



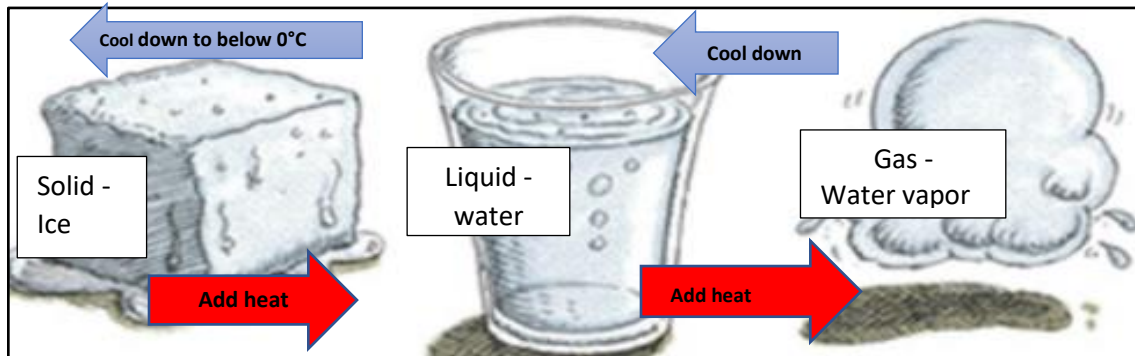
Geography:		Grade 10	
TERM 1		Week 4 Lesson 4	
TOPIC	CLIMATOLOGY: Moisture in the atmosphere		
AIMS OF LESSON	What are the different forms of water in the atmosphere? The processes associated with evaporation, condensation and precipitation. The concepts of dew point, condensation level, humidity, relative humidity.		
RESOURCES	Paper based resources	Digital resources	
	Refer to your textbook: Read the topic: Moisture in the atmosphere.	https://oceantoday.noaa.gov/watercycle/ https://www.britannica.com/video/163379/process-water-vapour-atmosphere-video	
INTRODUCTION	<ul style="list-style-type: none"> • What are the different forms of water in the atmosphere? • <i>How and why does it change from one form to the next?</i> • <i>What is the difference between evaporation, condensation and the different forms of precipitation?</i> • <i>What role does the concepts of dew point, condensation level, relative humidity and humidity play in the precipitation process?</i> 		
CONCEPTS AND SKILLS	<ul style="list-style-type: none"> • The change from gas to liquid and solid water formats • The understanding of evaporation and condensation in the atmosphere • <i>How to determine relative humidity.</i> 	CAN YOU? Distinguish between evaporation and condensation? Distinguish between different types: precipitation i.e. dew, frost, rain, hail and snow as well as the process for the formation of each type. Give reasons how each of the following concepts dew point, condensation level, relative humidity determines whether precipitation will take place and what type of precipitation will occur?	
ACTIVITIES/ ASSESSMENT	<i>Complete the attached activities as well as those in your textbook.</i>		
CONSOLIDATION	<ul style="list-style-type: none"> • <i>Complete the activities.</i> • <i>Study the diagrams to understand the different process, types of rain as well as concepts</i> • <i>This information is important to understand the conditions that must exist to determine when and how precipitation will occur.</i> • <i>This information is important to show you how to take care of the environment to provide sustainable living conditions</i> 		
VALUES	<i>It is important to understand the preservation of the atmosphere of the earth it is crucial to maintain the processes to provide precipitation to all living organisms.</i>		

Water in the atmosphere

The atmosphere provides the earth with oxygen and water. All living creatures and organisms need water for survival on earth. This is why we want to know more about water in the atmosphere to ensure that we have a sustainable supply of water. It implies that we must take a closer look at our daily activities to ensure that all actions are contributing to the sustainability of the earth.

What is it? Different form of water in the atmosphere

Water has three forms in the atmosphere as indicated in the figure below:



Adapted from gwconsortium.org

All the different forms are evident in the atmosphere every day somewhere on the planet.

Solid format examples include – frost, snow and hail

Liquid format examples are dew and rain

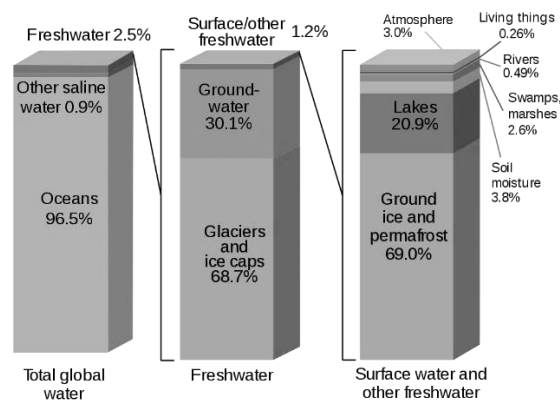
Gas format is water vapor. – an example of gas format is when you boil water and you see the steam that is released.

The water change to a form if we add energy(heat) in the atmosphere or it can change if the energy is reduced (when it cools down). It will only reach a solid if it is cooled down to below freezing point in the atmosphere – normally in winter and/or at night.

If water change from a gas form to a solid form or from a solid to a gas form it is called sublimation. – this is how snowflakes are formed.

Where is it? Water distribution on earth and atmosphere

Where is Earth's Water?

