

Chemical Bonds

5E Lesson

The 5E model is a scientifically proven method to improve student engagement and learning in your classroom

- ✓ Engagement
- ✓ Exploration
- ✓ Explanation
- ✓ Elaborate
- ✓ Evaluate



Complete Teacher Instructions

Types of Chemical Bonds 5E Lesson

Grades 7-10 Types of Chemical Bonds Ongoing Lesson (4)

Lesson Objective:

Students will learn about:

- Forces of attraction
- Ionic bonds
- Covalent bonds
- Single, double, and triple bonds
- Metallic bonds
- Hydrogen bonds
- Linus Pauling
- Polyethylene
- Surface tension

Possible Student Misconceptions:

- Electrons are equally shared in all covalent bonds
- When salt is dissolved in water, sodium and chloride ions will still attract one another

Materials:

- 1 device (smartphone, Chromebook, laptop, tablet, or computer) per 3 students
- A means of projecting a PowerPoint presentation
- Internet access
- General classroom objects
- Molecule building kit

Teacher Notes:

- All videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If it does not, right-click on the image and click **Edit Hyperlink** or something similar.
- I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>
- I don't believe in long lessons. If you feel your students are losing their focus, stop the PowerPoint and give them a 5-minute break. If you'd like to show a video, I recommend my video collection here - <http://www.teachwithfergy.com/science> are tons of brain-break videos to choose from all grouped by category.

Types of Chemical Bonds – 5E Lesson

Engagement Phase

Your students will watch the video 'Dogs Teaching Chemistry – Chemical Bonds' and complete the questions found in the file – *Engagement – Dog Chemical Bonds Video*.

The video can be found here -

<https://www.youtube.com/watch?v=M9khs87xQ8>

Teacher Notes:

- The video is about a minute and a half long
- You may need to show the video more than once or pause when an answer is given to one of the questions.

Exploration Phase

Exploration – Lab Station Activity

- In groups of 2-3, have your students complete *Exploration – Lab Station Activity*. Once they're done, they will submit their passport to you.

Teacher Notes:

- The complete instructions for my Lab Station activity can be found in the *START HERE – Instructions* file.

Explanation Phase

PowerPoint Lessons

- The lesson is found in the folder – *Explanation – Types of Chemical Bonds Lesson*
- This lesson is designed to be completed over one day
- There are multiple embedded videos and plenty of opportunity to engage, interact and check for your students' understanding throughout the lesson
- The lesson covers the following topics:
 - Force of attraction
 - Ionic vs. Covalent Bonds

- Ionic Bonds Overview
- Covalent Bonds
- Single, Double, and Triple Bonds
- Polar Covalent Bonds
- Metallic Bonds

Teacher Notes:

- All videos can be accessed directly from the PowerPoint. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If they don't open, right-click the image and select **Edit Hyperlink** or something similar.
- I've created a video walkthrough if needed. It can be accessed here - <https://youtu.be/oCIKIP9SaDQ>
- I have also enclosed a .PDF version of both the teacher and student versions.

Elaborate Phase

Elaborate – Scavenger Hunt

Your students will complete – *Elaborate – Scavenger Hunt*. This activity will require your students to move beyond what was covered directly in the lesson and allow them to further develop their understanding.

Teacher Notes:

- Students will work individually or in small groups
- Students will need one device per group

Evaluate Phase

Quiz

Have your students complete - *Evaluate – Types of Chemical Bonds Quiz*

Teacher Notes:

- It's sometimes best to have the students peer evaluate
- Placing students in small groups and having them exchange papers to mark will accomplish two things
- 1) Provide immediate feedback on the questions they just completed
- 2) Significantly reduce your marking time
- Peer evaluation is not needed, only suggested when appropriate

Goals

- ☐ Students develop understanding of the content
- ☐ Observations and experiences are discussed and critiqued
- ☐ Students develop vocabulary
- ☐ Students are able to connect the content presented to previous experiences

Duration: 1 hour

Teacher Role – Facilitate learning and keep students focused

Goal

- ☐ Students use their newly obtained knowledge to propose solutions and extend their learning to new situations

