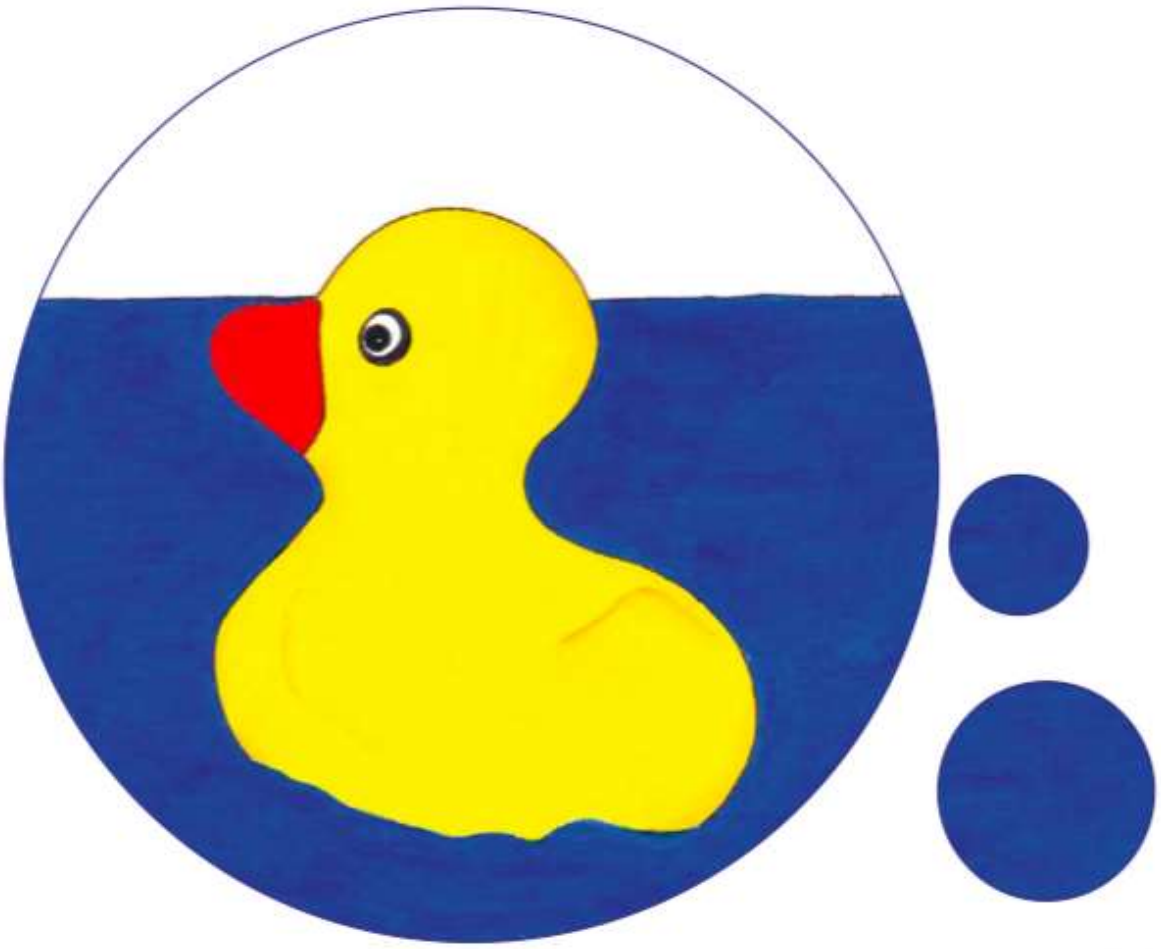
Little Rubber Duck, Where Do You Swim?

A teaching resource for primary schools



This material was created as part of the project "Global Schools –Learning for the Future". The project aims for changes at 3 levels:
Practice level: to support teachers and build their confidence and understanding so that they can integrate Global learning into everyday teaching practice.
Policy level: to embed Global learning into educational policies and the primary curriculum.
Society: to promote the Sustainable Development Global Goals, raise awareness and involve teachers, parents and the wider community in the issues.

