Kinetic Systems

System 1

Investigate the mechanisms of chemical reactions:

A. $F_2 + NO_2 \rightarrow NO_2F + F$
   Molecular - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KNO2FM.htm
   Graphic - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KNO2FN.htm
B. $RB \rightarrow R + B$
   Molecular - http://cheminfo.chem.ou.edu/~mra/CCLI2004/K2RBO2M.htm
   Graphic - http://cheminfo.chem.ou.edu/~mra/CCLI2004/ K2RBO2N.htm
C. $R + 2G \rightarrow RG_2$
   Molecular - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KRG2M.htm
   Graphic - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KRG2N.htm
D. For $RG \rightarrow R + G$
   Molecular - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KCATRGM.htm
   Graphic - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KCATRGN.htm

System 2

In investigate the rate laws of chemical reactions. (See system 1 for examples.)

System 3

There are two possible mechanisms for $G_2 + 2B \rightarrow 2GB$:

$G_2 + B \rightarrow GB + G$ slow
$G + B \rightarrow GB$

$G_2 \rightarrow G + G$ slow
$G + B \rightarrow GB$

A. Use the evidence from http://cheminfo.chem.ou.edu/~mra/CCLI2004/K2GBNa.htm to pick the correct mechanism.
B. Use the evidence from http://cheminfo.chem.ou.edu/~mra/CCLI2004/K2GBNb.htm to pick the correct mechanism.

System 4

Investigate the affect that temperature has on the rate of a chemical reaction. (Hint: use the Arrhenius equation.)

System 5

Investigate the affect that activation energy has on the rate of a chemical reaction. (http://cheminfo.chem.ou.edu/~mra/CCLI2004/KR2BN.htm)

System 6

Investigate any other kinetic system or investigate a modification of any of the above systems.

Research Statements

Use evidence from the MoLE simulations to prove or disprove the following assertions. Following are locations of various reactions that can be used in your investigations.

1. The amount of a catalyst does not affect the rate of a chemical reaction.
   Molecular - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KCATBGM.htm
   Graphic - http://cheminfo.chem.ou.edu/~mra/CCLI2004/KCATBGN.htm

2. According to your textbook, increasing the temperature 10K will double the rate of a chemical reaction. This depends on the activation energy of the reaction. (http://cheminfo.chem.ou.edu/~mra/CCLI2004/KR2BN.htm)

3. According to your textbook, increasing the temperature 10K will double the rate of a chemical reaction. This depends on the ΔH of the reaction. (http://cheminfo.chem.ou.edu/~mra/CCLI2004/KR2BN.htm)

4.