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UNIT 12 THE WATER CYCLE

SCHEME OF WORK

Suggested time frame: 8 periods (1 period is approximately 40 minutes.)

Lesson	No. of Periods	Learning Objective(s)	Process Skill(s)	Vocabulary	Resource(s) and Material(s)
1	4	• Describe the water cycle. • Create a piece of work about the water cycle in a diagram based on information from various sources. • Analyse the water cycle and its impact on events on Earth as well as the survival of living things. • Explain the parts played by evaporation and condensation in the water cycle. • Understand that the Sun is the main source of energy for the water cycle.	• Analysing • Comparing • Inferring • Observing	• Condense • Evaporate • Fresh water • Landslide • Water cycle • Water vapour	• **Textbook**, pp. 163–167 • **Activity Book**, pp. 113–118 • Internet • Sealable plastic bag, ruler, different coloured markers, water, blue food colouring, sticky tape • Beaker, hot water, Petri dish, ice cubes • Potted plant, water, two transparent plastic bags, two pieces of string
2	4	• State how human activities affect the water cycle.	• Analysing • Communicating • Inferring • Observing	• Deforestation • Drought • Flood • Global warming	• **Textbook**, pp. 168–174 • **Activity Book**, pp. 119–135 • Internet • Baking tray, dry sandy soil, large tray, thick book, watering can, water • Empty disposable plastic bottle (2L), penknife, dirty water, measuring cup, spoon, stopwatch, pencil, paper, activated charcoal, gravel, sand, cotton balls, coffee filter • Empty disposable plastic bottle (2L), plants, soil, sand, pebbles, activated charcoal, water, scissors, penknife, disposable plastic spoons Optional • Internet

Note: This unit is supported by PowerPoint Slides and an online Question Bank, which can be found at: *www.MCEduHub.com*

12.1 What Is the Water Cycle?
12.2 What Is the Impact of the Water Cycle on the Earth and Living Things?

Lesson 1

Duration of lesson: 4 periods

Learning objectives

- Describe the water cycle.
- Create a piece of work about the water cycle in a diagram based on information from various sources.
- Analyse the water cycle and its impact on events on Earth as well as the survival of living things.
- Explain the parts played by evaporation and condensation in the water cycle.
- Understand that the Sun is the main source of energy for the water cycle.

Process skills

- Analysing, communicating, comparing, inferring, observing

Vocabulary

- Condense, evaporate, fresh water, landslide, water cycle, water vapour

5E	Lesson	Resource(s) and Material(s)
Engage (10 min)	*(Process skills: Observing, analysing, communicating)* • Get pupils to look at Textbook p. 163 and ask them the following question: ➢ Have you ever wondered why water on the Earth does not run out? ○ The water cycle on Earth prevents water from running out. • Show pupils the infographic in the following link: https://www.nationalgeographic.org/photo/800px-water-cycle/#water-cycle • Guide pupils to understand how water moves from Earth to the sky, and back to the Earth. • Tell pupils that the water cycle consists of three parts — evaporation, condensation and precipitation.	• **Textbook**, p. 163 • Internet
Explore (30 min)	*(Process skills: Observing, analysing, inferring, communicating)* • Get pupils to look at Flashback on Textbook p. 164 and recall that water changes its state when it gains or loses heat. • Get pupils to complete Creative Science on Activity Book p. 117. • Tell pupils to complete question 2 only after observing changes in the sealable plastic bag. • Ask pupils the following questions: ➢ How do evaporation and condensation of water happen in this model? ➢ How does it happen in the real water cycle? ➢ What do you think would happen after condensation in this model? • Get pupils to recognise that the Sun is the main source of energy for the water cycle.	• **Textbook**, Flashback, p. 164 • **Activity Book**, Creative Science, p. 117 • Sealable plastic bag, ruler, different coloured markers, water, blue food colouring, sticky tape

5E	Lesson	Resource(s) and Material(s)
Explain (40 min)	*(Process skills: Analysing, inferring, communicating)* • Guide pupils to understand the process of water cycle using Textbook pp. 164–165. • Get pupils to use Language Connect on Textbook p. 165 to write three to five sentences to describe how you would feel as a drop of water going through the water cycle. • Go through Textbook pp. 166–167 to explain to pupils the impact of the water cycle on the Earth and living things. • Get pupils to use Explore on Textbook p. 166 to discuss with their classmates the life processes and daily activities that require water. • Get pupils to use Research on Textbook p. 164 to find out when water first existed on Earth.	• **Textbook**, pp. 164–167, Research, p. 164, Explore, p. 166
Elaborate (40 min)	*(Process skills: Observing, comparing, inferring)* Note: Prepare steps 1–3 of Activity 2, on Activity Book p. 115 one hour before the lesson. • Get pupils to complete Activity 1 on Activity Book pp. 113–114. • Get pupils to complete Activity 2 on Activity Book pp. 115–116.	• **Activity Book**, Activity 1, pp. 113–114 and Activity 2, pp. 115–116 • Beaker, hot water, Petri dish, ice cubes • Potted plant, water, two transparent plastic bags, two pieces of string
Evaluate (40 min)	*(Process skills: Observing, analysing, inferring)* • Draw the land, ocean, clouds and the Sun on the whiteboard. • Get pupils to fill in the changes in the state of matter that occur in the water cycle. • Get pupils to explain how each change in state happens. • Ask pupils why the water cycle is important. • Get them to list and explain the impact of the water cycle on the Earth and living things. • Get pupils to answer the questions in Quick Check on Textbook p. 167. • Get pupils to complete Activity 3 on Activity Book p. 118.	• **Textbook**, p. 167 • **Activity Book**, Activity 3, p. 118

12.3 How Do Human Activities Affect the Water Cycle?

Lesson 2

Duration of lesson: 4 periods

Learning objective

- State how human activities affect the water cycle.

