Nuclear Chain Reaction

During the fission process in a nuclear power plant, pellets of the radioactive element uranium-235 are lined up in a rod and used to create a chain reaction that produces power. This means that a strong force splits apart the atoms in the first uranium-235 pellets, and they strike each pellet in the next row until the motion travels all the way through the rod. Within the reaction, the process is speeded up or slowed down by using a control rod.

Demonstrate this process by using dominoes to represent the uranium fuel pellets and a ruler to represent the control rod.

You'll need:

- Several dominoes
- A ruler
- A flat surface or table that won't shake

You'll do:

- Arrange the dominoes like they are in this picture
- Arrange two straight lines of dominoes on another section of the table (away from your first formation)
- Knock over the first domino in the front of the first formation. Watch what happens.
- Knock over the first domino in one of the two straight lines. Watch what happens.
- Now, go to the second straight line and hold the ruler anywhere between the dominoes. Then knock over the first domino and watch what happens.

You'll learn:

- In the first formation, you'll see how positioning of the rods can cause the chain reaction to get bigger and bigger. Each domino will knock down the next *two* dominoes in the same way that each uranium-235 atom splits off two neutrons each time it's hit. It's easy to see how the process could get out of hand if it weren't controlled.
- In the second formation, you'll see how quickly a straight line of pellets can be knocked down. This is what happens to uranium-235 atoms when a control rod is used to speed up the fission process.
- In the last formation, you'll see that the ruler keeps some of the dominoes from falling over. This is what happens when a control rod is used to slow up the fission process.