

Build a Bohr Grade 9 Science – Chemistry (SNC1D)

<h2 style="margin: 0;">Lesson Plan</h2>	Coding Tool	Scratch https://scratch.mit.edu/
	Cross-curricular	N/A

<p>Big Ideas (SNC1D) C3: To demonstrate an understanding of the properties of common elements and compounds, and of the organization of elements in the periodic table</p> <p>Learning Goal(s):</p> <ul style="list-style-type: none"> I can build a Bohr-Rutherford atomic model for the first twenty elements. I can identify patterns with the arrangement of protons, neutrons and electrons using the Bohr-Rutherford model. 	<p>Specific Expectations (SNC1D)</p> <p>C3.1 Explain how different atomic models evolved as a result of experimental evidence (e.g., how the Thomson model of the atom changed as a result of the Rutherford gold-foil experiment)</p> <p>C3.5 Describe patterns in the arrangements of electrons in the first 20 elements of the periodic table using the Bohr-Rutherford model</p>
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Description
 Your students will have a chance to explore the history of atomic models and build a Bohr-Rutherford atomic model using Scratch coding blocks. This will be an interactive way for the students to understand the structure and components of an atom using the Bohr-Rutherford atomic model and develop coding skills in the process.

<p>Materials</p> <ul style="list-style-type: none"> Computer for each student Internet access 	<p>Computational Thinking Skills</p> <ul style="list-style-type: none"> Problem Solving Algorithmic thinking Conditional statements <p>Prior knowledge of block coding and Scratch will help</p>
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Introduction

- Recap previous lesson(s) on the various atomic models. The last part of the video talking about the Quantum Theory Model may lead to some enrichment material.
- Atomic Model History recap video:
<https://www.khanacademy.org/science/chemistry/electronic-structure-of-atoms/history-of-atomic-structure/v/chem37-history-of-atomic-chemistry>

Action

- Using “Build a Bohr” Pre-Build Scratch activity to build a Bohr-Rutherford atomic model for an element (Nitrogen, oxygen, etc.). Go through each step as a class.
- Have students pick their own element to build using “Build a Bohr” (link found below). Once students have built one or two Bohr-Rutherford atomic models, discuss with the class their observations. Reinforce the idea of an element with the possibility of different number of neutrons (isotopes), the placement of electrons in the energy levels of the Bohr atomic model and the charge of an atom.
- “Build a Bohr” link: <https://scratch.mit.edu/projects/867623/fullscreen/>
- Assign an element to each student (first twenty elements only) based on your observations and conversations with the students’ understanding of the Bohr atomic model and coding abilities/experience.
- The link below will bring you to a Bohr atomic model of Lithium. Next, click the ‘Remix’ button found in the top right corner of the webpage. Students will follow the same steps mentioned above. Once here, you can go through the programming of the Lithium model and make suggestions on how your students could alter it for their particular element. How much you model and explain the programming will vary on your students’ skill levels and experience coding with Scratch. Once you feel your students have enough information to be successful in building their own Bohr atomic model, have them break off into groups for peer support.
- Lithium atomic model link: <https://scratch.mit.edu/projects/129024642/>

Consolidation/Extension

- **Consolidation:** You may have to consolidate the next day if students aren’t finished. Finish Bohr atomic model for homework. Once students have completed the Bohr atomic model of their element(s), have each group/individual explain what they had to add or take away for their element(s) and why.
- **Extension:** Build Bohr model of element with an atomic number larger than twenty.
- **Extension:** Build Bohr model of compound(s) (example H₂O)

Assessment

- **Assessment for Learning:** Evidence of students meeting the learning goals through observations and conversations
- **Assessment of Learning:** Peer and self assessment as students develop and tweak their own programs and their peers’ programs.

Additional Resources

- **Scratch Education link:** <http://scratched.gse.harvard.edu/resources>