**FPS – Rates of Reactions and Molar Masses**

Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Period\_\_\_\_\_\_\_\_\_\_

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| ***Bellwork*** | |
| 1 | 1. Do all reactions happen at the same speed? |
| 1. What does a “rate of reaction” mean?    1. The speed of different chemical reactions varies hugely. Some reactions are very \_\_\_\_\_\_\_\_ and others are very \_\_\_\_\_\_\_\_\_\_.    2. The speed of a reaction is called the \_\_\_\_\_\_\_\_\_ of the reaction.    3. What is the relative rate of these reactions?      1. Rates of Reaction    1. A chemical reaction involves a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ between particles.    2. The particles collide and make \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.    3. The original particles which react are called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.    4. The substances which are made or produced are called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. 2. Reactions, particles and collisions   Reactions take place when particles collide with a certain amount of \_\_\_\_\_\_\_\_\_\_\_.   * 1. The rate of reaction depends on two things:   ∙ the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of collisions between particles  ∙the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with which particles collide.   * 1. The minimum amount of energy needed for the particles to react is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, and is different for each reaction.   2. If particles collide with \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ energy than the activation energy, they will \_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_. The particles will just bounce off of each other.  1. Changing the rate of reactions    1. Anything that \_\_\_\_\_\_\_\_\_\_\_\_\_ the number of successful collisions between reactants will speed up a reaction.    2. What factors affect the rate of reactions?   ∙ increased \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  ∙ increased \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of reactants or **pressure** of gases  ∙ increased \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_ of solid reactants  ∙ use of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | |
| 1. ***Slower and slower***    1. Reactions do not proceed at a \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_. They start off at a certain speed, then get slower and slower until they stop.    2. As the reaction progresses, the amount of reactants decreases. 2. ***Temperature and collisions***    1. How does temperature affect the rate of particle collision?   \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_   1. ***Surface Area***     1. If we make the pieces of the reactants \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ we increase the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ on surface which can react.    2. This makes the reaction \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.      1. ***Concentration***    1. If we make on reactant more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ (like making a drink of Kool-Aid more sweet)    2. There are \_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to react.    3. So the reaction goes \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. 2. ***Using a catalyst***    1. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is a chemical which is added to a reaction.    2. It makes the reaction go \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.    3. The catalyst \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the reaction.    4. It gives the reaction the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to get started. 3. ***Everyday catalysts***    1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_    3. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ 4. ***Endothermic and exothermic***    1. Endothermic reactions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.    2. When bonds are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, heat must be \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and stored in the bonds of the products.    3. Exothermic reactions \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to their surroundings.    4. When bonds are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, heat is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ as a product.    5. Which are the following?   Label the following graphs. | |

Complete the following questions with a partner, using your notes and your book!

***Review Questions – Factors affecting rates of reactions***

1. You are trying to get a mystery block of substance to react with acid. You crush the block of substance in order to get it to react faster. Which of the 4 factors are you using to speed up the rate of reaction?
2. You are baking a cake for your sister’s birthday. You set the oven to 350 degrees Fahrenheit. You decide to turn up the oven to 400 degrees to bake it faster, and your burn the cake. Which of the 4 factors are you using to speed up the rate of reaction?
3. Your car uses platinum to catalyze carbon monoxide and nitrogen monoxide into CO2 and nitrogen. Which of the 4 factors is your car using?
4. WHY does a higher temperature speed up the rate of reaction?
5. WHY does a higher concentration speed up the rate of reaction?
6. WHY does a higher surface area speed up the rate of reaction?
7. WHY would industries want to use catalysts?
8. What happens to the rate of a reaction as the amount of reactants decreases?
9. Why doesn’t a reaction occur at a steady rate?
10. What is activation energy?

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| ***Molar masses – notes continued*** |
| http://crescentok.com/staff/jaskew/isr/tigerchem/moles/mole.jpg   1. How can we count the atoms in a chemical formula?    1. CH4    2. CuSO4    3. Al2(SO4)3 2. The Mole    1. SI unit for amount of matter is the \_\_\_\_\_\_\_\_\_\_\_\_ (mol).    2. The mole describes the amount of particles in a substance.    3. 1 mol = \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ particles    4. The weight of one mole of any element is equal to its \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the periodic table in \_\_\_\_\_\_\_\_\_\_\_\_\_\_. This is called the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.    5. Carbon’s atomic mass is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ amu. So, its molar mass is 12.011 grams. |
| 1. ***Calculating molar masses from chemical formulas***    1. The molar mass of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ can be found by taking the product of the number of each atom in the formula and its mass. Then, add up all the products.    2. Molar mass of water (H2O)    3. Molar mass of (NH4)2SO4 |