Waste Management in Education - Intersen

Written by:
Liezel Blom

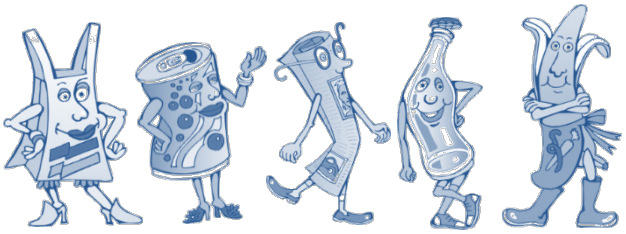
Edited by:
Michele van Loggenberg

Technical support by:
Dreyer Lötter
Mark Hageman
Maryke Hageman

Printed by:
Cytocento (PTY) Ltd

E-mail: Evodia.Boonzaier@pgwc.gov.za
Website: www.westerncape.gov.za/eadp

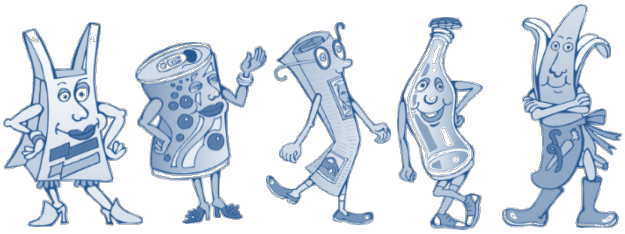
ISBN: 978-0-620-54521-1



WAME Game





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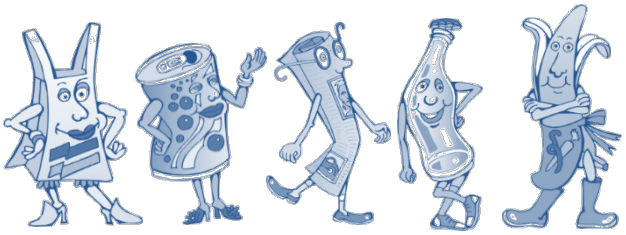


Why work with waste at school?

Problem Statement

South Africa produces 470 million tonnes of waste a year. Each person produces almost 2kg of domestic waste **A DAY**. Most of this waste is dumped and buried in budfill or waste dump sites. This causes precious resources to be wasted and the physical , state of many of the landfill sites create **HUGE** environmental problems, as well as **HEALTH** problems for those line close by. This situation is totally unacceptable and unsustainable.

"The government will promote the education and empowerment of South Africa's people with regards to integrated pollution and waste management by increasing their awareness of and concern for pollution and waste, and assisting in the developing of the knowledge, skills, values and commitment necessary for successful integrated management."
http://easd.org.za/sapol/polwp6&7.htm#7.2

How are you going to create awareness and concern for waste at your school?

The Bill of Rights

The most pertinent fundamental right in the context of integrated pollution and waste management is the Environmental

Right (s 24) which provides that:

"Everyone has the right

a. to an environment that is not harmful to their health or well-being; and

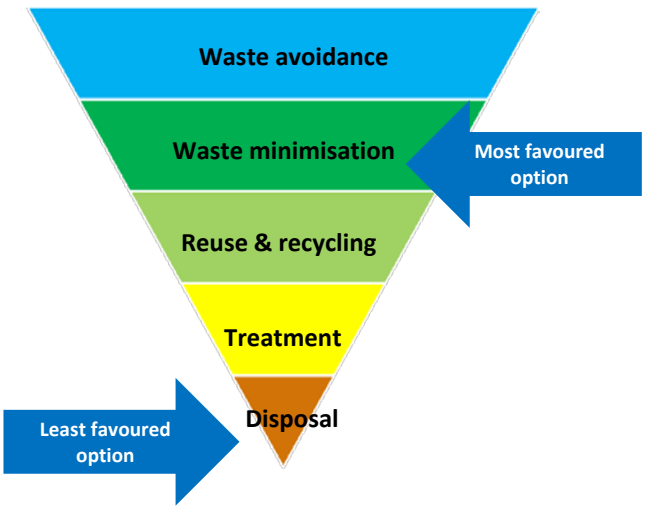
b. to have the environment protected, for the benefit of present and future generations, through reasonable legislative and other measures that

(i) prevent pollution and ecological degradation;

(ii) promote conservation; and
(iii) secure ecologically sustainable development and the use of natural resources while promoting justifiable economic and social development.

This section of the Bill of Rights guarantees the people of South Africa the right to an environment not detrimental to human health or well-being, and specifically imposes a duty on the State to promulgate legislation and take other steps to ensure that the right is upheld and that, among other things, pollution and ecological degradation are prevented.

What can be done to minimise the impact of waste?

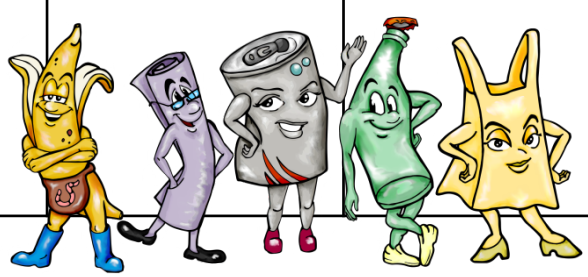


1. Our environment

Subject: Life Skills
Objective: To make learners aware of waste around them.

CAPS link:

Grade 4 ✔	Grade 5 ✔	Grade 6 ✔	Grade 7 ✔
Term 4 **Personal and social well-being** **Topic: Health and environmental responsibility** Healthy environment and personal health: home, school and community • Examples of environments that are unhealthy: pollution (air, water and land) including illegal dumping sites • Dangers of unhealthy environments to personal health • Strategies to keep environments healthy: conservation of environment • Celebrating Arbor Day **Creative arts: Performing arts** **Topic: Read, interpret and perform** Animation (bringing to life) of objects (props, puppets) to portray a character or tell a simple story	**Term 3** **Personal and social well-being** **Topic: Health and environmental responsibility** Safety measures at home and the environment:. Harmful household products and medication (hazardous waste).	**Term 4** **Creative arts: performing arts** **Topic: Improvise and create** **Optional: Puppetry** Basic hand and/or head puppets, using found or recycled materials, inspired by an African story (traditional or contemporary) NOTE: ready-made puppets may also be used **Topic: Read, interpret and perform** **Optional: Puppetry** A puppet performance, using dialogue, puppet movement and musical accompaniment. Consider characters, relationships and structure (conflict and resolution).	**Term 4** **Personal and social well-being** **Topic: Health, social and environmental responsibility** • Concept: environmental health • Local environmental health problems • Community and individual projects and strategies to prevent and deal with environmental health problems • Problem-solving skills: an action plan to address an environmental health problem and formulate environmentally sound choices and actions



Resources needed:			
Puppet show	Puppet show box	Poster	Resources for finger puppets (Grade 2)
Hand puppets		Worksheets	

Story

Grade 4–7

Read the story to the learners.

- Ask the learners what the story tells them.
- Ask them why they think people litter.

Grade 4

Picture

Give learners the community picture.

- Ask them to share in groups where they would like to live.
- Why is it dangerous to live in an unhealthy environment?
- How would you keep your environment healthy? Clean?

Grade 5

Picture

Give learners the community picture. Ask them:

- Why is it not safe to live in the environment on the left?
- Why is it safe to live in the environment on the right?

Grade 6

Picture

Give learners the community picture.

Ask the learners:

- What are the different categories of solid waste? (glass, paper, plastic, metal and organics.)
- What tells us more?

So then the answer could be:
(The sorting bins - solid waste can be recycled but we first need to sort it using sorting bins.)

Hand puppets

Show the learners the puppets used in the Foundation Phase. In groups, learners brainstorm how they can make basic hand or head puppets using old materials (waste). Learners should give each puppet an 'African touch'. See Grade 6 worksheet.

Grade 7

Picture

Give learners the community picture. Ask them to list all the environmental health problems. Ask learners to identify the same or similar problems in their community.

Tell learners that they have to come up with an action plan to address the environmental health problem in their communities.

Worksheets

Grade 4–7

Learners use or complete the worksheets.

Story 1: The Waste Busters clean up

One way in which people get rid of rubbish is to throw it on the ground, in water or on sidewalks. Learners are given a practical lesson on the difficulties of waste in the environment by participating in a waste collection. Activities include making and displaying a collage and a team competition to pick up as much waste as possible.

This activity will take place in and outside the classroom.

Peter Paper and Milly Metal arrive at the school together. All the children are waiting for them in the classroom. Milly is jolly, but Peter's chin is trembling as he says: "Hello, children. I'm so unhappy today."

Milly Metal looks worried: "Why, Peter? What is wrong?" Peter walks to the window and tells the children to look. The whole schoolyard is littered with paper and other garbage. The Litterbugs were there!

Peter Paper's eyes are full of paper tears just like confetti. "Kids, I just can't stand it to see the litter lying around on your schoolgrounds." Milly Metal tries to hug Peter and make him feel better. "Hey, Peter, don't you cry. I'm sure the children will help us clean up." He wipes the paper tears from his face and looks cheerful again.

All the children stand around Peter and Milly. She looks at the children: "Hmmm... You are... oh yes! You are the Waste Busters!" Peter jumps for joy and claps his hands: "Yes, you are the Waste Busters!"

Milly Metal and all the children run out together: "Come on! We have to collect all the litter and bring it to the classroom."

Peter Paper is all smiles again: "Yes, let's zap the mess the Litterbugs made!" Before you could say one-two-three all the paper, tins, and other throwaway things were picked up. Peter and Milly and all the children cheer and dance. "We're so glad our environment is clean now."

Picture

Keeping places clean

Grade 4

Name: _____

Read the following on pollution.

Pollution

You can't miss it, can you? It's all over our planet. It makes people, animals and plants sick or even kills them. It even causes climate change. Humans are causing it and they should stop it, because the future belongs to them.

Examples of pollution:

Air pollution: noise pollution, smoke, exhaust gases of vehicles, combustion of coal and acid rain.

Water pollution: industrial, mining and agriculture waste and sewage disposal, and domestic waste.

Land pollution: soil pollution and waste disposal.

Answer the following questions.

a. What is pollution?

_____

_____

b. Name the different types of pollution.

_____

_____

_____

c. Look at the picture and read the story. What type of pollution do we see and read about?

_____

d. Is an environment **unhealthy** if it is polluted? Why?

_____

_____

_____

e. How can we make our environment healthy?

_____

_____

_____

_____

f. How can we use **Arbor Day** to make our environment more healthy?

_____

_____

g. Draw a picture of a healthy environment.

A safe environment

Grade 5

Name: _____

Read the following on a safe environment.

Our Constitution says that everyone has the right to a safe and healthy environment.

The environment is our home. The quality of our environment affects all of us, no matter where we live. If it is not healthy, we will not be healthy either. When people abuse the environment, it affects us all. If water is polluted, if the air is full of smoke and chemicals, if food contains poisons, and if rubbish lies around, people, plants and animals get sick.

All people have a responsibility to use the environment in such a way that it would be protected for us, our children, and our grandchildren.

Many people do not understand why we need to worry about the environment. They think people's needs and environmental needs cannot both be looked after, and that people are more important than the environment.

The environment is the whole planet on which we live. Everything (wind, trees, animals, insects, people, etc.) forms part of the living system of earth.

Source: http://www.etu.org.za/toolbox/docs/government/environmental.html

Answer the following questions.

a. What is a safe environment?

_____

_____

_____

b. What is an unsafe environment?

_____

_____

_____

c. What is hazardous waste?

_____

_____

_____

d. What would you do to be a ‘rommelheld’?

_____

_____

e. Cut out pictures of objects that are hazardous/not hazardous.

Hazardous	**Not hazardous**

Puppet making

Grade 6

Name: _____

In groups you are going to make waste puppets and write a puppet show.

What you need:
Option 1: Own puppets from waste materials.
Option 2: Hand puppet templates and materials. (See next page.)
Option 3: Finger puppets and materials. (See next page.)

What to do:
In groups of five, learners prepare a puppet show using the Foundation Phase scene 1 dialogue, or they create their own puppet show dialogue.

Your puppet show should include:
- puppet movements
- music

You will perform your puppet show to:
- the Foundation Phase learners or
- the whole school.

Puppet show

Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
1	2	3	4	5	6	7
0-29 %	30 -39 %	40 – 49 %	50 – 59 %	60 – 69 %	70 – 79 %	80 – 100 %
Cannot make a puppet.	Create a puppet with help.	Create some components of the puppet.	Create most components of the puppet..	Create a puppet.	Create a puppet and perform a puppet show.	Create an extra ordinary puppet and puppet show.

