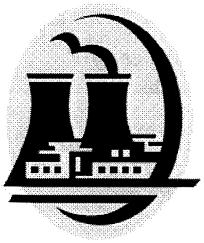
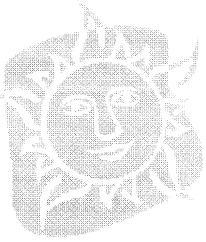
Fission versus Fusion



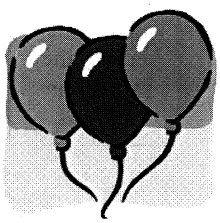
Nuclear power plants use fission.

There are two types of nuclear reactions.

The sun uses fusion and is the source of all power on earth.



	Fission	Nuclear Process	Fusion
	Large atoms are split apart. Uranium is split into smaller atoms.		Small atoms are fused together. Two hydrogen atoms are fused into a helium atom.
J	1 lb completely fissioned Uranium = 6,000 barrels of oil = 1,000 tons high-quality coal	Energy Produced	1 km^3 of sea water = more energy than all known fossil fuels in the world.
K	Toxic radioactive waste that takes billions of years to decay until safe.	Waste Products	Perfectly safe Helium. We could make balloons.



The real winner: nuclear fusion. So why don't we use it? Fusion occurs in the sun. It takes millions of degrees to even start fusion. So far we can't control it. But scientists are working on it.

As a future voter — demand money for fusion research!

1. Alpha Particle D	A. The largest natural element. Fuel for fission reactors.	1. Chain Reaction C	A. Combining smaller atoms into larger atoms. Harmless products; stars use this.
2. Gamma Ray E	B. Can be stopped by wood; occurs when a neutron breaks into a proton and electron.	2. Fission B	B. Splitting large atoms into smaller ones. Toxic by-products.
3. Beta Particle B	C. An atom that emits energy or a particle.	3. Fusion A	C. When one fission causes another and another, etc.
4. Radioactive C	D. A helium nucleus (2 protons and 2 neutrons): low in energy.	4. Half-life E	D. Using the known decay of an isotope to determine the age of objects.
5. Uranium A	E. Powerful radiation that can cause biological damage; takes many feet of concrete to stop.	5. Carbon Dating D	E. The time necessary for 50% of a radioactive sample to decay.

Directions: Identify each as a **fusion**, **fission**, or **both** kinds of reactions:

1. Used in nuclear power plants: Fission
2. Occurs on the sun: Fusion
3. More power per gram: Fusion
4. A larger nucleus divides to make a smaller nucleus: Fission
5. Two hydrogen atoms fuse to make a helium atom: Fusion
6. A critical mass is necessary to explode: Fission
7.  : Fission
8. An atomic bomb: Both