Guided Notes: Le'Chatelier's Principle

Name: _____ Period: ___

Background Knowledge:

1. What happens if you are running on a treadmill and someone increases the speed?

2. What happens if you are riding your bike and the wind picks up?

-- These are _____ being put on you.
--Chemists put _____ on chemical reactions.
Why do chemists want to put stresses on chemical reactions?
--Chemists put stresses on chemical reactions to produce more _____.
--_____ chemists use this.

Le'Chatelier's Principle: If a _____ is applied to a system at _____, the system shifts in the direction that relieves the _____.

Changes in Concentration:

Adding Reactants

1. What will happen to the balance if you add more reactants?

2. What happens if I add more CO?

$CO(g) + 3H_2(g) \leftrightarrow CH_4 + H_2O$

3. The reaction will shift to the _____.

Removing Products

1. What will happen to the balance if you remove products?

2. What happens if I remove H_2O?

$CO(g) + 3H_2(g) \leftrightarrow CH_4 + H_2O$

3. The reaction will shift to the _____.

Adding Products

1. What will happen to the balance if you add products?

2. What happens if I add H_2O?

$CO(g) + 3H_2(g) \leftrightarrow CH_4 + H_2O$

3. The reaction will shift to the _____.

Changes in Volume and Pressure:

Decreasing the Volume

1. What happens to the pressure when volume is decreasing? _____
2. What happens to the number of collisions? _____
3. To determine if the reaction will shift, we need to look at the number of _____ of the reactants and products.

   $CO(g) + 3H_2(g) \leftrightarrow CH_4 + H_2O$

4. Which side of the reaction contains more moles? _____
5. Volume only has an effect on the reaction if the _____ of reactants differs from the number of products.
6. This reaction has more moles of _____, so the reaction will shift to the _____.

Changes in Temperature

1. Alters both the _____ and the _____.
2. Think of heat as either a _____ or _____.
3. Is this an exothermic or an endothermic reaction? _____
4. Is heat considered a product or reactant in the reaction below? _____

   $CO(g) + 3H_2(g) \leftrightarrow CH_4 + H_2O$ + heat

5. In this reaction, adding more heat would shift the reaction to the _____.

Addition of a Catalyst

1. _____ up a reaction, but does so in both ways.
2. _____ is just reached _____.

Summary: **Le'Chatelier's Principle: Changes in _____, _____, and _____ make a difference in the amount of product formed in a reaction.**

Practice:

For the reaction below, which change will cause the reaction to shift to the right?

$CH_4(g) + 2H_2S(g) + heat <---> CS_2(g) + 4H_2(g)$

a. decrease the concentration of dihydrogen sulfide

b. increase the pressure on the system

c. increase the temperature on the system

d. increase the concentration of carbon disulfide

e. decrease the concentration of methane