An action plan

Grade 7

Name: _____

You are going to write out an action plan to address the health problem in your area.

What is an action plan?

_____

_____

_____

_____

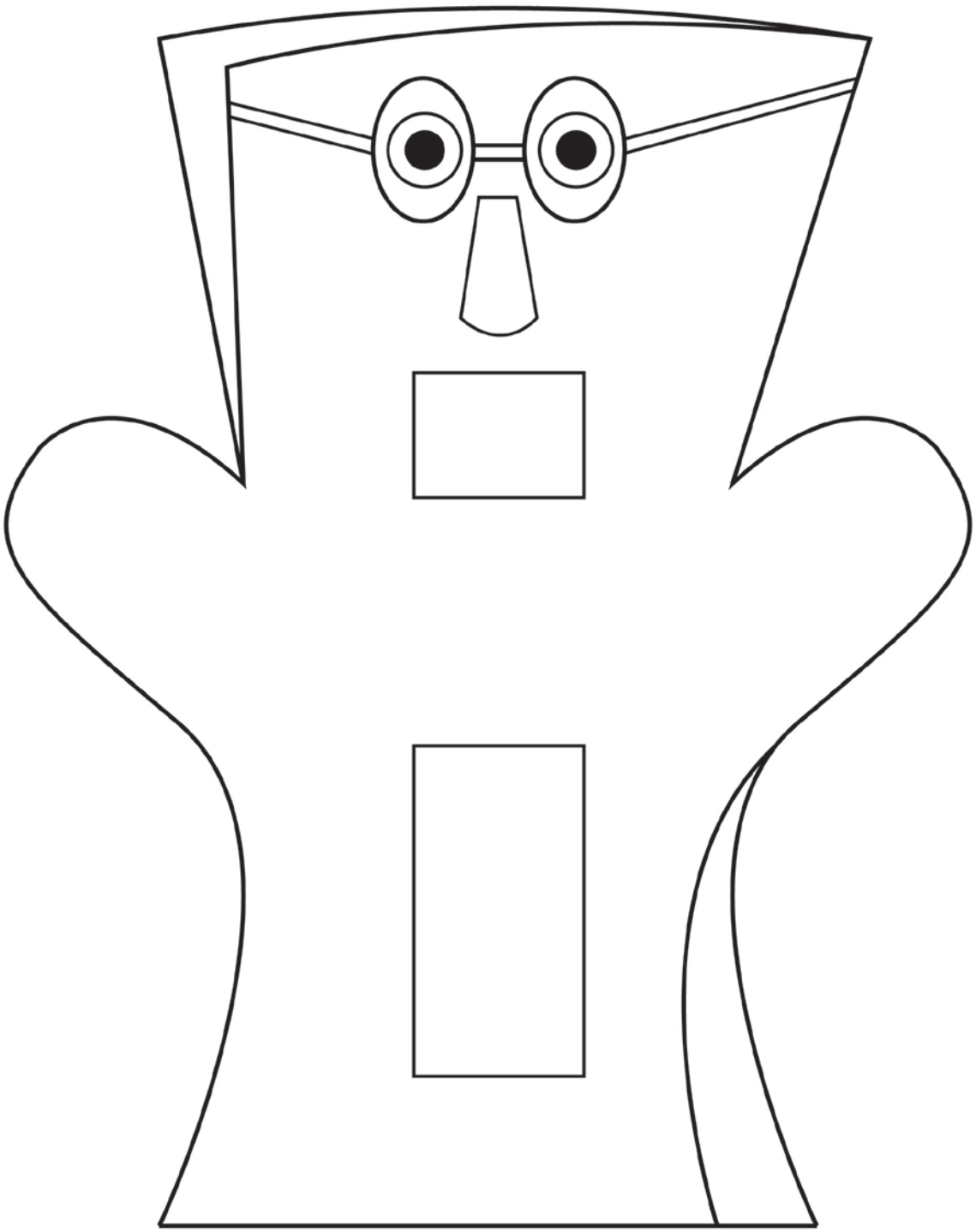
These questions might help you to come up with your action plan.

- Where am I now?
- Where do I want to be?
- How do I get there?
- Taking action.
- Where am I now?

First identify the health problem in your area and then write out your action plan.

Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
1	2	3	4	5	6	7
0-29 %	30 -39 %	40 – 49 %	50 – 59 %	60 – 69 %	70 – 79 %	80 – 100 %
Cannot write an action plan.	Started to write an action plan.	Wrote an action plan with a lot of support.	Wrote an action plan with some support.	Wrote an average action plan.	Wrote a good action plan.	Wrote an extra ordinary action plan.

Hand puppet template



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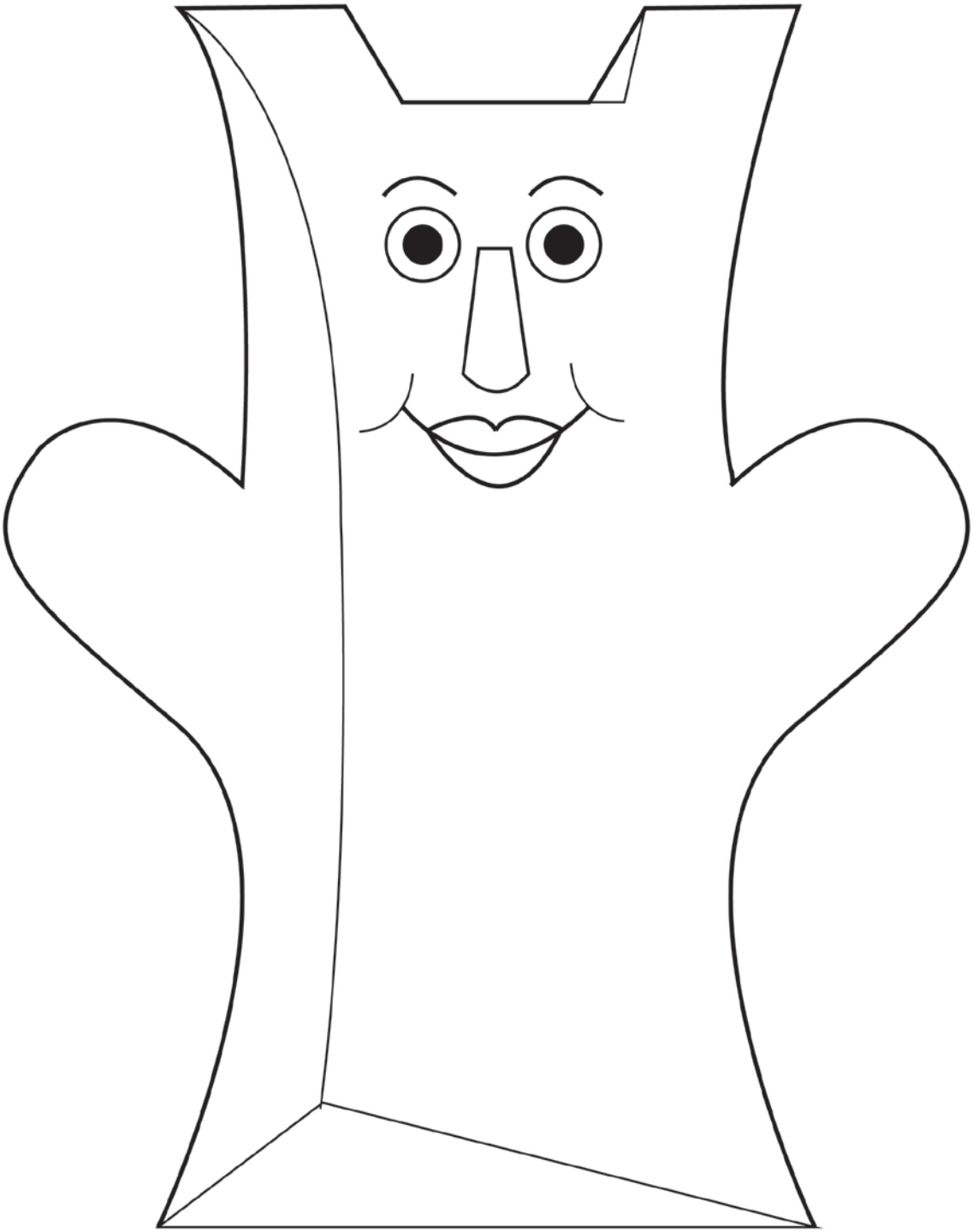

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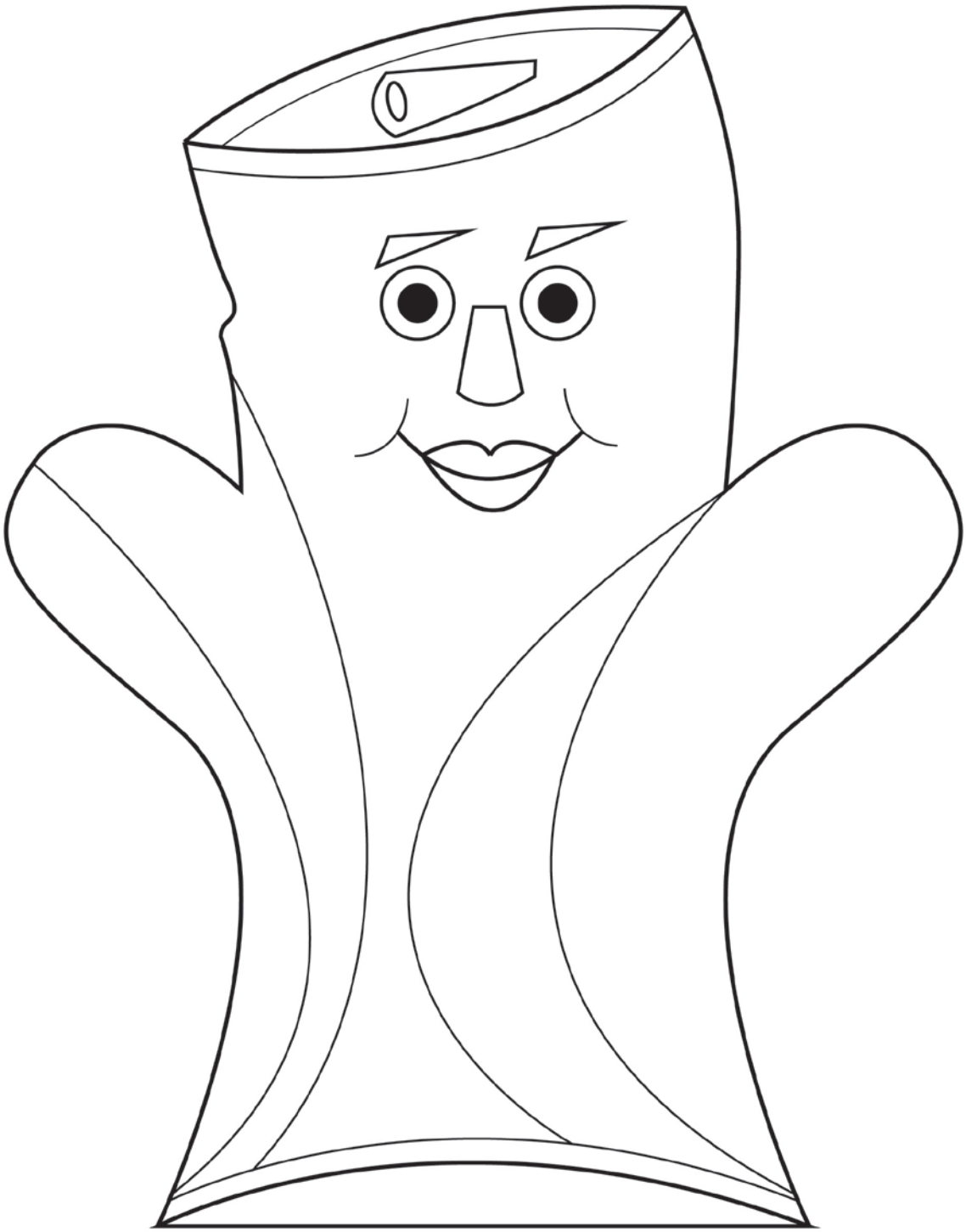

