Activity #1 - Wind Circulation, Surface Currents & Climate

Concepts # 3 & 6

 # 3 Atmospheric cells and ocean gyres redistribute heat from low to high latitudes, which influences climate, weather, and ocean temperature.

#6 Surface currents are created by the prevailing wind system.

Objective:

Students will be able to describe the connections between wind patterns, surface currents, and ocean climate zones.

Materials:

- map of world with climate zones
- overlay of ocean currents
- overlay of global wind patterns
- question sheet
- colored pencils
- red and blue china markers

Procedures: (See illustrations)

1. Teacher reviews the wind patterns of the Earth. Explain the Coriolis effect and how it produces gyres in surface currents.
2. Have students break into groups to study this occurrence. Each group has a climate map, overlays of wind patterns and surface currents.
3. Students color the ocean climate zones in four different shades of blue, with the tropics being the darkest.
4. Students color the warm surface currents with a red china marker and the cold currents with a blue china marker. Overlay the surface current sheet on top of the climate zone map.

Evaluation:

- Answer these questions:
- What four currents make up the North Pacific gyre? (Kuroshio, N. Pacific, California, N. Equatorial)
- What is the main climate zone of this gyre? (subtropical)
- How many other gyres are formed in the open oceans? (4)
- Name them. (N. Atlantic, S. Atlantic, S. Pacific, S. Indian)
- Where is the tropical zone the greatest in latitude span? (the Atlantic)

Evaluation Continued:

Now place the wind pattern overlay over the climate zone map. Answer these questions:

- Which climate zone contains the westerlies? (Temperate zone)
- Easterlies bring cold air from where? (the poles)
- Now place the current overlay on top of the wind pattern and answer these questions:
- At what angle are the equatorial currents to the trade winds? (45° angle)
- Why does this occur? (Because the Coriolis effect deflects the wind)
- What would happen if the trade winds became weaker? (The equatorial current would become weaker and create an El Niño effect.)

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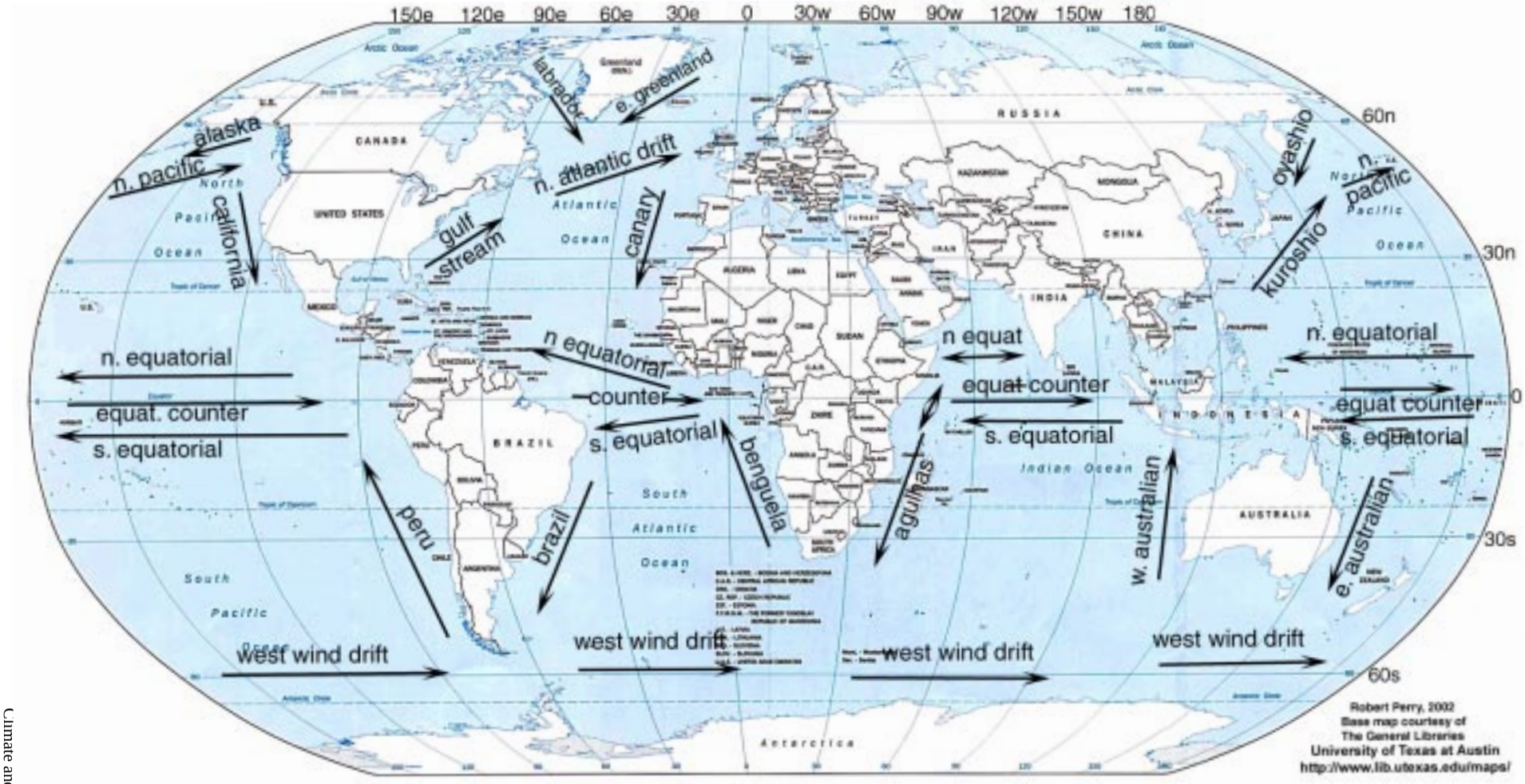
Major World Ocean Surface Currents



