

# Intermolecular Forces

## Integrated Chemistry Concepts:

- Polar and Nonpolar Bonds
- Molecular Geometry and Polarity
- Polar and Nonpolar Molecules
- London Dispersion Forces
- Dipole-Dipole Forces
- Hydrogen Bonding
- Intermolecular Force Strength

### Use Collisions HE **PRE-INSTRUCTIONALLY** to engage your students and explore a topic.

Assign your students the first 10 levels of IMFs. During gameplay, ask your students to answer the following guided questions:

1. In Level 3, what molecule formed a hydrogen bond? What is different about Br and F?
2. In a molecule, what partial charge is often connected with hydrogen (positive or negative)?
3. In Level 6, what is the relationship between the number of electrons in an atom and the strength of its London Dispersion Forces? Why is that?
4. In Level 8, what molecule did you build for the dipole-dipole target?
5. What are the 3 types of IMFs? Order these IMFs from weakest to strongest.

### Use Collisions HE **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. Explain the rules of the IMF game, using some or all of the following keywords: molecular polarity, LDF, dipole-dipole, hydrogen bond, polar molecule, nonpolar molecule, attraction.
2. What makes one nonpolar molecule have greater London Dispersion Forces than another nonpolar molecule?
3. List 3 molecules that form hydrogen bonds.
4. How does molecular polarity affect the type of IMF?
5. Explain how a tetrahedral molecule can be nonpolar. Explain how a tetrahedral molecule can be polar. You can reference Level 13 to answer this question.

You can also use the Intermolecular Forces Sandbox to highlight a specific concept integrated into gameplay and encourage your students to earn the built-in Achievements.

### Additional resources:

- IMFs Content Area Overview
- IMFs Extension Activity
- IMFs Formative Assessment