Duration: 30 min

Teacher Role – Distribute and collect evaluation

Goal

- ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

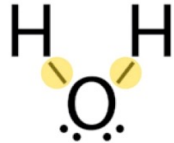
Each phase is clearly described

A Complete Lesson

Force of Attraction

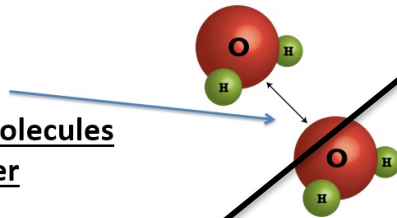
1. Intramolecular Force

- Within molecules
- The force that holds atoms of molecules together



2. Intermolecular Force

- Between molecules
- The force that holds molecules of a substance together

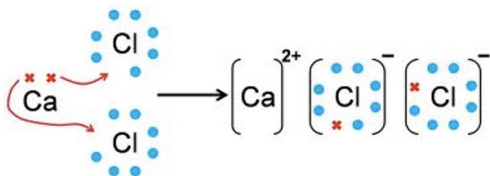


← Make sure your students are on track

Student copies with blanks
Videos embedded right into
your slideshow

Ionic Bonds

- Occurs when the Electronegativity difference (EN) is _____
- _____
- Involves the transfer of electrons from less EN atoms (metals) to an atom of greater EN (non-metal)
- Oppositely charged ions are attracted to each other



Ionic vs. Covalent Bonds



Interactive and Engaging Activities

Device-Based Scavenger Hunt Types of Chemical Bonds

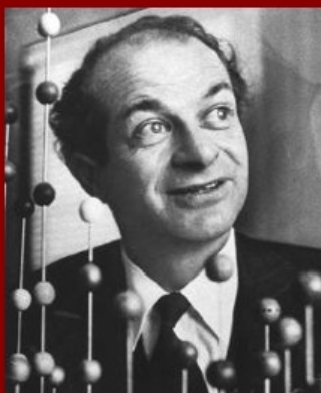
Includes

- 5 Unique Locations
- Online form submission
- Answer Key

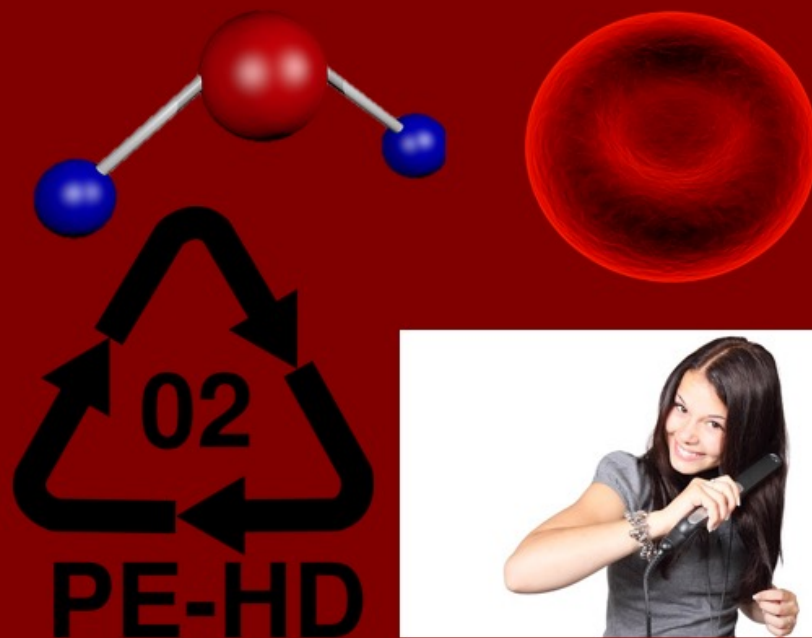


Works on all smartphones, tablets, Chromebooks, and laptops

- **100% Digital**
- Simulations
- Quizzes
- Videos
- Games
- and more



Types of Chemical Bonds Lab Station Activity



7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration

