Group Name _____

Students _____ _____

_____ _____

H = blue bead; I = green bead

Part 1

1. Write K expression for the reaction $H_2 + I_2 \rightleftharpoons 2HI$

$$K = \text{————————}$$

2. Put the information for your K tray in the table

Tray #	How many H_2?	How many I_2?	How many HI?	K = ?

3. Calculate K based on the expression in Question 1. Show your work.

4. Groups will share data with the class. Copy the data collected into the table below for different tray numbers.

Tray #	How many H_2?	How many I_2?	How many HI?	K = ?

H = blue bead; I = green bead

5. What do you notice about the K values for each tray?

6. Did every tray have the same number of each type of molecule?

7. Can the amounts of reactants and products be different and the system still be at equilibrium?

Part 2

Now, we will look at systems that are not at equilibrium.

Q is for **Q**uestioning if you're at equilibrium

K is when you **Know** you're at equilibrium

Both values are calculated using the same mathematical equation; we just call them different things!

8. With your Q tray, count the number of each molecule present and record in table.

	How many H_2?	**How many I_2?**	**How many HI?**
Q			

9. Write the equation used to calculate Q.

10. Calculate Q for your Q tray. Same equation as K (Question 1) but we know we aren't at equilibrium, so we call it Q. Show your work.

If your calculation has you divide by zero, treat it as a very large number (>1000).

11. Compare the values of Q (from Question 10) and K (from Question 2). Circle one.

Q < K Q = K Q > K

H = blue bead; I = green bead

12. With your Q tray
    a. copy the values from Question 8 in the first row.
    b. record the changes you make so that the Q tray looks like your K tray (i.e. +2, –1, 0).
    c. record the final count of each species in the row labeled K. It should match the values from Question 2.

	How many H_2?	**How many I_2?**	**How many HI?**
Q			
Change			
K			

13. To make out Q tray look like the contents of the K tray, we had to…(describe what you did in words such as "break" and "make".)

14. For every H_2 particle that changed, _____ I_2 particle(s) is(are) changed.

15. For every H_2 particle that changed, _____ HI particle(s) is(are) changed.

16. Groups will share data with the class. Compare your data to a group with a different answer to question 11. What do you notice?

Before you leave, rearrange the Q tray so it is back to the original configuration shown in Question 8.

17. Based on what you saw with data from your group and other groups, complete the following statements.
    a. When Q < K,

    b. When Q > K,

    c. When Q = K,