17 partner organizations (NGOs, local authorities and universities) from ten European countries are working together as part of the project from 2015 to 2018. In the UK, the project is delivered by Cumbria Development Education Centre.The pan-European coordination of the project is carried out by the Autonomous Province of Trento (Italy).

Contents

Foreword

Plastic is an indispensable part of our everyday lives. Children's rooms are full of plastic toys, water from clear plastic bottles is popular, our food is sealed in plastic, our kitchens are full of plastic bowls and when we go shopping there are plastic bags everywhere. Plastic is widely used and popular because of its characteristics. But our lives full of plastic are affecting the environment. It takes up to 500 years until plastic rots. Much plastic waste therefore makes itsway sooner or later into the sea. There are even islands of plastic waste in the sea. Many animals confuse the plastic waste with food, which results in deadly consequences. But the quality of water also suffers from the plasticizers contained in plastic.

Is plastic a curse or a blessing? Is it harmful to the human body? And if so, would a life without plastic be possible? Are there alternatives? And how can we treat this complex topic in primary school?

An approach to these and other questions around the subject of plastic are offeredin this resource. A global learning approach relates learning to children’s own lives, and incorporating a playful approach to the topic, awakening pupils' own thirst for research, making the positive and negative effects of plastic on our lives tangible, and getting to know options for action in one's own environment.

In this resource we explore the example of a rubber duck. This is followed by a discussion on how long it takes for certain substances to "disappear" from the ground and ends with the packaging of your own sandwich and getting to know a store that does without conventional supermarket packaging. All exercises in this resource follow the principle of global learning and are designed to be as interactive and experiential as possible. Thus it is possible for the pupils not only to look at this diverse topic from different perspectives, but also to experience it.

We hope you enjoy the journey!

The Rubber Duck's Journey

Age of students: key stage 2
Subjects: Geography, Literacy
Duration: 2-3 lessons

Overview:
You can find her in almost every household with children: the rubber duck. She is an indispensable part of bathtime. But what do we know about the rubber duck? What does the duck have to do with the dinosaurs? Where does she "sleep"? How does she come to us? Where does she go when she is no longer needed? And what do 29,000 rubber ducks have to do with the study of ocean currents? These and other exciting questions about the popular plastic toy will be answered in this lesson activity.

Learning goals:
The pupils recognise that plastic consists of valuable, non-renewable raw materials. Pupils discover the properties of plastic.They expand their knowledge of the conditions of toy production. They recognise their own interconnectedness with people in the global South. Pupils practise reflection on alternatives.

Procedure:
This activity consists of 3 exercises:

1. "Plastic Researchers" - Why is plastic everywhere and what are the properties of plastic?
2. "A rubber duck is born" - How is plastic made and where does our toy come from?
3. "The Adventurous Journey of the Duck" - From waste incineration, plastic in the sea and alternatives.

1. Plastic Researchers

Preparation
Collect some plastic items, such as bottles, toys, lego, dolls or balls, various packaging materials or sackcloths. The pupils should take a thin scarf with them.

Instructions

Step 1
Pupils should look around the classroom and then name things that are made of plastic.

Step 2
Now the children work together in teams of two or four. One or two pupilscover their eyes with a scarf and now have the task not only to guess different things made of plastic by touching, but also to name the properties of plastic. To do this, place some plastic items in the centre of the table of each group after the eyes have been covered. At the table, the half of the small group should have blindfolded eyes.

Step 3
After a few minutes the pupils swap, so that all can "feel". Some features can only be recognised by"seeing", such as that plastic can have all sorts of colours.
Some features at a glance:
Light, colourful, cannot break, can be hard or soft, can crackle, can take on all sorts of shapes, washable.

Step 4
Write down the found properties on the board. Explain that there are many different "grades" of plastics, depending on what is needed. More background information on various plastics can be found here:
kids.britannica.com/kids/article/plastic/400149

Possible reflection questions:

Why arechildren's toys mainly made of plastic?
Which items in the classroom are not made of plastic? Why? Together with the children, you can now discuss the fact that plastic is so popular because of its special properties. Does anyone know how plastic is made? Move on to Part 2

2. A rubber duck is born

Preparation

Print out the drawings that show the journey of the Rubber Duck on A4 or A3. Cut out the explanation cards one by one. Take a big map of the world into the classroom. Copy a worksheet with the world map (free download here: https://www.tes.com/teaching-resource/world-map-3000292) in sufficient numbers for each child (or for children to work in pairs). It is also helpful if you have a yellow rubber duck with you!

