





CURRENT TRENDS

Polar Seas (Grade 8)

Lesson Overview

There are 2 sessions to Current Trends. The first session, students will complete station 1 and 2. In the second session, students will complete station 3 and make a poster describing how what they have learned connects to actual currents.

Lesson Rationale

Current Trends is a lesson that will demonstrate, at the students' own pace, how water temperature and salinity drive ocean currents. By the end of this lesson students may be able to connect what they've discovered to weather and current patterns on a larger scale, across the globe.

Teacher's Notes

This lesson is a student-centered lesson wherein the class will be rotating through 3 stations which include three different experiments involving water currents. It should take 2 class periods, but allow for a third class to conclude and discuss results. NOTE: Groups of 4 or 5 students per station work well.

My Notes

Key Concept:

Salinity and temperature differences create masses of water with different densities.

Gravity causes more dense water to sink below less dense water. As a result, the less dense water rises.

Time Required:

2-3 class periods

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	<ul style="list-style-type: none"> • Temperature measurement • Density/Salinity • Movement • Scientific process • Recording data • Observation • Prediction • Lab Safety • Mass 	<ul style="list-style-type: none"> • Tornado tubes (2) • Kosher salt • Food coloring(at least 2 dark colors, no yellow) • Clear water bottles, straight side • Yogurt lids (4) • Plastic lunch trays • Chart paper • Markers • Inflatable globes • Styrofoam cups • 6qt(large) plastic rectangular container • 20 marbles • Push pins • White paper(computer or copy) • Tablespoon measure • White dish towels 	<p>Make your own hydrometers Test unknown samples for density/salinity</p>	<p>Standard 5.1 (Scientific Process) A.1, A.2, A.3, A.4, B.1, B.3, C.1, C.2 Standard 5.6(Chemistry) A.1, A.2 Standard 5.7(Physics) A.2, B.1, B.3 Standard 5.8(Earth Science) B.1</p>
Language Arts Literacy	<p>Group discussion Recording ideas/brainstorming Reasoning Sharing/publishing results</p>			<p>Standard 3.1(Reading) A.1, F.1, H.1 Standard 3.2(Writing) C.1, C.8, D.1, D.8 Standard 3.3(Speaking) A.2, A.4, A.7, B.4, C.1, C.1, D.1, D.2, D.6, D.8 Standard 3.4(Listening) A.1, A.2, A.3, B.7</p>

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Mathematics	Measurement Volume Data collection Temperature			Standard 4.1 (Numerals & Numeric Process) A.3 Standard 4.2 (Geometry & Measurement) D.4 Standard 4.5 (Mathematical Process) C.3
Social Studies	Map/Globe skills Geography Bodies of water identification Projection of where they might find real-life examples of the currents they created in the lab			Standard 6.1 (Social Studies Skills) A.5 Standard 6.3(World History) D.1 Standard 6.6(Geography) A.5, B.4, C.2, C.3, C.5
Visual Arts	Presentation of posters Layout and design of posters			Standard 1.2 (Creation & Performance) D.1
Technology			Use online resources for surface temperature maps to further these activities.	
World Language			This lesson is another one that could be taught entirely in Spanish or another World Language Include: Colors, volume(measurements), time, following directions, responding to	Standard 7.1 (Communication) A.1, A.3, A.5, B.1, B.3, C.1, C.2, C.3 Standard 7.2(Culture) A.2

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
			<p>questions, describing experiments using proper vocabulary. Students could discuss the exploration of the New World from the perspective of the Portuguese and Spanish explorers(first views of the Amazon plume)</p>	
Career Education & Consumer, Family & Life Skills	Group Discussion Teamwork			Standard 9.2(Consumer, Family and Life Skills) A.1, B.2, C.1, C.2, C.3, C.4, C.5, C.6, F.1
Physical Education	Group Discussion Teamwork		Have students model the movement of the different types of water by moving around the room.	Standard 2.2 (Integrated Skills) A.4, E.1, E.3

TIMELINE CLOTHESLINE*

Polar Seas (Grade 8)

Lesson Overview

Students will stretch the Timeline Clothesline across the classroom. Then they will break up into groups, or as a class, be given different cards that have an event written on one side and an approximate date on the other. They will be asked to place their event on the timeline. This will be repeated 4 times, representing the Earth's history.

