the reactions happen. Students will make observations and summarize what happens in the videos.

Part 1: Bleach and Yellow Food Coloring

Link: https://youtu.be/49Z_oldmNVk

Molar concentration (also called molarity) is a measure of concentration equal to moles of substance per liter of solvent volume. The unit for molar concentration (molarity) is M.

Complete the table below. Use the information from the video.

	Bleach Volume added (ml)	**Bleach concentration (Molarity)**	**Yellow Dye (volume)**	**Time for reaction to happen**
Mixture 1				
Mixture 2				

Follow up questions

Which concentration of bleach made the chemical reaction happen faster?	
Why does concentration affect reaction rates? (how fast reactions happen)	

Part 2: Zinc Block vs. Zinc Powder

Link: https://www.youtube.com/watch?v=Qq4nqbxYddY

Write your observations in the table below. Be specific and detailed.

Zn block + Acid	
Zn powder + Acid	

Follow up questions

How do you know which chemical reaction was happening faster?	
Why does surface-to-mass ratio (surface area) affect reaction rates? (how fast reactions happen)	

Part 3: Alka Seltzer Tablet Reaction Rates

Link: https://www.youtube.com/watch?v=SDZZGT9Ifas

Alka Seltzer tablets are made of sodium hydrogen carbonate (sometimes called sodium bicarbonate), $NaHCO_3$. Alka Seltzer tablets will chemically react with weak acids, like vinegar, in a neutralization reaction. HX is a generic way to write an acid.

$NaHCO_3(s) + HX \rightarrow NaX(aq) + CO_2(g) + H_2O$

Carbon dioxide gas is liberated by the chemical reaction. That is what forms the bubbles.

Watch video 0:00 min to 3:00 min

	Observations **What happened during the chemical reaction?**
Half-tablet	
Crumbled tablet	
Powdered tablet	

Part 4: Alka Seltzer Tablet Reaction Rates

Link: https://www.youtube.com/watch?v=tgbrP8q9lYA

	Time for reaction to happen
Cold Water	
Warm Water	
Hot Water	

Follow up questions

How do you know which chemical reaction was happening faster?	
Why does temperature affect reaction rates? (how fast reactions happen)	

Part 5: Diffusion of Food Coloring

Link: https://www.youtube.com/watch?v=PsnfYHDjUwo

Diffusion is the spreading out of matter by random motion from higher concentration to lower concentration. In this video, the effect of temperature on the rate of diffusion is examined. No chemical reaction happens, only physical movement of dye solutes through water.

	Observations **What happened during the diffusion of the blue food coloring.**
Cold water	
Warm water	
Hot water	

Follow up questions

Why does different temperatures affect the rate of motion of molecules?	

Part 6: Decomposition of hydrogen peroxide with catalysts

Link: https://www.youtube.com/watch?v=Ta4DomSDzF8

Hydrogen peroxide H_2O_2 is an unstable and highly-reactive compound that readily decomposes into hydrogen gas and oxygen gas

$$H_2O_2 \rightarrow H_{2(g)} + O_{2(g)}$$

In this observational experiment, you will observe the effects of adding catalysts (or placebos) to hydrogen peroxide.

	Observations **What happened in the cylinder after hydrogen peroxide was added?**
0.50 g $MnO_{2(s)}$	
0.50 g $PbO_{2(s)}$	
0.50 g $Fe_2O_{3(s)}$	
0.50 g Chopped potato	
0.50 g Fresh liver	
0.50 g Boiled liver	

Put the reaction rates of hydrogen peroxide, with which catalyst, in order from fastest (1) to slowest (6). Write the catalyst (or substance added) in order.

1	2	3	4	5	6