Instructions

Step 1
Depending on the reading ability of the pupils, you can do this exercise in a big circle with A3 images or divide the children into four small groups.

Step 2
Big circle:
In the middle are the 12 pictures, around which the 12 explanatory cards are placed withthe text facing down. Children read each text out loud, from 1 to 12, and search for the corresponding picture. You can add explanations after each picture.
Variant small groups:
Each small group gets the 12 pictures and 12 explanatory cards. Together they have to match the right text with each image. When all groups are ready, the plenary session resolves and adds explanations or answers questions.
More background information on the "journey of the rubber duck" can be found in the info box.

Step3
Now distribute the world map copies. Together with the children, search for China and record together the journey of the duck from China to Europe.

Reflection questions

Why does the rubber duck squeak?
What does the rubber duck have to do with dinosaurs?
How long does the transport of the ducks to Europe take?
Why do the ducks come by boat and not by plane?
What happens to the raw materials when the duck ends up in waste incineration?

Infobox

What do ducks have to do with dinosaurs?
The connection is in petroleum. Oil began to form 150 million years ago, at the time of the dinosaur era, when organic matter from plants and even animal remains sank to the bottom of the sea. Because there was too little oxygen there, they did not decompose. Sand and clay mixed with these organic substances, and also remains of dinosaurs, which settled into a layer of silt. This forms the basis for today's oil and thus for plastic production.

Why is the duck so famous?
The duck became well known in 1970 when Ernie (from the TV show "The Sesame Street") sang his Rubber Duckie song. "Rubber Duckie, you're the one ..."

Why does the rubber duck squeak?
The squeak is created by a small hole in the bottom of the rubber duck. Rubber ducks are hollow, and filled with air. That's why they can float. If it is compressed, a lot of air is pressed through the small narrow opening in a short time. This causes the air to vibrate. That makes the squeaky tone.

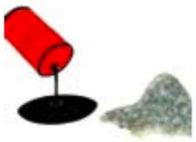
Where does the duck come from?
Like 80% of all toys, most rubber ducks are made in China. The duck has travelled around 20,000 km into our bathroom.

What do Rubber Ducks have to do with ocean currents research?
In 1992, a container ship made its way from Hong Kong to the Tacoma, on the west coast of the US. On the freighter were about 29,000 rubber ducks. The ship capsized in the eastern pacific. In the process, a few containers and ducks floated out into the open sea, and the strong currents of the sea spread the ducks in different directions. On many beaches in the world, ducks were and are still being washed up from the freighter.

Source:
https://www.mnn.com/earth-matters/wilderness-resources/stories/what-can-28000-rubber-duckies-lost-at-sea-teach-us-about

RESOURCE - explanations

Rubber ducks are either natural rubber or plastic. Most ducks are made of plastic, more specifically PVC. On the following 12 cards the journey of the duck is explained in more detail.



1. Plastic is made

Plastic basically consists of two things: petroleum and rock salt. The oil is processed in a refinery. That is, it is cleaned and "disassembled" into various parts, e.g. petrol. By adding salt and bonding materials a powder is created. It is called PVC, polyvinyl chloride.

2. The plastic becomes elastic

The PVC is softened with the help of mineral oils. So you have a viscous mass, which later becomes elastic plastic.

3. The colour yellow

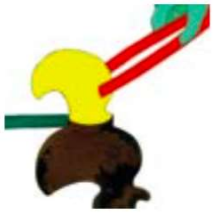
Now the dye is added. Following a precise recipe, the liquid plastic mass is coloured bright yellow.

4. In the oven

Now, a very small amount of this liquid is poured into a cast-iron duck mould. The mould is then heated in a hot oven. Due to the heat, the liquid spreads by itself on the walls of the mould and becomes solid. But because the mineral oils are there, the plastic does not harden.

5. Drenching

Now the mould comes out of the oven and is ‘set’ in cold water, like boiled eggs. On the base, the duck gets a hole so she can squeak later.



