The Fission Game

OBJECTIVE:
To help students understand how a large atomic nucleus can be split into two smaller particles, which produce energy for nuclear power.

Grade: 3-8

Intended Learning Outcome:
- Make predictions
- Use a model to demonstrate understanding
- Understand science concepts and principles

Subjects: Science, Physics, Math

Materials:
- Balloons (2 per student) to serve as neutrons

Teaching Time: One class period or approximately 45 minutes

Number of Players/Students: Full class (20-30 students) – this activity will work better with a large group.

Teacher Information: This activity is meant to demonstrate that a nuclear reaction is constantly producing energy.

Nuclear fission is the process in which the nucleus of a uranium atom splits into smaller atoms (called fission products), producing 2 or 3 free neutrons and releasing a very large amount of energy. Fission is the process by which energy is produced in a nuclear reactor.

Procedure:

1) Each student gets two balloons (neutrons) to hold. Students should stand together in a close-packed group.
2) The reaction starts with a balloon (source neutron) being thrown into the group by the teacher or a volunteer.
3) When hit with a balloon that is in the air, the students will demonstrate “fission” by throwing their two balloons into the air.
4) Add “control rods” (a person who grabs balloons out of the air,
making them unavailable to cause fission) one at a time. Discuss how adding control rods affect the chain reaction. More control rods = slower reaction. Keep increasing the number of rods until the reaction proceeds very slowly or not at all.

5) Discuss chain reaction, critical, sub/supercritical, and reactor control.

6) If there is enough time, discuss how you use fission to make electricity, then discuss different electricity generation types.