

# Warm-up

Answer the following questions in your notebook.

1. How do cold fronts differ from warm fronts?
2. What type of weather is associated with stationary fronts?

# Learning Objectives

I will explain the influence of convection, global winds, and the jet stream on weather and climatic conditions.

I will describe what causes local and global wind.

I will name and describe the different global winds.





# Global and Local Winds

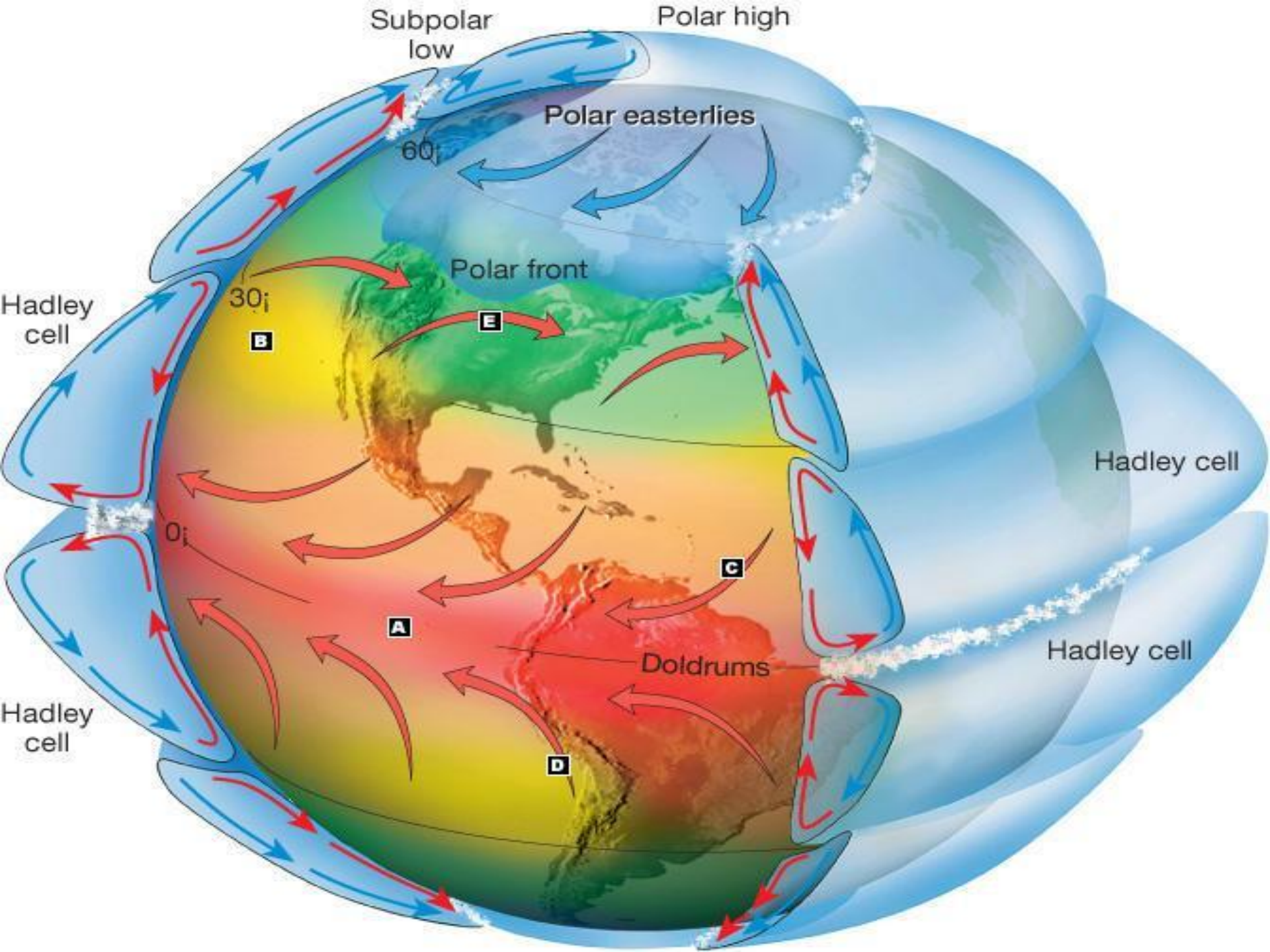
# Air Movement

- **Wind** is the movement of air caused by differences in air pressure
- The **greater** the difference, the **faster** the wind moves



# Air Pressure

- Differences in air pressure are caused by the **uneven heating** of Earth
- Uneven heating produces **pressure belts** which occur every 30° latitude