6. Elastic shapes

Then the duck can be removed from the mould with pliers. And because it is elastic, the plastic does not tear. The duck returns to the right shape when hatched.

7. More colours
Now, a red beak and black eyes are sprayed on one after the other. A stencil prevents the whole duck from being discoloured. Many workers spray one part at a time. (The beak is bright red, so even small children recognise the face of a duck!)

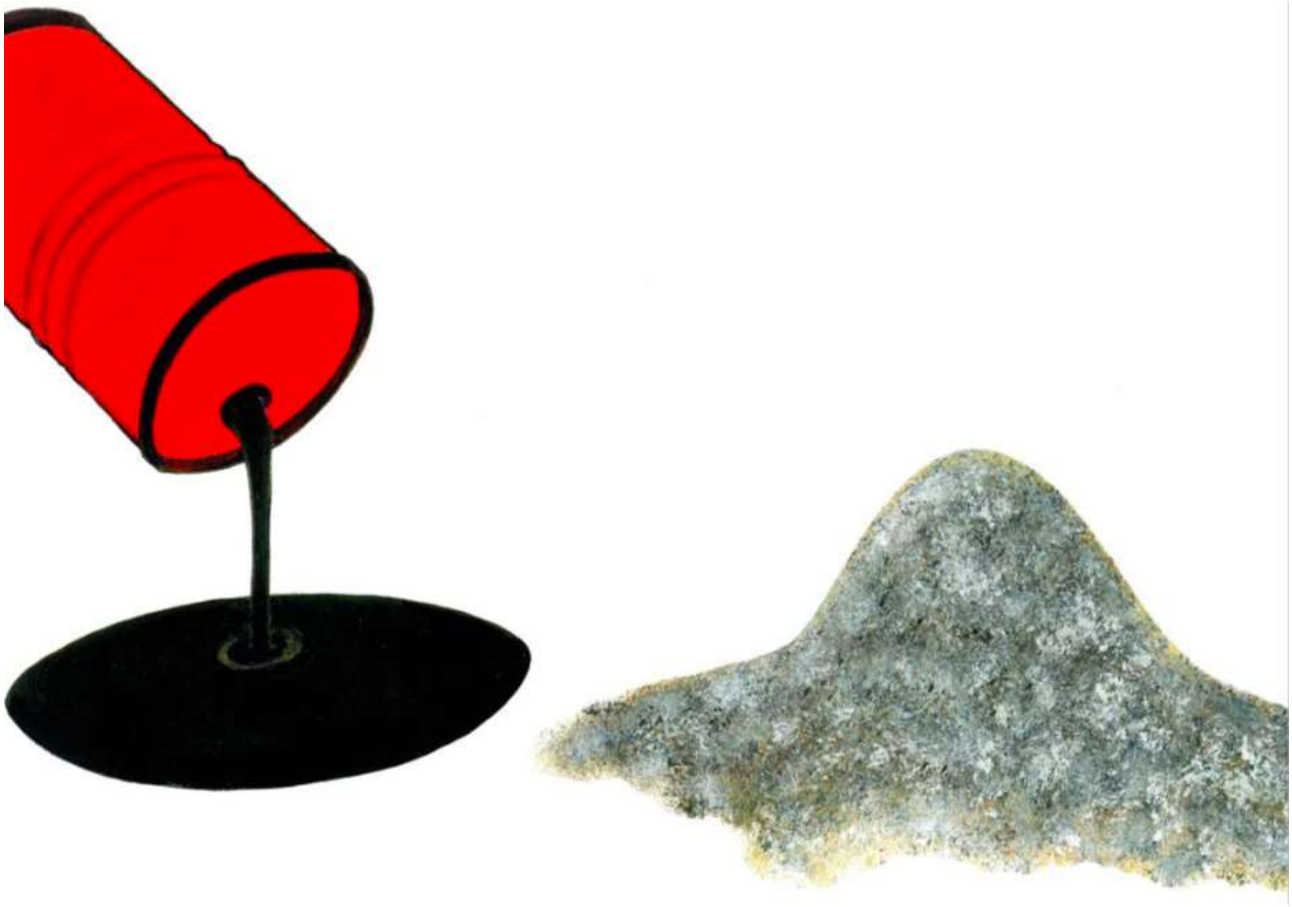
8. The duck is packed
Now many hundreds of ducks are packed in boxes and loaded into a container.

