I.Q. Movie Review

Physical Science

Essential Question: What is the difference between nuclear fusion and cold fusion?

Nuclear fusion can produce energy when the nuclei of lighter elements come together (fuse), creating larger nuclei. Energy is liberated when the total mass of the end products is slightly less than the mass of the lighter nuclei going into the process, with that difference in mass being converted to energy via Einstein's famous $E=mc^2$ relationship.

Because the protons in nuclei are all positively charged, and like charges repel, nuclei need some convincing to get them to fuse. That convincing ordinarily involves high temperature and pressure, such as exists at the core of a star or under conditions created by a fission bomb.

Cold fusion is an attempt to get fusion to occur under less extreme conditions, possibly as a result of chemical reactions. Despite the flurry of publicity several years ago, cold fusion remains unrealized speculation for now.

Nuclear Fission vs. Nuclear Fusion

Nuclear fusion and **nuclear fission** are two different types of energy-releasing reactions in which energy is released from high-powered atomic bonds between the particles within the nucleus. *The main difference between these two processes is that fission is the splitting of an atom into two or more smaller ones while fusion is the fusing of two or more smaller atoms into a larger one.*

	Nuclear Fission	Nuclear Fusion
Definition:	Fission is the splitting of a large atom into two or more smaller ones.	Fusion is the fusing of two or more lighter atoms into a larger one.
Natural occurrence of the process:	Fission reaction does not normally occur in nature.	Fusion occurs in **stars**, such as the sun.
Byproducts of the reaction:	Fission produces many highly radioactive particles.	Few radioactive particles are produced by fusion reaction, but if a fission "trigger" is used, radioactive particles will result from that.
Conditions:	Critical mass of the substance and high-speed neutrons are required.	High density, high temperature environment is required.
Energy Requirement:	Takes little energy to split two atoms in a fission reaction.	Extremely high energy is required to bring two or more protons close enough that nuclear forces overcome their electrostatic repulsion.
Energy Released:	The energy released by fission is a million times greater than that released in chemical reactions; but lower than the energy released by nuclear fusion.	The energy released by fusion is three to four times greater than the energy released by fission.
Nuclear weapon:	One class of nuclear weapon is a fission bomb, also known as an **atomic bomb or atom bomb. Like the one used in Nagasaki and Hiroshima (1945)**	One class of nuclear weapon is the **hydrogen bomb**, which uses a fission reaction to "trigger" a fusion reaction.

http://www.diffen.com/difference/Nuclear_Fission_vs_Nuclear_Fusion

Clarifying Questions:

1. What is the difference between nuclear fusion and cold fusion?
   _____
   _____
2. What is the difference between nuclear fission and nuclear fusion?
   _____
   _____
3. This is the type of nuclear reaction that happens in stars like our Sun.
   _____
4. This type of nuclear reaction produce more radioactive wastes.
   _____
5. This type of nuclear reaction releases energy three to four times greater that nuclear fission.
   _____
6. This type of nuclear reaction releases energy million times greater than chemical reaction.
   _____
7. The atomic bomb is this type of nuclear weapon._____
8. The hydrogen bomb is this type of nuclear weapon _____

On a separate sheet of lined paper, write an essay about the movie comprising of three paragraphs. Use the following guide questions in completing your essay.

<u>Level One (Observation) –First Paragraph</u>

1. What was your favorite scene? Funniest moment?
2. Who were the background matchmakers (besides Einstein), and how did they help?
3. Who in this film is a good role model? Why?

<u>Level Two (Abstraction)-Second Paragraph</u>

1. *How can cold fusion be better than hot fusion? Research.*
2. How do you react on Einstein's reasoning for the concocted lies on cold fusion?
3. How does the deceit of raising a car mechanist to the level of a super-genius (rivaling that of Einstein) work out? Does this kind of thing really work (lying to get into a relationship)? Should it work?
4. Another quote question; what do you think of this quote: "I would rather be an optimist and a fool than a pessimist and right."?

<u>Level Three (Personalization) –Third paragraph</u>

1. Do you recognize similarities with any of the characters' behavior within you or your social circle? Explain.
2. How did the movie affect you? Explain

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Name: _____ Period: ____ Date: _____

My Movie Review