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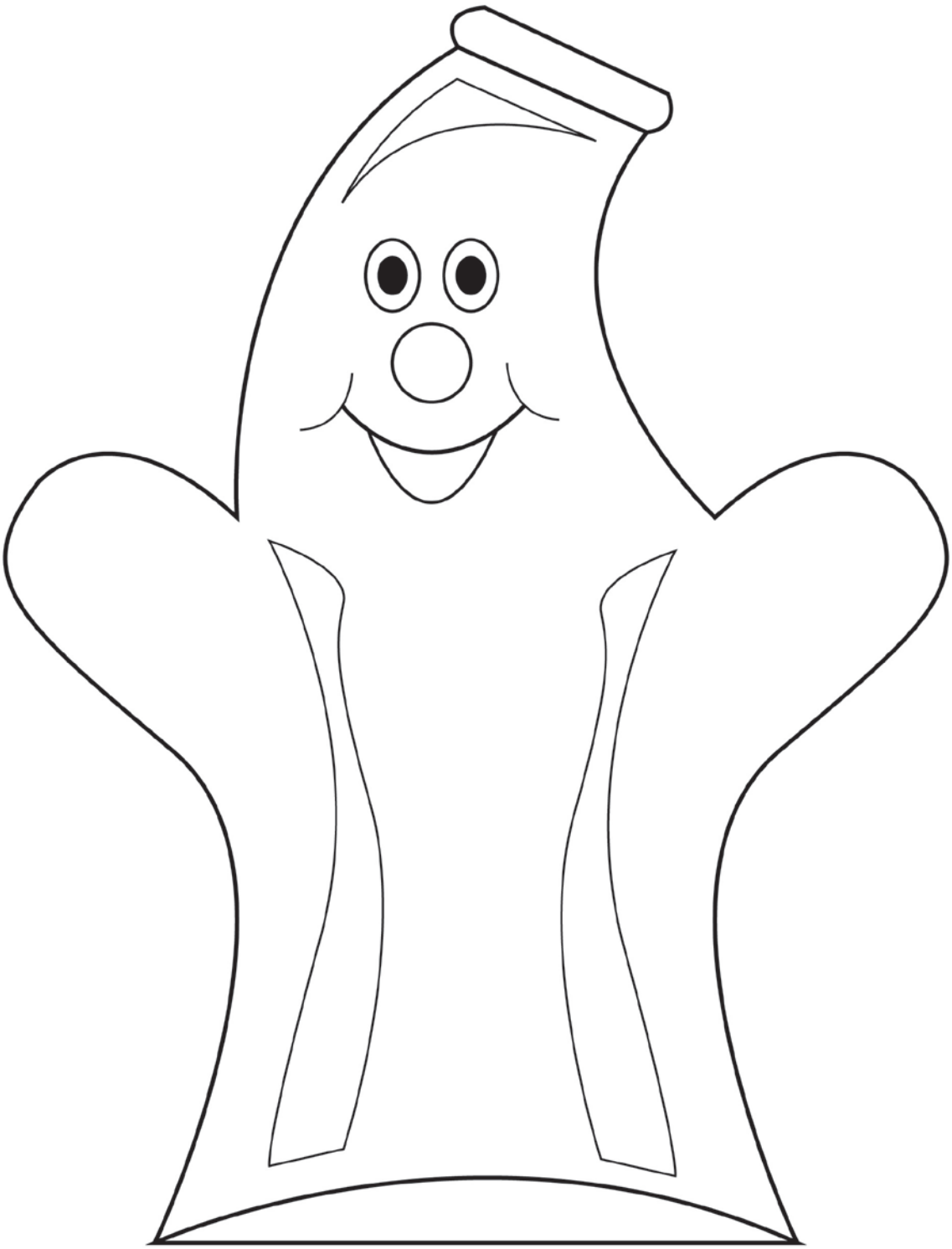

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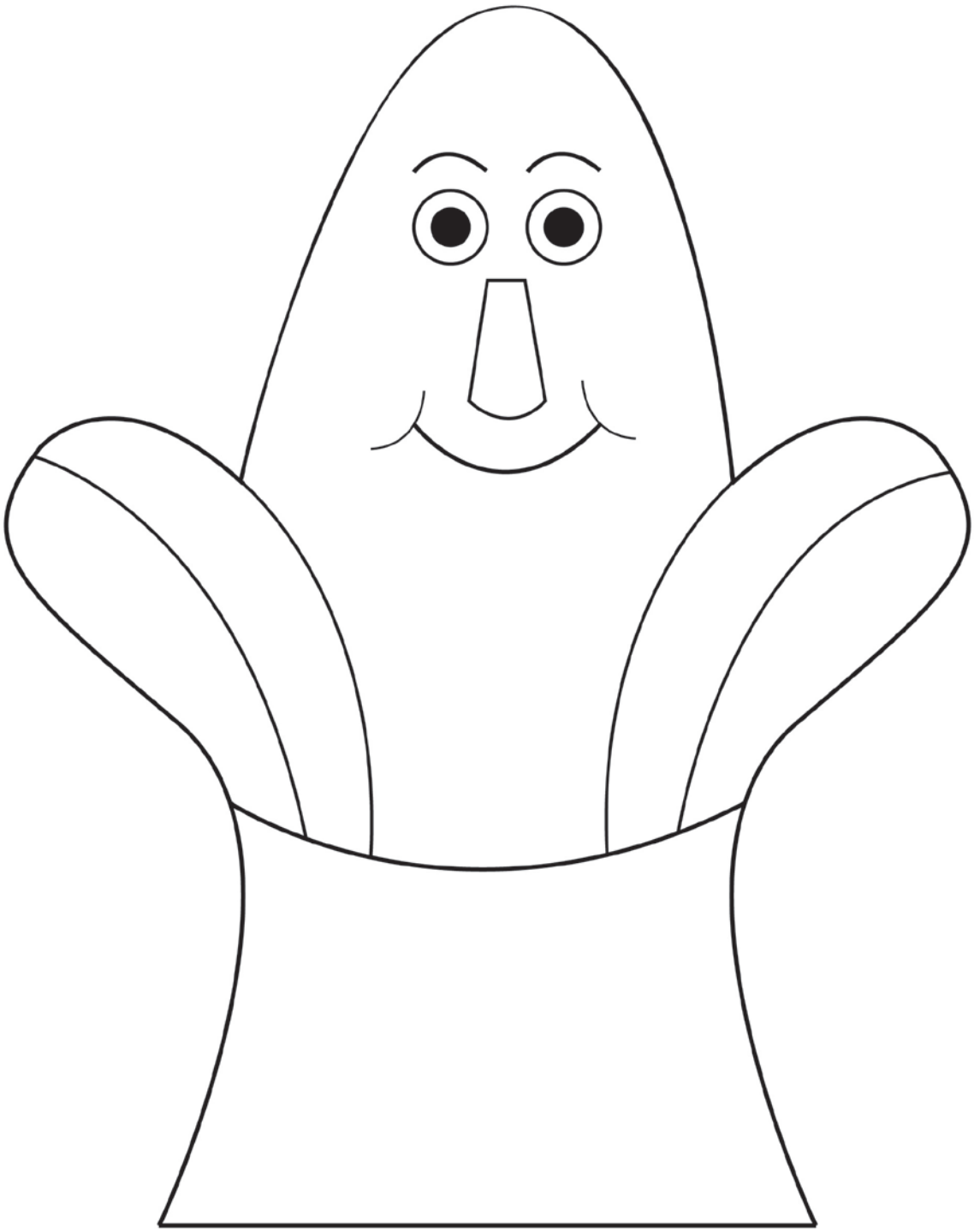
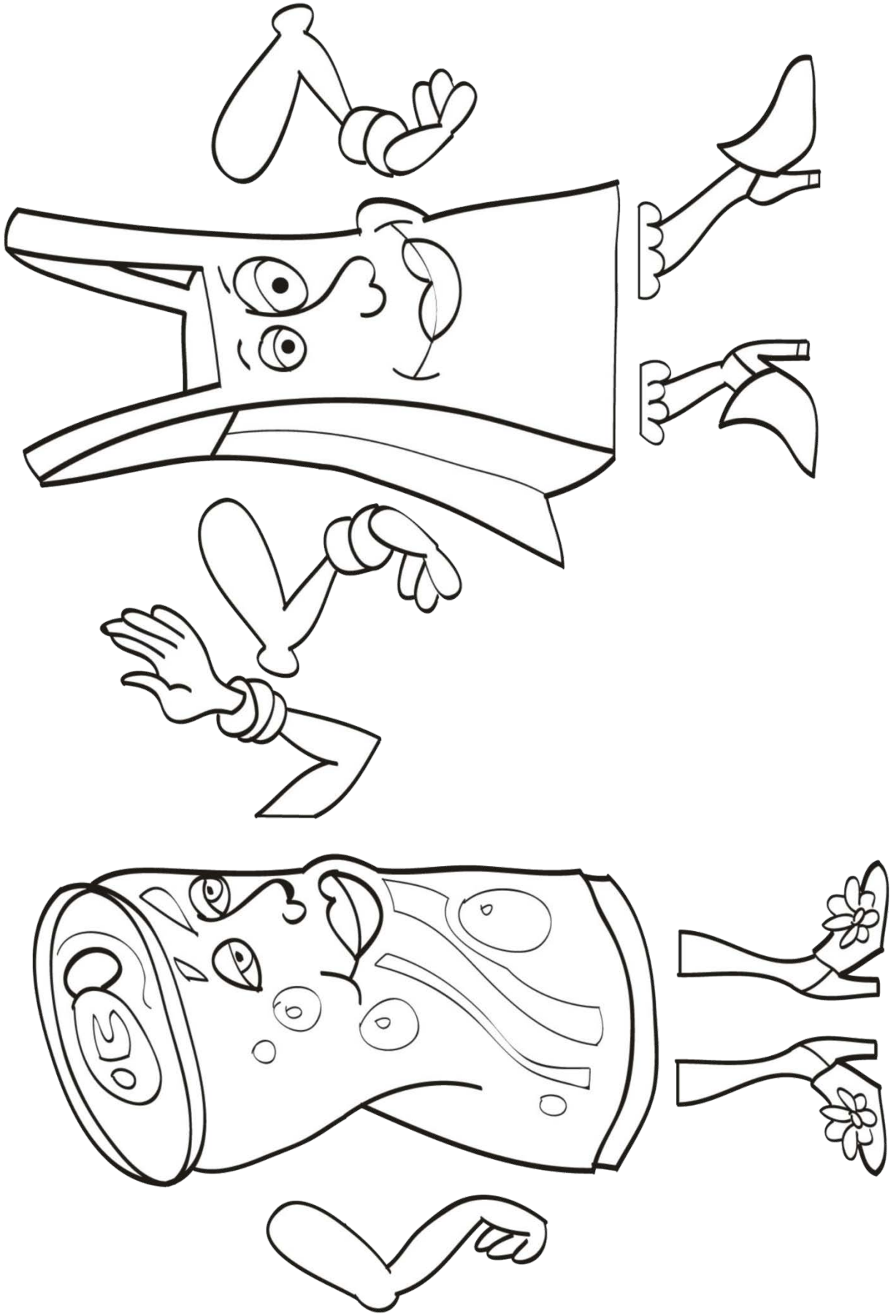


