

Atoms and the Atomic Theory

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

Atoms and the Atomic Theory - 5E Lesson

Engagement Phase

Whose Theory Was It Anyway?

This is a thinking activity where your students need to use their prior knowledge and common sense to create the best answer possible. The file is called – Engagement – Whose Theory Was It Anyway? and is located in the your folder.

Teacher Note:

This is not a graded activity and it should be made clear to the students that they are to simply use their best judgment. I usually just project it onto the board but you can print it off or send it to their devices if you choose. Following the allocated time (~15 min.), ask the students what they think and draw out their answer on the board as you guide them to the solution.

Duration 15-20 min.

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Connect student's experiences
- ☐ Create interest
- ☐ Ask questions
- ☐ Understand the objectives of the lesson

Exploration Phase

Atomic Model, Notation and Atoms Lab Station Activity

- In groups of 2-3, have your students complete Exploration - Atomic Model, Notation and Atoms – 7 Engaging Lab Station Activities. 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.

Duration: 55-60 min.

Teacher Role – Facilitate learning and guide student understanding

Goals

- ☐ Students receive real experience with the topic
- ☐ Students use and develop creative thinking skills
- ☐ Students make observations, record results, and make connections

Explanation Phase

Atomic Theory and Model Lesson

- Over the course of 1 - 2 days, go through the Explanation - Atomic Theory and Model Lesson. There are many opportunities to engage your students and show how the content is relevant to their lives.
- The lesson covers the following topics:
 - ✓ Atomic Theory Matching
 - ✓ Atom Size
 - ✓ Democritus
 - ✓ Dalton – Ball Model
 - ✓ J.J. Thompson – Raisin Bun Model
 - ✓ Rutherford – Gold Foil Experiment
 - ✓ Bohr – Energy Level Model

Duration: 2-2.5 hours

Teacher Role – Explain the concepts by presenting the material found in the presentation.

Teacher Notes:

- No prior knowledge is required for this lesson
- 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 have also enclosed a .PDF version of both the teacher and student versions

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

Elaborate Phase

Atoms: History and Theory Scavenger Hunt Activity

The scavenger hunt activity will require your students to move beyond what was covered directly in the lesson and allow them to demonstrate how Atoms and the Atomic Theory can be applied to the real world. Students will work in groups of two or three and will require a single device (smartphone, tablet, chromebook, laptop, etc.). The Hunt can be accessed from the folder - Elaborate – Atoms: History and Theory Scavenger Hunt Activity

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

Evaluate Phase

Atoms and the Atomic Theory quiz

Have your students complete the Evaluate - Atoms and the Atomic Theory – 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 quiz they just completed
- 2) Significantly reduce your marking time
- Peer evaluation is not needed, only suggested when appropriate

Duration: 20-40 min.

Teacher Role – Distribute and collect evaluation

Goal

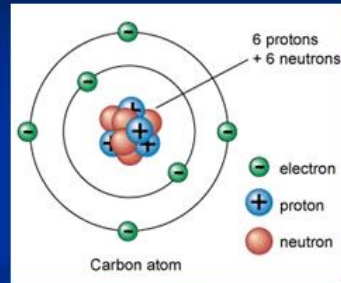
- ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

Each phase is clearly described

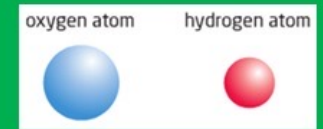
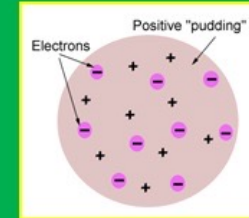
Complete Lesson

The Bohr-Rutherford Model

- _____
- Electrons move in orbits (energy levels) around the nucleus
- Electrons more or less stay in their orbit unless an increase in energy causes them to move

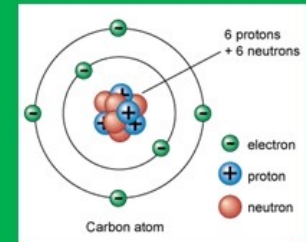


Atom Animation



The Atomic Theory

1. Atomic Theory Matching
2. Atom Size
3. Democritus
4. Dalton – Ball Model
5. J.J. Thompson – Raisin Bun Model
6. Rutherford – Gold Foil Experiment
7. Bohr – Energy Level Model



Thomson's Atomic Model

- Thomson believed that the electrons were like plums embedded in a positively charged "pudding"
- It was called the **"Plum Pudding"** or **"Raisin Bun"** model.

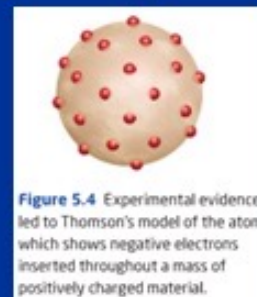
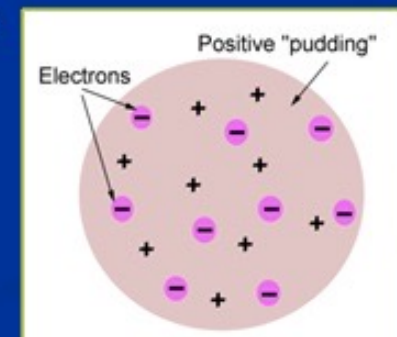


Figure 5.4 Experimental evidence led to Thomson's model of the atom, which shows negative electrons inserted throughout a mass of positively charged material.



