Waste management

Lesson plan and teacher's notes · Form 1 Biology · 1 period of 40 minutes

School	(write school name)	**Teacher**	(write name)
Date	(date)	**Class**	Form 1
Subject	Biology	**Enrolment**	Boys ___ Girls ___ Total ___
Time	40 minutes	**Topic**	Waste management

Learners sort waste into wet and dry waste and into categories, find the sources of waste in a local area, explain the benefits of a waste-free environment, describe ways of managing waste including the three Rs, incineration and correct disposal, and name challenges communities face. Examples come from the school grounds and a village near the main road.

Specific outcomes

By the end of the lesson, learners should be able to:

1. Sort waste into wet and dry waste and into categories such as metals, plastics, glass and left over foods
2. Identify the sources of waste in a local area and the factors that cause waste to be produced
3. Explain the benefits of living in a waste-free environment
4. Describe ways of managing waste, including the three Rs, incineration and correct disposal
5. Identify challenges communities face that lead to waste piling up and suggest solutions

Prior knowledge

- Everyday things people throw away
- Plastics, glass, metals and food as materials
- Keeping the school and home clean

Teaching and learning materials

- chalk and board
- exercise books
- gloves and bags if available
- manila paper and markers if available

References

Ministry of Education (CDC) Form 1 Biology syllabus and module; 25Schools learners' note: Waste management.

Lesson development

Stage and time	Teacher activities	Learner activities
Introduction **5 min**	Ask learners what they threw away today and where it went. Lead them to see that waste piles up when nothing is done about it. Write the title and key words.	Say what they threw away today and copy the title and key words.
Development: sorting and sources **10 min**	Explain the waste audit: groups collect waste, record the types they find and group it as wet or dry waste. Explain waste source mapping and the categories: metals, plastics, glass and left over foods.	Copy the categories and list the waste they see in the school grounds.
Development: managing waste **10 min**	Explain the stages of waste management: collection, transportation, processing, recycling and disposal. Explain that a plan should include the three Rs, incineration and correct disposal in designated places, and name the benefits of a waste-free environment.	Copy the stages and the benefits in their books.
Practice **10 min**	Give the scenarios on the school yard and the village market. Move around and check that learners use the correct categories and name the right activities.	Work the scenarios in groups, then share answers.
Conclusion **5 min**	Ask groups to name one challenge communities face and one solution. Explain that waste-free zones must be sustained. Set the homework.	Answer orally and copy the homework.

Teacher's content notes

Read these before the lesson. They are what you need to know, not what to copy onto the board.

Waste audit

In a waste audit, groups of four or five collect waste from a set area of the school or community, observe and record the types they find, and group it as wet or dry waste. They record the findings in a data table or chart and present them. Gloves, bags and a first aid kit are used for safety.

Sources of waste

In waste source mapping, learners draw a map of their local area and label the sources of waste. They then discuss the factors that cause waste to be produced at each source.

Benefits of a waste-free environment

Learners discuss the benefits in groups. The module names reduced waste management costs and a cleaner living environment. A zero-waste challenge with posters can be run at school and extended to homes, and its purpose is attitude and value change.

Managing waste

Waste management involves collection, transportation, processing, recycling and disposal. Learners separate waste into metals, plastics, glass and left over foods and make a plan that includes the three Rs, incineration and correct disposal in designated places.

Challenges

Communities face challenges that lead to waste accumulating. Groups record the challenges and possible solutions on a worksheet with the columns number, challenge and possible solution, then present.

Waste-free zones and awareness

Learners plan and create waste-free zones in the school, and the zones must be sustained. They also design posters in the local language about the impacts of waste and proper disposal, display them to the public, discuss the challenges and repeat the campaign.

