

School kit

Recycling

- Grow Recycling -

Fun game-based
learning about STEAM
and sustainable development





Grow Play Education

Grow Play Education offers school packages for students in grades K-3 in science, technology and mathematics - all with a sustainability perspective. School Kits include lesson plans, student assignments and digital games in areas such as recycling, upcycling, ecological cultivation, renewable resources and biodiversity. Grow Play School Kits are free and available at Groplay.com/Education.

Grow Recycling School Kit

Our natural resources are limited and we need to make sure that we use them wisely. Learning about the different life cycles of the materials that we use every day and thinking about how we can reduce the amount of waste we are producing is a good starting point. To recycle is a way of using our natural resources in a sustainable way.

Here you will find extensive teaching resources including a fun and creative game, curriculum-based lesson plans and teaching guides for classroom activities, fact sheets for teachers, student activity sheets as well as a quiz.

You may use the material either for a longer project about recycling or you can just pick and choose individual activities.

The school kit focus on grades K-3.



The Game Grow Recycling

Grow Recycling is a game where students learn in a playful and intuitive way about how the recycling chain is interconnected and how sorting waste works. Meet all the funny and cheeky recycling containers and feed them with garbage. Who likes what? The containers' reactions help students to figure out each character's favorite waste.



The students then get to come along and make new things from the recycling they have sorted by following the container into the recycling factory. Here they can play on recycling machines, pull levers, click buttons, spin wheels and play along to the music. Once they have finished playing, they have created a new product from the material they recycled.

The product is then used at rabbit Banja's picnic with her friends. Whatever they consume- be it a bottle of juice, a jar of jam or a jar of pineapple rings - it will be taken care of and later ends up in the cycle again.



Connections to the Next Generation Science Standards

Science and Engineering Practices

Planning and carrying out investigations to answer questions or test solutions to problems in K–2 builds on prior experiences and progresses to simple investigations, based on fair tests, which provide data to support explanations or design solutions.

- Make observations (firsthand or from media) to collect data that can be used to make comparisons. (1-ESS1-2)

Obtaining, evaluating, and communicating information in K–2 builds on prior experiences and uses observations and texts to communicate new information.

- Read grade-appropriate texts and use media to obtain scientific information to determine patterns in the natural world. (1-LS1-2)

Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.

- Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions. (1-ESS1-1)

Lesson Plan - Talk About Recycling



Talk About Recycling

Recycling is everywhere around us today. But what do the students know about recycling if you dig a little deeper into the question? Start by playing Grow Recycling and make a mind map to discover what your students already know and what they would like to know more about.

Play Grow Recycling

Start by letting students play the Grow Recycling game as an inspiring start and common ground for classroom discussions. A web-based version is available for free at www.groplay.com. The Grow Recycling app is available for purchase for IOS and Android.



Questions to Discuss

- What do you think the game Grow Recycling is about?
- The game does not have an ending it just goes around again to the beginning, like a circle. Why do you think it works like that?
- Why do you think we recycle things?
- Where does the waste come from in the game? How do we produce waste in our daily lives?
- In the game, different types of waste are placed in different containers and the containers have different shapes and colors. What do the containers look like where you live?
- Have you seen recycling containers somewhere?
- Do you think everything can be recycled?

Lesson Plan - Talk About Recycling

Make a Mind Map

Create a mind map during or after the discussions. You can use an app or computer program, a white board or a large sheet of paper. Let the mind map be displayed during your continued work, so the students can add and extend it with new knowledge that they discover during the journey.



Objectives:

To visualize the students' understanding for recycling and creating a common ground for your work on recycling.

Grades: K - 3

Materials needed:

Access to tablets or computers as well as the game Grow Recycling. A program, board or paper and pen to make a mind map.

Next Generation Science Standards & Common Core State Standards

PS1.A: Structure and Properties of Matter

- Different kinds of matter exist and many of them can be either solid or liquid, depending on temperature. Matter can be described and classified by its observable properties. (2-PS1-1)
- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

ELA/Literacy:

W.1.8 With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question. (1-ESS1-1),(1-ESS1-2)

SL.2.2 Recount or describe key ideas or details from a text read aloud or information presented orally or through other media. (2-ESS1-1)

Lesson Plan - What is Packaging?



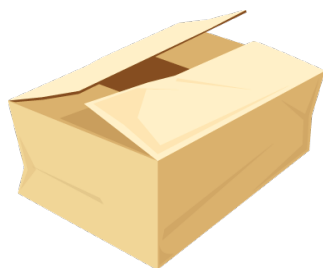
What is Packaging?

Did you know that it is only packaging and magazines can be recycled in the containers we see outdoors or at home? Packaging includes all materials used to wrap, protect or present a product until it is used. It is not always easy to recognize what packaging really is. Now you can learn more about it!

Make a Packaging Collage

Invite students to bring empty packs from home or ask in your school's cafeteria. Look for recycling symbols on the packaging and sort them according to how they are recycled. Do you find things that aren't really packaging? What happens to those things that cannot be recycled?

You can also cut out images of packaging that you find in newspaper ads or ads from supermarkets. Group the different packages according to the materials they are made of and make a collage.



Lesson Plan - What is Packaging?

Packaging Through the Ages

How we package our goods has really changed over time. Before plastic started to be used in the mid-20th century we had been using completely different packaging solutions. Let students, in groups or individually, choose one product that has been around for a long time (e.g. milk, bread or flour) and let them do research about how the product was packaged 100 years ago. What did it look like inside the grocery store and how did people take it home? Students can interview an older person in their neighbourhood or you can, show photos of old grocery stores, or watch a movie showing the interiors of an old grocery store. You might even get lucky and find some old packaging like a milk bottle that you can bring to class.

Objectives:

To get a deeper understanding for how our recycling system works and what packaging is.

Grades: K - 3

Materials needed:

Different kinds of packaging (some items that are not packaging)
Advertising-leaflets from grocery shops, supermarkets etc. that depict various packaged goods.

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- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

ELA/Literacy:

W.1.7 Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions). (1-ESS1-1),(1-ESS1-2)

W.2.8 Recall information from experiences or gather information from provided sources to answer a question. (2-LS2-1),(2-LS4-1)

Lesson Plan - Recycled Postcards



Recycled Picture Postcards

Explore paper as a material a bit closer and try to recycle it yourself. Paper is one of the materials every student comes into contact with in their daily lives and that is available in many different forms. Take a look around in the classroom! Maybe you will find all of these different types of paper: notepad paper, newspapers and magazine paper, books, cardboard, tissue paper, gift wrap paper, toilet paper and wallpaper.

Make Your Own Picture Postcards

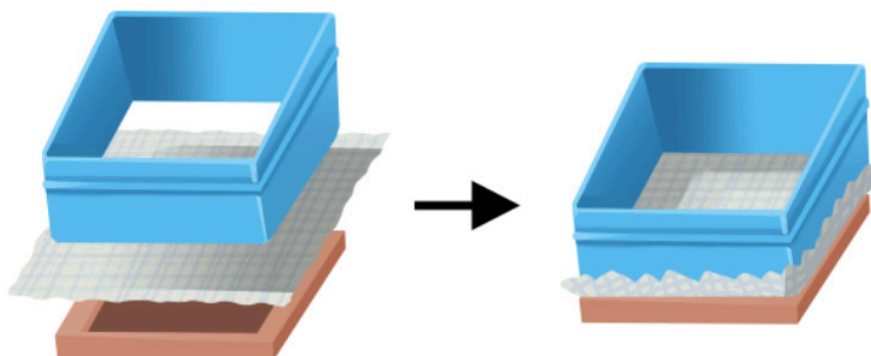
Take an old plastic container e.g. an icecream box or a reusable food container (preferably rectangular size) that matches the size you want your postcard to be.