Toilet roll puppet



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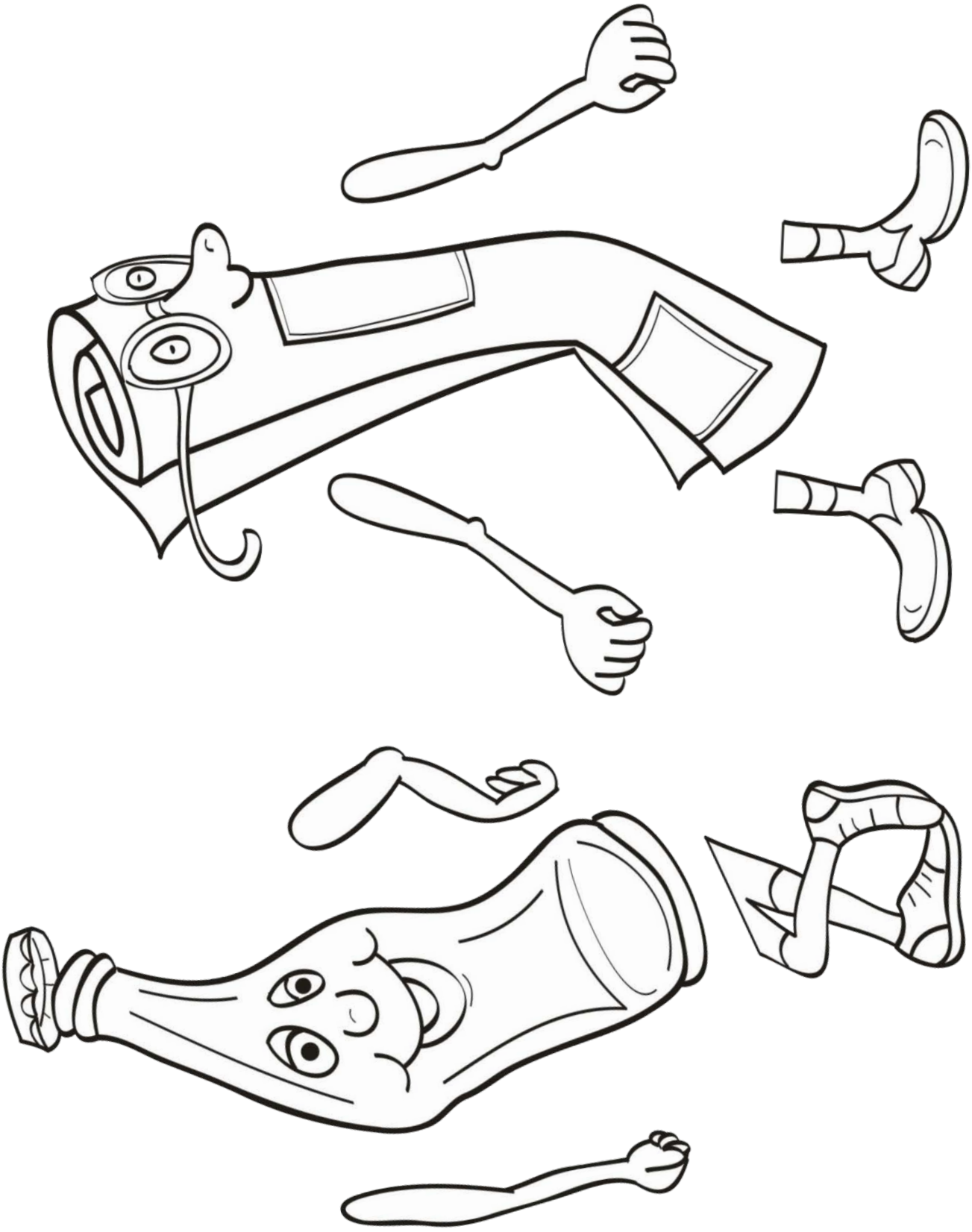

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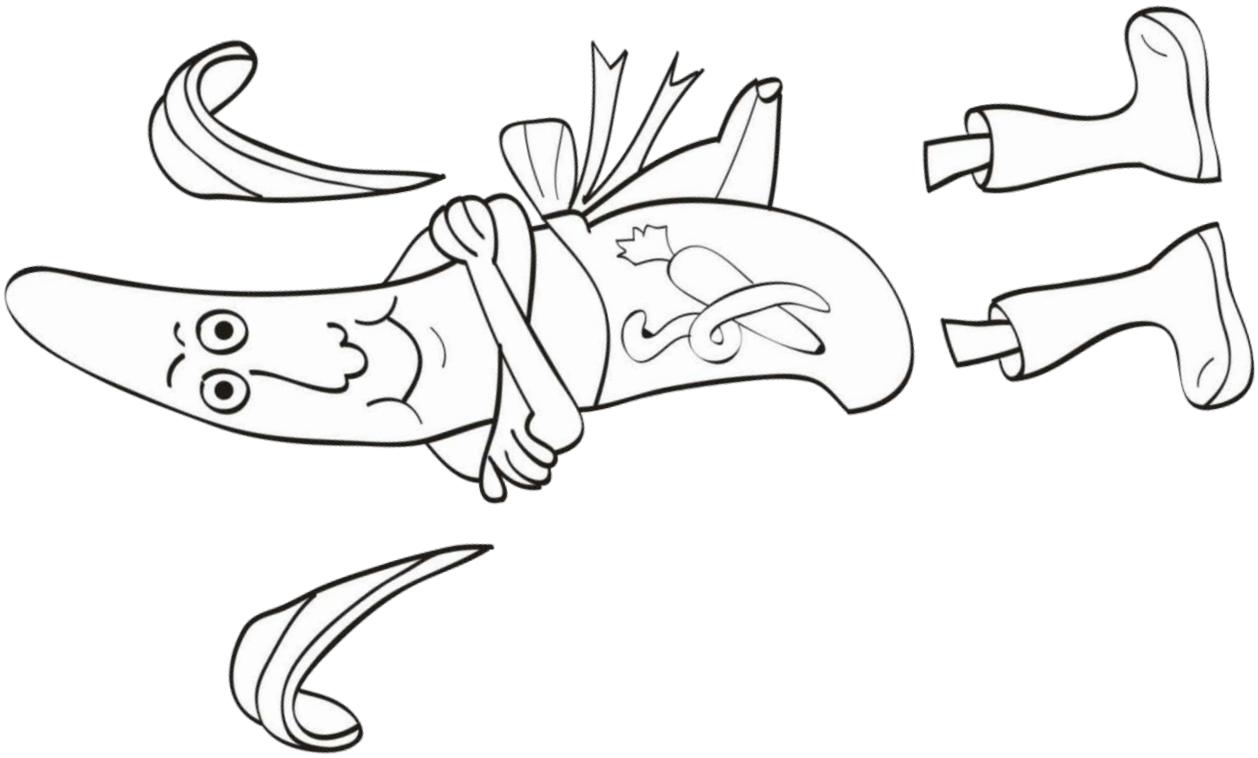
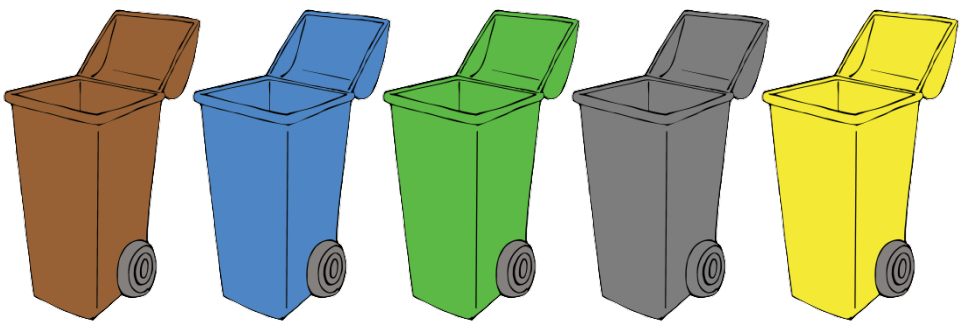


2. Waste we create

Subject: Mathematics
Objective: To make learners aware of how much waste we create.

CAPS link:

Grade 4 ✔	Grade 5 ✔	Grade 6 ✔	Grade 7 ✔
Term 4 **Measurement** **Mass** Calculations and problem solving with mass included: • Solve problems in contexts with mass	**Term 3** **Measurement** **Volume** Calculations and problem solving with mass included: • Solve problems in contexts with mass	**Term 4** **Measurement** **Volume** Measurement of volume • Find volume/ capacity of objects (by packing or filling them) in order to develop an understanding of cubic units	**Term 4** **Measurement** **Volume** Measurement of volume • Continue to find volume/capacity of objects (by packing or filling them) • Develop an understanding of why you can describe the volume of rectangular prisms as their length multiplied by their breadth multiplied by their height



Resources needed:			
Story	Products as described below	Poster worksheets	Worksheets

Story

Grade 4–7

Read the story to the learners.

Grade 4

How much waste do we create?

Give learners a variety of products that weigh 2 kg. Tell them that each person creates more or less 2 kg of waste per day. Give them bags with waste and then ask them to estimate which bag weighs 2 kg. Give them a spring scale to test if their answer is correct. Tell them that 2 kg is the same as 2 000 g.

Grade 5

Tell the learners that each person creates about 2 kg of waste per day. Do the same estimation activity as in Grade 4.

Grade 6

Tell learners that each person creates about 2 kg waste per day. Give them the dustbin activity in the worksheet section to do in pairs.

Grade 7

Tell the learners that each person creates about 2 kg of waste per day. Divide them into groups of three. Give them some waste and let them make a bag with 2 kg waste in it. Give them the following problem.

How long will it take a class to fill a classroom with waste? See worksheet for guidance.

Worksheets

Grade 4–7

Learners use or complete the worksheets.

Story 2: What does it weigh?

Learners need to understand how much garbage and waste is created daily, so they will know why solid waste is such a problem. This story can help them to visualise the volume of waste they and their classmates create every day. Identify the sources of litter. This activity will include a "waste bag weigh-in". It is a mathematics-oriented activity focussing on mass.

The whole Waste Buster gang is here today. They are sitting around a huge bag chock-full of waste. Peter Paper thinks it's terrible: "How can people make such a mess?" Penny Plastic shakes her head and keeps quiet. Gugu Glass and Milly Metal peer in the bag and cry out: "Where did all the waste and litter come from? Who created all this waste? Who are the Litterbugs?

Peter Paper looks at the stage: "THEY did!"

Gugu Glass stamps her feet angrily: "... and THEY did." She is very cross as she looks at the children. Peter Paper's eyes are like saucers. The Litterbugs really did it this time. Imaging filling such a huge bag with so much waste in one day: "Eish!"

Milly Metal's motto is: Fix things right away and you won't be sorry. She opens the bag and starts taking things out. She wants to see what is in the bag. All the children are watching her. The Litterbugs are feeling so ashamed, they are hiding behind their desks where no one can see them.

Gugu Glass stops Milly just as she is going to put her hand in the bag again. Milly is very surprised. "No wait," says Gugu. You can't take out stuff just like that!" Milly is surprised. What's in the bag? There is paper and used food bags and cooldrink cans. Someone threw away a half-eaten hamburger. And beer bottles and pieces of glass and plastic! It's a dirty, unhealthy mess.
Gugu Glass opens her backpack and takes out rubber gloves and overalls.

"Milly, you must wear gloves and protective clothing when you handle garbage, you hear?" Milly Metal looks scared: "Wow, Gugu – you are so clever! I almost started unpacking the bag without gloves. It could have made me ill!" She puts on the gloves.

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“Milly, you must wear gloves and protective clothing when you handle garbage, you hear?” Milly Metal looks scared: “Wow, Gugu – you are so clever! I almost started unpacking the bag without gloves. It could have made me ill!” She puts on the gloves.

Gugu Glass asks the learners who would like to unpack the bag. She has two Waste Buster outfits ready. Milly calls the children to the table where they will sort the waste. All the children help her to drag the heavy bag to the table. The Waste Busters put on their clothes and gloves and start unpacking.
Peter Paper shakes his head. “Eish! that’s a lot of waste. And so much paper.”
Penny Plastic's voice is sad: “Look, some of my cousins are also in the bag.”

Peter Paper is sure she’s wrong. “Don’t be silly. How would your cousins get into the bag?”

Penny Plastic points at the torn bread bags and plastic tubs and cooldrink bottles on the table. It’s all made of plastic. “They really are bits and pieces of my cousins. Kids, won’t you please show the bits of my family to your classmates?”

Peter Paper is very proud of the learners today. They are real Waste Busters! He smiles broadly and says: “You are the Waste Busters. Who are you? I can’t hear you, speak up!”

Milly Metal is still confused. Why are they Waste Busters? Peter Paper explains that Waste Busters watch to see who are the Litterbugs, and who throws away things that we can re-use ... and hammer them! “Will they only do it at school?” Milly asks. NO! Waste Busters watch out for Litterbugs at home, in their communities, in public parks ... everywhere they make a mess.

Milly Metal and Peter Paper and Gugu Glass start marching with the children. They march in place and then around the table full of waste and then around the playground. They are singing and stamping their feet:
(This can be a sort of “war cry” that the children recite while marching (in the classroom, but preferably outside.)

Name: _____

Things to remember:

1 kilogram = 1 000 gram

Answer the following questions.

a. How much waste does each person create per day?

_____

b. If each person creates 2 kg of waste, how much will our whole class create in one day?

These questions will help you solve the problem.
What is the question?

_____

What are the numbers?

_____

Which number do I need to find out?

_____

Draw a picture. You will need an extra sheet of paper.
Write a number sentence.

_____

Do the calculation.

Boxes full of waste

Grade 5

Name: _____

Things to remember:

Capacity is the total amount that an object can hold (or the amount of space inside the object).

Volume is the amount of space that something takes up.

The capacity of the truck is 220 boxes.

Look at the table and answer the following questions.

