**Chapter 11: Kinetics, Energy & Equilibrium**

**Learning Objectives**

1. Collision theory states that a reaction is most likely to occur if reactant particles collide with the proper energy and orientation. (3.4d)
2. The rate of a chemical reaction depends on several factors: temperature, concentration, nature of reactants,surface area, and the presence of a catalyst. (3.4f)
3. Some chemical and physical changes can reach equilibrium. (3.4h)
4. At equilibrium the rate of the forward reaction equals the rate of the reverse reaction.The measurable quantities of reactants and products remain constant at equilibrium. (3.4i)
5. LeChatelier’s principle can be used to predict the effect of stress (change in pressure, volume, concentration,and temperature) on a system at equilibrium. (3.4j)
6. Energy released or absorbed by a chemical reaction can be represented by a potential energy diagram. (4.1c)
7. Energy released or absorbed during a chemical reaction (heat of reaction) is equal to the difference between the potential energy of the products and the potential energy of the reactants. (4.1d)
8. A catalyst provides an alternate reaction pathway, which has a lower activation energy than an uncatalyzed reaction. (3.4g)
9. Entropy is a measure of the randomness or disorder of a system. A system with greater disorder has greater entropy. (3.1ll)
10. Systems in nature tend to undergo changes toward lower energy and higher entropy. (3.1mm)

| **Section and Learning Objectives** | **Date Completed** | Learning OpportunitiesMinimum Suggested:3-4 per section | **Section Quiz Grade**  **Mastery Level:**  **70 75 80** | **Labs & POGILs**  **\*\* = Required Activity**  **Must complete a minimum of 3 POGILs** | **Date Completed** |
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| 11.1  Collision Theory  Obj #1 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.1 pgs 2. Suppl.Video/Animation 3. TB pgs 541-544 4. RevBook2013 pg 136 5. Vocab-Quizlet 11.1 6. Prac. WS pgs 7. Castle Learning 11.1 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  Handout:  \*\* Kinetics Activity  **POGILs**  Collision Theory pgs 229-232 | \_\_\_\_\_\_\_  \_\_\_\_\_\_\_ |
| 11.2  Variables that Affect Reaction Rates  Obj #2 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.2 pgs 2. Suppl.Video/Animation 3. TB pgs 542-547 4. RevBook2013 pg 136-8 5. Vocab-Quizlet 11.2 6. Prac. WS pgs 7. Castle Learning 11.2 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  \*\* Choose 1 of 2  #36: pgs 129-132  #37: pgs 133-135  **POGILs**  Distillation pgs 182-186 | \_\_\_\_\_\_\_  \_\_\_\_\_\_\_ |
| 11.3  Potential Energy Diagrams  Obj# 6,7,8 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.3 pgs 2. Suppl.Video/Animation 3. TB pgs 542-547 4. RevBook2013 pg 138-141 5. Vocab-Quizlet 11.3 6. Prac. WS pgs 7. Castle Learning 11.3 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  \*\* Choose 1 of 2  #38: pgs 136-137  #39: pgs 138-139  **CRT Practice**  \*\*Table I pgs  **POGILs**  Bond Energy pgs 129-133 | \_\_\_\_\_\_\_  \_\_\_\_\_\_\_  \_\_\_\_\_\_\_ |
| 11.4  Equilibrium  Obj# 3,4 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.4 pgs 2. Suppl.Video/Animation 3. TB pgs 549-551 4. RevBook2013 pg 142-144 5. Vocab-Quizlet 11.4 6. Prac. WS pgs 7. Castle Learning 11.4 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  \*\* Choose 1 of 2  #40: pgs 140-142  Handout: Simulating Equilibrium  **POGILs**  Equilibrium pgs 122-128  Dyn. Equilib pgs 225-228 | \_\_\_\_\_\_\_  \_\_\_\_\_\_\_ |
| 11.5  Le Chatelier’s Principle  Obj# 5 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.5 pgs 2. Suppl.Video/Animation 3. TB pgs 552-555 4. RevBook2013 pg 144-147 5. Vocab-Quizlet 11.5 6. Prac. WS pgs 7. Castle Learning 11.5 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  \*\*Le Chatelier’s Principle pgs 143-144  **POGILs**  Equilibrium & Le Chatelier’s Principle pgs 115-121 | \_\_\_\_\_\_\_  \_\_\_\_\_\_\_ |
| 11.6  Entropy & Enthalpy  Obj# 9,10 | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Video Notes 11.6 pgs 2. Suppl.Video/Animation 3. TB pgs 566-571 4. RevBook2013 pg 148-150 5. Vocab-Quizlet 11.6 6. Prac. WS pgs 7. Castle Learning 11.6 8. Poster or Concept Map 9. Review Sheet pg 10. Discuss with peers 11. Mini Lecture-Teacher | Grade 1\_\_\_\_  If mastery not achieved, complete \_\_\_\_ more Learning Opps  Grade 2\_\_\_\_  **Avg. Quiz Grade:** | **Labs**  \*\*#41: pgs 143-144 | \_\_\_\_\_\_\_ |
| Choose 1-2:  Review & Test | \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_  \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 1. Review Sheet pgs  2. Review Your Section Quizzes  3. Review Unit Study Guide pg  4. Create Unit Poster/Concept map  5. Castle Learning Review  6. Practice Exam pg  7. [www.regentsprep.org](http://www.regentsprep.org) Unit Rev  8. Discuss Questions with Teacher  In groups of 2-4:  9. Whiteboard Review  10. Discuss with peers | **COMPLETE LAST:**  Unit Test Grade | \*\* Current Event Article\*\*  What’s so Equal about Equilibrium? pgs  Corrections must be completed if test grade is below mastery level | \_\_\_\_\_\_\_ |

Grade Sheet Attached: For a 5-pt test bonus, get signed grade sheet signed by\_\_\_\_\_\_\_\_\_

Date:\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Parent/Guardian Signature Date Checkpoints will occur at Progress Reports and Quarter Ends. Average will be reduced by a full grade if unit is not completed within a reasonable time of the posted deadline, based upon effort & participation during class time and attendance at extra help.