- Cut out the bottom of the container leaving only the frame and the lid.
- Cut out a rectangular shape in the lid of about the size of a postcard.
- Cover the frame of the plastic container with a rough mesh fabric, such as gauze weave and stretch and tighten it by attaching the lid. (see figure).

Tear some old newspapers into small pieces and put them in a bowl of water. Leave the paper in the water for at least an hour while stirring it from time to time. Make sure there are no lumps of paper by mixing it with your fingers so that the pieces dissolve and everything turns into a viscous pulp. To add a little extra touch you may decorate your paper by adding small petals, glitter, confetti or the like to the pulp.

Now dip the plastic container into the pulp with the lid facing downward so that just enough pulp gets caught on the mesh. Make sure the pulp is evenly distributed over the mesh. Now lift the container up and place it over the sink where it can drain and dry. You may also carefully wipe away excess water from underneath the fabric with a sponge.

Carefully remove the lid and hang up the fabric or place it on a towel for the paper to dry completely.



Lesson Plan - Recycled Postcards

Durable Paper Fibers

Paper fibers used in newspapers can be recycled up to seven times before they are worn out. It is a hard-wearing material that should really end up in the right place - in recycling!

You can start by testing the paper fibers durability.

Test to see what happens to the fibers when you expose them to different kinds of "stress-tests":

Place pieces of a newspaper in a glass of water - hot or cold. Perhaps you can add something to the water to see if the fibers will be affected by it?

Bury some pieces of a newspaper in the ground covering it with soil. Soak pieces of newspaper in water or put it in the freezer for 24 hours.

Let your students brainstorm and come up with suggestions for testing!

Objectives:

To examine the properties of different materials and find out how the actual recycling process for the material works.

Grades: K - 3

Materials needed:

Newspapers, a rectangular plastic container/box, gauze weave or fine mesh fabric, a tub of water (should be bigger than the plastic container)

Next Generation Science Standards & Common Core State Standards

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- Different properties are suited to different purposes. (2-PS1-2),(2-PS1-3)
- A great variety of objects can be built up from a small set of pieces. (2-PS1-3)

Structure and Function

- The shape and stability of structures of natural and designed objects are related to their function(s). (K-2- ETS1-2)

Student Activity- Your Recycling Bin



Your Recycling Bin

What would your own recycling bins look like if you got to decide? Draw pictures of recycling bins that would make recycling more fun!

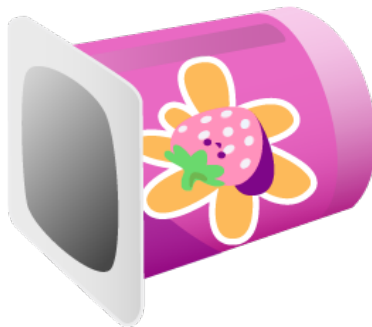
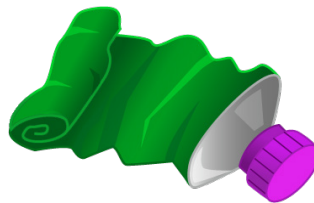
A large, empty rectangular box with a thin black border, intended for a student to draw their own recycling bins. The box is white and occupies most of the page below the instructions.

Student Activity- Find the Plastics



Find the Plastics

Mark all packaging that you think is made of plastic.



Student Activity- Match the Waste



Match the Waste

Draw a line matching each kind of trash with the right recycling bin.



