***Reversible Reactions***

<http://phet.colorado.edu/en/simulation/reversible-reactions>

*Computer simulation I – A and B at equal Energy*

* Keep the activation energy at zero – no barrier between A and B

1. Before adding molecules A, make a prediction about what you expect for the relative amounts of A and B at equilibrium.

* Add approximately 75 atoms of A to the container.

1. What happened to the reaction? (Which way did the reaction shift and where was the final equilibrium point?)
2. What do you think would have happened if we had started by adding molecule B instead of molecule A? Test this idea. Were you correct? Why/why not?

*Computer simulation II – A and B at different energies*

* Change the energy level of molecule A so that it is higher than that of molecule B.

1. What happens to the equilibrium?

* Adjust the heat control.

1. What happens to the molecules in the container when it is heated?
2. What happened to the reaction? (Which way did the reaction shift and where was the final equilibrium point?)
3. How does this affect the final equilibrium ratio?
4. What do you think will happen to the relative amounts of A and B at equilibrium if you add more B?

* Next, you will add more molecule B to the reaction vessel.

1. What happens to the equilibrium when more of compound B is added to the container?

*Summary Questions*

1. Write Le Chatelier’s Principle in your own words.
2. Fill in the chart for the following reaction:

H2O(l) ⮀ H2O(g) +ΔH

|  |  |  |
| --- | --- | --- |
| Change/Stress on system | Direction of shift | Reason for shift |
| Adding heat |  |  |
| Adding water vapor |  |  |
| Removing water vapor |  |  |
| Decreasing temperature |  |  |
| Increasing the pressure |  |  |

1. What factors can affect equilibrium?
2. What role does activation energy play in product-favored reactions? Reactant-favored? How might this be related to Gibbs free energy?