# Pressure Belts

- As **warm air** rises at the equator and moves toward the poles, it cools
- As it cools, some of the air sinks around **30° north and south** of the equator

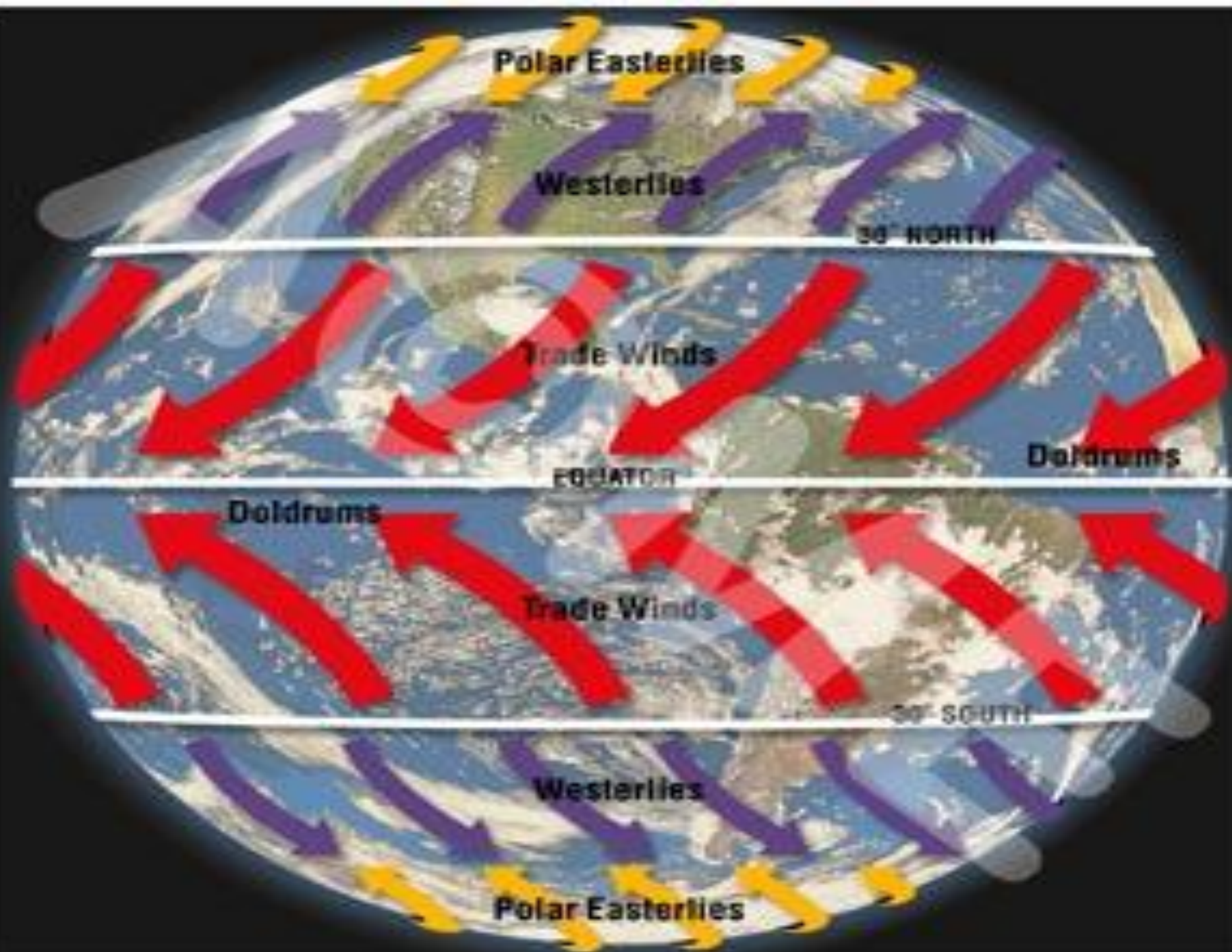
# Pressure Belts

- At the poles, **cold air sinks** and moves towards the equator
- Around **60° north and south**, the air begins to heat up and rise



# Global Winds

- The combination of pressure belts and the Coriolis Effect cause **global winds**
- These are **polar easterlies, prevailing westerlies, and trade winds**





