

Waist deep in Waste – Necessity or Irresponsibility?

Developers:

Institute: ICASE
Country: South Africa



Teacher's Guide

This module is intended to

- (a) illustrate the problem of waste disposal especially of plastics
- (b) determine ways to identify different plastics
- (c) introduce the concepts of thermoplastic and thermosetting plastics.



Suggested Teaching Strategy

A suggested lesson breakdown assuming students have had prior experience in creating a survey, devising laboratory experiments and have gained proficiency in handling laboratory equipment, If these conditions are not met, then the number of lesson may need to double.

Lesson 1

At the end of this lesson students are expected to be able to :

- a) put forward ideas for handling the plastic waste situation
- b) design a well sampled survey to determine the average amount of plastic waste discarded

Lesson 2

At the end of this lesson students are expected to be able to:

- a) analyse the outcomes of the survey
- b) create a report on the survey findings

Lesson 3

At the end of this lesson, students are expected to be able to :

- a) carry out tests on burning different plastics
- b) suggest how the products of burning can be identified
- c) distinguish between thermoplastic and thermosetting materials

Lesson 4

At the end of this lesson, students are expected to be able to :

- a) put forward a justified decision on how best to deal with waste, especially plastic waste.

Suggested Approach

1. The teacher guides the students to read the scenario.
2. In groups, the students discuss the problems of the discarding of waste and put forward ideas for handling the situation. The ideas are discussed as a class.
3. Students carry out task 1 by designing, in groups, how they could carry out a survey. The groups then pool their ideas.
4. The teacher guides the students to carefully consider how the sample can be made representative. Students make a careful record of the resulting survey plan and the questions for the questionnaire are validated by whole class discussion. Different groups can use different samples.
5. After the students have carried out their survey, the results of the survey are analysed. Each group makes a report. The reports are then presented to the rest of the class. Each group take care to present their findings to the class in a suitable format.
6. Students are guided to consider the problem of separating waste and how to recognise various forms of plastic waste. The teacher asks the students, in groups, to carry out experiments on different forms of plastics to see if they can be identified, whether thermoplastic and thermosetting plastics can be identified and what hazards are associated with the burning of plastics. Students devise tests to determine products formed on burning plastics and carry them out after the teacher has given permission.
7. In groups, students consider how to handle waste. After discussing their ideas, the students create role playing groups and decide whether it is appropriate and feasible to close, move or rehabilitate rubbish dumps. The outcomes from each group are compared and a class decision is formulated.



Achieving the Objectives

Objective	To be achieved by
1. decide, with justification, the most appropriate way to deal with plastic waste	<i>students taking part in group discussions</i>
2. classify plastics as thermoplastic or thermosetting	<i>students working in groups follow a workshop</i>
3. design and carry out an experiment to test gases liberated when plastics are heated and identifying the products formed.	<i>students in groups develop a procedure to test gases and when giving the permission by the teacher carry out the experiment</i>
4. carry out a survey and analyse, organise and critically evaluate findings.	<i>students work in groups to carry out their survey and analyse</i>
5. cooperate by discussing meaningfully, listen to others opinions, and reach consensus in a group	<i>students work in groups and discuss</i>
6. communicate effectively using language skills and appropriate visual aids and present the findings from the survey in a meaningful way to the class	<i>students take part in oral discussion their groups and record their findings in their notebook</i>
7. explain the term plastics and the classification into thermoplastic and thermosetting	<i>students record the explanations as part of the written work</i>