

**NATIONAL INSTITUTE FOR LITERACY
LITERACY INFORMATION AND COMMUNICATION SYSTEM (LINGS)
Science & Numeracy Special Collection**

Showcase: Ocean Drifters— Investigating Ocean Currents

ACTIVITY 2: THE RACE IS ON (TEACHER VERSION)

A.Speed

Speed is a measure of how fast an object (including people) moves across a given distance. To calculate speed we take the distance between two points and divide by the time it takes to cross that distance:

$$\text{Speed (m/s)} = \text{Distance (m)} \div \text{Time (s)}$$

Many different units can be used to describe speed. For instance, if you are calculating the speed of a train, you may want to use mph (miles per hour) or kph (kilometers per hour). However, if you are tracking the path of a snail, you may want to use cm/h (centimeters per hour) or in/h (inches per hour).

Practice calculating speed using different units for the examples given below.

Object	Distance	Time	Speed
Airplane	700 miles	2 hours	350 mph
Snail	1.2 cm	1.5 hours	0.8 cm/h (.0005 mph)
Whale	25 nm*	5 hours	5 nmph (knots)
Cheetah	24 miles (38 km)	15 minutes (.25 hours)	96 mph

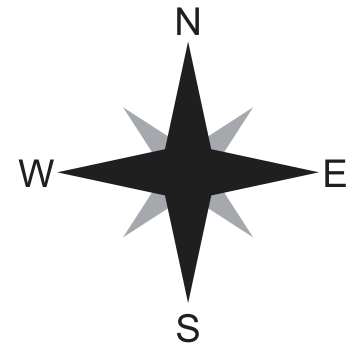
* nautical miles

When making charts to show currents, scientists often use arrows to represent speed. The size of the arrow is proportional to the speed. If 1 cm = 1 mph, then the airplane's speed could be represented by an arrow that is 350 cm long. Yikes! That is a long arrow! In this case it would be better to use 1 cm = 35 mph. Then our arrow would be only 10 cm long. If we use 1 cm = 1mph, then the snail's arrow would only be 0.8 cm long. That arrow is a short arrow. Using 1 cm = 10 mph, on the next page, draw the arrows which would represent the speeds of the whale and cheetah.



B. Direction of movement:

Speed describes how fast or slowly an object moves, but it does not tell us anything about the direction of movement. If we combine the speed and direction of an object, it is called velocity. Velocity can be shown using a vector (an arrow which shows direction and speed).



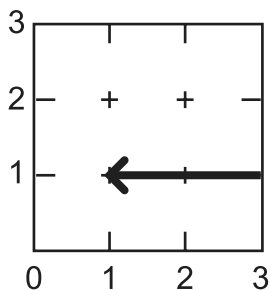
On maps and charts there is usually a compass rose. The compass rose shows north-south-east-west directions on a map. To the right is an example.

N = North, S = South, W = West, E = East

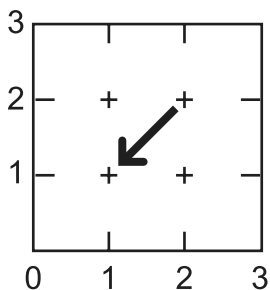
If a direction is between 2 of the major directions (N,S, E and W), then the directions are combined. An arrow pointing to a direction between North and East, would be pointing Northeast (NE). What direction do these arrows point?

Example: East a. North b. Southeast

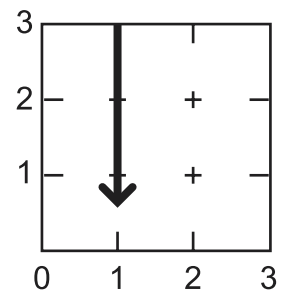
For each of the arrows below, measure its length. Using a scale of 1 cm = 10 mph, determine what speed it represents and name the direction it is pointing (this is its velocity).



a Example: West (20 mph)

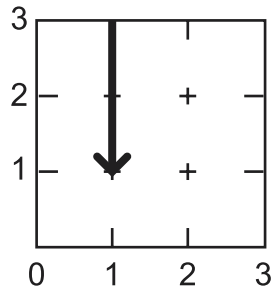


b. Southwest (10 mph)

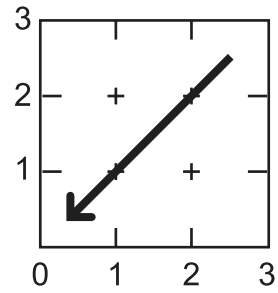


c. South (23 mph)

Draw arrows which represent the speed and direction for the following velocities.



a. 20 mph, south



b. 30 mph, southwest

These activities were adapted from “Track a NOPP Drifter” written by Anna C. Switzer for the NOPP-Consortium of Oceanographic Activities for Students and Teachers (COAST). To find out more, please visit: <http://drifters.doe.gov/> and www.coast-nopp.org. All rights reserved