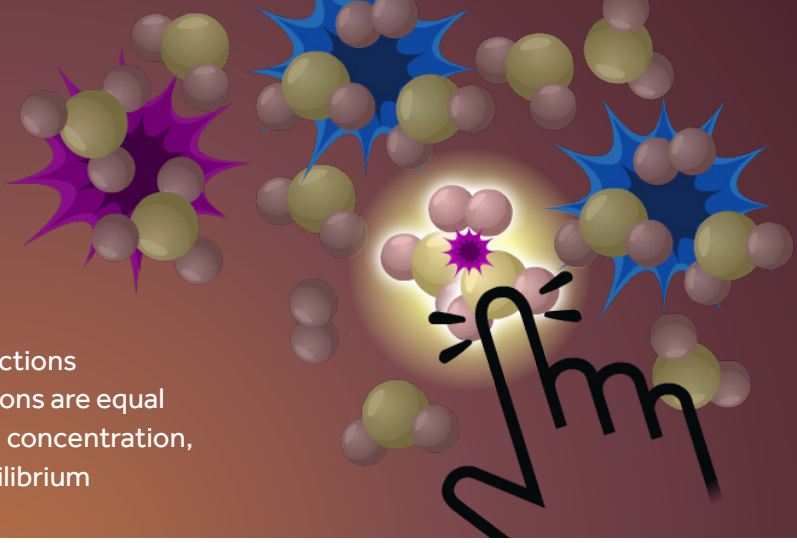
Educator Quick Start Guide

EQUILIBRIUM GAME



Integrated chemistry concepts:

- All reactions can proceed in the forward and reverse directions
- At equilibrium, the rate of the forward and reverse reactions are equal
- When a system at equilibirum is disturbed by a change in concentration, pressure, or temperature, it will shift to re-establish equilibrium

Use Collisions® PRE-INSTRUCTIONALLY to engage your students and explore a topic.

Assign your students the first 11 levels of Equilibrium. During gameplay, ask your students to answer the following guided questions:

1. What do the purple bursts represent?
2. What do the blue bursts represent?
3. What does it mean when a reaction is reversible?
4. What is equilibrium?
5. What does it mean to 'shift right'?
6. What does it mean to 'shift left'?
7. In Level 6, what are the reactants? When you add more reactants to a system, which way does the system 'shift'?
8. In Level 7, what are the products? When you add more products to a system, which way does the system 'shift'?
9. What happens when you remove reactants from a system?
10. In Level 9, is heat a product or reactant? Which way will equilibrium shift if more heat is added to the system?
11. In Level 11, what happens to the container size when you decrease pressure?

Use Collisions POST-INSTRUCTIONALLY to practice, review, and extend the learning.

After instruction, encourage your students to work through the remaining core game levels. To check for student understanding, here are some additional guided questions to incorporate into your lesson:

1. In Level 9, how do you increase the solubility of the ionic solid?
2. In Level 15, how did you increase pressure at equilibrium? Why did this work?
3. In Level 16, how did you increase [NH_3](at equilibrium? Why did this work?
4. In Level 18, how did you decrease pressure? Explain how this happened.
5. In Level 19, how did you decrease [O_2]? Why did this work?
6. In Level 19, what happened to the pressure when you successfully decreased [O_2]? Why?
7. Which direction does equilibrium shift in Level 21, when attempting to increase [H_2O]?
8. In Level 21, does pressure ever change? Explain why or why not.
9. Explain what is happening when a system is returning to equilibrium after being disturbed.

Additional free resources available at www.playmadagames.com

- **Equilibrium Game Guide** - Teacher resource that provides an overview of the game.
- **Equilibirum Student Quest** - Student activity designed to be completed during and after gameplay.

collisions®