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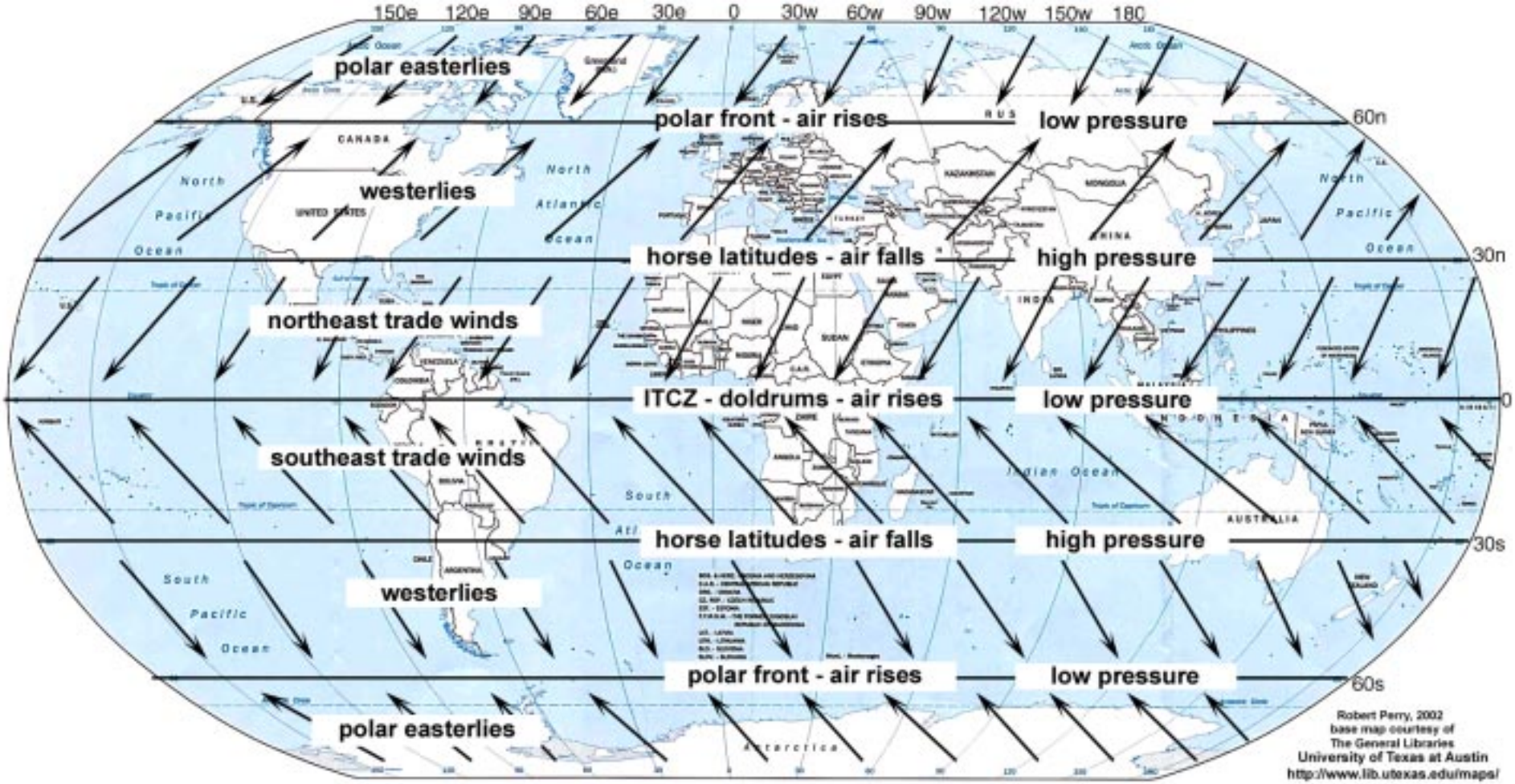
Global air circulation & wind patterns



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Ocean Climate Zones (based on surface temperatures)