Questions to ask during the lesson

Question	Expected answer
A teacher near Feira asks learners to collect waste from the school yard and group it. The learners find a bottle, a food wrapper, a tin and some left over food. (a) Name the two main groups used in a waste audit. (b) Name the category each item belongs to. (c) Say how the findings are recorded.	(a) Wet waste and dry waste. (b) The bottle and wrapper are plastics, the tin is a metal and the food is left over food. (c) In a data table or chart.
Learners at a school in Luangwa draw a map of their area and label the places where waste comes from. (a) Name this activity. (b) Say what the learners discuss next. (c) Say why this activity is useful.	(a) Waste source mapping. (b) The factors that contribute to waste generation at each source. (c) It shows where waste is produced and where management is needed.
A group near Feira wants to manage the waste it collected so that it does not pile up. (a) Name the three things the plan should include. (b) Name the stages of waste management. (c) Say where waste should be disposed of correctly.	(a) The three Rs, incineration and correct disposal. (b) Collection, transportation, processing, recycling and disposal. (c) In designated places.

Worked examples for the board

Sorting waste into categories

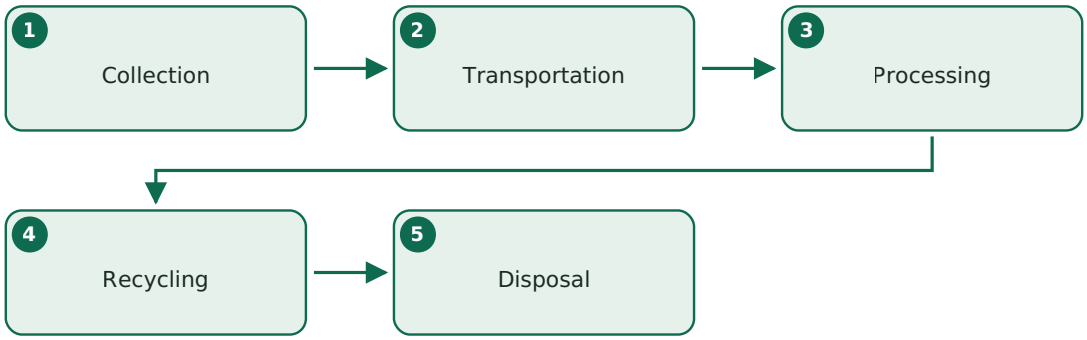
A group finds plastic bottles, food wrappers, broken glass, metal scraps and left over food. Bottles and wrappers go under plastics, broken glass under glass, scraps under metals and food under left over foods. The group records them in a table and presents.

Planning for one category

A group collects plastic bottles. Its plan names the three Rs, incineration and correct disposal in a designated place. The group then carries out the plan on the waste it collected.

Board plan

Write the title and key words. Left: the waste audit and the categories. Centre: the stages of waste management. Right: the benefits of a waste-free environment and what a waste plan includes.



Stages of waste management

Mistakes to expect

Learners often think	Put it right
Waste management only means throwing waste away.	Waste management involves collection, transportation, processing, recycling and disposal of waste, all of which reduce its negative impact on the environment.
A waste-free zone needs to be created only once.	The waste-free zones created must be sustained, so the work continues after the zone is set up.
Waste is just a school problem.	Learners reach out to the community with posters about the impacts of waste and proper disposal, and extend the campaign to their homes.
A waste management plan only needs one method.	The plan should include the three Rs, incineration and correct disposal of wastes in designated places.

Differentiation

Learners who struggle

Give learners a table with the headings metals, plastics, glass and left over foods and a list of waste from the school grounds, and let them copy each item under the correct heading before they say whether it is wet or dry waste.

Learners who finish early

Ask learners who finish early to write a short plan for the waste in one category, using the three Rs, incineration and correct disposal, and to name one challenge their community would face in carrying it out.

Hearing or visual impairment

For learners with visual impairment, let them handle clean samples such as a bottle, a tin and a wrapper and name the category aloud. For learners with hearing impairment, write each key word and each stage on the board and use the flow diagram.

No projector, no printing

Use waste already lying in the school grounds, collected with whatever protection is available, and draw the tables on the board. Learners work in groups without charts or manila paper.

If time is short

Skip the benefits stage and work only the sorting and managing waste scenarios; set the rest as homework.

