Global Weather 5

**Outcome: (116-1), (117-10)**

# Content: Page 220-221

### **Weather vs. Climate:**

#### **Weather:**

* Weather describes what is happening outdoors when you **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Weather is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that happen from minute to minute.
* The weather can change a lot within a very **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* For example, it may rain for an hour and then become sunny and clear.
* Weather includes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in precipitation, barometric pressure, temperature, and wind conditions for your area

#### **Climate:**

* Climate is the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for your area during different times of the year.
* Climate data is based on a 30-year average, which includes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**, regular weather patterns (like winter, spring, summer, and fall), and special weather events (like tornadoes and floods).
* Climate tells us what it's **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** at different times of the year.
* Climate data includes information such as; precipitation, temperature, humidity, sunshine, wind velocity and direction, fog, frost, and other distinct conditions for a specific area.

### **Factors Affecting Climate:**

* The climate you receive depends entirely on where you live.

##### **Latitude**

* Latitude measures the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from the equator.
* The equator receives more **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**than anywhere else on earth.
* The further you move away from the equator the sun becomes less direct, therefore, when you move toward the north and south poles **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.

#### **Ocean currents**

* + Ocean currents can greatly affect temperatures and weather conditions.
	+ Two main ocean currents affect Newfoundland and Labrador; the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (Warm) and the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** (Cold).
	+ What will happen when the warm moist air of the Gulf Stream passes over the cold water of the Labrador Current?
		1. **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**3. Wind and air masses**

* + Winds that blow from the sea often bring rain to the coast because an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
	\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ The winds blowing over the cold ocean water in summer tends to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
	+ During the winter the oceans are generally warmer than the winds so the winter air becomes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** as it blows over the ocean.

#### **Elevation**

* Elevation measures how high you are **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* As you rise, **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**. In fact the air cools by 6.5oC for every kilometer (1000m) you rise.
* The higher the place is above sea level the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* This happens because as altitude increases, air becomes thinner and is less able to absorb and hold heat.
* This is also why you often see snow on the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** all year round.

#### **Relief (Steepness)**

* Mountains receive **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** than low-lying areas because the temperature on top of mountains is **\_\_\_\_\_\_\_\_\_\_\_\_** than the temperature at sea level due to the elevation.
* As the warm moist wind blows into the mountainous barrier (windward side) the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* As the air rises it cools and begins to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* As the air continues to rise and cool **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* When the air goes over the mountain and begins to fall (leeward side) the air becomes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* So the amount of precipitation and the temperature depends **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!**

#### **Closeness to water.**

* If you live close to a large body of water like the ocean or a large lake, climate is affected.
* Coastal areas are cooler and wetter than inland areas since wind blowing over the water picks up moisture and is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* In Newfoundland you may have noticed that inland communities like Gander and Grand Falls have much **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** than areas out around the coast.
* However, in winter, the ocean warms the coastal air so the coastal areas have **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** than central areas.

#### **Human activities**

* Human activities are now beginning to influence local climates as well as the global climate.
* Southern Ontario (places like Toronto) now includes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** for spring and summer.
* The excessive pollution from cars and industry, high temperatures and high humidity combine to produce an **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* The burning of fossil fuels in cars, industry and home heating is accused of causing **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Global warming is supposed to be responsible for **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** in just about every part of the world.

**Outcome: (115-2), (331-2)**

# Content: Page 222-225

## The Atmosphere:

* The **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** that surround the earth
* The atmosphere is where all the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**happens.
* The atmosphere acts like a blanket, which controls the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** of the earth.
* If there were no atmosphere, the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
	+ In the day, on the light side the temperature would be hot enough to boil water but at night on the dark side the temperature drops to -150oC

#### **What is the earth's atmosphere made of?**

* The earth's atmosphere is a made up of **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Some of these gases include:

|  |  |
| --- | --- |
| **Gas** | **Amount** |
| Nitrogen (N2) | 78% |
| Oxygen (O2) | 21% |
| Other gases: * Water vapour, argon, carbon dioxide, neon, helium, krypton, hydrogen, ozone,...
 | 1% combined |

##### **Some of these gases have very important roles in the atmosphere.**

* Nitrogen and ozone act as a protection shield that blocks out **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* Oxygen is essential for life.  **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and we breathe it in.
* Carbon dioxide is essential for life too.  We breathe out carbon dioxide and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Water vapour is essential to the water cycle and **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.  Water vapour is responsible for clouds, fog, rain and snow.

#### **Layers of the atmosphere:**

* The farther we travel from the earth **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the atmosphere gets.
* About 99% of the mass of the atmosphere is below 30 km but has been measured to a height of 1000km.
* The layers of the atmosphere are classified based on their **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.**

##### **Troposphere**

* + We live in the troposphere and this is where all the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
	+ This layer is the closest to the earth, which means the troposphere gets **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** the most.
	+ This heating causes **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and cloud formation.
	+ Also, all the dust of the atmosphere is in the troposphere.
	+ Water vapour condenses on the dust particles to create **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
	+ The troposphere goes from the ground to about 16 km up.

##### **Stratosphere**

* + The stratosphere rises from 15 km to 50 km.
	+ The stratosphere has **­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­­\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** but ice crystals have been seen to form at this high altitude.
	+ The major gas of the stratosphere is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
	+ This layer is cooler than the troposphere
	+ The ozone layer blocks out **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** from space.
	+ Some of the energy of ultraviolet (UV) light being blocked gets transferred to the ozone layer.
	+ **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** form between the troposphere and the stratosphere.
	+ There is not enough oxygen in the stratosphere to keep you alive.  This is why the pilots of high-level aircraft need to breath oxygen from masks.

##### **Mesosphere**

* + The mesosphere has **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** and ranging in altitude from 50 to 80 km.
	+ The temperature of the mesosphere goes as low as -80oC!
	+ This is the layer of the atmosphere where **\_\_\_\_\_\_\_\_\_\_\_
	\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_!** (Shooting stars!)

##### **Thermosphere**

* + The atmosphere in the thermosphere is very, very **\_\_\_\_\_\_.**
	+ It is so thin that as the sun's energy hits so few molecules of air we begin to see **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
	+ However, because there are so very few molecules the energy doesn't get transferred to other layers.

### **Atmospheric Pressure:**

#### **Air density:**

* The atmosphere is made up of gases.
* If we warm up these molecules of gas they begin to **\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* The faster they move the more space they want to occupy, that is, the warmed gas molecules **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* If we had this air in a container with a small hole in it some of the gas would escape and the container with the gas would get lighter then before (**less dense**).
* HOT is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* If we cooled down the air the molecules of gas would begin to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**
* When molecules slow down they need less space and begin to move closer together (contract).
* For the same container above, the gas inside would begin to **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**and now air from the outside will move in to fill up the container.
* The container with the gas will now be heavier then before (**denser**).
* COLD is **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

#### **Air pressure:**

* **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** pulls down on all matter.
* Gases are matter and gravity pulls down on them.
* This is why the **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**(layer closest to the earth) has 99% of all the gases in the atmosphere.
* As these gas molecules are being pulled down they are colliding, pushing and bumping into everything else on the surface of the earth, including you.
* All this bumping and pushing creates what we call **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**.
* Have you ever put your hand out the window while you were driving in a car?  That's air pressure - you are feeling the force of the air colliding with your hand!

**Homework: page 225: #’s 2, 4**