Lesson Rationale

The idea of climate change occurs over enormous time scales that are often difficult to conceptualize. This lesson addresses the vast scope of climate study and will help students come to the realization that the Earth has a natural climate variability.

Teacher's Notes

Timeline Clothesline could be completed in as little as 20 minutes but there is approximately 1 hour minimum preparation time to become familiar with the materials. Also, be sure to have a lot of space to stretch the rope "timeline" out—moving desks, or performing the lesson in a larger room or outdoors is a good alternative.

*This lesson is from the *Climate Change Backpack*, published by the New England Science Center Collaborative.

My Notes

Key Concept:

Students gain a perspective of how the Earth has evolved since its beginning including: (1) How and when our atmosphere formed. (2) How our atmosphere changed over time due to interconnected geological, biological, hydrologic, and atmospheric processes

Time Required:

1 class period

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	<ul style="list-style-type: none"> Modeling a timeline Earth science Photosynthesis Environmental Change 	Timeline cards Clothes line 15 clothes pins(spring type)		Standard 5.1 (Scientific Process) B.2, B.3 Standard 5.2 (Science and Society) A.1, A.3, B.1, B.2 Standard 5.3 (Mathematical Application) A.1, C.1 Standard 5.5(Life Science) A.1, B.2 Standard 5.6(Chemistry) A.1 Standard 5.8(Earth Science) B.1, C.1 Standard 5.10 (Environmental Studies) B.1
Language Arts Literacy	<ul style="list-style-type: none"> Fact gathering Group discussion 		Debate: Are humans really to blame for the recent climate change or is this another stage in a larger Earth cycle?	Standard 3.1(Reading) A.1, F.1, F.2 Standard 3.3(Speaking) A.2, A.4, A.7, B.4, D.6, D.8 Standard 3.4(Listening) A.2
Mathematics	Time continuum Scale in time(1/100th)			Standard 4.1 (Numbers & Numerical Operations) A.2, A.3, C.2 Standard 4.4(Data Analysis) C.3 Standard 4.5 (Mathematic Process) B.1, B.2, C.3, C.4, D.2, E.1

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Social Studies	<ul style="list-style-type: none"> • World (Earth) History • Governments established • Early Humans • Hunting & Gathering 		Group discussion Debate(See above LAL)	Standard 6.1 (Social Studies Skills) A.1, A.2, A.4, A.5, A.9, A.11 Standard 6.2(Civics) E.8 Standard 6.3(World History) A.1, A.2, B.5, B.10, B.11 Standard 6.5(Economics) B.1, B.3 Standard 6.6(Geography) B.2, C.3, C.4, C.5, E.1, E.2
Visual Arts	Visual representation of different eras via different colored information cards			
Technology			Use online resources to follow up on any interesting information points from clothesline	
World Language				
Career Education & Consumer, Family & Life Skills	<ul style="list-style-type: none"> • Group discussion • Teamwork • Leadership skills 			Standard 9.2(Consumer, Family & Life Skills) A.1, C.1, C.2, C.3, C.4, C.5, C.6
Physical Education	<ul style="list-style-type: none"> • Group discussion • Teamwork • Leadership skills 		Physically demonstrate the idea of 1/100th using the playground (measure out 100ft on the ground and compare it to 1 foot) Create a game that demonstrates the idea of photosynthesis	Standard 2.2 (Integrated Skills) E.1

CHANGES CLOSE TO HOME*

Polar Seas (Grade 8)

Lesson Overview

Students use interview techniques to explore perceptions about local climate change amount long-time residents of their community. Students then compare the results of their interviews to 30-year local temperature and precipitation records.

Lesson Rationale

Students may not recognize that weather and climate have changed over the last 50 years or so. This experience will help them recognize that our climate, not just our immediate weather, is undergoing long-term changes.

Teacher's Notes

This lesson is a great way for students to get in touch with older community members. You might want to schedule a class trip to a community center where some students could survey some people in the community about the weather and climate in the not-so-distant past.

*This lesson is from the Smithsonian.

http://forces.si.edu/arctic/05_00_00.html

My Notes

Key Concepts:

- Demonstrate appropriate use of tools and techniques to gather, analyze and interpret data.
- Compile and summarize community survey results on local climate change.
- Communicate results of their investigations.
- Use a climate database.
- Explain the difference b/w weather and climate

Time Required:

- 3-4 Class periods over the course of several weeks.
- 1-2 Weeks for students to conduct surveys.
- 1 class period for and optional extension activity.

