Ocean Currents & Climate

- The student will be expected to demonstrate an understanding of how ocean currents affect climate.

Ocean Currents & Climate

Outcomes…

- In this lesson you will learn to…
- 2.4.1 Define the term ocean current. (k)
- 2.4.2 Analyze how ocean currents can create different climatic conditions for two coastal locations on the same latitude. (a)

Ocean Currents

- **DEFINITION: Ocean currents** are the permanent or semi-permanent **horizontal movement** of surface water (the top 100m).
- **Videos:**
  - Ocean currents explained
  - Bill Nye- Ocean Currents
- Ocean currents are usually warmer or colder than with the surrounding water.
- Caused by and shaped by:
  - prevailing winds
  - changes in air temperature
  - density of water
  - Coriolis force

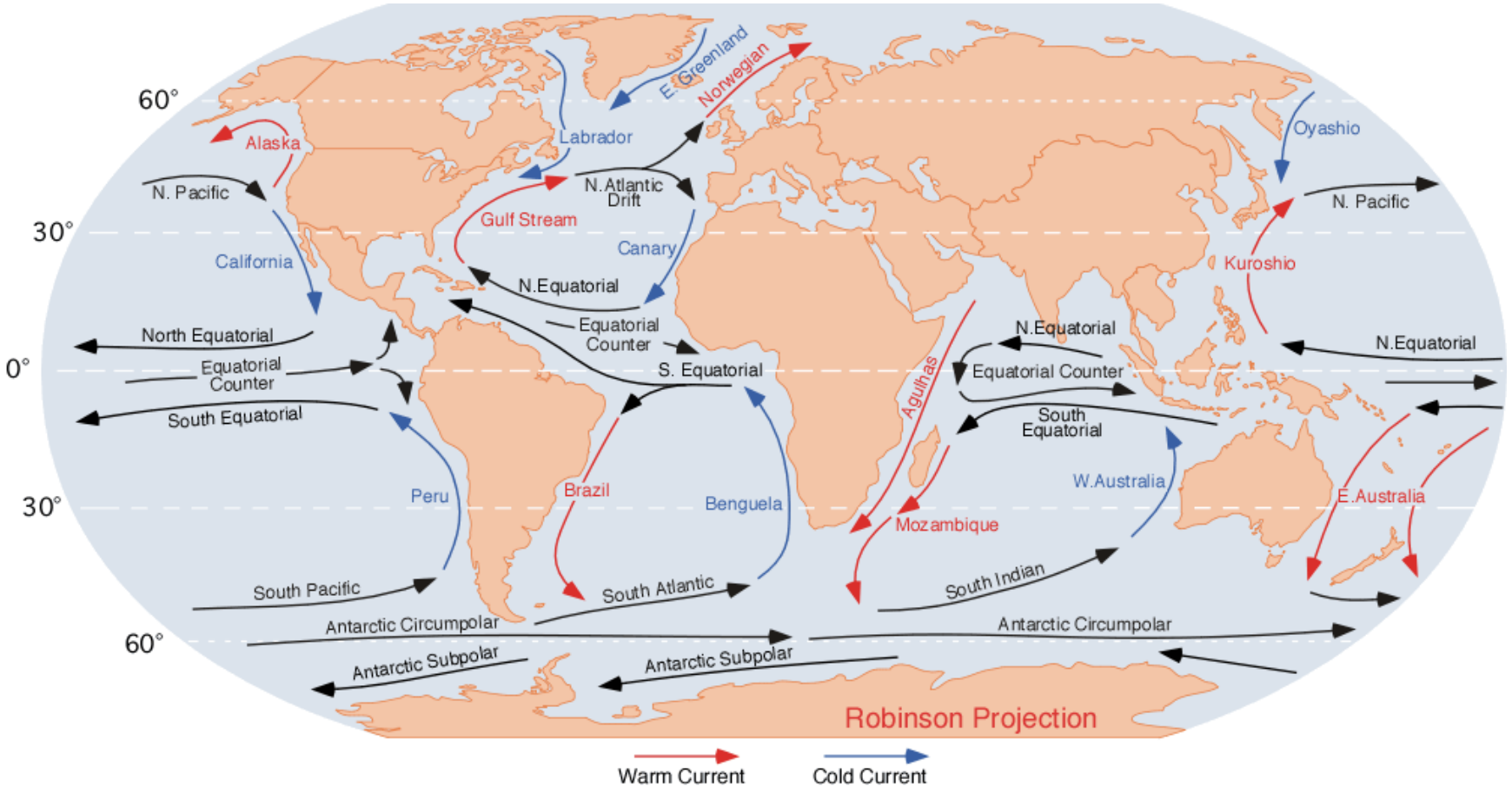
Cold ocean currents

- **Cold water currents** move water **towards the equator**.
- For example, the **Peru Current** carries cold water from Antarctica toward the equator.
- Another example is the **Labrador Current** which carries cold water from the Arctic Ocean.
- See pg 60 for a diagram of ocean currents

Warm ocean currents

- **Warm water currents** move water **away from warm equatorial regions**.
- **Example:** The **Gulf Stream** moves warm water from the Gulf of Mexico, past Newfoundland and then across the Atlantic Ocean toward England.
- Another good example is the **Japanese Current** which moves warm water from Japan northeast towards Vancouver.

