

EarthComm Earth's Fluid Spheres: Oceans and Your Community Storylines

Below are storylines that were designed by Cheryl Mosier, an Earth Science Teacher at Columbine High School in Littleton, Colorado.

Big Idea:

6. Fluid spheres within the Earth system include the hydrosphere, atmosphere, and cryosphere, which interacts and flow to produce ever-changing weather, climate, glaciers, seascapes, and water resources. These affect human communities, shape the land, transfer Earth materials and energy, and change surface environments and ecosystems.
9. Natural hazards associated with Earth processes and events include drought, floods, storms, volcanic activity, earthquakes and climate change. They pose risks to humans, their property and communities. Earth science is used to study, predict, and mitigate natural hazards so that we can assess risks, plan wisely, and acclimate to the effects of natural hazards.

	Activity 1 – The Causes of Ocean Circulation	Activity 2 – Deep Circulation of the Ocean	Activity 3 – Surface Circulation of the Ocean	Activity 4 – El Nino and Ocean Circulation	Activity 5 – Weather, Climate and El Nino	Activity 6 – El Nino and the Oceanic Food Chain
Key Evidence Learned	- effect of wind on surface movement - Coriolis force - temperature and density layers in the ocean	- how water temperature affects circulation - how salinity affect circulation - ocean currents and water masses	- normal circulation patterns - average speed of currents - how winds move water - how surface circulation changes in an El Nino - how Coriolis affects patterns	- how surface temps vary during an El Nino - examine a typical El Nino event - technology for determining ocean temps	- “normal” temperature and precipitation changes in an El Nino - how El Nino makes a global impact	- investigate fish catch data over time - identify past El Nino events using a graph
Connections To:	- pycnocline & thermocline	- nature and causes of deep ocean circulation - convection cells are related how?	- how ocean currents impact climate	- inferences about changes in circulation based on data	- impact of El Nino in Colorado - impact of an El Nino on Colorado agriculture	- relationship between upwelling, phytoplankton abundance and fish catches - how El Nino can impact life in Colorado
Big Idea	- understanding the fluid spheres	- understanding the fluid spheres - movement of energy in the oceans	- how oceans affect climates - movement of energy in the oceans	- how El Nino changes the ocean	- how El Nino changes the weather and climate patterns	- effect of El Nino on industry

Real Life and Chapter Challenge	- Coriolis effect on water and wind - normal ocean circulation patterns	- density differences and how things move in nature - normal ocean circulation patterns	- climate impacts - El Nino impacts	- El Nino impacts - how to determine if an El Nino is occurring - technology	- El Nino impacts in Colorado: temperature, precipitation, agriculture - worldwide impacts of an El Nino	- how El Nino effects life in Colorado - ocean impacts on life during an El Nino
Geosphere		- comparing convection in the mantle with deep ocean circulation				
Hydrosphere	- ocean circulation causes and patterns	- deep ocean circulation causes and patterns	- normal patterns - El Nino changes - climate patterns - upwelling	- El Nino temperature impacts		- upwelling and downwelling
Atmosphere	- Coriolis effect on air		- wind impacts on water - climate patterns - El Nino changes	- El Nino impacts	- El Nino impacts on weather and climate	
Cryosphere						
Biosphere	- temperature and density differences in the ocean		- El Nino impacts	- El Nino impacts	- El Nino impacts on industry and agriculture	- costs of fish products - impact of El Nino on humans
State Standard	4.3.d	4.3.d	4.2.e, 4.3.d	4.3.c, 4.3.d, 4.2.c, 4.2.e	4.2.c, 4.2.d, 4.2.e, 4.3.c, 4.3.d	4.2.d, 4.3.c
Jeffco Standard			4.3.c, 4.2.c, 4.2.e	4.2.c, 4.2.e, 4.3.c	4.2.c, 4.2.e, 4.3.c	4.2.e
CSAP Frame	4.3.4.a	4.3.4.a	4.3.4	4.3.4.a	4.3.3.b, 4.3.4.a	4.3.4a
Jeffco PE	W&C 2a	W&C 2a	W&C2a, 2c, 3a	W&C 2a, 2c	W&C 2a, 2c, 3a	