

LE CHÂTELIER'S PRINCIPLE

NAME _____

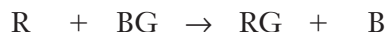
SECTION _____

This DCI consists of a series of experiments that involve interaction between you (the student), your instructor, and a molecular level simulation.[†] Log on to the Internet. Type the following address into the location-input line of your browser:

<http://introchem.chem.okstate.edu/DCICLA/ERGBN.htm>

1. Open the Graphics Simulation program. Using the data from the Control Bar Region, enter the initial concentration of each substance in the equation below.

EXPERIMENT #1:



Initial Concentration – I

Concentration Change – C

Ending Concentration – E

Click on the Resume and then the Enable Reactions button to begin the reaction. When the reaction appears to be complete, click Pause to stop the action. Record the values of the ending concentrations in the table in Section 1.A. Calculate the change in concentration of each of the substances in the reaction.

Notes, observations, and speculations:

[†] If you do not have access to this DCI's Web site link, your instructor will provide you with the data you will need to complete Experiments 1–6.

2. If necessary, click Pause to stop the action. Use the ending concentrations of BG, RG, and B from Experiment #1 (Section 1.A.) as the initial concentrations in this experiment. Enter those values in the table below. In the Control Bar Region, add R until its concentration is 2.0 M. Record this initial concentration of R in the table below. Click the Resume button. Observe how the concentrations of the substances change over time. When the reaction appears to be complete, click the Pause button. Record the values of the ending concentrations in this table:

EXPERIMENT #2: Increase reactant R to 2.0 M	R	+	BG	\rightleftharpoons	RG	+	B
Initial Concentration – I	_____		_____		_____		_____
Concentration Change – C	_____		_____		_____		_____
Ending Concentration – E	_____		_____		_____		_____

Notes, observations, and speculations:

3. If you moved the strip chart scrollbar in the previous section, shift it back to as far to the right as it will go. Use the ending concentrations of R, RG, and B from Experiment #2 as the initial concentrations in this experiment. Enter those values in the table below. In the Control Bar Region, add BG until its concentration is 1.0 M. Record this initial concentration of BG in the table below. Click the Resume button. Observe how the concentrations of the substances change over time. When the reaction appears to be complete, click the Pause button. Record the values of the ending concentrations in this table:

EXPERIMENT #3: Increase reactant BG to 1.0 M	R	+	BG	\rightleftharpoons	RG	+	B
Initial Concentration – I	_____		_____		_____		_____
Concentration Change – C	_____		_____		_____		_____
Ending Concentration – E	_____		_____		_____		_____

Notes, observations, and speculations:

4. In a manner similar to the previous experiments remove R until its concentration equals 0.75 M. Record the new initial conditions of all substances in the table below. Click the Resume button. Observe how the concentrations of the particles in the sample change over time. When the reaction appears to be complete click the Pause button. Record the values of the ending concentrations in the table and calculate the change in concentration of each of the substances in the reaction.

EXPERIMENT #4: Decrease reactant R to 0.75 M	R	+	BG	\rightleftharpoons	RG	+	B
Initial Concentration – I	_____		_____		_____		_____
Concentration Change – C	_____		_____		_____		_____
Ending Concentration – E	_____		_____		_____		_____

Notes, observations, and speculations:

5. In a manner similar to the previous experiments add RG until its concentration is 2.0 M. Record the new initial conditions of all substances in the table below.

EXPERIMENT #5: Increase product RG to 2.0 M	R	+	BG	\rightleftharpoons	RG	+	B
Initial Concentration – I	_____		_____		_____		_____
Concentration Change – C	_____		_____		_____		_____
Ending Concentration – E	_____		_____		_____		_____

Notes, observations, and speculations:

6. In a manner similar to the previous experiments remove RG until its concentration is 1.0 M. Record the new initial conditions of all substances in the table below.

EXPERIMENT #6: Decrease product RG to 1.0 M $R + BG \rightleftharpoons RG + B$

Initial Concentration – I	_____	_____	_____	_____
Concentration Change – C	_____	_____	_____	_____
Ending Concentration – E	_____	_____	_____	_____

Notes, observations, and speculations:

7. Summarize your observations of Experiments #3 – #6 by completing the table below. As an example, the entries for Experiment #2 have been done for you.

Experiment	Stress	Change in [Reactants]	Change in [Products]	Reaction shift
#2	Add reactant [R]	Concentrations decreased	Concentrations increased	Left to Right
#3				
#4				
#5				
#6				

8. Review the summary of your experimental observations that you prepared in Section IV.A. Write a statement(s) that generalizes how stressing a reaction by adding or removing a reactant or product shifts the chemical reaction.