Evaluation

Question or task	A correct answer shows
A group of learners at a school near Feira collects waste from the school yard and finds plastic bottles, food wrappers, broken glass, metal scraps and left over food. (a) Sort the items into categories. (b) Say how the group should record its findings. (c) Name one safety item they should use.	(a) Plastics: bottles and wrappers. Glass: broken glass. Metals: scraps. Left over foods: food. (b) In a data table or chart. (c) Gloves, with a first aid kit nearby.
A village near the main road has waste piling up beside the market. Learners are asked to help the community. (a) Name one activity that shows where the waste comes from. (b) Say how learners can raise awareness among the people. (c) Say why they should use the local language.	(a) Waste source mapping, drawing a map and labelling sources of waste. (b) By designing posters about the impacts of waste and proper disposal and displaying them to the public. (c) So that the people in the community understand the message.

A school near Feira wants to keep its yard free of waste for the whole year. The learners plan a waste-free zone and create it. (a) Say what must be done after the zone is created. (b) Name two benefits the school may notice. (c) Say what the learners should document.	(a) The zone must be sustained. (b) Reduced waste management costs and a cleaner living environment. (c) Their experiences, the challenges they faced and the benefits they noticed.

Homework

A learner at a school near Feira collects waste from the school yard and wants to make a plan for it. (a) Name three things the plan should include. (b) Name the five stages of waste management. (c) Give one benefit of a waste-free environment.

Extra practice with answers

Question	Answer
1. A group of learners at a school near Feira collects waste from the school yard and finds plastic bottles, food wrappers, broken glass, metal scraps and left over food. (a) Sort the items into categories. (b) Say how the group should record its findings. (c) Name one safety item they should use.	(a) Plastics: bottles and wrappers. Glass: broken glass. Metals: scraps. Left over foods: food. (b) In a data table or chart. (c) Gloves, with a first aid kit nearby.
2. A village near the main road has waste piling up beside the market. Learners are asked to help the community. (a) Name one activity that shows where the waste comes from. (b) Say how learners can raise awareness among the people. (c) Say why they should use the local language.	(a) Waste source mapping, drawing a map and labelling sources of waste. (b) By designing posters about the impacts of waste and proper disposal and displaying them to the public. (c) So that the people in the community understand the message.
3. A school near Feira wants to keep its yard free of waste. The learners plan a waste-free zone and create it. (a) Say what must be done after the zone is created. (b) Name two benefits the school may notice. (c) Say what the learners should document.	(a) The zone must be sustained. (b) Reduced waste management costs and a cleaner living environment. (c) Their experiences, the challenges they faced and the benefits they noticed.
4. Learners in a community near Feira discuss why waste piles up in their area and want to suggest answers. (a) Name the worksheet columns they use. (b) Say what each group does after filling the worksheet. (c) Say what the learners do after the campaign discussion.	(a) Number, challenge and possible solution. (b) Presents its findings to the class. (c) They repeat the campaign.

Answers to the learners' check-yourself questions

1. Name the five stages involved in waste management.
   Collection, transportation, processing, recycling and disposal.

2. Name the two main groups into which waste is sorted in a waste audit.
   Wet waste and dry waste.
3. Give two benefits of living in a waste-free environment.
   Reduced waste management costs and a cleaner living environment.
4. What three things should a waste management plan include.
   The three Rs, incineration and correct disposal of wastes in designated places.
5. Why must a school waste-free zone be sustained.
   A zone only keeps waste from accumulating if the work continues after it is created.
6. A group of learners at a school near Feira collects waste from the school yard and finds plastic bottles, food wrappers, broken glass, metal scraps and left over food. (a) Sort the items into categories. (b) Say how the group should record its findings. (c) Name one safety item they should use.
   (a) Plastics: bottles and wrappers. Glass: broken glass. Metals: scraps. Left over foods: food. (b) In a data table or chart. (c) Gloves, with a first aid kit nearby.
7. A village near the main road has waste piling up beside the market. Learners are asked to help the community. (a) Name one activity that shows where the waste comes from. (b) Say how learners can raise awareness among the people. (c) Say why they should use the local language.
   (a) Waste source mapping, drawing a map and labelling sources of waste. (b) By designing posters about the impacts of waste and proper disposal and displaying them to the public. (c) So that the people in the community understand the message.

Teacher's reflection

What went well:

What I will change next time:

Learners who need follow-up: