

# Kinesthetic Modeling & Interpreting GPS Data Maps

Within a tectonic plate, some parts of the land move more quickly or in different directions from other regions nearby. This can cause the land to deform, stretch, compress, and twist, until it breaks along a fault, creating an earthquake. This motion can be measured and monitored using the Global Positioning System. We use vectors to show how fast and in which direction these measurements show us. In this short demonstration, students explore ground deformation and ground movement. Students become vectors as they discover that longer arrows mean higher speeds not distance.

## Learning Objective:

- Students will explain that velocity has two components: the speed and direction of ground movement.

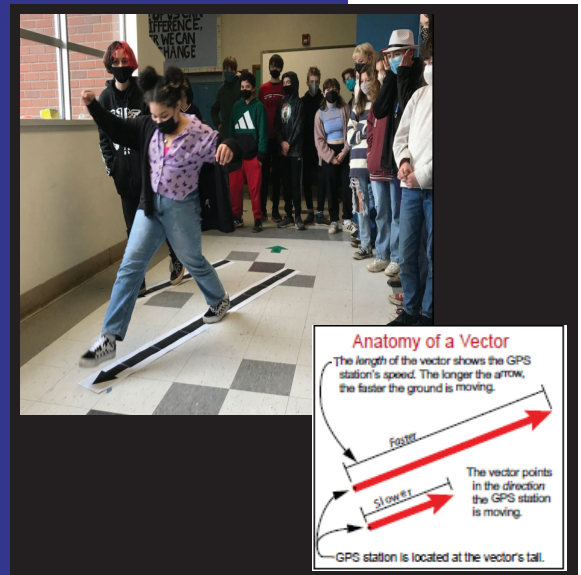
### Steps

Step 1: **Set up the Demo:** Tape different lengths of printed arrows to the floor .

Step 2: **Investigation Begins:** Students pair up. Starting at the same time, they walk along the arrows.

Step 3: **Controlled Timing:** Students must finish the lengths within the same time frame.

Step 4: **Analysis & Comparison:** Students compare the speed needed to walk to the end.



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- Have students always describe vectors using two components: direction and speed.
- Relate this to plate movements using a GPS vector map and ask "Where are earthquakes more likely to occur?"
- Note: There may be some confusion between time and speed. Clarify that they get to the ends at the same time, but at different speeds.
- NGSS: MS-ESS2-2, MS-PS2-2, Developing and Using Models, Stability and Change



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