	TOTAL:
Paper	**540**
Plastic	**216**
Glass	**108**
Metal	**180**
Organic	**540**
Non-recyclables	**216**

a. Our school creates all this waste in one week. How many truck loads do we create in total? _____

b. What is the capacity of the truck (what can the truck hold)?

_____

c. How many truck loads of paper do we create? _____

d. How many truck loads of plastic do we create? _____

e. How many truck loads of glass do we create? _____

f. How many truck loads of metal do we create? _____

g. How many truck loads of organic materials do we create? _____

h. How many truck loads of non-recycables do we create? _____

g. Complete the table:

Type of waste	**Capacity of the truck**	**The space the boxes take up (volume)**	**The space not filled with waste.**
Paper	220 boxes		
Plastic			
Glass			
Metal			
Organic			

h. Use this activity to write in your own words what the difference between capacity and volume is.

_____

_____

_____

_____

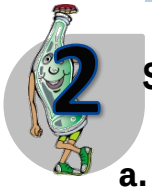
Filling a bin

Grade 6

Name: _____

Things to remember:

The average person creates 2 kg of waste per day.

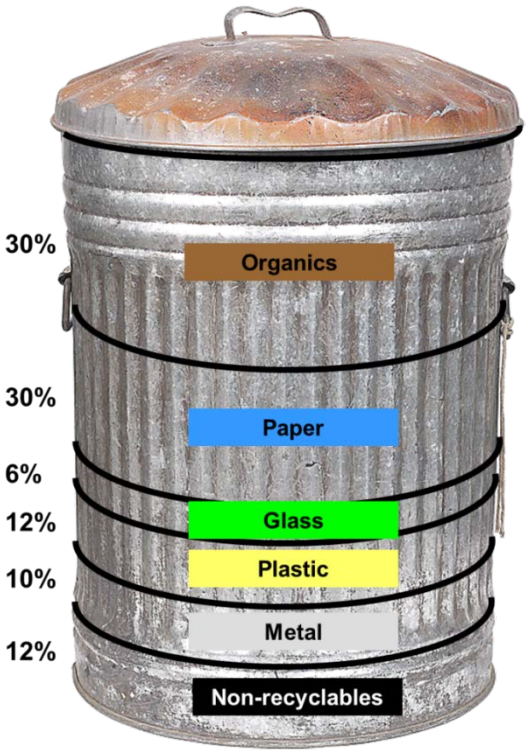


Solve the problem

a. How long would it take four people to fill this bin? (You need extra paper to solve the problem.)

Here are some clues:

- The bin is 100 litres.
- Organic materials: 1 kg = 1 litre
- Paper: 500 g = 1 litre
- Glass: 2 kg = 1 litre
- Plastic: 500 g = 1 litre
- Metal: 3 kg = 1 litre



b. What do you think the percentages stand for?

_____

_____

_____

_____

_____

c. Knowing these percentages, what impact will it have on the environment?

_____

_____

Name: _____

Things to remember:

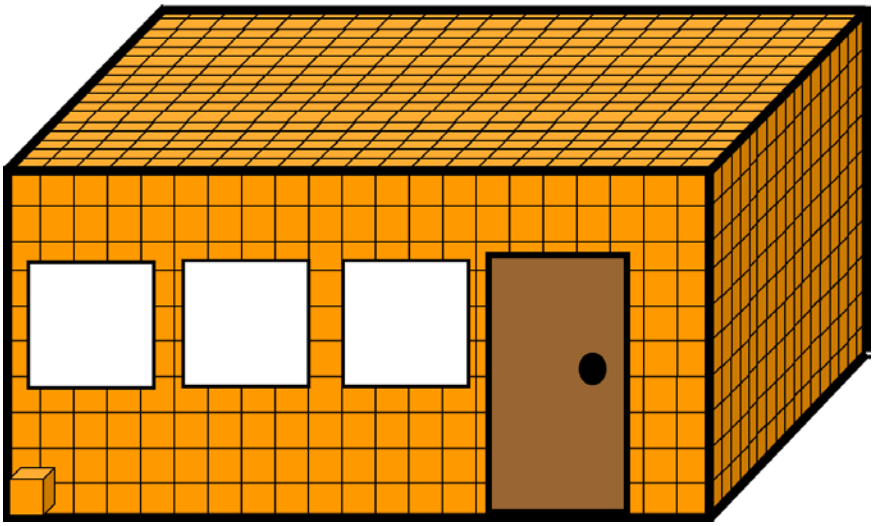
The average person creates 2 kg of waste per day.

Solve the problem

a. Each person creates about 2 kg of waste per day. How long will it take to fill this classroom?

Here are some clues:

- I have a 2 kg bag with waste. I compressed it into a cube of 30 cm x 30 cm.
- I have a class that is 6,3 m x 5,1 m x 3 m
- There are 25 children in the class.



b. Repeat the same activity but do it for your class.

3. Solid waste

Subject: Mathematics
Objective: To make the learners aware of the five types of solid waste and how to sort it.

CAPS link:

Grade 4 ✔	Grade5 ✔	Grade 6 ✔	Grade7 ✔
Term 3 **Data handling** **Collecting and organising data** Collect data using tally marks and tables for recording **Representing data** Draw a variety of graphs to display and interpret data including: Bar graphs and double bar graphs **Analysing, interpreting and reporting data** Interpreting data Critically read and interpret data represented in words	**Term 3** **Data handling** **Collecting and organising data** Collect data using tally marks and tables for recording **Representing data** Draw a variety of graphs to display and interpret data including: Bar graphs and double bar graphs **Analysing, interpreting and reporting data** Interpreting data Critically read and interpret data represented in words	**Term 3** **Data handling** **Collecting and organising data** Collect data using tally marks and tables for recording **Representing data** Draw a variety of graphs to display and interpret data including: Bar graphs and double bar graphs (only Grade 6) **Analysing, interpreting and reporting data** Interpreting data Critically read and interpret data represented in words	**Term 4** **Data handling** **Collect, organise and summarise data** **Collect data** • Pose questions relating to social, economic, and environmental issues in own environment. **Content: Organise and summarise data** • Organise (including grouping where appropriate) and record data using o tallies o tables **Content: Represent data** • Draw a variety of graphs by hand/technology to display and interpret data (grouped and ungrouped) including: o bar graphs and double bar graphs; **Content: Analyse, interpret and report data** Interpret data • Critically read and interpret data represented in words.

The data handling cycle starts with **collecting data**. Once we have collected the data, the question is: What can we do with the data?

The data in its raw format very often does not tell us much about our problem. For data to help us solve our problem, we need to organise, represent and summarise it. In this lesson we are going to do the data handling cycle by focusing on waste.

Resources needed:		
Story	WAME game See below	Worksheets

Story
Grade 4–7

Learners read the story. Ask them to summarise the story for you in a few words.

Data handling
Grade 4–7

The data handling cycle starts with collecting data. Once we have collected the data, the question is: What can we do with the data?

The data in its raw format very often does not tell us much about our problem. For data to help us solve our problem, we need to organise , represent and summarise it. In this lesson we are going to do the data handling cycle by focusing on waste.

WAME game

Learners play the game and collect data.

Game rules

What you need:

- Tokens to cover the bins
- Dice (your teacher will provide you with a template on how to make a dice.)
- Game board

How to play:

• Divide your group into two teams.
• Each team has a token.
• Place your token on any empty square. You can move in any direction.
• Throw the dice. The number on the dice will indicate to you how many places you can move.
• Your aim is to land on a recycling bin. When you land on a recycling bin, make a tally (see worksheets for more information) in the tally column on your table.
If you tick the contents on your table, place a token on the recycling bin. This means that no-one can answer a question on this square again; it is now the same as a white square.

• The next team plays.
• If you land on an empty square you cannot take a turn, but must wait for your next turn to throw again.
• The game is over once all the recycling bins have been covered/ emptied.

Worksheets

Complete Grade 4–7 worksheets.

Story 3: The Waste Busters go spring cleaning

On 1 September, Spring Day, the Waste Buster family decide it's time for a picnic. Mom and Dad Buster and the three small Busters have spring fever! The birds are singing in the trees that have fresh green leaves. You can almost hear the grass growing. They walk to the park near their home. It's a lovely place with big shady trees. Just the place for a picnic.

Oh, no. The park is littered like you wouldn't believe. Baby Buster wants to cry. The garbage bins are full and there is paper all over. The Waste Busters are so angry. "Who made this mess in our park?" Paper Man, in the far corner of the park, looks very ashamed. He hides behind a tree.

Betty kicks a pile of cans and cries out: "Who made this mess?" Tin Man is hiding behind the swings. He is hoping no one will notice him there. Mum Buster looks at the plastic bottles floating in the park's pond. "Just look at this. It's awful." The Waste Busters want to go home. No one can enjoy a picnic in a place where the garbage is all over the lawn. PawPaw Plastic has crept out of the park and is sitting on the pavement. He is red with shame.

Just then, Milly Metal and Peter Paper arrive. Compi Compost and Gugu Glass are also on their way. They say hello to the Waste Buster family and look at the waste all over the park. Milly Metal speaks first.

"There are pieces of my family all over. Would you please help me pick them up?" Mom and Dad nod, but the Buster kids are unsure. "My body is made of metal," says Milly Metal. "I see!" it's Baby Buster. "But where must we take the metal bits that we pick up?

Milly Metal shows the children a row of waste containers against the wall. "There is a bin with a picture of a tin can on it. Wherever you see this sign, remember, that is where we put metal items." She gives the Buster kids a magnet each and shows them how magnets "grab" metal. They start looking for metal things. It's great fun to use the magnets on the cooldrink cans and other bits of metal. In two ticks all the metal stuff has been placed in the metal bin.

Peter Paper looks at all the newspapers and magazines that are lying around. No one wants them anymore. "I'm also made of paper, children – did you know that? Come on, let's collect all the paper and put everything in the paper container."

The Waste Buster are enjoying themselves. It's cool to see the park becoming tidy and pretty again. They collect every scrap of paper they can find and carry everything to the waste container with the paper sign on it. Compi Compost is still doing his bit. He is picking up all the fruit peels and apple cores he can lay his hands on. They are going into a special container for making compost. He shows the Waste Buster the container. "See, all the plants were given compost at the end of the winter. That is why the flowers are blooming so nicely."

Yes, it's springtime! The park is looking lovely and much better without all the litter the Waste Busters picked up. It's time for that picnic. Dad Buster invites Milly Metal and her friends to join them. But Gugu Glass hasn't finished yet. She holds up a broken glass bottle. "This was one of my glass cousins," she says. Mom and Dad Waste Buster say they will help Gugu pick up the broken glass and put it in the last container, which is marked for glass. Everyone then enjoys a lovely picnic.