Process skills

- Analysing, communicating, inferring, observing

Vocabulary

- Deforestation, drought, flood, global warming

5E	Lesson	Resource(s) and Material(s)
Engage (10 min)	*(Process skills: Communicating, analysing)* Note: Prepare step 1 under Procedure and Observations of Activity 4 on Activity Book p. 119 before the lesson. • Get pupils to watch the following video: https://www.nationalgeographic.org/media/urban-water-cycle/#urban-water-cycle • Ask pupils the following question: ➢ What does the water cycle involve other than the three processes? ○ Infiltration and runoff • Get pupils to understand that infiltration is when water enters the soil and that runoff is the flow of water from the surface of land. • Explain to pupils that these processes occur to return water to the water bodies.	• Internet
Explore (20 min)	*(Process skills: Observing, communicating)* • Get pupils to recall the processes in the water cycle. • Ask them why some places experience floods, while some places experience droughts. • Get pupils to think about the human activities that affect the water cycle. • Guide pupils to realise that water cycle is affected by changes in the Earth's atmosphere, such as the amounts of water vapour and carbon dioxide in the air. • Get pupils to complete Activity 4 on Activity Book p. 119.	• **Activity Book**, Activity 4, p. 119 • Baking tray, dry sandy soil, large tray, thick book, watering can, water
Explain (10 min)	*(Process skills: Observing, communicating, inferring)* • Ask pupils to think about the human activities that can affect the amount of water vapour and carbon dioxide in the air. • Guide pupils to realise that deforestation and burning of fossil fuels are examples of such activities. • Go through Textbook pp. 168–170 to explain how floods and droughts are results of changes in weather patterns caused by global warming. • Get pupils to realise that deforestation and burning of fossil fuels increase the amount of carbon dioxide in the atmosphere which results in global warming.	• **Textbook**, pp. 168–170, We Care and Quick Check, p. 170

5E	Lesson	Resource(s) and Material(s)
	• Get pupils to answer the question in the speech bubble: ➢ Dr Atom: How are living things affected when a flood or a drought lasts too long? ○ Plants and crops will die. There will be less food for animals and humans as a result. Hence, many lives will be lost. • Use We Care on Textbook p. 170 to emphasise the importance of caring for the environment. • Get pupils to answer the questions in Quick Check on Textbook p. 170.	
Elaborate (20 min)	*(Process skills: Observing, analysing)* Note: Prepare the "dirty" water before lesson. (Refer to the link below.) • Get pupils to understand that it is important to keep the environment clean to ensure that the water flowing back to water bodies will not be contaminated. • Carry out the experiment in the following link with pupils: https://kids.nationalgeographic.com/explore/books/how-things-work/water-wonders/ • Get pupils to understand that the actual clean-up process of polluted water is more tedious. • Use this experiment to emphasise the importance of keeping the environment clean. • Get pupils to read Science Today on Textbook p. 174 to understand the process of producing fresh water from seawater.	• **Textbook**, Science Today p. 174 • Internet • Empty disposable plastic bottle (2L), penknife, dirty water, measuring cup, spoon, stopwatch, pencil, paper, activated charcoal, gravel, sand, cotton balls, coffee filter
Evaluate (60 min)	*(Process skills: Analysing, evaluating, inferring)* • Go through What We Have Learnt on Textbook p. 171 and Science Glossary on Textbook p. 173 to recall the concepts and vocabulary learnt in this unit. • Get pupils to complete Test Yourself on Textbook pp. 172–173. • Get pupils to complete Let's Review on Activity Book pp. 120–122. • Get pupils to complete Revision Exercise on Activity Book pp. 123–135.	• **Textbook**, pp. 171–173 • **Activity Book**, Let's Review, 120–122 and Revision Exercise pp. 123–135
Additional Activity	*(Process skills: Evaluating, inferring)* Note: Give pupils instructions to bring a plastic bottle (2L) before the lesson. Get them to ask their parents to help them cut the bottle into two parts, 15 cm from the bottom, such that the bottom looks like a small pot. • Get pupils to carry out the following steps to build a terrarium: ➢ Cover the bottom of the bottle with sand of about 1 cm in height and add a layer of pebbles. ➢ Add about a spoonful of activated charcoal. ➢ Add soil to the bottle and ensure that it is 5 cm to 8 cm in height. ➢ Place the plant into the soil and pour some water. ➢ Slide the lid over the top of the terrarium base. • Get pupils to understand that they will not have to water the plant as a mini water cycle will take place in the terrarium. ➢ The plant gives out water vapour during respiration, which will condense into water droplets on the plastic bottle. ➢ The water returns to the soil where the plant can take it in through the roots again. ➢ The plant undergoes photosynthesis. Hence, the air supply is regulated in the terrarium.	• Empty disposable plastic bottle (2L), penknife, scissors, disposable plastic spoons, sand, pebbles, activated charcoal, soil, plant, water