

# Worksheet: Nuclear Fission



**Q1:** An atomic nucleus in the core of a nuclear reactor is struck by a neutron, causing it to split into two smaller nuclei and release several neutrons. What is the name of this process?



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- A Nuclear fusion
- B Induced nuclear fission
- C Spontaneous nuclear fission
- D Alpha decay
- E Beta decay

**Q2:** Which of the following correctly describes the process of induced nuclear fission?

- A The nucleus of an atom of a fissionable substance is struck by a neutron, causing the nucleus to split into two smaller fragment nuclei and release several neutrons.
- B The nucleus of an atom of a fissionable substance is struck by a neutron, which is absorbed. The nucleus then becomes unstable and decays via beta decay.
- C The nucleus of an atom of a fissionable substance is struck by a neutron, causing the nucleus to split into at least three smaller fragment nuclei.
- D The nucleus of an atom of a fissionable substance is struck by a proton, causing the nucleus to split into two smaller fragment nuclei and release several protons.
- E The nucleus of an atom of a fissionable substance is struck by an electron, causing the nucleus to split into two smaller fragment nuclei and release several electrons.

**Q3:** Which of the following correctly describes the process of spontaneous nuclear fission?

A Two atomic nuclei collide and combine to form a single larger nucleus.

B The nucleus of an atom of a fissionable substance is struck by a neutron, causing the nucleus to split into two smaller fragment nuclei and release several neutrons.

C The nucleus of an atom of a fissionable substance is struck by a proton, causing the nucleus to split into two smaller fragment nuclei and release several protons.

D The nucleus of an atom splits without being struck by a neutron, resulting in at least three smaller nuclei and two or three high-speed protons.

E The nucleus of an atom splits without being struck by a neutron, resulting in two smaller nuclei and two or three high-speed neutrons.

**Q4:** Which two of the following are used as fuel in nuclear fission reactors?

- a. Iridium
- b. Lead
- c. Uranium
- d. Polonium
- e. Plutonium

A c and e

B a and b

C c and d

D d and e

E b and c

**Q5:** In a nuclear fission reactor, the \_\_\_ takes heat away from the core to a heat exchanger so that the heat can be used to generate steam for electricity generation. The \_\_\_ slows down the neutrons produced through fission so that they are more likely to interact with another nucleus and keep the chain reaction going. The \_\_\_ absorb surplus neutrons and keep the reaction under control.

A coolant, moderator, fuel rods

B moderator, coolant, fuel rods

C coolant, moderator, control rods

D coolant, concrete shield, control rods

E moderator, coolant, control rods

**Q6:** Which of the following describes the purpose of the coolant in a nuclear fission reactor?

- A The coolant takes heat away from the core to the heat exchanger, where it is used to make steam that is used for power generation.
- B The coolant is used to speed up the fission neutrons so that it is more likely that they will interact with another fissionable nucleus and cause it to split.
- C The coolant is used to slow down the fission neutrons so that it is more likely that they will interact with another fissionable nucleus.
- D The coolant is used to absorb some of the neutrons. This keeps the chain reaction under control.

**Q7:** Which of the following materials is used for the control rods in a nuclear fission reactor?

- A Graphite
- B Concrete
- C Uranium
- D Boron
- E Iridium

**Q8:** The control rods in a nuclear fission reactor are rods made of boron that are placed in the reactor core.



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► Which of the following describes the purpose of control rods in a nuclear fission reactor?

A Control rods are used to remove heat from the reactor core, which is used to make steam for power generation.

B Control rods are used to slow down the fission neutrons such that it is more likely that they will interact with another fissionable nucleus.

C Control rods are used to absorb some of the neutrons. This keeps the chain reaction under control.

D Control rods are used to speed up the fission neutrons such that it is more likely that they will interact with another fissionable nucleus and cause it to split.

► Does removing the control rods from the core of the reactor increase or decrease the rate of the chain reaction?

A It increases it.

B It decreases it.

**Q9:** Which of the following is used as a moderator in some nuclear reactors?

A Water

B Lead

C Concrete

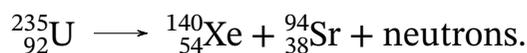
D Oxygen gas

E Nitrogen gas

**Q10:** Which of the following correctly describes the purpose of a moderator in a nuclear reactor?

- A A moderator is used to speed up the fission neutrons such that it is more likely that they will interact with another fissionable nucleus and cause it to split.
- B A moderator is used to remove heat from the reactor core, which is used to make steam for power generation.
- C A moderator is used to increase the number of neutrons in the reactor to speed up the reaction.
- D A moderator is used to slow down the fission neutrons such that it is more likely that they will interact with another fissionable nucleus.
- E A moderator is used to absorb some of the neutrons in the reactor and slow the reaction down.

**Q11:** The following nuclear equation shows the fission of uranium-235 into xenon and strontium:



How many neutrons are produced in this reaction?

- A 3
- B 1
- C 2
- D 0



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