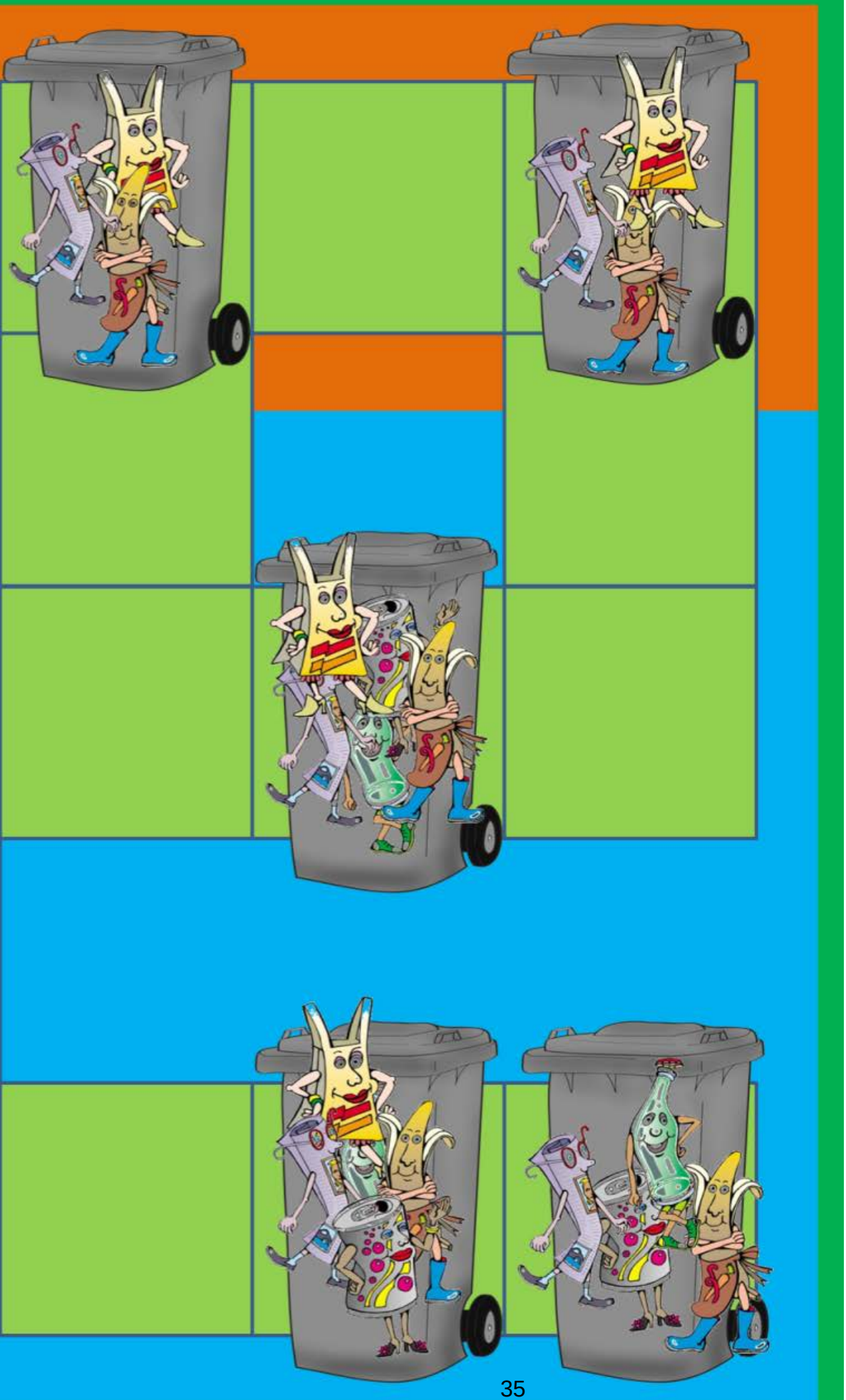
Plastiek

Metaal

Papier

Glas

Kompi Kompos



Name: _____

WAME game

Your teacher will explain to you how to play the game.

You are going to collect information on waste while playing the game. You will record your results in the tally table below. In each grade the type of solid waste (character) will have a different count. In Grade 4 each character in a bin will count five points (one tally), in Grade 5 ten points, Grade 6 fifteen points and in Grade 7 twenty points.

Type of solid waste	Tally
Metal 	
Plastic 	
Paper 	
Glass 	
Organic 	

Up to now we have collected information and we have organised the data into tables using tallies.

a. Use the information in the tally table to complete the frequency table. Each tally represents 1 kg.

Type of solid waste	Frequency (kilograms)
Metal	
Plastic	
Paper	
Glass	
Organic	

b. What is the total mass of all the waste?

Draw a bar graph to represent your data. You will need extra paper to do this.

Representing data

Up to now we have collected information and we have organised the data into a frequency table.

All this information helps us to find a solution to the problem we want to solve. From the tables and summary we can already draw some conclusions, but very often it is difficult to understand and interpret the data in this format.

To help us understand and interpret the data, we can also display it in the form of a drawing. We call this a graphical representation of data, graphs or charts.

There are different types of graphs and charts and we need to choose the one that would help us best to interpret the data and find a solution to our problem.

Find out what you can get from you local recycler for the different types of solid waste. Calculate what you will receive for the waste you have collected. Read the previous table.

Type of solid waste	Calculation
Metal ●R	
Plastic ●R	
Paper ●R	
Glass ●R	
Organic ●R	

Look at your graph again. Write five sentences about it.

Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
1	2	3	4	5	6	7
0-29 %	30 -39 %	40 – 49 %	50 – 59 %	60 – 69 %	70 – 79 %	80 – 100 %
Collect data (Question 1).	Collect data and record in tallly table (Question 1).	Collect data, record in tally table and complete frequency table (Question 1 and 2).	Collect data, record in tally table, complete frequency table and represent data on bar graph with help. (Question 1, 2 and 3).	Collect data, record in tally table, complete frequency table and represent data on bar graph (Question 1, 2 and 3).	Collect data, record in tally table, complete frequency table, represent data on bar graph and interpret the graph (Question 1, 2, 3 and 5).	Calculate waste (data) collected. (Question 4)

4. Re-use and reduce

Subject: Life Skills and Creative Arts
Objective: To create objects from waste..

CAPS link:

Grade 4 ✔	Grade 5 ✔	Grade 6 ✔	Grade7 ✔
Term 4 **Creative arts: Visual arts** **Topic: Create in 3-D, a kite/dream catcher/bird feeder** • Skills and techniques like pasting, cutting, wrapping, tying, joining various recyclable materials • Art elements: texture, shape/form, colour reinforced through use in own construction • Design principles: reinforce conscious use and naming of contrast and proportion in construction • Spatial awareness: reinforce conscious awareness of extending parts of models into space • Appropriate use of tools	**Term 4** **Creative arts: Visual arts** **Topic: Create in 3-D, things that fly** • Skills and techniques like pasting, cutting, wrapping, tying, joining various recyclable materials • Art elements: texture, shape/form, colour reinforced through use in own construction • Design principles: reinforce conscious use and naming of contrast and proportion in construction • Spatial awareness: reinforce conscious awareness of extending parts of models into space • Appropriate use of tools	**Term 4** **Creative arts: Visual arts** **Topic: Buildings, architecture and the environment** • Skills and techniques like pasting, cutting, wrapping, tying, joining various recyclable materials • Art elements: texture, shape/form, colour reinforced through use in own construction • Design principles: reinforce conscious use and naming of contrast and proportion in construction • Spatial awareness: reinforce conscious awareness of extending parts of models into space • Appropriate use of tools	**Term 3** **Creative arts: Visual arts** **Topic: Create in 2-D** Recommended resources: photographs in resource books (e.g. buildings) **Content/concepts/skills** • Paper cut collage: buildings as heritage • Art elements: shape, geometric and organic, line, tone, texture (colour to include monochromatic colour) • Design principles: balance, contrast, harmony, proportion • Pattern-making – in collages, designs (exploration of various repeat methods) • Emphasis on the interpretation buildings in paper cut collage – cutting, layering, pasting, monochromatic colour • Variation of paper size and format: different scale and degrees of detail

Story 4: Litter gets a new face

The children are on their way to school. Each one is carrying a bag of waste. Lindie is a member of the Waste Buster family. She's been taught what to do with waste: put glass, plastic, paper and metals in separate containers. Place your vegetable peels and eggshells in the compost bin! She is carrying a big bag of old newspapers. Nikitha's bag is full of cans, and Alex's bag is jingling with old bottles.

Peter Paper and his friends are waiting for them in the classroom. All five have objects in front of them. Lindie waves at them. Everyone is curious. What are they going to do in the arts class? The room is crowded with plastic bottles, old cooldrink cans, egg boxes and glass bottles. What can they do with all this garbage?

Miss Bell is their arts teacher. She has red hair and a lovely smile. The children really enjoy her classes. But today she takes a seat at the back of the classroom. "Morning, children! Our waste winners are here today to show you what we can make from waste items."

Penny Plastic gets first turn. "Hello children. Can you still remember what this bottle is made of? The children nod. Easy – that's plastic. However, Penny's plastic bottle looks quite different from when it contained cooldrink. It has been turned into a feed bottle. It's full of birdseed. The sparrows and their babies will enjoy this feast.

Milly Metal's tin originally contained peach slices. The label has been removed and it is shiny and clean. The tin now contains a cactus! Milly Metal lifts the tin so that the children can see its bottom. It has been pierced so that excess water will drain away and the plant will not drown.

Peter Paper has a heap of old newspapers. He is tearing them in strips. Next to the heap is a bowl of water filled with pieces of paper. There is also a tub of glue. He shows them a papier-mâché egg with a jolly face. "Look! We can make all kinds of things from paper pulp!"

Gugu Glass has cleaned a used coffee bottle and decorated it with ribbons. It is filled with scented soaps and dried lavender flowers. "That's a great idea for a Mother's Day gift," exclaims Lindie. "It doesn't look too hard. I'm going to make up a bottle for my mum."

Compi Compost is always hungry. Before him is a bowl of fruit and next to it are apple cores and peels. “I’m hungry! Hmmmm, this is nice!” What should I do with the bits I don’t want? Oh yes – they can go to the compost heap!” Compi Compost dances over to Milly Metal's cactus tin. “This plant will grow beautifully from the compost I made.”

Lindie and her friends can’t wait to get started. She takes her newspapers to Peter Paper's table and starts to tear them up. Small groups of children have joined Penny Plastic, Gugu Glass, Milly Metal and Compi Compost. Everyone is discussing ideas to make something nice from their waste items. Because almost everything can be used for something else, they don’t have to send so much waste to the rubbish dump.

Resources needed:		
Story	Waste objects	Worksheets

Story
Grade 4–7

Learners read the story. Ask the learners to summarise the story for you in a few words.

Make from waste
Grade 4–7

Tell the learners that they are going to create an art object using waste. Give learners some guidance. See worksheets.

Grade 4

The Grade 4 learners can choose between the following:

- kite
- dream catcher
- bird feeder

Grade 5

The Grade 5 learners can choose any object that flies, e.g. planes, helicopters, air balloons, etc.

Grade 6

The Grade 6's topic is buildings, architecture and the environment

Grade 7

The Grade 7's topic is buildings as heritage. Learners should make a paper collage.

Steps in making an object from waste

Step 1: Ask the learners to plan the resources and tools that they are going to use.

Step 2: Learners make an object from waste.

Step 3: Learners present this object to the class.

What you need to observe when learners are making these objects from waste:

- Skills and techniques, like pasting, cutting, wrapping, tying, joining various recyclable materials
- Art elements: texture, shape/form, colour reinforced through use in own construction
- Design principles: reinforce conscious use and naming of contrast and proportion in construction
- Spatial awareness: reinforce conscious awareness of extending parts of models into space
- Appropriate use of tools

Worksheets

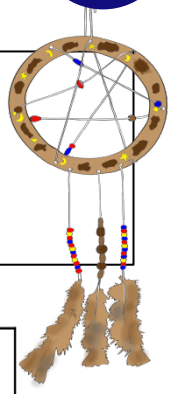
Complete or use
Grade 4–7 worksheets.

Making a dream catcher

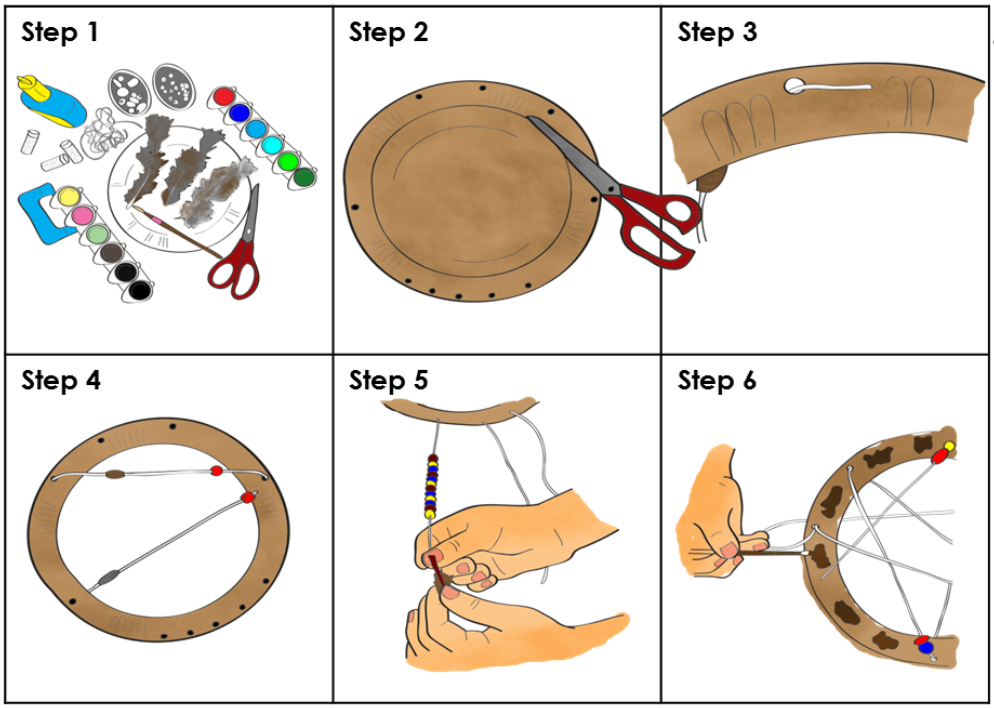
Grade 4

Name: _____

You need to plan what resources and tools you need.



