Teacher's Manual

Theme: Matter in Nature

Learning Area: Preservation of Water Quality

Learning Objectives: To study the causes and effects of water pollution and preventives measures that should be taken

Elements Assessed: Element 1:Science Process Skill
                          Element 3: Scientific attitude and noble values

Construct: E1(C2,C4, C5, C6, C8)
                          E3(C17)

Scoring Table Guideline:

Element assessed	Construct/Criteria	Score	
E1:C2	C 2 : Classifying a) Identify the differences and similarities b) Classify according to common characteristics c) Use other criteria to group objects Explain method of classification used	3	Master all the criteria
		2	Master criteria (a) and (b) and state briefly the method of classification
		1	Able to show the idea of classification using criteria (a) and/or criteria (b)
E1:C4	C4 - Making Inferences (a) Make various possible Interpretations from an observation using past experiences. (b) Use information from an observation to make an initial conclusion. (c) Use the inference made as a tool to determine the following observation.	3	Able to master all the criteria and make inference correctly and logically.
		2	Able to master criteria (a) and (b).
		1	Able to make at least one interpretation from an observation.

	C 5 : Predicting (a) Use the previous or present data to predict a possible occurrence. (b) Use pattern as evidence in making prediction. (c) Determine the possible outcome from any activity. (d) Verify prediction based on a set of data of past experience	3	Master all the criteria and make a correct prediction based on an observation in any activity.
		2	Apply criteria (a), (b) and (c) to limited activity.
		1	Apply criteria (a) or (b) to make a partially correct prediction.
E1:C6	C6 - Communicating (a) Identify the general characteristic of a group of item. (b) Explain ideas (orally/written) record information. (c) Choose the suitable method (d) Prepare and plan required materials. (e) Prepare and plan required materials to be used.	3	Able to choose the appropriate method to present all the data correctly and accurately.
		2	Able to present only some of the data.
		1	Able to choose or arrange data only.
E1:C8	C 8 : Interpreting Data (a) Gather various data through observation. (b) Detect pattern from the information gathered. (c) State the relationship. (d) Make rational explanations based on the data gathered.	3	Master all the criteria and interpret data correctly
		2	Master criteria (a), (b) and (c).
		1	Extract at least a set of data and identify the pattern.
E3:C17	C17 Scientific Attitudes & Noble values (a) Intrinsic attitude (b) Extrinsic attitude (c) Thinking ability (d) Nobel values	4	Able to exhibit all four criteria continuously.
		3	Able to exhibit two or three criteria continuously.
		2	Able to exhibit two to three criteria.
		1	Able to exhibit only one criterion.

Student's Manual

Theme: Matter in Nature

Learning Area: Preservation of Water Quality

Learning Objectives: To study the causes and effects of water pollution and preventives measures that should be taken

Elements Assessed: Element 1
                        Element 3

Construct: E1(C2,C4, C5, C6, C8)
                        E3(C17)

Instructions:

1. You are required to carry out a group work of 3 students to collect evidence for water pollution in the form of pictures and etc. from various sources.

2. Information can be collected from a resource center or by accessing the internet. You are required to gather information on water pollution at least from 3 different locations such as industrial areas, housing areas and rural areas.

3. A plan of action for collecting information is proposed below.

Location	Type of Pollutants	Effect on Living Things	Preventive Measures
Area 1 Industrial Area (Shah Alam) (Picture)	• Toxic Chemicals • Acidic and Alkaline substances • Heavy Metals (Cu,Pb,Hg)	• Poison aquatic life • Change acidity of water • Accumulate and pass along food chain	• Implement laws regarding the disposal of industrial waste
Area 2 (Picture)			
Area 3 (Picture)			

E1:C6(b,c)
E1:C8(a,b)

4. Prepare a folio consisting of the plan above accompanied by a user manual. The user manual should have the headings in the following sequence:

3

a) Title

b) Introduction

    -General characteristics of water

    -Difference and similarities between clean water and polluted water

    -Observe the evidence obtained and identify the patterns that can be seen

c) Objectives of the project

E1:C6(a) E1:C2 (a,b)

d) Table of information as given above

e) Discussion

        -What are the possible factors that might cause water pollutions?

        -Predict what will be the effect if polluted water was consumed by the public?

        -What will be the condition of all living things if all the rivers are polluted in the future?

        -How will you promote public awareness to conserve and preserve water and its quality?

E:C4(a), C5

        -What are the relationship between the different location and the degree of pollution in that area? Explain why?

f) Conclusion

g) Reference source

5. You are given two weeks to complete the user manual.

E1:C8(d,c)

Example of Students Task Report

Title: Preservation of Water Quality

Introduction:

<u>**General Characteristics of Water**</u> **[E1:C2(a, b),C6(a)]**

-Water made up of 2 types of elements that is H and O

-Colourless, Odourless, Tasteless

-BP 100° C FP 0° C, Density 1g/cm^3

-Impurities increases BP and lowers FP

<u>**State differences & similarities between clean and polluted water**</u> **[E1:C2(a)]**

Type of Water	Clean Water	Polluted Water
Similarities	Consists of H and O	Consists of H and O
Differences	No impurities	Contains impurities

<u>**Objective:**</u> To study the causes and effects of water pollution and preventive measures that has to be taken

<u>**Table of Information**</u> **[E1:C6(b,c), C8(a,b)]**

Location	Type of Pollutants	Effect on Living Things	Preventive Measures
Area 1 Industrial Area(Shah Alam) (Picture)	• Toxic Chemicals • Acidic and Alkaline substances • Heavy Metals (Cu,Pb,Hg)	•Poison aquatic life •Change acidity of water •Accumulate and pass along food chain	• Implement laws regarding the disposal of industrial waste
Area 2 Housing area (Gombak) (Picture)	• Rubbish/Domestic Waste • Human Waste/Faeces • Untreated sewage	• Choke up streams and rivers • Flashfloods	• Reuse & Recycle • Educate the public • Build more public sewerage system
Rural Area (Hulu Langat) (Picture)	• Less pollutants	• No obvious effects	• Educate the public to maintain clean river

Discussion

What are the possible factors that might cause water pollutions? **[E1:C4(a), C5(a)]**

Human activities

Predict what will be the effect if polluted water was consumed by the public? **[E1:C4(b)]**

Public will be poisoned and exposed to many kinds of diseases

What will be the condition of all living things if all the rivers are polluted in the future? **[E1:C5 (c,d)]**

It will extinct

How will you promote public awareness to conserve and preserve water and its quality?

Through education, seminars, media campaign, exhibition and talks

What are the relationship between the different location and the degree of pollution in that area? Explain why? **[E1:C8 (d,c)]**

The higher the human activities in the area, the higher the degree of pollution. This is because human activities produce lots of water pollutants that pollute the water.

Conclusion

Rivers in the industrial areas are the most polluted followed by rivers in the housing areas and rural areas. This shows rapid human activities is the main cause of water pollution and many preventive measures can be taken to control water pollution in the future.

Reference Source

Newspaper, Websites, Educational Magazine, Reference books, Government Agencies