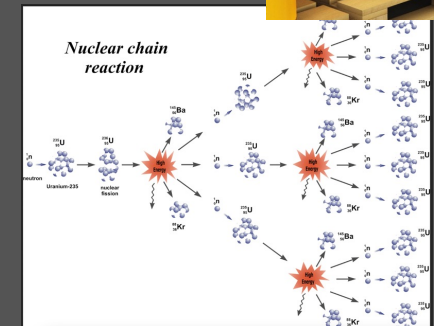
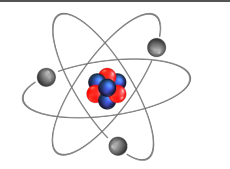
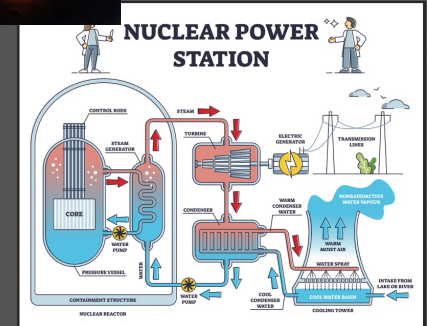
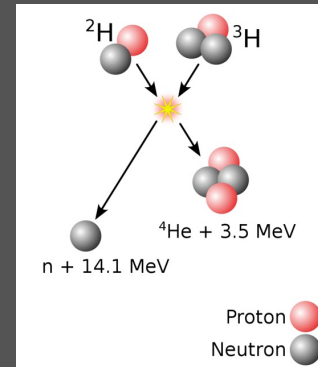


Nuclear Energy

Fission and Fusion – Middle School

- 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



Preview File

Please enjoy this preview of your Student Version of the presentation. Please note within this sample file:

- Some slides appear blank because they have been removed
- Student versions have portions of the text removed which is given in the teacher version and appear as _____ which the students are to fill in
- Other slides may have on them, this represents writing that has been removed on this sample

**The paid full version of your resource includes
both Google Slides and PowerPoint and is
Google Classroom Ready**



Lesson Objective:

The objective of this lesson is to introduce students to the concepts of nuclear energy, specifically focusing on nuclear fission and fusion, and their applications.

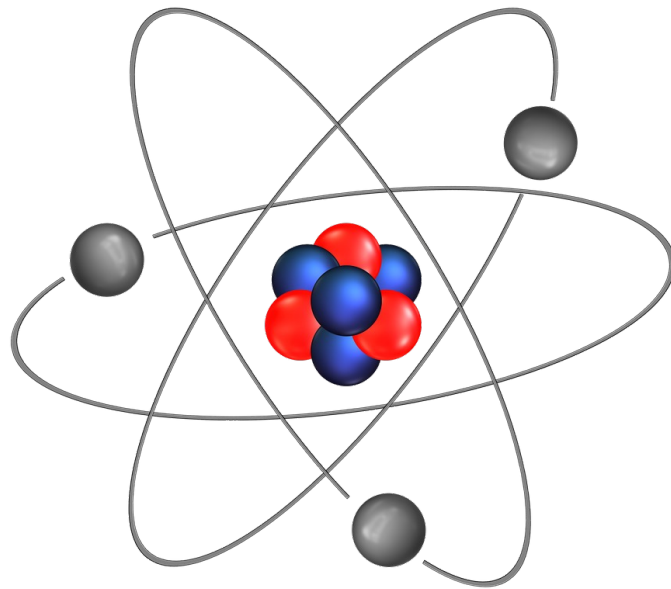
The lesson will also discuss the benefits and drawbacks of each.

With the person beside you, answer the following.