Examples of ocean currents



Ocean Currents & The Affect on Climate

- **Effects of cold ocean currents**

1. Cools the summer temperature

2. Reduces precipitation…cooler air holds less moisture.

Ocean Currents & The Affect on Climate

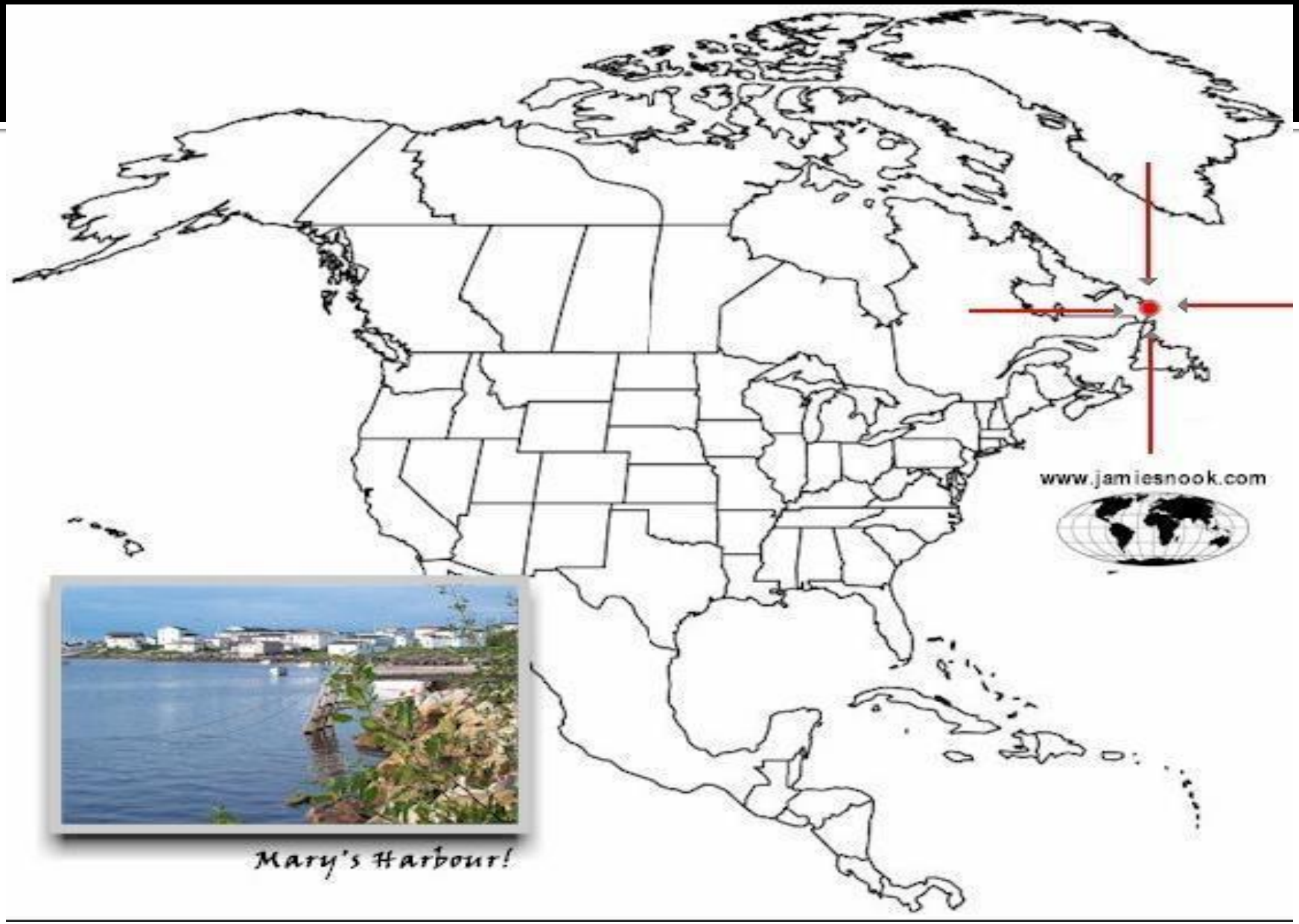
- **Effects of warm ocean currents**

1. Warms the winter temperature

2. Increases precipitation because warmer air holds more moisture

Example #1

- Mary's Harbour on the south coast of Labrador:
  - affected by the Labrador Current
  - cool summer temperatures
  - little precipitation for a location right on the ocean's edge.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Mary's Harbour!

Example #2

- Vitoria, Brazil
  - affected by the Brazilian Current.
  - This warm current brings moist air, so they get more rain.


Santa Marta
Los Roques
Panama Canal
TRINIDAD AND TOBAGO
VENEZUELA
SURINAME
GUYANA
Devil's Island
FRENCH GUIANA
COLOMBIA
Atlantic Ocean
Esmeraldas
Quito
GALAPAGOS ISLANDS
Manta
ECUADOR
Isla de la Plata
Guayaquil
Amazon River
Boca da Valeria
Breves Narrows
Anavilhanas
Manaus
Belém
Santarém
Parintins
Alter do Chão
Fortaleza
Paita
Natal
Salaverry
PERU
Recife
Maceió
Machu Picchu
Lima (Callao)
Cusco
Pisco
