

Student directions *Reactions and Rates 4: LeChatlier's Principle*

50 minutes untested


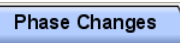
Learning Goals: Students will be able to

- Explain how to make equilibrium systems change and predict what changes will happen.
- Compare and contrast salt-solution, phase, and chemical equilibriums.

Instructions:

1. Research “LeChatelier’s Principle” and then write the principle in your own words.

Part A Physical Equilibrium

2. Investigate salt solution equilibrium by talking with partner about a-d and using *Salts and Solubility* simulation. *You will be using your ideas to answer question 3.*
 - a. If you had a salt solution with some undissolved salt, what should happen if you add water? Talk about how LeChatelier’s Principle might be used to explain what happens. Make sure to test your ideas using the *Salts and Solubility* simulation.
 - b. How would your answers change for an unsaturated or saturated solution? Don’t forget to test!!
 - c. Test to see how letting out water affect salt solutions (undissolved salt, unsaturated or saturated). Talk about how LeChatelier’s Principle might be used to explain what happens.
 - d. If you had a real salt solution, what are some other ways that you could reduce the amount of water?
3. Explain using LeChatelier’s Principle what happens to salt solutions when the amount of water is varied. Illustrate your explanations with “test tube” size drawings and “close-up” views to show the ions and crystals.
4. In *States of Matter* simulation, what are ways that equilibriums are displayed? Use ideas from both   tabs.
5. Explain on a molecular level how you can change the phase equilibrium and what changes happen. Try to relate Kinetic Molecular Theory and LeChatelier’s Principle.

Part B Chemical Equilibrium: use *Reactions and Rates*,  tab

6. How would you identify a chemical equilibrium? What can you do to change it? Does it matter which reaction you are testing? Make a data table that demonstrates that you have thoroughly explored the possibilities. *If you use a total of about 180 particles, the data is more consistent.*
7. Describe how chemical equilibriums are similar to physical equilibriums and identify areas where the chemical systems are more complicated.