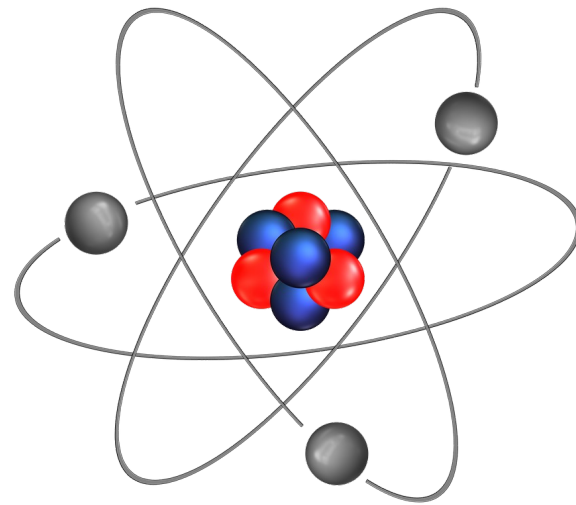
1. What is an atom?
2. What is nuclear energy?
3. How do we currently use nuclear energy?

You can research the answers.

Atoms



Nuclear Energy



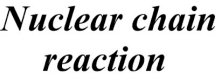
Fission – Breaking Atoms Apart

- Fission is what we use in our nuclear power plants
- _____
- _____



Nuclear Reactor

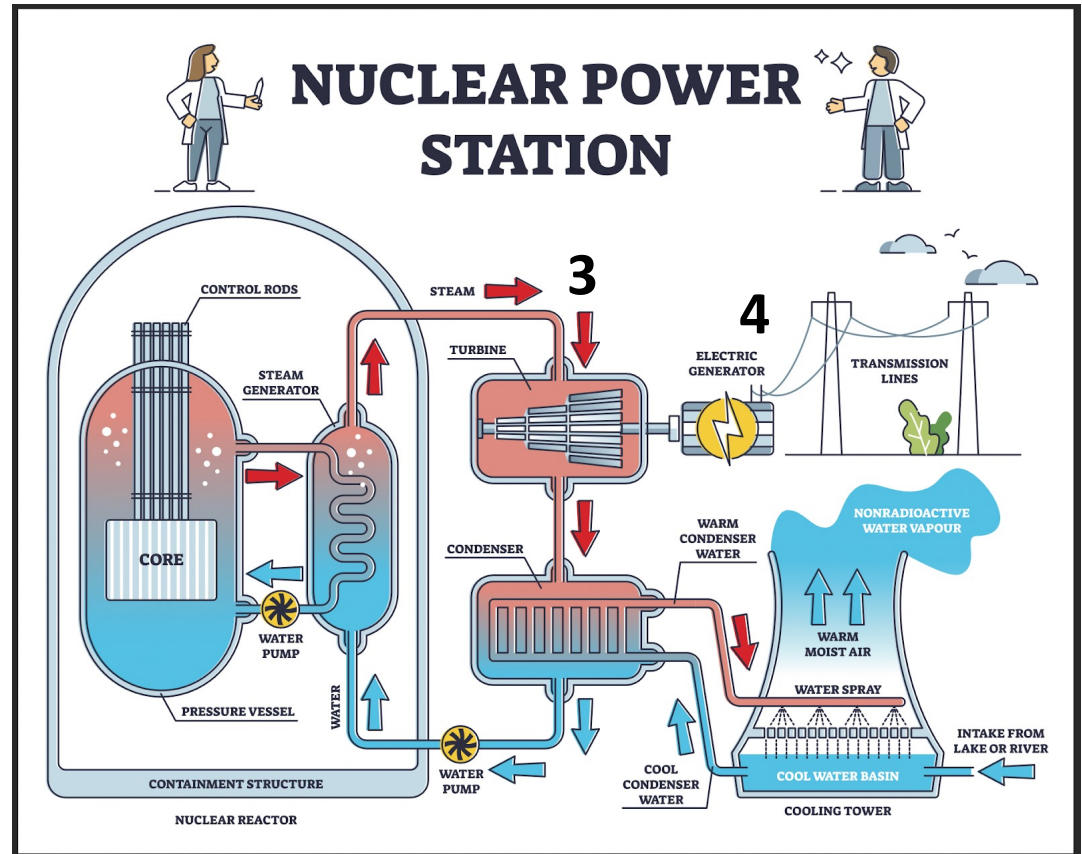
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Fission – Energy Release