Interactive Lab Station and Scavenger Hunt Activities

Device-Based Scavenger Hunt Atoms: Atomic Theory and Structure

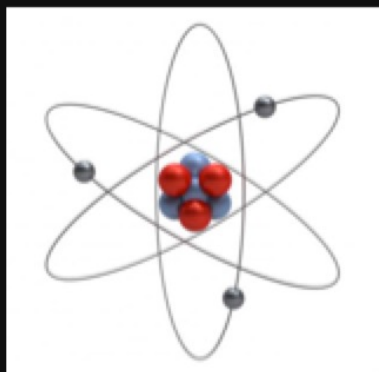


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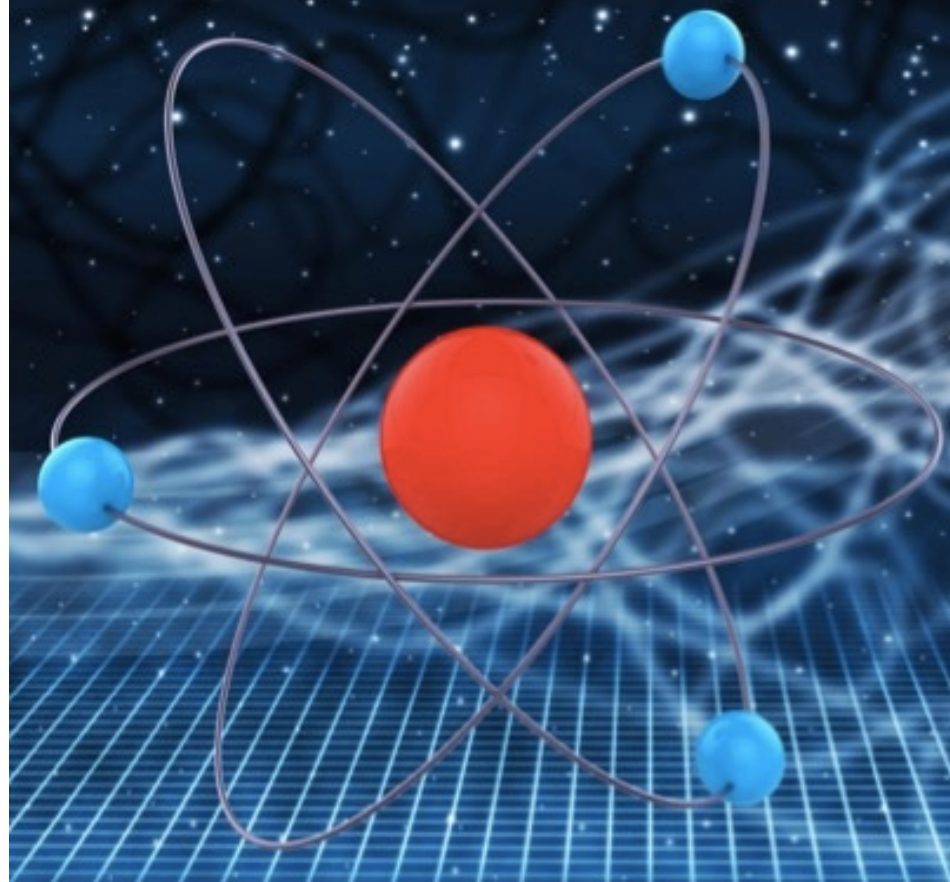
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- Answer Key

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Atomic Model, Structure and Notation Lab Station Activity

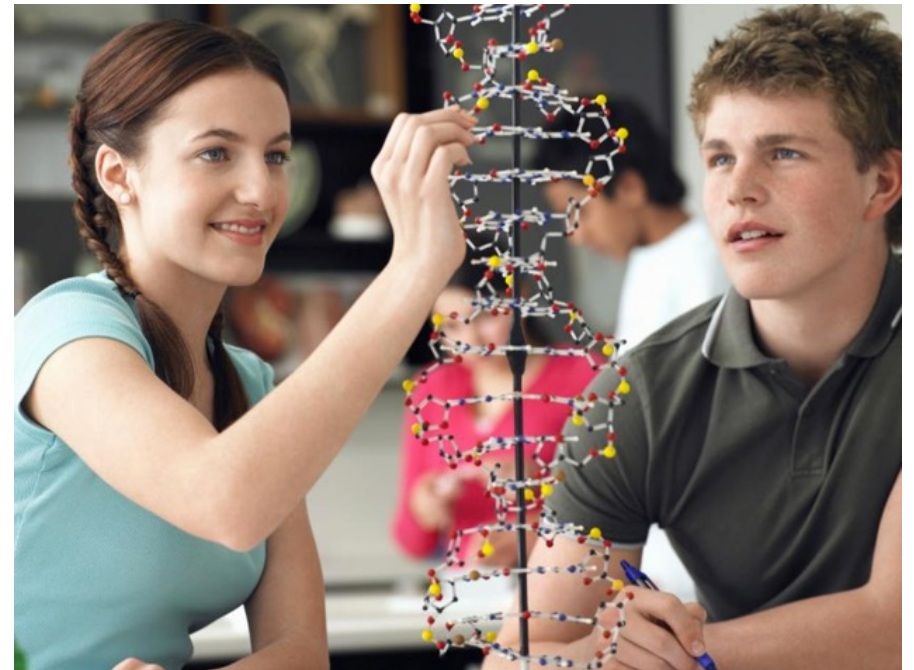


7 Lab Station Activities to get your kids out of their seats and engaged in their learning

Get away from tired practices and unengaged students



Provide a Scientifically-Proven means of instruction



Incorporate Technology and Increase Collaboration

