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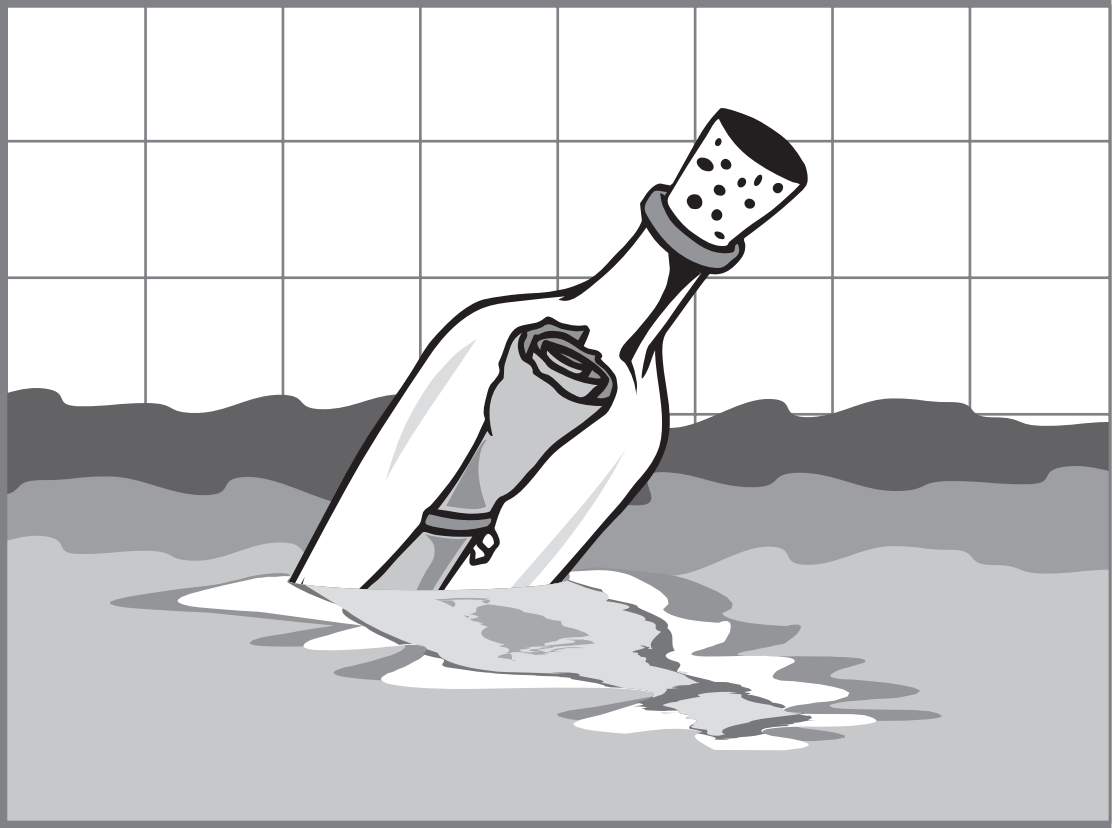
S.O.S.



A Simulation Solving a Scientific Mystery by
Understanding the Formation and Motion of Ocean Currents

Welcome to S.O.S.!

Hours of Instruction: 15

Grades: 4–7

Overview: Working in cooperative Rescue Teams students solve a mystery by understanding the formation and motion of ocean currents. Each team receives clues from a family stranded out in the ocean. Teams learn about ocean currents, density, water temperature and salinity, then use their new knowledge to find the lost families. As a culminating activity, each Rescue Team makes a presentation to convince the Global Emergency Travel Unit (G.E.T.U.) to send a rescue ship to a specific destination.

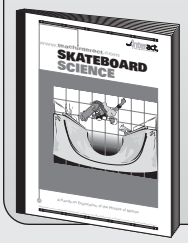
Your students will:

- Discover how currents are formed and how they connect the oceans of the world
- Learn how temperature and salinity affect the density of seawater
- Research plants (flora) and animals (fauna) and conduct experiments to determine density
- Use map skills

These related titles and others are available at www.teachinteract.com

SKATEBOARD SCIENCE
Grades: 5–9

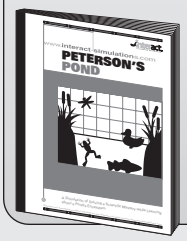
Student teams build and experiment with three-dimensional models of skate park equipment to explore the physics of skateboarding. They use this equipment in an overall skate park design, sending glass marble "skaters" through their parks. They explain how the skater and each piece of equipment demonstrate concepts of physics.