- The released energy is used to heat water which becomes steam (3)

• _____



Fission

- Nuclear fission gives off a lot of energy
 - However, it also creates radioactive materials which
-



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Fission Disaster - Chernobyl

- ---
- This led to the evacuation of nearby communities, affecting approximately 350,000 people and leaving some places uninhabitable today due to the radiation levels



Chernoby

Fission – Nuclear Weapons

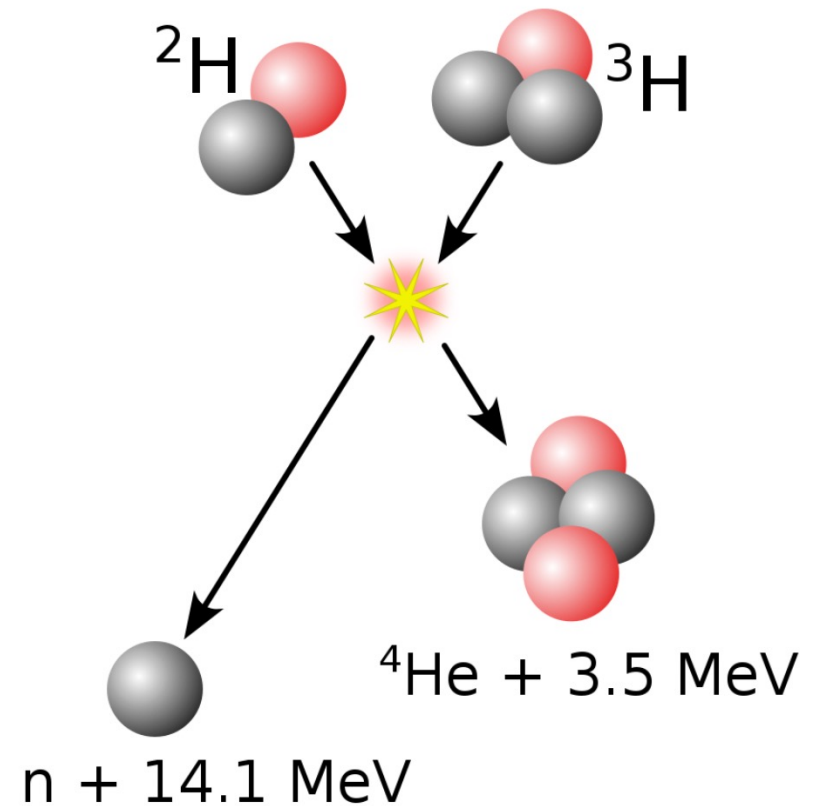
- Nuclear weapons are simply uncontained nuclear reactions which release their
-

- The first nuclear bomb was created by the United States during World War II



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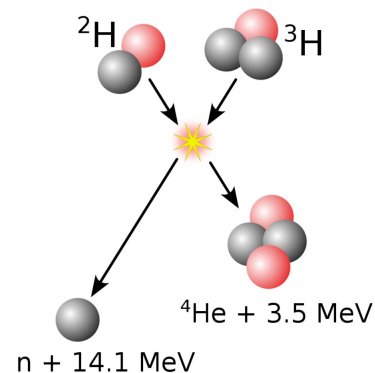
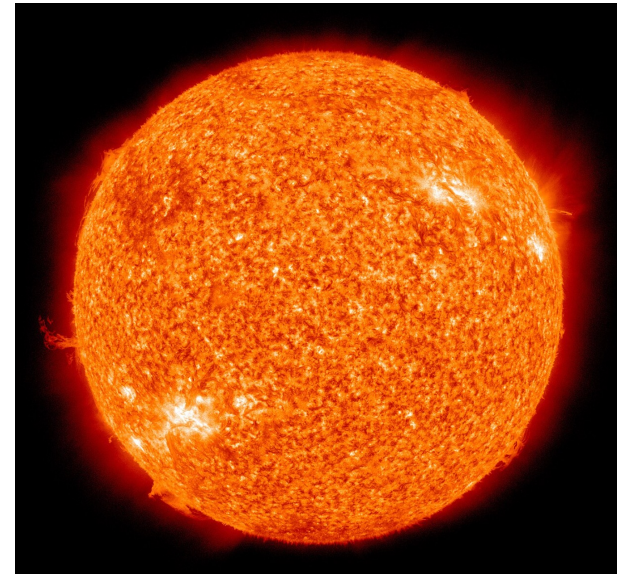
Fusion – Combining Atoms