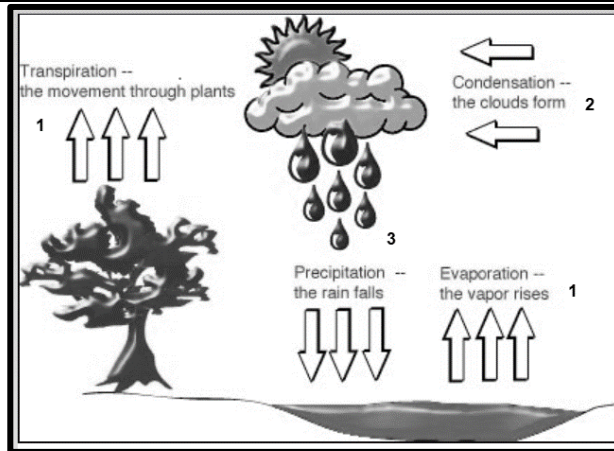


(Source: https://en.wikipedia.org/wiki/Water_distribution_on_Earth#/media/File:Earth's_water_distribution.svg)

The figure indicates how precious the freshwater resource is. We need to make sure that we protect and use the freshwater of the earth with great care.

Why is it there? –The water cycle -concepts and processes.

A simple diagram of the water cycle.



(Source: <http://www.mbgnet.net/fresh/cycle/concepts.htm>)

Investigate the concepts:

- 1- **Evaporation:** This is where the sun's energy is added to the water body changing the format of some of the water, from a liquid to a gas, i.e. water vapor.

Transpiration: is when the moisture in the leaves of plants receive more energy and some of the moisture change to a gas format- water vapor and is released into the atmosphere.

🔪 (Experiment -Take a clear plastic bag and place small plant in the bag for a few hours. Observe what happens.)

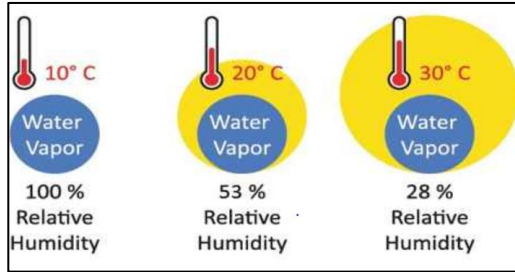


- 2- **Condensation** occurs when the water vapor rises due to the energy received, it starts to cool because the air uses the energy to rise until it cools down sufficiently to change from a vapor to droplets- a liquid to form clouds.
- 3- **Precipitation:** if the air cools down further it causes more and more droplets to form and when it becomes too many the cloud is oversaturated with water droplets the excess water droplets will fall to the ground in the form of rain or precipitation.

Key concepts:

Dew point temperature: The temperature at which water vapor change to a liquid.

Relative humidity: Refer to the amount of moisture in a cubic of air (1mx1mx1m) presented as a percentage of the maximum moisture what the cubic can hold. A practical example if a glass of water is half full, we refer to it as 50%, because if the glass is full the percentage will be 100%. The relative humidity is presented as a percentage. The nearer the percentage of moisture in the air is to 100 the greater the chance for precipitation. Refer to your textbook for the table to determine the relative humidity at a specific temperature.



(Source <https://qsstudy.com/physics/meaning-statement-relative-humidity>)

The same unit of moist warm air can contain more moisture than dry cold air.

Condensation level: This is the level(height) at which water vapor turn into liquid format. If we look at clouds it is the height at which the cloud base is. It normally looks that is on the same height.



(Source <https://sageography.co.za/wiki/grade-10/the-atmosphere/moisture-in-the-atmosphere/>)

Climatology:

Consolidation Activity 1 Term 1 Week 4 Lesson 4

1. Complete the experiment below. Give feedback on the observations you made.

Material needed:

- One clear bottle with cap. (glass if possible)
- Water – fill the bottle with about 3cm of water.
- Sunlight
- Your notebook
- Patience



Instruction:

- ✓ Take the bottle and fill it with about 3 cm of water.
- ✓ Place it in an area where it will be in sunlight.
- ✓ Record every hour what you observe in the bottle
- ✓ Keep recording for at least 6 hours e.g. from 9:00 to 15:00.
- ✓ Write a paragraph on your observations and the process that you observed. Refer in your paragraph to evaporation, dew point and condensation level.

Climatology:**Consolidation Activity 2 Term 1 Week 4 Lesson 4**

2.	Answer the question that follows:	
2.1.1	To change the water format in the atmosphere from a solid to a liquid A. Add water B. Add heat C. Reduce the heat D. Remove water	
2.1.2	To change the water format from a liquid to a solid the water ... A. must be cooled down. B. must be heated. C. must cool down to below freezing point. D. must be heated to above freezing point.	
2.1.3	The point at which gases turn in to liquid is called its A. Peak point B. Dew point C. Converting point D. Equilibrium point	
2.1.4	If the temperature of the air increases without additional water vapor being added at the air the relative humidity will likely? A. Increase B. Decrease C. Stay the same D. Temperature has no impact on relative humidity	
2.1.5	The factor influencing humidity includes A. Water B. Temperature C. Pressure D. osmosis	
2.2.	Explain how you will change an ice cube to a liquid only using natural resources.	
2.3	Explain the process of transpiration from plants.	
2.4	People can contribute to the process of transpiration. Use yourself as an example and describe one occasion that you can remember where this happened?	
2.5	If you take a cold bottle of water from the fridge and place it on a table for a few minutes you will observe some droplets on the side of the bottle. Describe the process that caused the droplet to form.	
2.6	Explain the difference between air being saturated and over-saturated.	