This drawing might guide you to make the waste object.



Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

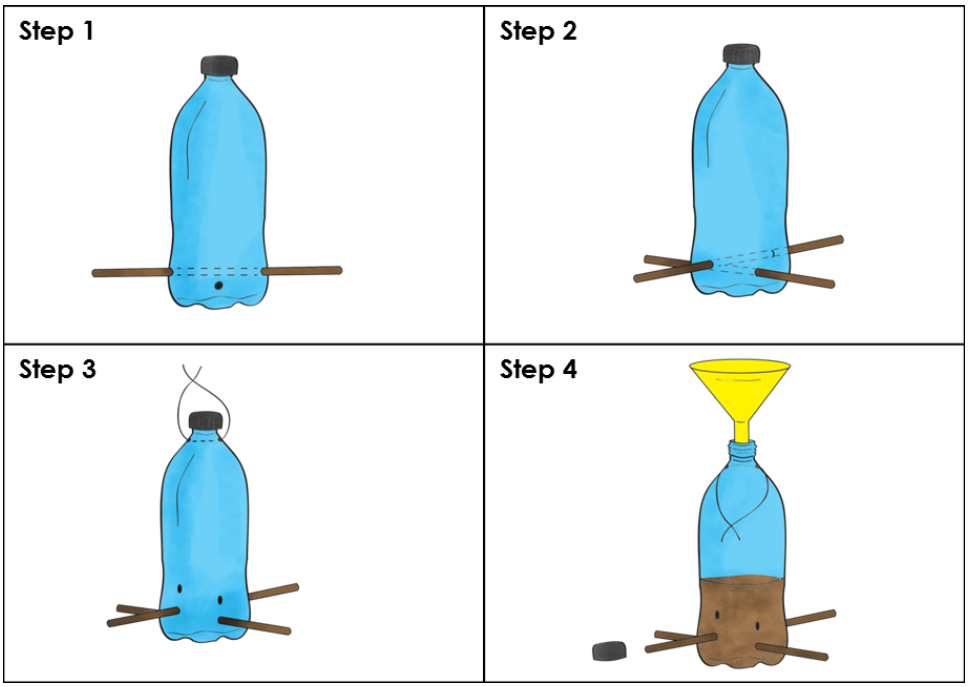
Making a bird feeder

Grade 4

Name: _____

You need to plan what resources and tools you need.

This drawing might guide you to make the waste object.



Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

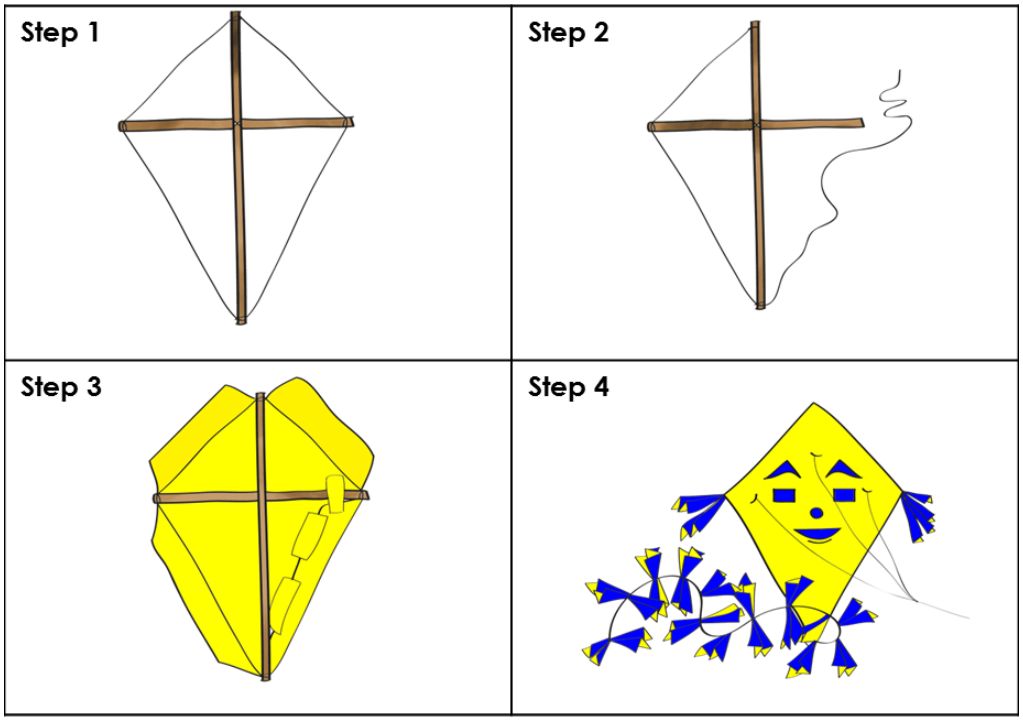
Making a kite

Grade 4

Name: _____

You need to plan what resources and tools you need.

This drawing might guide you to make the waste object.



Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

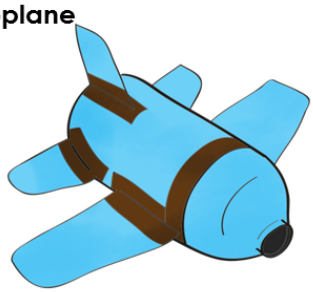
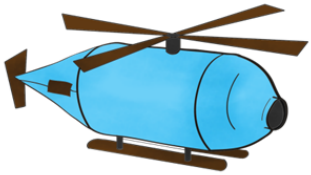
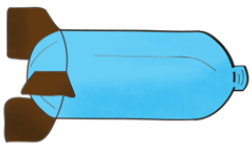
Things that fly

Grade 5

Name: _____

You need to plan what resources and tools you need.

This drawing might guide you to make the waste object.

Rocket 	**Aeroplane** 
Helicopter 	**Airship** 

Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

Name: _____

You need to plan what resources and tools you need.

Make a four step drawing.

Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

Name: _____

You need to plan what resources and tools you need.

Make a four step drawing.

Your teacher will use this rubric to assess your waste object.

	Not achieved	Elementary achievement	Moderate achievement	Adequate achievement	Substantial achievement	Meritorious achievement	Outstanding achievement
Rating code	1	2	3	4	5	6	7
Percentage	0–29 %	30–39 %	40–49 %	50–59 %	60–60 %	70–79 %	80–100 %
Skills							
Art elements							
Design principles							
Spatial awareness							
Appropriate use of tools							

You need to present your waste object. Write down a few basic notes that you will share with the class. You will need an extra sheet of paper.

5. Recycling

Subject: Life Skills
Objective: To understand recycling.

CAPS link:

Grade 4 ✔	Grade 5 ✔	Grade 6 ✔	Grade7 ✔
Term 2 **Topic: Solid materials** **Content and concepts:** **Raw and manufactured materials** examples of some raw materials we use to make other useful materials: sand is used to make glass, clay is used to make ceramics, coal and oil are used to make plastics, paints and fabrics, wood and fibre from plants are used to make paper, animal wool and hide are used to make fabrics and leather **Properties of materials** • raw and manufactured materials have specific properties. These properties can include being hard or soft, stiff or flexible, strong or weak, light or heavy, waterproof or absorbent	**Term 2** **Topic: Metals and non-metals** **Content and concepts:** **Properties of metals** • metals are used to make things because they have certain properties • some properties of metals: shiny, hard, strong, can be hammered, shaped (malleable) and made into thin wires without breaking (ductile), melt at high temperatures, • metals are mined from the earth. **Suggested activities: Investigations, practical work and demonstrations**: **Investigating, comparing and recording** the properties of some metal objects (such as copper wire, coins, nails, cooking pots, knives and forks) and some non-metal objects (such as a piece of chalk, a stone, a pile of sand, a piece of coal)	**Term 2** **Topic: Mixtures** **Mixtures of materials** • a mixture consists of at least two different substances/ materials mixed together • in some mixtures, the different substances are still clearly visible after mixing -- the substances in such mixtures can be separated by physical means such as sieving, filtering, hand sorting, settling and decanting	**Term 1** **Topic: Mixtures** ☐A mixture is made up of two or more substances or materials that have different properties. If the properties differ, the substances can be separated ☐Methods of physical separation ☐hand sorting (e.g. sheep wool and thorns, paper and plastic) ☐using a magnet to separate iron (or nickel) from non-magnetic components ☐sieving/filtration, (e.g. sand or soil in water, stones in sand) ☐Problems of recycling waste materials by local authorities: importance of separation of materials for recycling. ☐Consequences of poor waste management by local authorities. ☐Careers in chemistry, mining and waste management.

Resources needed:		
Story	Waste objects	Worksheets

Story

Grade 4–7

In this section we are only looking at components of the recycling process that are related to CAPS.

What is recycling? (Recycling is the process of turning used waste and materials into new products. This prevents potentially useful materials from being wasted as well as reducing energy use and pollution.)

Science and waste

Grade 4

Discuss with your learners examples of raw materials that we use to make other useful materials, such as:

- Sand is used to make glass
- Coal and oil are used to make plastic
- Wood and fibre of plants are use to make paper
- Iron ore is used to make iron and steel

Read the paper story and look at the poster. Discuss the paper process with your learners.

Grade 5

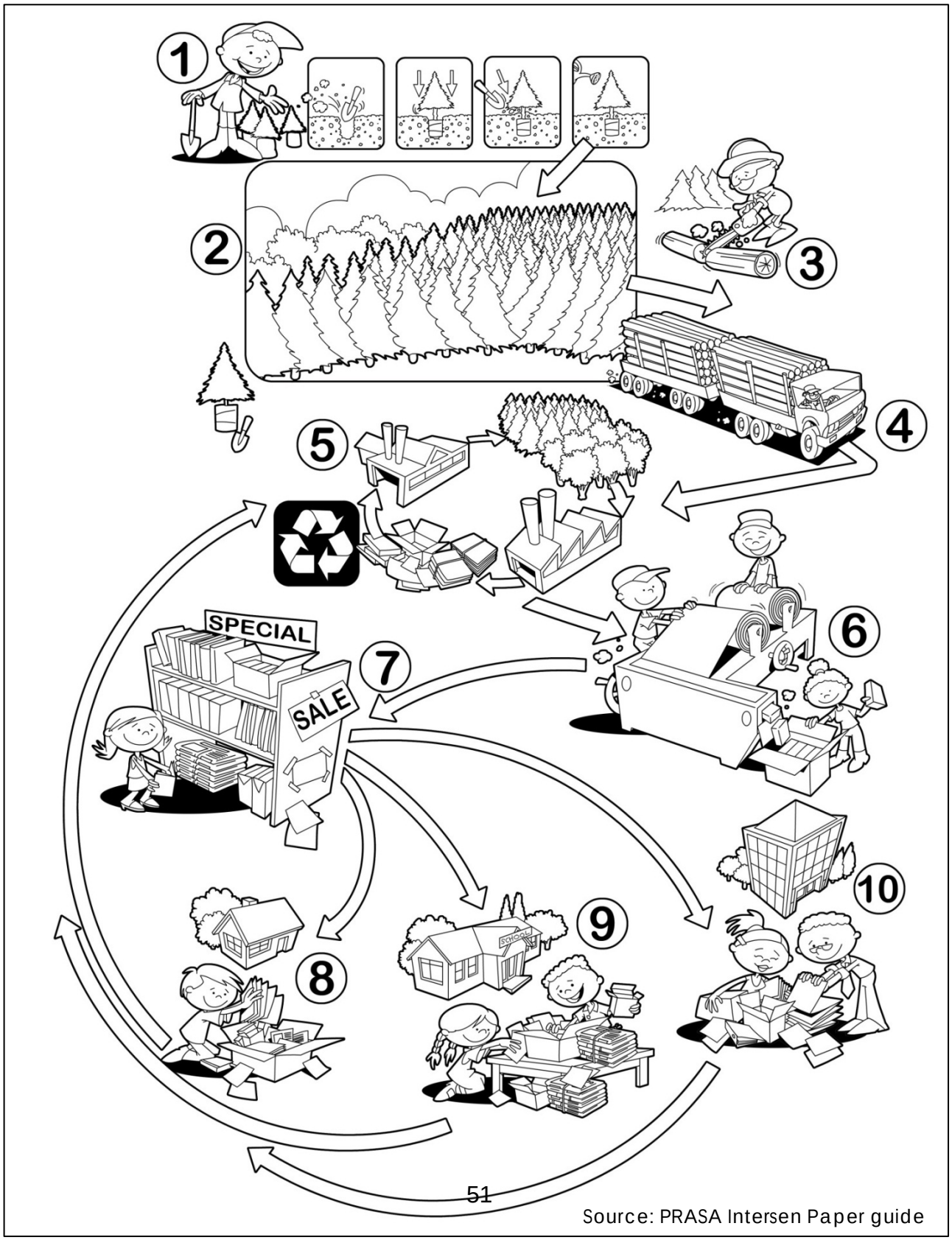
Tell learners that we know that recycling is the process of turning used waste and materials into new products. In grade 5, we are going to focus on the sorting process, looking at hand sorting. Do this practical activity by giving learners waste to sort. Make sure when you prepare this bags with waste for the learners that all the contents should be clean.

