

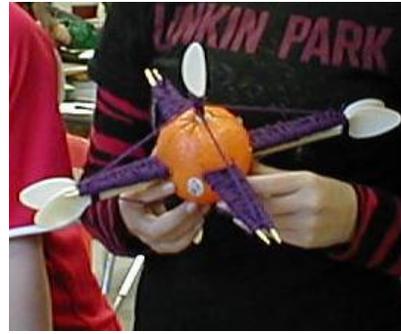
## Engineering Bio-degradable Drifters

### Objectives

- Students will demonstrate engineering design skills by creating biodegradable drifters.
- Students will record data and calculate current velocity.
- Students will use observations of drifter speeds to predict the rate of a current and how long a piece of debris will take to enter the ocean.

### Materials

- Oranges, apples, & potatoes
- Bamboo skewers (or twigs)
- Corn-based “plastic bags” or biodegradable material (cotton, silk or bamboo) for sails (optional)
- Corn-based eating utensils
- Wooden toothpicks
- Data sheets
- Clipboards
- Stopwatches
- Meter tapes
- Waders or boots and long-handled net for retrieving drifters
- Sharpie (for labeling drifters)



### In Classroom:

From materials provided, students work in small groups to design biodegradable drifters that will allow calculation of surface current speed. To be successful, student-built drifters must float and drift down a creek.

### Outside:

Test drifters on a local creek or stream for a distance of 50 meters. Some group members will stand at the upstream drop-off location, others stand downstream 50 meters. Set up start and finish lines for the drifter race. Strings spanning the creek may be used, but are not necessary. Drop-off teams stand in the center of the stream. When both teams are ready, at the agreed-upon signal, Drop-off teams release drifters while pick-up teams start the stopwatches. Pick-up teams grab the drifters as they float to the finish line, and record the time on a datasheet. Student groups move downstream site and repeats the steps above to average data and predict overall stream velocity.

### Back in the Classroom:

Calculate group drifter speeds. Groups can then calculate the time required for drifters to travel over longer, set distance (to the mouth of the river/entrance to the ocean for example). Students can also create graphs of drifter distance over time and present their results.

Adapted from *Drifters and Ocean Currents* by Terri Hanshumaker & Kama Almasi, MBARI EARTH 2010 Workshop

