Name\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Date\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Chemistry

**Kinetics (Rate of a Reaction) Graphic Organizer**

Collision Theory states that in order for a reaction to occur the reactant particles must collide under the following conditions:

1. Proper amount of Energy
2. Proper alignment, direction, or orientation.

Six (6) Factors Affecting Rate of Reaction

|  |  |  |  |
| --- | --- | --- | --- |
| Factor | How Rate is Affected? | Why Factor Affects the Rate? | Visual Interpretation |
| Nature of Reactants |  |  |  |
| Concentration |  |  |  |
| Pressure |  |  |  |
| Temperature |  |  |  |
| Surface Area |  |  |  |
| Catalyst |  |  |  |

|  |  |  |
| --- | --- | --- |
| Factor | How Rate is Affected | Why Factor Affects the Rate? |
| Nature of Reactants | IONIC substances react FASTER  COVALENT substances react SLOWER  | * Ionic = smaller (LESS bonds to

break; LESS steps):  NaCl(aq) + AgNO3(aq) → NaNO(aq) + AgCl(s) Na+(aq) + Cl-(aq) + Ag+(aq) + NO3-(aq) → Na+(aq) + NO3-(aq) AgCl(s) (1 step)  * Covalent = larger (MORE bonds to

break; MORE steps): CH4(g) + O2(g) → CO2(g) + 2H2O(l) (break 4 C-H bonds, 1O-O bond, form 2 C-O bonds, and 4 O-H bonds) |
| Concentration | INCREASE concentration, INCREASE reaction rate  | The MORE PARTICLES in a given space, the LESS SPACE b/w particles🡪MORE COLLISIONS |
| Pressure | INCREASE pressure, INCREASE reaction rate (affects GASES ONLY!) | Increasing pressure DECREASES VOLUME which DECREASES SPACE b/w particles🡪MORE COLLISIONS |
| Temperature | INCREASE temperature, INCREASE reaction rate  | Greater SPEED 🡪 MORE total COLLISIONS Greater AVERAGE Kinetic energy🡪collisions take place with MORE energy |
| Surface Area | INCREASE the surface area (by making PIECES SMALLER) INCREASES the reaction rate | Increasing surface area EXPOSES MORE REACTANT PARTICLES to possible collisions  |
| Catalyst | SPEEDS UP THE RXN WITHOUT CHANGING THE NATURE OF THE REACTANTS/PRODUCTS | Provides a SHORTCUT or ALTERNATIVE PATHWAY for the mechanism.Lowers the ACTIVATION ENERGY for the reaction  |