Order code: INT946

PETERSON'S POND
Grades: 4–8

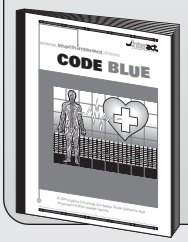
Using the scientific method, student teams investigate why creatures in a nearby pond are dying. To solve the mystery, students use microscopes, test the Ph level of different substances, and visit a pond and take samples. As students examine the effects of pollution and water temperature, they also learn about pond habitat and food webs



Order code: INT950

CODE BLUE
Grades: 6–8

Students learn about six different body systems and important public health issues while they work in cooperative jigsaw groups to form Medical Clinics. Each member researches and presents a different specialty to inform their group about the six major body systems. Each group responds to Challenge and Code Cards and has the the opportunity to achieve "medical breakthroughs" for extra credit.



Order code: INT944

Visit our website @ www.teachinteract.com for FREE Sample Activities and to see a complete list of our titles!

ICONS KEY *When you see these icons...*

Grouping
This shows if your students work independently, in partners or in cooperative groups for each activity.

Timing
Many activities vary in length. Use this icon to help plan your teaching time.

Teaching Tip
In the margins of your Teacher Notebook, these tips clarify materials or procedures.

Read or Tell
This is important information your students need for the activity. Be sure to read the passage or clearly instruct your students as stated in your Teacher Notebook.

Answer Key
For student activities with specific objective responses, this icon directs you to the answer key.

Learning Tip
Found in the Student Guide. This directs your students to important procedures or directions.

S.O.S.

A Simulation Solving a Scientific Mystery by Understanding the Formation and Motion of Ocean Currents

Author JANET STONE received her B.A. in elementary education and her masters in Middle School Mathematics, Psychology, and Reading from the University of Rhode Island. Currently, Janet teaches sixth grade Reading, Science, and Social Studies in Narragansett, Rhode Island. Her classes follow the inclusion method and include gifted students as well as students with special challenges. The various needs of her students have helped Janet become a very creative and effective teacher.

Author DEBORAH BARONE received her B.A. in Elementary Education, Resource and Special Education certifications from Rhode Island College, and has completed graduate classes at the University of Rhode Island. Experience with teaching physically and mentally challenged students refined her hands-on style for teaching and learning. Experience in an integrated middle school classroom led to the creation of a science investigation that will appeal to all styles of learners.

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The nationwide movement for high standards has not only determined what students should learn, but also has mandated that students demonstrate what they know. S.O.S. is a standards-based unit addressing numerous National Science Education, English Language Arts, National Educational Technology, and Information Literacy Standards. The content and skills taught are targets of most state frameworks for science, writing, and research. In S.O.S. students work in cooperative learning groups to explore ocean currents and characteristics as they solve a mystery. The peer teaching and cooperative problem solving required in S.O.S. also address Applied Learning standards. There are many opportunities to assess student understanding by using the prompts and rubrics provided.

National Science Education Standards

Standard B Physical Science

Properties and Changes of Properties in Matter

- A substance has characteristic properties, such as density, a boiling point, and solubility, all of which are independent of the amount of the sample.

Motion and Forces

- The motion of an object can be described by its position, direction of motion, and speed. That motion can be measured and represented on a graph.

Standard D Earth and Space Science

Structure of Earth System

- Water, which covers the majority of the earth's surface, circulates through the crust, oceans, and atmosphere in what is known as the "water cycle."
- Water is a solvent. As it passes through the water cycle it dissolves minerals and gases and carries them to the oceans.
- Global patterns of atmospheric movement influence local weather. Oceans have a major effect on climate, because water in the oceans holds a large amount of heat.