# Polar Easterlies

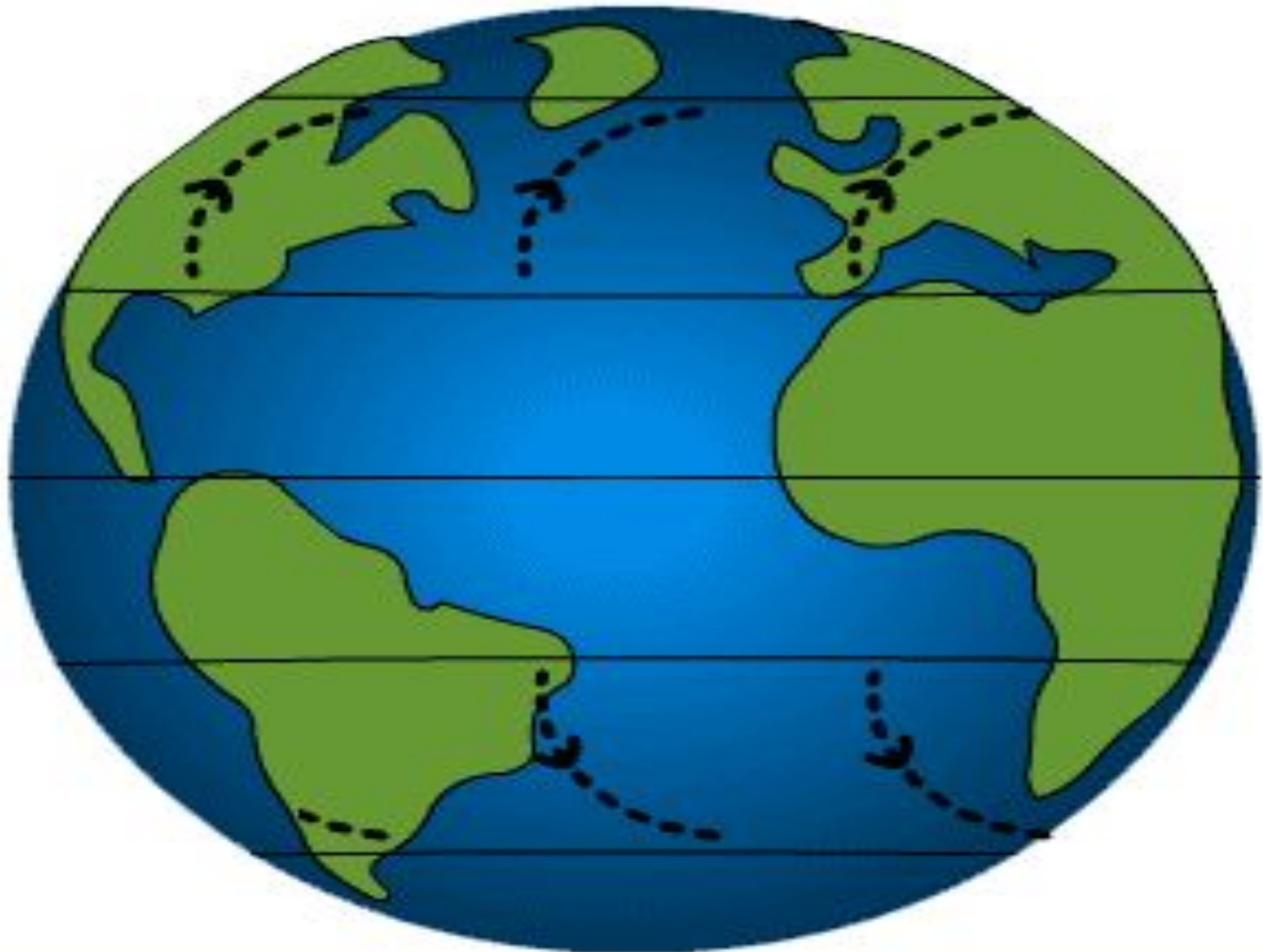
- Wind belts that extend from the **poles to 60° latitude**
- Formed from cold sinking air moving from the poles creating **cold temperatures**





# Prevailing Westerlies

- Wind belts found **between 30° and 60° latitude**
- Flow towards the poles from west to east carrying **moist air** over the United States





# Trade Winds

- Winds that blow from **30° almost to the equator**
- Called the trade winds because of their use by **early sailors**





# Doldrums

- Located along the equator where **no winds blow** because the warm rising air creates an area of low pressure

# Horse Latitudes

- Occur at about  $30^{\circ}$  north and south of the equator where the winds are **very weak**
- Most deserts on the Earth are located here because of the **dry air**



# Jet Stream

- The jet streams are narrow belts of **high speed winds** that blow in the upper troposphere and lower stratosphere
- **Separates** warm air from cold air



