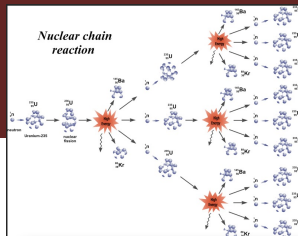


Nuclear Energy – Fission and Fusion Middle School 5E Lesson

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



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



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Complete Teacher Instructions



Nuclear Energy – Fission and Fusion 5E Lesson

Grades 9-12	Nuclear Energy – Fission and Fusion	Ongoing Lesson (6-8 hours)
Lesson Objective: Students will learn about the following: • Atoms • Nuclear Energy • Fission • Fission Safety • Chernobyl Disaster Case Study • Nuclear Weapons – Fission • Fusion and Controlled Fusion • Controlled Fusion Challenges and Benefits • Nuclear Energy Applications • Nuclear Weapons – Fusion • Power plants • Environmental Impact		
Possible Student Misconceptions: • Nuclear power plants can explode like nuclear bombs. • Nuclear energy causes widespread illness and mutations. • Fusion reactors can have meltdowns like fission reactors. • Fusion power is already widely available. • Fission and fusion produce the same kinds of waste.		
Materials: • 1 device (smartphone, Chromebook, laptop, tablet, or computer) per 3 students • A means of projecting a presentation • Internet access • General classroom objects		
Teacher Notes: ➢ The presentations as well as the student notes are in Google and Office format which can easily be used in class or online ➢ All videos can be accessed directly from the presentation. To retrieve them, click on the video icon while in slideshow mode and it will automatically open for you. If it doesn't for some reason, 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/oCjKIP9SaDQ ➢ I don't believe in long lessons. If you feel your students are losing their focus, don't force it. Stop the presentation and give them a 5-minute break. If you'd like to show a quick video, I'd recommend my video collection here - http://www.teachwithfergy.com/science-videos/. There are tons of brain-break videos to choose from all grouped by category.		

Nuclear Energy – Fission and Fusion - 5E Lesson

Engagement Phase Your students will complete two science comprehension readings. 1) 'Nuclear Energy – Fission and Fusion' 2) 'The Physics of Nuclear Fusion'	Duration: 2 hours 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 Exploration – Lab Station Activity • In groups of 2-3, have your students complete 'Nuclear Energy – Fission and Fusion Lab Station Activity'. Once they're done, they will submit their passport to you.	Duration: 1 hour 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

Elaborate Phase Your students will complete 'Fission vs Fusion Infographic'. This activity will allow your students to go beyond what they've done in the classroom and demonstrate their understanding in a different way.	Duration: 2-3 hours 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 Have your students complete – <i>Evaluate - Nuclear Energy</i> . The test includes multiple choice, true and false, and short answer questions. Answer key is included.	Duration: 45 mins Teacher Role – Distribute and collect. Goal ☐ Students are given the opportunity to demonstrate their understanding and evaluate their own progress

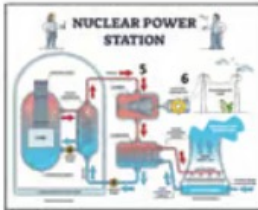
Each phase is clearly described

Complete Lessons

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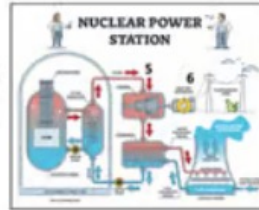
Fission – Energy Release

- The released energy is used to heat water which becomes steam (5)



Fission – Energy Release

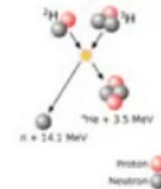
- The released energy is used to heat water which becomes steam (5)
- The steam turns a turbine which spins a generator to create electricity (6)



Student and Teacher version:
the presentations

Fusion – The Power of the Sun

- Nuclear fusion is the opposite of nuclear fission
- Nuclear fusion is the process that happens in all stars to produce heat and light
- Stars are able to undergo fusion reactions due to their immense size and internal pressure

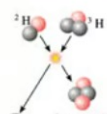


Videos embedded directly into the slides. One-click access.

Interactive and Engaging Activities

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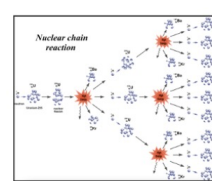
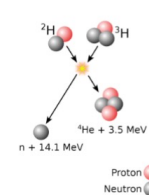
The Physics of Nuclear Fusion



Improve your students' Analysis Skills, use an activity or create Applicability in your classroom

FISSION VS. FUSION INFOGRAPHIC ASSIGNMENT

- Students are tasked with creating an infographic that demonstrates their understanding of photosynthesis
- Full rubric included



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Nuclear Energy – Fission and Fusion Lab Station Activity

Station 1
Get Hands-On – You've seen drawings of photosynthesis occurring in a plant, without looking at any examples, you'll be able to identify the process.

7 Lab Station Activities of their seats and engage

Nuclear Energy: Fission and Fusion- Scientific Reading Comprehension Article

Improve your students' Scientific Literacy and Analysis Skills, use as an Emergency Substitute Plan or create Applicability in your classroom

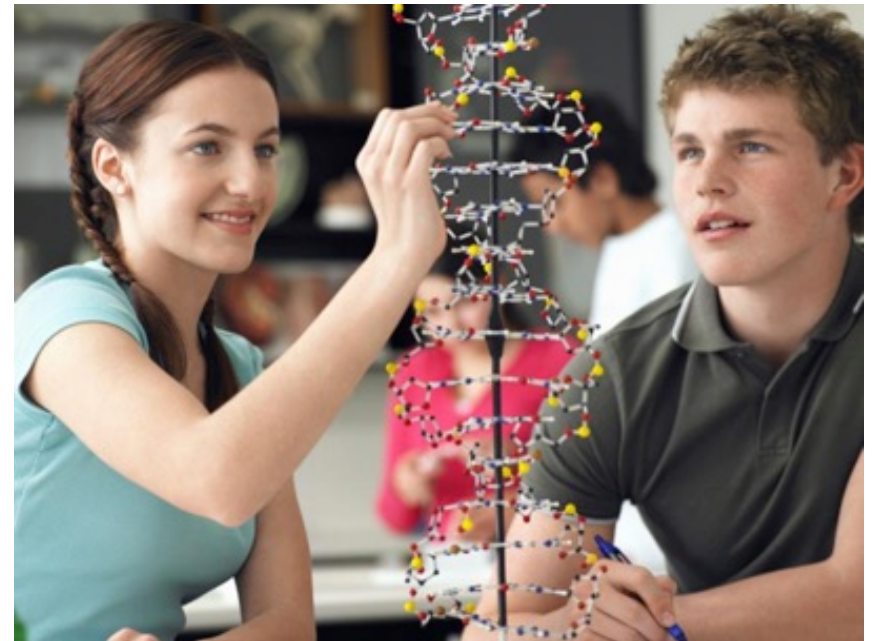
Get away from tired practices and unengaged students



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Provide a Scientifically-Proven means of instruction

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Incorporate Technology and Increase Collaboration



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