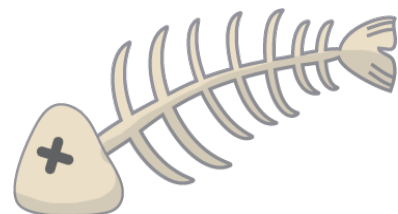
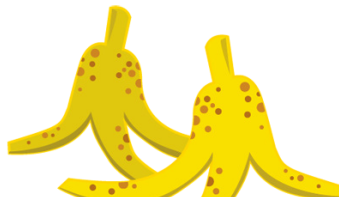
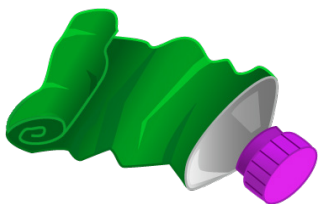
PLASTIC



METAL



COMPOST



Student Activity- Recycling Story



Recycling Story

Write a story about a package's journey through the recycling system. Perhaps you can write about a soda can or a magazine being recycled. At least three of the words in the box should be included in your story! Continue on the back of the paper if your story is going to be longer.

truck bottle seagull trash grocery store factory clown melt metal can street newspaper
zombie crane machine recycling battery bin heat bike glass jar happy environment

Student Activity - Recycling Math



Recycling Math

Solve Banja's secret message! Do the addition or subtraction below. Use each answer to find the right letter in the box below.

A = 1	K = 11	U = 21
B = 2	L = 12	V = 22
C = 3	M = 13	W = 23
D = 4	N = 14	X = 24
E = 5	O = 15	Y = 25
F = 6	P = 16	Z = 26
G = 7	Q = 17	
H = 8	R = 18	
I = 9	S = 19	
J = 10	T = 20	



$1+1$	$3-2$	$10+4$	$4+6$	$6-5$	$9+2$	$6-5$	$9+5$	$5+3$	$9+8$
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$5+10$	$20+4$	$10-7$	$15-4$	$8-3$	$9+9$	$24+2$	$15+5$	$8-3$	$15+3$
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$25-3$	$6+3$	$20-6$	$9+5$	$15-6$	$17-3$	$11-4$	$25+2$	$20-2$	$10+9$
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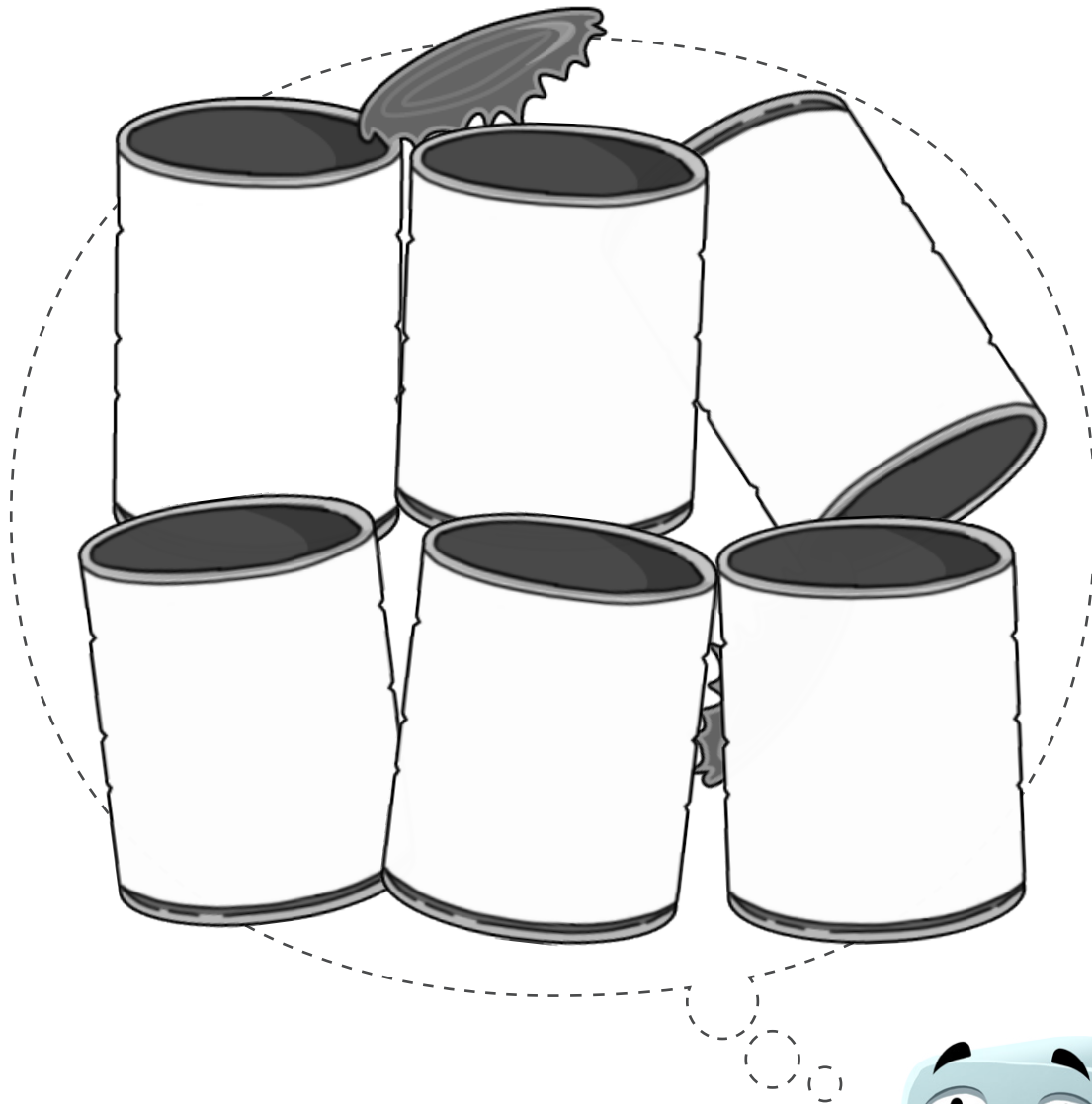
$9+4$	$3-2$	$23-5$	$24-4$
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Student Activity - Make New Labels



