

Lesson 1-7: Nuclear Imaging & Nanotechnology	
Curriculum Expectations	<ul style="list-style-type: none"> • C1.1 • C1.2
Learning Goals	<p>Learning Goals:</p> <p>By the end of this lesson you will:</p> <ul style="list-style-type: none"> • Assess the benefits to society of technologies based on the principles of atomic and molecular structures. • Evaluate the benefits to society and the environment of specialized materials created based on the structure of the atom and molecular structures
Success Criteria	<p>Success Criteria:</p> <p>I know I have achieved the learning goals when I can describe the benefits to society of technologies related to the structure of atoms and molecules.</p>
Teacher Prep	

Minds On
<p>Goal: This activity will allow students to be able to visualize the tug-of-war for electrons that occurs between atoms within the same molecule.</p> <p>Unit Review Discussion</p> <p>This is the final lesson of the unit and is comprised of a research assignment. Before beginning the class and introducing the culminating task this is a good opportunity to review the unit.</p> <ul style="list-style-type: none"> • You should start by guiding the students through the progression of the unit, starting with the structure of the atom at the nucleus-electron level • Building from there to orbital structure and quantum numbers. • From there students learned about how the battle for electrons leads to polar bonds and molecules. • Polarity can affect the intermolecular forces between molecules and these forces have a profound effect on the properties of matter. • Finally, in this culminating task, students will learn about some of the applications of this knowledge in current technologies. • This is the time to clear up any misconceptions, and answer any relevant questions about the unit to this point.

Action

1. 1-7A: Nuclear Imaging & Nanotechnology

This is the opportunity to introduce the culminating task which is a research project related to nuclear imaging and nanotechnologies. Explain that both of these technologies relied on the understanding of the structure of the atom and the behavior of matter.

Explain the nature of research projects, and instruct students that they must complete activities 1-7B→ 1-7F before they can attempt the assignment.

2. 1-7B: Plagiarism

- Have students complete the interactive activity on their own.
- Once all students are finished, ask if there are any questions.
- Put the activity up on a projector and go through the presentation as a class.
- Ask students for examples of plagiarism and have the class debate whether these would be considered plagiarism.
- Ask students what they think are fair consequences for students found cheating.
- This is also a good opportunity to discuss ethics in and around research in general and scientific research especially.

3. 1-7C: Finding Information Online – Tips & Strategies

- Have students complete the interactive activity on their own.
- Once all students are finished, ask if there are any questions.
- Put the activity up on a projector and go through the presentation as a class.
- You may want to use a sample topic, such as climate change and perform research as a class using the tips and strategies in the activity.

4. 1-7C: Research Skills – Finding Credible Sources

- Have students complete the interactive activity on their own.
- Once all students are finished, ask if there are any questions.
- Put the activity up on a projector and go through the presentation as a class.
- You may want to use a sample topic, such as climate change and perform research as a class. Try to find both credible and unreliable sources.

5. 1-7E: Citation – How to Credit Sources of Research

- Have students complete the interactive activity on their own.
- Once all students are finished, ask if there are any questions.
- Put the activity up on a projector and go through the presentation as a class.
- Use several sources as examples and have the class properly cite them.
- Use different types of sources for this (websites, articles, books, etc.)

6. 1-7F: Effective Communication – How to Organize and Present Information

- Have students complete the interactive activity on their own.
- Once all students are finished, ask if there are any questions.
- Put the activity up on a projector and go through the presentation as a class.
- Have students practice effective communication by doing sample research as a class and asking students to present the information using strategies from the activities.

Consolidation

- 1. Unit 1 – Review – This is a worksheet** that summarizes much of the relevant information from the unit. It can be used as a preparatory activity to get ready for the unit test. Answers should be taken up as a class and any misconceptions and questions addressed before the unit test.
- 2. 1-7G: Nuclear Imaging & Nanotechnology Report** – This is a graded activity. Review the expectation with the whole class before the students attempt the assignment. Emphasize where the marks are allocated and review proper naming convention and file formats. You should review the rubric in detail so that students are clear about how their marks are allocated. Emphasize that students should spend several hours completing their research and organizing their information before submitting the assignment.
- 3. 1-7H: Nanotechnology Response.** Students must submit a response in this forum to receive a grade on their assignment 1-7G.
- 4. Unit 1 Learning Log** – Students must complete this before they are eligible to write the unit test.