BRAZIL
Salvador
Paracas Bay
General San Martin
Ilheus
BOLIVIA
Arica
Iquique
Rio de Janeiro (Copacabana Beach)
Vitoria
Antofagasta
CHILE
PARAGUAY
São Paulo
Búzios
Iguazu Falls
Paranagua
Angra dos Reis
Ilha Grande
Pacific Ocean
Itajaí
Parati
Porto Belo
Ilhabela
La Serena
Coquimbo
ARGENTINA
Rio Grande
Valparaiso
Santiago
URUGUAY
Easter Island
Buenos Aires
Punta del Este
Montevideo
N
Isla Mocha
Puerto Montt
Puerto Madryn
Atlantic Ocean
Castro
Puerto Chacabuco
Camarones
Laguna San Rafael
FALKLAND ISLANDS
West Point
Puerto Natales
Port Stanley
Punta Arenas
Ushuaia
Strait of Magellan
Port Williams
Cape Horn

Example #3…one to think about

- Newfoundland's south coast has ice-free ports year-long while its north coast has heavy ice for several months. The difference in latitude is not enough to explain this difference in ice.

- Can you explain it with ocean currents?

Ocean Currents …Conclusion

- Ocean currents can have a bigger effect on an area if the prevailing winds blow onshore.
- But if the prevailing wind blows off the land, it can weaken the effect of the current.

- EX: If a place is near a cold current and the wind is off the land, the cold air that comes with the current can be blown out to sea.