Make New Labels

Tin cans are Gofh's favourite food! But do you know what was inside these cans before? Perhaps crushed tomatoes? Sliced pineapples? Write and draw new labels on the tin cans in the picture!





1. What word describes used materials that are being made into new things?

1. Circling

2. Recycling

3. Cycling



2. Why should we recycle?

- 1. Recycling helps to conserve our natural resources like trees, oil and metal.**
- 2. Because you will get candy.**
- 3. We do not need to recycle.**



3. Recycling one glass bottle saves enough energy to power a 100-watt light bulb for...

1. 1 hour

2. 3 days

3. 4 hours



4. If you started digging a hole in the ground 1000 years from today - which material would you be able to find remaining from our time?

1. banana peel

2. glass

3. newspaper



5. Which material can be used again and again if they get recycled?

1. gift wrapping paper

2. plastic

3. steel, aluminum and glass



6. How long does it take nature to break down an empty soda can?

1. 300 years

2. 100 years

3. 5 years



7. Which product can plastic bottles NOT be made into when being recycled?

- 1. candy**
- 2. new plastic bottles**
- 3. fleece jackets**



8. How many times can paper be recycled before the paper fibres are worn out?

1. up to 7 times

2. 3 times

3. paper fibres never wear out



9. 1 recycled tin can would save enough energy to power a television for...

1. 1 hour

2. 24 hours

3. 3 hours



10. What can organic waste (f.ex. a banana peel) become if it gets recycled?

1. paper for comic books

2. biofuel to power buses

3. cinnamon buns



11. In Gro Recycling - the game there is a recycling container that loves eating metal. What is its name?

1. Banja the rabbit

2. Pete the paper bin

3. Gofh



Right answers

- Q 1 2. Recycling**
- Q 2 1. Recycling helps to conserve
 our natural resources**
- Q 3 3. 4 hours**
- Q 4 2. glass**
- Q 5 3. steel, aluminum, glass**
- Q 6 1. 300 years**
- Q 7 1. candy**
- Q 8 1. up to 7 times**
- Q 9 3. 3 hours**
- Q 10 2. biofuel to power buses**
- Q 11 3. Gofh**