**Cold Air Mass**

**Warm Air Mass**

**Jet Stream**



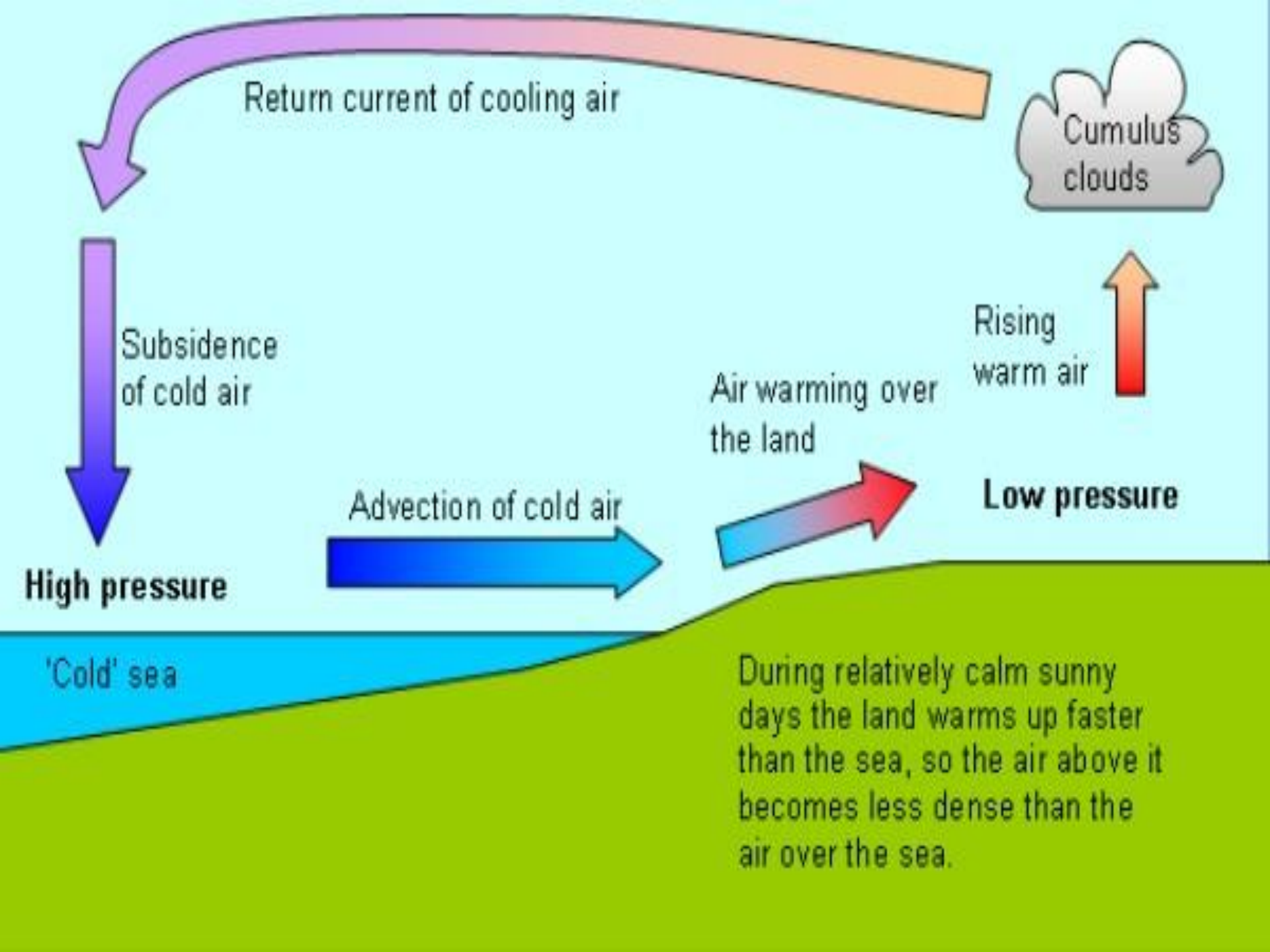
# Local Winds

- Generally move **short distances** and can blow in any direction
- Caused by **geographic features** that produce temperature differences

# Sea Breezes

- High pressure is created over the ocean during the day and low pressure over land due to **uneven heating**
- Air moves from the ocean to the land creating a **sea breeze**