Earth in the Solar System

- The sun is the major source of energy for phenomena on the earth's surface, such as growth of plants, winds, ocean currents, and the water cycle.

Standard G History and Nature of Science

Science as a Human Endeavor

- Science requires different abilities, depending on such factors as the field of study and type of inquiry. Science is very much a human endeavor, and the work of science relies on basic human qualities, such as reasoning, insight, energy, skill, and creativity—as well as on scientific habits of mind, such as intellectual honesty, tolerance of ambiguity, skepticism, and openness to new ideas.

STANDARDS

NCTE Standards for the English Language Arts

Standard 4: Students adjust their use of spoken, written, and visual language (e.g., conventions, style, vocabulary) to communicate with different audiences for a variety of purposes.

Standard 7: Students conduct research on issues and interests by generating ideas and questions, and by posing problems. They gather, evaluate, and synthesize data from a variety of sources (e.g. print and non-print text, artifacts, people) to communicate their discoveries in ways that suit their purpose and audience.

Standard 8: Students use a variety of technological and informational resources (e.g., libraries, databases, computer networks, video) to gather and synthesize information and to create and communicate knowledge.

Standard 12: Students use spoken, written, and visual language to accomplish their own purposes (e.g. for learning, enjoyment, persuasion, and the exchange of information.)

California Applied Learning Standards

Standard 6: Students will understand how to apply communication skills and techniques. Students will demonstrate ability to communicate orally and in writing.

Standard 8: Students will understand the importance of teamwork. Students will work on teams to achieve project objectives.

National Educational Technology Standards for Students

If your students use the Internet for research

Standard 3. Technology productivity tools

- Students use technology to enhance learning, increase productivity, and promote creativity.

Standard 2. Social, ethical, and human issues

- Students practice responsible use of technology systems, information, and software.

Standard 5. Technology research tools

- Students use technology to locate, evaluate, and collect information from a variety of sources.

The Nine Information Literacy Standards for Student Learning

Standard 1: The student who is information literate accesses information efficiently and effectively.

Standard 2: The student who is information literate evaluates information critically and competently.

Standard 3: The student who is information literate uses information accurately and creatively.

Standard 8: The student who contributes positively to the learning community and to society is information literate and practices ethical behavior in regard to information and information technology.

Standard 9: The student who contributes positively to the learning community and to society is information literate and participates effectively in groups to pursue and generate information.

STANDARDS

FOREWARD

Dear Educators:

Children need to be aware of the world around them. They need to realize that the ocean currents connect the whole world. Something happening in one ocean affects oceans in other parts of the world. *S.O.S.* will bring this understanding to your students in a most real way. It begins with a recovered bottle containing a message. This bottle will send your students around the globe on a search and rescue mission.

Within this unit, your students will learn about ocean currents, flotsam, density, plants (flora) and animals (fauna), and geography while solving a realistic dilemma. The unit contains opportunities for exploration, deduction, group decision making, and research science. Your students will have the opportunity to conduct hands-on experiments to determine how density affects ocean currents. They will apply research skills using standard references and Internet technology. The premise of this simulation will keep your students involved in trying to locate one of several stranded families. At the end, they will build a case to present before a fictional international search and rescue group (G.E.T.U.) who will send the rescue ship to save the families.

We have included several detailed background essays about the concepts taught in this unit. However, to keep within the framework of a 15 day unit, we did not cover some concepts (i.e. weather, Coriolis effect), and we limited explanations of other concepts (water cycle, wind currents.). If you have more time, you may introduce and explore these concepts in more depth by supplementing with your own materials.

Sincerely,

Deborah Barone and Janet Stone

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Students are very curious about the ocean, regardless of whether they live along the coast or far inland. Although they may be familiar with tides, most are unaware that the ocean is filled with layers, pools, and rivers of seawater traveling miles and miles within the oceans. We call these rivers within the oceans *currents.* Exploring currents provides a concrete application of the effects of salinity and temperature on the density of seawater. It also explains the effect of winds on currents and the effect of currents on climate.

S.O.S. also allows students to apply their research skills to a real-life problem. They will determine a specific location on the earth by using their knowledge of plants (flora), animals (fauna), and land forms.

