

READING COMPREHENSION WORKSHEET

NUCLEAR CHANGES: FISSION, FUSION, AND RADIOACTIVE DECAY

35+ QUESTIONS

GRADE
9

1. Radioactive decay involves
- splitting a nucleus into smaller parts.
 - combining two nuclei into one nucleus.
 - spontaneous breakdown of unstable nuclei-making isotopes.
 - adding energy to the nucleus to increase its size.
2. Which model best represents nuclear fusion?
- One large ball splitting into two smaller balls.
 - Two small balls merging into a bigger one.
 - A ball releasing a smaller object-energy.
 - A ball staying the same, but glowing brightly.
3. What is the main difference between fusion and fission?
- Fusion splits nuclei. Fission combines them.
 - Fusion occurs in nuclear reactors. Fission occurs in stars.
 - Fusion combines light nuclei. Fission splits heavy nuclei.
 - Fusion releases less energy than fission.
4. Why is controlled fusion energy desirable on Earth?
- It produces less energy than fission.
 - It uses heavy elements like uranium.
 - It would provide cleaner and more plentiful energy.
 - It is easier to control than radioactive decay.
5. What is released during nuclear fusion inside a star?
- Electrons and positrons.
 - Neutrons and energy.
 - Protons and neutrinos.
 - Only energy, no particles.
6. Which of these is NOT part of nuclear decay?
- Breakdown of particles of atoms.
 - Spontaneous nuclear change.
 - Combining two nuclei.
 - Breakdown of unstable atoms.
7. What does a single wave of radioactive decay emit?
- Two small particles into a bigger ball.
 - One ball splitting into two small balls.
 - A ball releasing a smaller piece or particle.
 - A ball moving that not changing size.
8. Which best describes the energy level of fusion compared to fission?
- Fusion releases much less energy than fission.
 - Fusion and fission release equal amounts.
 - Fusion releases much more energy than fission.
 - Fusion does not release energy.

Name: _____

Nuclear Changes: Fission, Fusion, and Radioactive Decay

Nuclear changes involve transformations in the nucleus of an atom, which can release and absorb energy. There are three main types of nuclear changes: fusion, fission, and radioactive decay. Fusion occurs when a heavy atomic nucleus splits into two smaller nuclei, releasing energy and particles. This process is used in nuclear reactors to generate electricity and can also happen in stars. Fission is the opposite of fusion; it occurs when a heavy atomic nucleus splits into two smaller nuclei, releasing energy and particles. Fusion powers the Sun and other stars, where extreme temperatures and pressure allow hydrogen atoms to fuse, producing helium and energy that reaches Earth as sunlight. Radioactive decay is the spontaneous breakdown of unstable atomic nuclei, emitting particles or energy in the form of radiation. This process happens naturally in some elements and contributes to the heat inside Earth and the background radiation we encounter daily.

Students are taught how to understand these nuclear changes. For example, fusion can be illustrated as two single balls spinning into one smaller ball, absorbing energy and releasing energy. Fusion can be shown as two small balls merging into a bigger ball, releasing energy. Radioactive decay might be shown as a ball that suddenly releases a smaller piece or a particle. These simple pictures help students see how nuclear changes and energy are connected, although these models are simplified and do not include the complex considerations behind nuclear physics. They convey the important concepts clearly to students.

The energy released from fusion is much greater than that from fission, which is why the Sun shines so brightly. On Earth, scientists focus on fusion because it would provide a cleaner and more powerful energy source. Understanding these nuclear processes helps us see how the universe works and how humans can harness energy in different ways for various needs.

24. Mark the best answer.

1. What happens during fusion?
- Two light nuclei combine into one.
 - A heavy nucleus splits into two or more.
 - An atomic nucleus releases energy.
 - A nucleus gains particles but stays the same.
2. Which process powers the Sun?
- Nuclear fusion.
 - Radioactive decay.
 - Nuclear fission.
 - Neutron capture.

Creating light nuclei from



Statement is True (T) or False (F).

1. Fusion splits heavy nuclei into two smaller nuclei. ☐
2. The process powering the Sun is fission. ☐
3. Light nuclear fusion releases energy. ☐
4. The nuclear energy in nuclear reactors is the energy from radioactive decay. ☐
5. Only fission is used to create electricity. ☐
6. A nuclear reactor generates energy without releasing heat. ☐
7. The main energy source for most Earth power plants is fusion. ☐
8. Fusion releases more energy than fission. ☐
9. Fusion is used to generate electricity. ☐

10. Fusion is the main difference between fusion and fission.

11. Fusion occurs in nuclear reactors. Fission occurs in stars.

12. Fusion combines light nuclei. Fission splits heavy nuclei.

13. Fusion releases less energy than fission.

14. Why is controlled fusion energy desirable on Earth?

15. It produces less energy than fission.

16. It uses heavy elements like uranium.

17. It would provide cleaner and more plentiful energy.

18. It is easier to control than radioactive decay.

19. What is released during nuclear fusion inside a star?

20. Electrons and positrons.

21. Neutrons and energy.

22. Protons and neutrinos.

23. Only energy, no particles.

24. Which of these is NOT part of nuclear decay?

25. Breakdown of particles of atoms.

26. Spontaneous nuclear change.

27. Combining two nuclei.

28. Breakdown of unstable atoms.

29. What does a single wave of radioactive decay emit?

30. Two small particles into a bigger ball.

31. One ball splitting into two small balls.

32. A ball releasing a smaller piece or particle.

33. A ball moving that not changing size.

34. Which best describes the energy level of fusion compared to fission?

35. Fusion releases much less energy than fission.

36. Fusion and fission release equal amounts.

37. Fusion releases much more energy than fission.

38. Fusion does not release energy.

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