



# Investigating Surface Currents Around the Globe

## Math Standards

### ALGEBRA AND FUNCTIONS

- 1.1 Analyze problems by identifying relationships, distinguishing relevant from irrelevant information, sequencing and prioritizing information, and observing patterns.
- 1.2 Determine when and how to break a problem into simpler parts.
- 2.0 Students use strategies, skills, and concepts in finding solutions:**
- 2.1 Use estimation to verify the reasonableness of calculated results.
- 2.2 Apply strategies and results from simpler problems to more complex problems.
- 2.3 Use a variety of methods, such as words, numbers, symbols, charts, graphs, tables, diagrams, and models, to explain mathematical reasoning.
- 2.4 Express the solution clearly and logically by using the appropriate mathematical notation and terms and clear language; support solutions with evidence in both verbal and symbolic work.

### MEASUREMENT AND GEOMETRY

- 1.0 Students choose appropriate units of measure and use ratios to convert within and between measurement systems to solve problems:**
- 1.1 Compare weights, capacities, geometric measures, times, and temperatures within and between measurement systems (e.g., miles per hour and feet per second, cubic inches to cubic centimeters).
- 1.2 Construct and read drawings and models made to scale.
- 1.3 Use measures expressed as rates (e.g., speed, density) and measures expressed as products (e.g., person-days) to solve problems; check the units of the so.

- 2.0 Understand and use coordinate graphs to plot simple figures, determine lengths and areas related to them, and determine their image under translations and reflection solutions; and use dimensional analysis to check the reasonableness of the answer.

## Science Standards

### INVESTIGATION AND EXPERIMENTATION

1. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other four strands, students should develop their own questions and perform investigations. Students will:
  - a. Select and use appropriate tools and technology (such as computer-linked probes, spreadsheets, and graphing calculators) to perform tests, collect data, analyze relationships, and display data.
  - b. Identify and communicate sources of unavoidable experimental error.
  - c. Identify possible reasons for inconsistent results, such as sources of error or uncontrolled conditions.
  - d. Formulate explanations by using logic and evidence.
  - e. Distinguish between hypothesis and theory as scientific terms.
  - f. Recognize the usefulness and limitations of models and theories as scientific representations of reality.

### MOTION

2. The velocity of an object is the rate of change of its position.
  - a. Students know position is defined in relation to some choice of a standard reference point and a set of reference directions.
  - b. Students know that average speed is the total distance traveled divided by the total time elapsed and that the speed of an object along the path traveled can vary.
  - c. Students know how to solve problems involving distance, time, and average speed.
  - d. Students know the velocity of an object must be described by specifying both the direction and the speed of the object.
  - e. Students know changes in velocity may be due to changes in speed, direction, or both.
  - f. Students know how to interpret graphs of position versus time and graphs of speed versus time for motion in a single direction.

## ENERGY IN THE EARTH SYSTEM

3. Heating of Earth's surface and atmosphere by the sun drives convection within the atmosphere and oceans, producing winds and ocean currents. As a basis for understanding this concept:
  - a. *Students know how differential heating of Earth results in circulation patterns in the atmosphere and oceans that globally distribute the heat.*
  - b. *Students know the relationship between the rotation of Earth and the circular motions of ocean currents and air in pressure centers.*
  - c. *Students know the origin and effects of temperature inversions.*
  - d. *Students know properties of ocean water, such as temperature and salinity, can be used to explain the layered structure of the oceans, the generation of horizontal and vertical ocean currents, and the geographic distribution of marine organisms.*
  
4. Climate is the long-term average of a region's weather and depends on many factors. As a basis for understanding this concept:
  - a. *Students know weather (in the short run) and climate (in the long run) involve the transfer of energy into and out of the atmosphere.*
  - b. *Students know the effects on climate of latitude, elevation, topography, and proximity to large bodies of water and cold or warm ocean currents.*



*Standards provided by Chuck Dichiera  
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