Return current of cooling air

Cumulus clouds

Subsidence of cold air

Rising warm air

Air warming over the land

Advection of cold air

Low pressure

High pressure

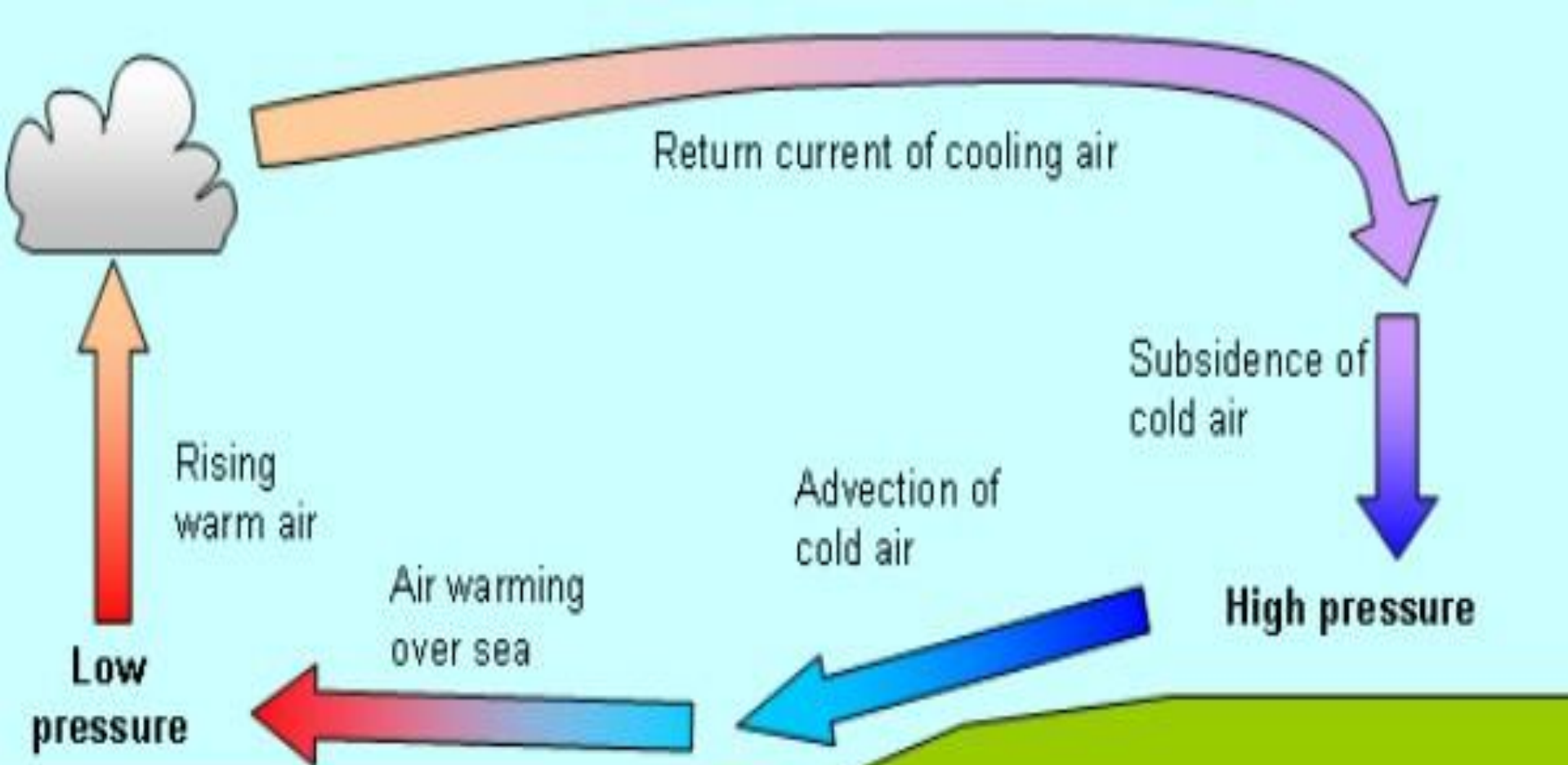
'Cold' sea

During relatively calm sunny days the land warms up faster than the sea, so the air above it becomes less dense than the air over the sea.

# Land Breezes

- Low pressure occurs over the ocean **during the night** and high pressure over land due to the uneven heating of earth
- This causes wind to move from the land to the ocean creating a **land breeze**





'Warm' sea

During relatively calm clear nights the land cools down faster than the sea, so the air above it becomes denser than the air over the sea, and sinks down towards the coast

# Review

[Video](#)

[Quizlet Flash cards](#)

[Quizziz Live](#)

[Simulation of land and sea breezes](#)

[Throw the ant review game](#)

[Paper bird review game](#)

[Homework](#)



# Question 1

- What causes winds?

# Answer

- Winds are caused by the uneven heating of Earth's surface, which causes pressure differences



## Question 2

- What are the three types of global winds?

# Answer

- Polar Easterlies
- Westerlies
- Trade Winds



## Question 3

- What is the difference between a land breeze and a sea breeze?

# Answer

- Sea breezes occur during the day when the land is warmer than water and a land breeze occurs at night when the water is warmer than land