Proton 
Neutron 

Fusion – The Power of the Sun

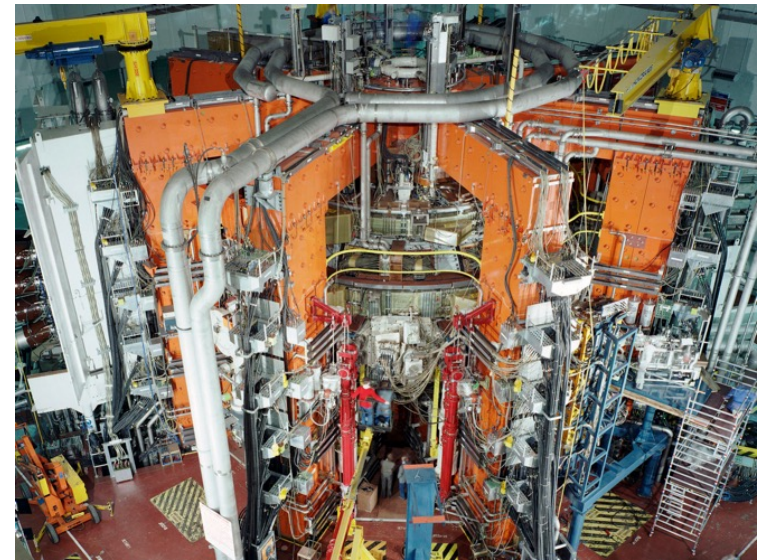
- Nuclear fusion is the opposite of nuclear fission
- Nuclear fusion happens in all stars to make heat and light



Proton 
Neutron 

Controlled Fusion

- Creating a safe and controlled fusion reaction on Earth is very hard
 - However, if we could do it,
-



The Joint European Torus (JET)

Controlled Fusion – Challenges

1. _____

2. Plasma confinement: The fuel for fusion needs to be heated to the point where it becomes a plasma. Plasma is difficult to control.
3. Energy input versus output: One of the challenges is to make sure
4. Materials and engineering: Finding materials that can withstand the extreme conditions of a fusion reaction is a major engineering challenge.

Controlled Fusion – Benefits

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FROM THIS SAMPLE

Current Nuclear Energy Applications

Nuclear energy is a powerful source of energy used in various things including

- Electricity for our homes

- _____



USS Nautilus, the first nuclear-powered submarine



Current Nuclear Energy Applications

- Nuclear energy has important applications in the field of medicine
- _____
- Scientists can use nuclear reactions to study the structure and properties of materials at the atomic level



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Uncontrolled Fusion – Nuclear Weapons

- _____
- Fusion bombs (also called hydrogen bombs or H-bombs) combine two hydrogens to produce helium and a lot of energy in an uncontrolled explosion



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Summary

- _____
- Nuclear fission involves splitting an atom into two smaller atoms and releasing a lot of energy
- The energy
- _____
- Creating energy through nuclear fusion on Earth is very hard but if it could be done, it would provide an almost limitless and clean supply of energy

Thinking Critically Activity: Evaluating Nuclear Energy and Sustainable Alternatives