Fission

OWAIN Hmmm…if I hit it at this angle…ummm…I'm not sure…

I just…need to split these apart.

ADA Searching database for split apart…

Top result - nuclear fission.

SOPHIE Here we go…

ADA Nuclear reactors use a process called fission. Fission is a nuclear reaction where neutrons split apart the nucleus of radioactive isotopes, such as uranium or plutonium. This splitting apart releases heat energy that can be used for power.

OWAIN Not now Ada! I'm trying to win a game here!

ADA In a nuclear reactor, a neutron is fired at the nucleus of a radioactive isotope. Usually of uranium-235 or plutonium-239. It is absorbed by the isotope and then splits the nucleus apart into two smaller nuclei. The collision also releases more neutrons, which also collide with other nuclei, which causes them to split too. This is called a chain reaction.

To ensure that the reaction happens at all, a moderator, usually made of water or graphite, slows down the speed of the neutron. If the neutron is travelling too fast, the nucleus of a radioactive isotope won't be able to absorb it – and absorption of the neutron is required for the splitting of the nuclei to occur.

However, you have to be careful. If the chain reaction isn't controlled, the heat energy generated becomes too much, and will cause the nuclear reactor to explode - which is how a nuclear bomb works. To control the rate of reaction, the moderator, which slows neutrons, and control rods, which absorb neutrons, are used to ensure the reaction occurs safely.

Control rods are used to control the chain reaction and stop it from getting out of hand. The control rod's job is to absorb neutrons, reducing the amount that could potentially increase the chain reaction. The control rods are made from a combination of boron, silver, indium and cadmium. Control rods can be used to shut down the reactor altogether! So, you now know how to create nuclear fission at home!

OWAIN I'll be there in a sec. Excuse me have you seen my… phone?