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Science	<ul style="list-style-type: none"> • Climate • Weather • Meteorological maps • Observation • Data Collection • Precipitation 	<ul style="list-style-type: none"> • Internet Access • Activity sheets B, C & D • Overhead projector • Transparency of fig 2.1 • Graph paper • Interviewees who have lived in the area for more than two or three decades. 	Have students retrieve 30 year average annual temperatures and precipitation records from various cities around the world. (incl. Arctic cities)	Standard 5.1 (Scientific Process) A.1, A.2, b.1, B.3 Standard 5.2 (Science & Society) A.1 Standard 5.3 (Mathematic Application) C.1, D.1, D.2, D.4 Standard 5.8(Earth Science) A, B.1
Language Arts Literacy	<ul style="list-style-type: none"> • Gathering information • Survey • Group Discussion 		<ul style="list-style-type: none"> • Students can generate a contact letter to reach out to local community groups for interviewees. • Students can generate a “thank you” letter after the activity, sharing their findings. • Publish their findings in a pamphlet or PowerPoint presentation. • Students can create persuasive writing pieces using the findings of their surveys as support. 	Standard 3.1(Reading) F.1 Standard 3.2(Writing) B.1, B.3, C.1, C.6, C.7, C.8, D.1, D.2, D.6, D.8, D.10 Standard 3.3(Speaking) A.2, A.7, B.1, B.2, B.3, B.4, C.1, C.2, C.3, C.4, D.1, D.2, D.3, D.4, D.8 Standard 3.4(Listening) A.1, A.2, A.3, B.5, B.6, B.7 Standard 3.5(Viewing & Media Literacy) C.3
Mathematics	<ul style="list-style-type: none"> • Temperature • Mean • Multiplication • Division • Data Analysis 		Graph results using a computer program(ex. MS Excel)	Standard 4.1(Number & Numeric Process) B.1 Standard 4.4(Data Analysis), Probability & Discrete Math) A.1, A.2, A.4, C.3 Standard 4.5 (Mathematic Process) A.1, A.2, B.1, B.2, C.3, F.1, F.2, F.6

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
Social Studies	<ul style="list-style-type: none"> • Weather patterns • Map skills • Climate Change • Effect of humans on climate change 			Standard 6.1 (Social Studies Skills) A.1, A.2, A.3, A.5, A.6, A.7, A.8, A.9, A.11 Standard 6.2(Civics) E.8, E.10 Standard 6.4 (US & NJ History) A Standard 6.6(Geography) A.1, A.2, B.2, C.3, C.4, C.5, D.8, E.1
Visual Arts	<ul style="list-style-type: none"> • Graphic Design & Layout 		Students may use their graphic arts knowledge and experience in publishing their results as mentioned above in LAL.	Standard 1.2(Creation & Performance) D.1, D.2, D.3
Technology			Students may find other web-based resources to complete this activity or an extension.	Standard 8.1(Computer & Information Literacy) A.5, A.7, A.8, A.11, B.4, B.6, B.7
World Language			<ul style="list-style-type: none"> • Interviews may be conducted in other languages. • Communicating with heritage speakers to extract information. • Translating scientific questions into target language to be used during interview process. • Writing thank-you letters in target language using appropriate cultural guidelines. • Interview people who lived in a different country for a 	Standard 7.1 (Communication) A.3, A.4, A.5, B.1, B.2, B.3, B.4, C.1 Standard 7.2(Culture) A.2, B.1, B.5

Subject Area	Interdisciplinary Connection	Resources	Going Further	NJCCCS
			long time and use that info to compare to current data in that city/region of that country.	
Career Education & Consumer, Family & Life Skills	<ul style="list-style-type: none"> • Group Discussion • Teamwork • Leadership skills 			Standard 9.2(Consumer, Family & Life Skills) A.1, C.1, C.2, C.3, C.4, C.5, C.6
Physical Education	<ul style="list-style-type: none"> • Group discussion • Teamwork • Leadership skills 			Standard 2.2 (Integrated Skills) E.1