Grade 6

Tell learners that we know that recycling is the process of turning used waste and materials into new products. In grade 6, we are going to focus on the sorting process, looking at hand sorting

1 **Look at the poster and read the tree story on the next page.**

Tree story poster



Source: PRASA Intersen Paper guide

From trees to paper

The story of paper begins in a forest plantation. The Sjonajona plantation is in Mpumalanga, which means 'the place of the rising sun'. Mpumalanga is home to many big forest plantations like Sjonajona, where thousands of pine trees and eucalyptus trees are specially grown for making all kinds of useful paper things. When a tree is 14 years old, it is the right age to be made into paper. Pine trees have long fibres that make strong paper.

When these mature trees are cut down, other trees that are left have more room to grow for another 10 to 15 years. The wood from these bigger trees will one day be used for making furniture, floorboards and houses.
The paper tree logs travel in huge trucks to a paper mill. At the mill, the outer covering of the logs, their bark, is peeled off. Huge machines called chippers cut the cleaned logs into chips. The chips are refined or rubbed together to take out pieces that are too big, washed to remove sawdust, and processed to soften them. The soft chips now become pulp, which contains the fibres that make up paper. Other machines bleach the pulp, and mix it with water and chemicals to soften and clean it. The cleaned pulp then goes through rollers that press out the water, until at last it is PAPER! Beautiful, smooth paper for printing and writing. Paper for telephone books, schoolbooks, newspapers, magazines, gift wrap and cardboard boxes, which people buy from shops.

Mrs Masingela's Grade 4 class is very excited. The church on the corner has been collecting magazines and used computer paper that they can use. Boxes and boxes full are coming today! They crowd around their teacher as she helps them open the boxes and unpack them. One of the boxes contains a stack of used writing paper for drawing on and cutting out shapes.

At the end of the school-day, the whole classroom is full of paper scraps, and Mrs Masingela claps her hands: 'Children, pick up all the paper pieces and clean up properly before we go home.' Thabo starts throwing the scraps of paper into a wastepaper bin. Michelle stops him. 'No, Thabo! We can recycle the paper. See, there is the recycling container in the corner of the classroom.' The two children take their paper to the recycling bin.
Mrs Masingela nods approvingly. 'Good, Michelle and Thabo! All the paper that we cannot use any more will be recycled. Instead of being thrown away at the municipal dump, the used paper will go to a factory where it will be cleaned and re-used to make more paper or packaging.' Thabo says, 'I am going to tell my family we must start recycling paper at home, too.'

So the trees from the Sjonajona plantation became paper. When this paper was used, it went to Mrs Masingela's classroom and was used again. Finally, the used paper was recycled – it went to a paper mill where it was cleaned and made into new paper, to be used once again. That is how we Reduce, Re-use and Recycle!

Name: _____

Use the words below to complete the sentences.
Steel, plastic, iron, paper, glass

a. Sand is used to make _____

b. Coal and oil are used to make _____

c. Wood and fibre of plants are use to make _____

d. Iron ore is used to make _____ and _____

Manufacturers make products from useful materials such as paper, plastic, metal and glass. We buy these products in shops.

a. What do we do with these products if we don't want them any more?

_____

b. What should we DO with these products?

_____

Tick what you can do with me at your school.

I am made from metal. Collect ☐ Sort ☐ Recycle ☐ 	**I am made from paper.** Collect ☐ Sort ☐ Recycle ☐ 
I am made from plastic. Collect ☐ Sort ☐ Recycle ☐ 	**I am made from glass.** Collect ☐ Sort ☐ Recycle ☐ 

Metal recycling process

Grade 5

Name: _____

Metals

Metals are used to make things because they have certain properties. These properties are: shiny, hard, strong, can be hammered, shaped (malleable) and made into thin wires without breaking (ductile), melt at high temperatures.
Metals are mined from the Earth.

- Examples of metal objects: copper wire, coins, nails, cooking pots, knives and forks
- Examples of non-metal objects: a piece of chalk, a stone, a pile of sand, a piece of coal.

a. What happens with metals if we don't want them any more?

_____

_____

b. Describe the metal recycling process using a diagram. You need to do this on a separate piece of paper.

c. What are the dangers of the metal recycling industry in South Africa?

_____

_____

Imagine you are a waste collector. You sell cans to a recycler. The recycler only buys metal cans from you. What will you do to differentiate between metal and aluminium cans?

_____

_____

What does this symbol mean? 

_____

Waste hand sorting (The recycling process starts)

Grade 6

Name: _____

Read the section below and answer the questions.

What is waste hand sorting?

Waste hand sorting is the process by which waste is separated into different elements by hand.

Waste segregation means dividing waste into dry and wet. **Dry waste** includes paper, plastic, metals and glass. **Wet waste**, typically refers to organic waste. Waste can also be segregated on basis of biodegradable or non-biodegradable waste.

Landfills are an increasingly pressing problem. Less and less land is available to deposit waste, but the volume of waste is growing all time. As a result, segregating waste is not just of environmental importance, but of economic concern, too.

The best way to cope with all this is to collect it at its source in each area and to separate it immediately where possible.

a. In what categories can we sort waste?

_____

_____

b. What health issues are important when you sort waste?

_____

_____

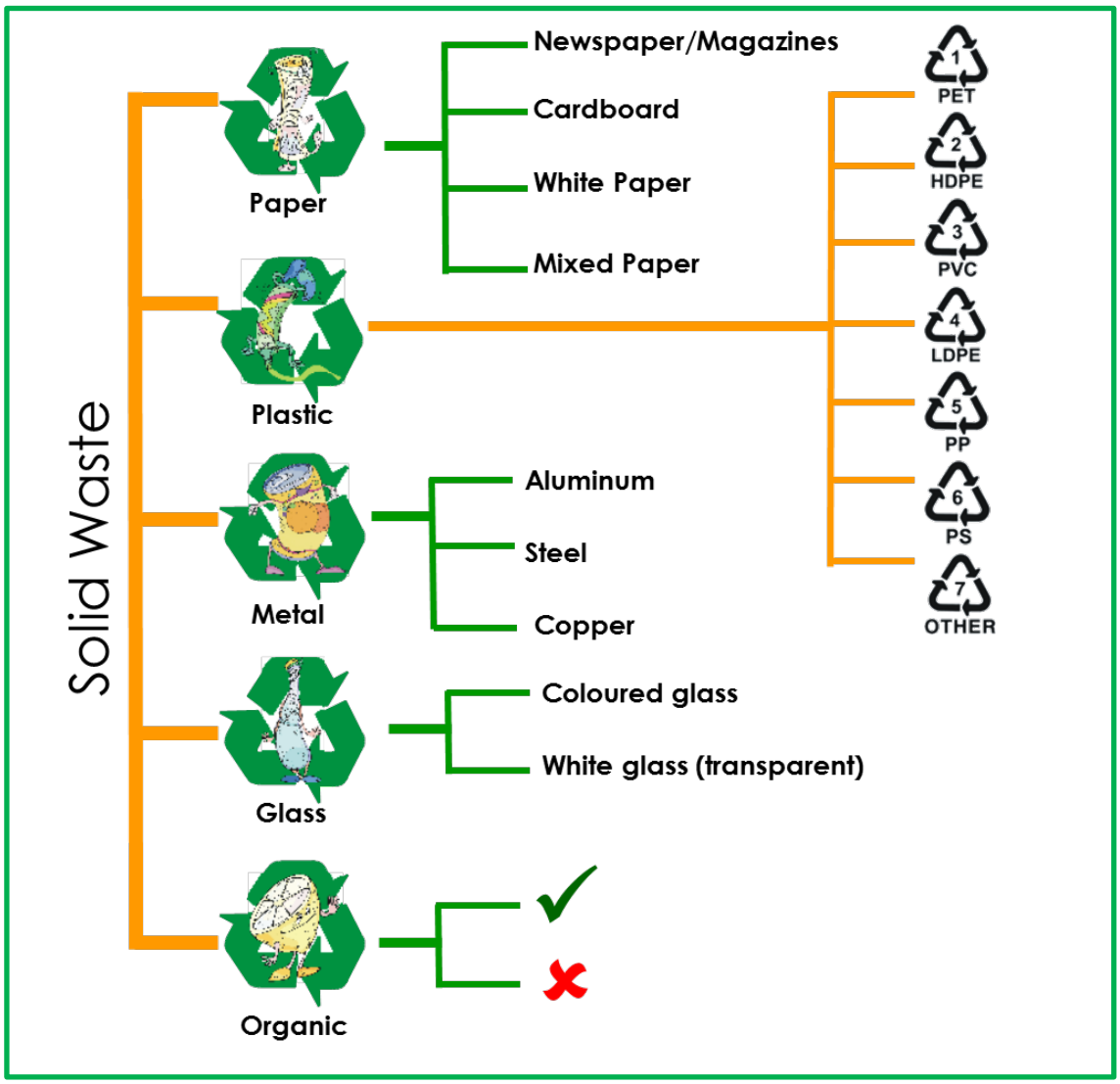
c. What does it mean to sort at source?

_____

i. Where will your 'sort at source station' be at home? _____
ii. Where will your 'sort at source station' be at school? _____
iii. Where will your parents 'sort at source station' be at work? _____
iv. Where do your local municipality sort their waste? How do they do it? Find out.

_____

_____



You are a supervisor at a local recycling company. You are sorting waste by hand. How will you use the above diagram to train your hand sorters.

_____

_____

_____

_____

_____

Name: _____

Read the section below and answer the questions. You will need extra paper to do the answer.

Where do we start?

The issue of municipal waste treatment is becoming more and more urgent, in terms of:

- Inadequacy and even non-existence of controlled landfill sites
- Limited capacity of landfill sites
- High operating costs of controlled landfill
- Necessity of recycling the effluents (leachate, methane) coming from landfill

The above points emphasizes the importance of reducing the quantities put into landfills. Recycling is obviously the solution, but, this requires a strict sorting of daily produced waste. By so doing, each type of waste can be sent on to appropriate treatment facilities.

a. Where is the waste in your community going to?
b. How far is the landfill from your schools?
c. Did you ever visit the landfill?
d. Look at the photographs below. Write a paragraph on it.

e. Find out if there is any waste sorting system in your community. You might need to visit your local municipality or recycler.
f. If there is no sorting system, what can you as family do to start this system at home? How will the people at the landfill benefit from this?
g. How do you think is the local municipality is managing waste in your community? What improvement would you like to see?

Read the section below, look at the photographs and answer the questions.

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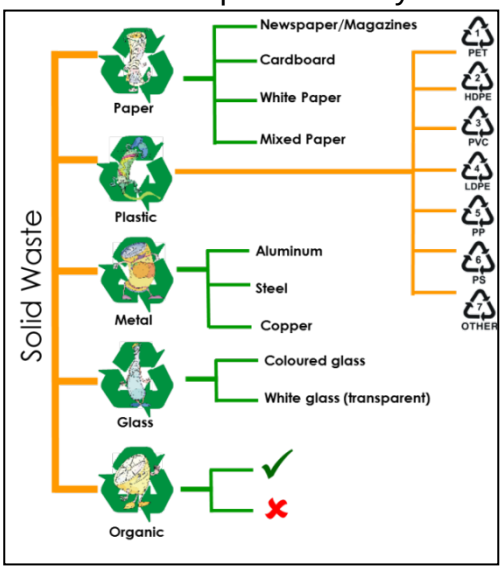
The best way to cope with all this is to collect it at its source in each area and to separate it immediately where possible.

a. These people work at the transfer station. What are these people doing?

b. What impact to they have on the recycling process?



c. You saw the poster on the left, where the people sorting the waste. What is this poster telling us?

d. What does the plastic abbreviations on the recycling symbols stands for?

Find out about the careers we get in Waste Management. Write five careers with a short description of each in your writing book.