

# Genomics Analogy Model for Educators (G.A.M.E.)

## Gel Electrophoresis Activity:

There are a variety of ways to involve students in demonstrating the movement of fragments of DNA through a gel. Activities should demonstrate how small fragments of DNA move farther from the start of the gel than large fragments do. In reality, the DNA in the gel is negatively charged, and when a current is applied (like magnets), the negative charged fragments are pulled toward the positive charge at the other end of the gel. The bigger the fragment, the slower it moves. Little fragments move quickly past the molecules of the gel, while bigger fragments “work” harder to get through the gel.

Two ideas you can use to demonstrate the concept of electrophoresis to students are explained below.

### Three-Legged Gel Race:

#### Materials:

- Ball of twine or similar material

#### Procedure:

- Divide into three groups.
  - Group 1 - one student
  - Group 2 - 3 to 5 students tied together or linked at the ankles, like a three-legged race.
  - Group 3 - 3 to 5 students tied together or linked at the ankles, like a three-legged race.
- Find a nice clear area and line up the groups. The goal is to see how far each group will go in a set amount of time (you can decide length of time. Try a minute and see what happens!)
- As you can well imagine, the single student will move much faster than the students that are tied together, and the group of three should move faster than the group of five.

#### Discussion:

- Talk about how their positions at the end of the time period are like the positions of fragments of DNA after a gel has been run.

## **Arm-in-Arm Obstacle Course:**

### **Materials:**

- None

### **Procedure:**

- At least 9 students will be needed for this activity.
- Divide students go into three groups.
  - Group 1 - one student
  - Group 2 – 3-5 students
  - Group 3 – 3-5 students
- Ask students within the groups to link arms.

Instruct students to walk from one end of the classroom to the other. Students must always move forward and are not allowed to turn sideways, so the groups of 3-5 students will be very wide. Their objective is to navigate through the desks and chairs to the other side of the room. Each group will have 30 seconds to see how far they can navigate across the room.

### **Discussion:**

- Talk about how fragments of DNA must navigate through the particles (like desks and chairs) that make up the gel. Large fragments move more slowly, and small fragments move more quickly.