Finally, S.O.S. raises student awareness of the interconnection between all the oceans. When students hear of a tanker sinking off the coast of Europe, they often do not fully understand how this far-away disaster may ultimately affect their own lives. Nor do they understand the danger of pollutants dumped not only into the oceans, but also into the rivers that feed the oceans. A toxic spill (i.e., something like Agent Orange) could have calamitous results worldwide.

In S.O.S., your students will experience the following:

Knowledge

- The sun is the major source of energy for winds, the water cycle, and ocean currents.
- All oceans are connected by ocean currents.
- There are currents throughout the ocean that can carry floating objects great distances over the globe.
- Surface ocean currents are formed from wind.
- Deep ocean currents are formed by the density of seawater.
- Salinity and temperature affect the density of seawater.
- Density is defined as mass per unit volume.
- Salinity is defined as the amount of dissolved salts in water.
- Certain plants (flora) and animals (fauna) are found in specific ecosystems.
- Constellations can be seen in specific hemispheres at specific times of the year.
- Stars and constellations can be used as navigational tools.

Skills

- Reading an ocean current map
- Using resource books such as encyclopedias and search engines on the Internet to find the answers to their questions
- Determining the hemisphere of a given location
- Finding a location using longitude and latitude
- Determining the relative density of a liquid
- Identifying plants (flora) and animals (fauna) based on their corresponding ecosystems

PURPOSE

PURPOSE

- Researching clues and continuing research from the clue answers
- Using reasoning to reach a conclusion
- Working together towards a common goal
- Preparing and presenting facts/evidence to support a conclusion
- Preparing and delivering an organized oral presentation

Attitudes

- Appreciate the vast distances that currents travel
- Appreciate the enormous differences in flora, fauna, and landforms that exist throughout our planet
- Become aware that all things on earth are connected
- Appreciate that pollution spills in an ocean can be devastating to the whole world
- Appreciate the uniqueness and individuality of plant and animal species
- Appreciate the value and efficiency of group work

Phase One (6 days)
In this phase, students read the Introduction, and learn about their Roles and Responsibilities. They also learn about ocean currents and current maps, density, and density's effect on ocean currents.

On Day 1, student teams are invited by the Global Emergency Travel Unit (G.E.T.U.) to try to locate stranded families. To begin, student teams pull a bottle from a bucket of water. On the bottle is an ID tag telling where the bottle was found. Inside each bottle is a note from a different family stranded and waiting for rescue. The notes give clues that help the teams determine where each family is. However, the task is made more difficult because unfortunately, the bottles have leaked and the clues are blurred and illegible. Over the next five days, students read background essays, respond to questions, and conduct experiments as they learn about warm and cool ocean currents, flotsam and jetsam, and how temperature and salinity affect density.

Phase Two (5 days)
During Phase Two, the local Crime Scene Investigations (CSI) unit not only deciphers what was written but also recovers additional clues. They give the clues to the teams, one per day. While waiting for the clues, teams learn how wind and density cause ocean currents. The students use their knowledge of the ocean currents to backtrack their bottle's journey from the place it was found to the place it was most likely dropped into the ocean. Using the Internet and other sources, they research the clues given by the CSI unit and try to confirm where the families are waiting.

Phase Three (4 days)
The students prepare and make a presentation to the Global Emergency Travel Unit (an audience of parents and/or peers) convincing them where to send the rescue ships.

Special Needs Students
Like all Interact units, S.O.S. provides differentiated instruction through its various learning opportunities. Students learn and experience the knowledge, skills, and attitudes through all domains of language (reading, writing, speaking, and listening). Activities offer students the opportunity to demonstrate their knowledge through several of Gardner's Multiple Intelligences including Interpersonal, Intrapersonal, Spatial, Kinesthetic, and Verbal. Adjust the level of difficulty or challenge to best fit your students. Support special needs students in the various roles. Utilize their strengths and allow them to succeed. Work together with the Resource Specialist teacher, Gifted and Talented teacher, or other specialist to coordinate instruction.

OVERVIEW