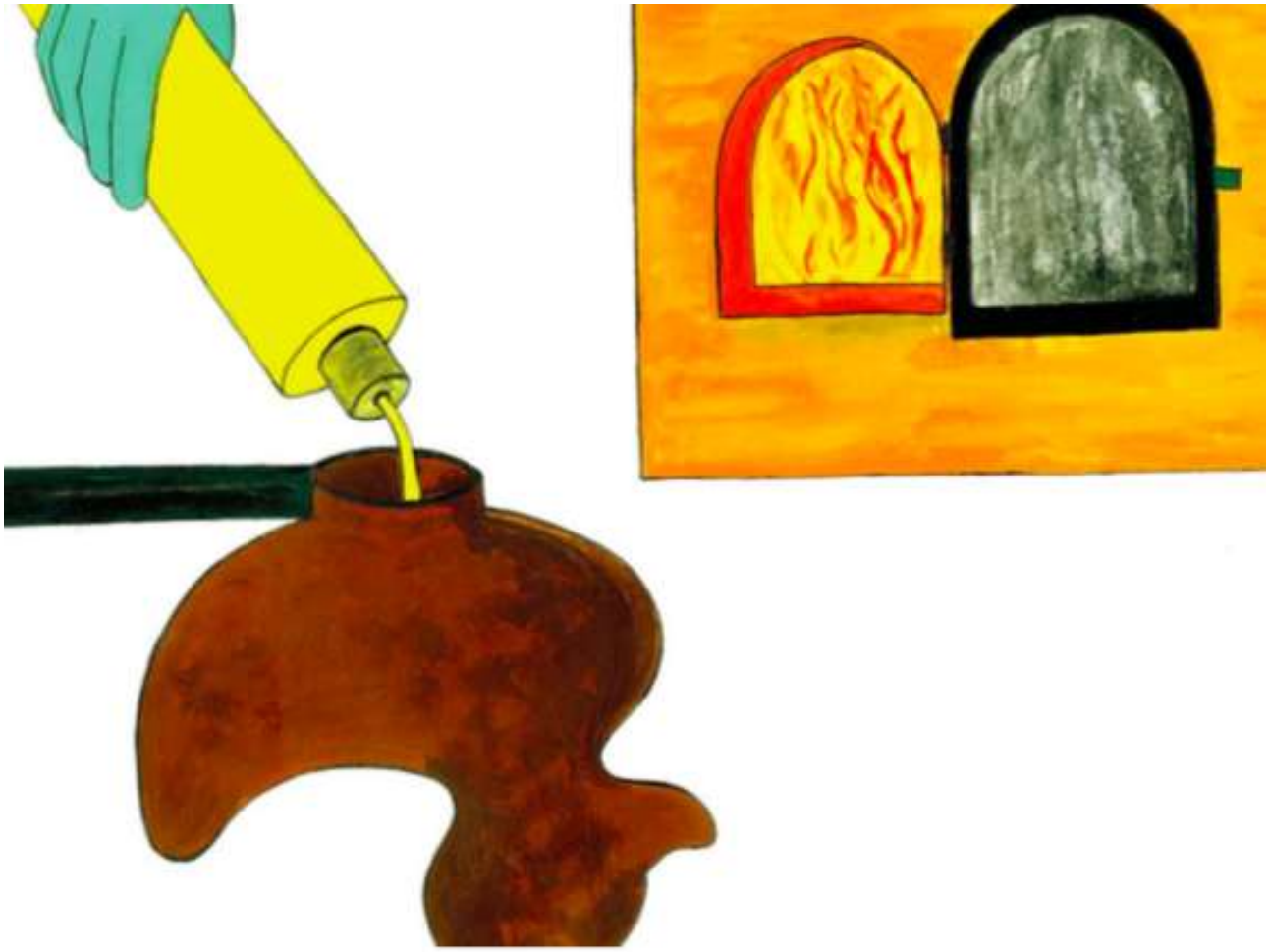
9. Transport to Europe
The container comes with many other containers on a large ship. This container ship takes five weeks from China to the UK. After that is transported by trucks to different cities.

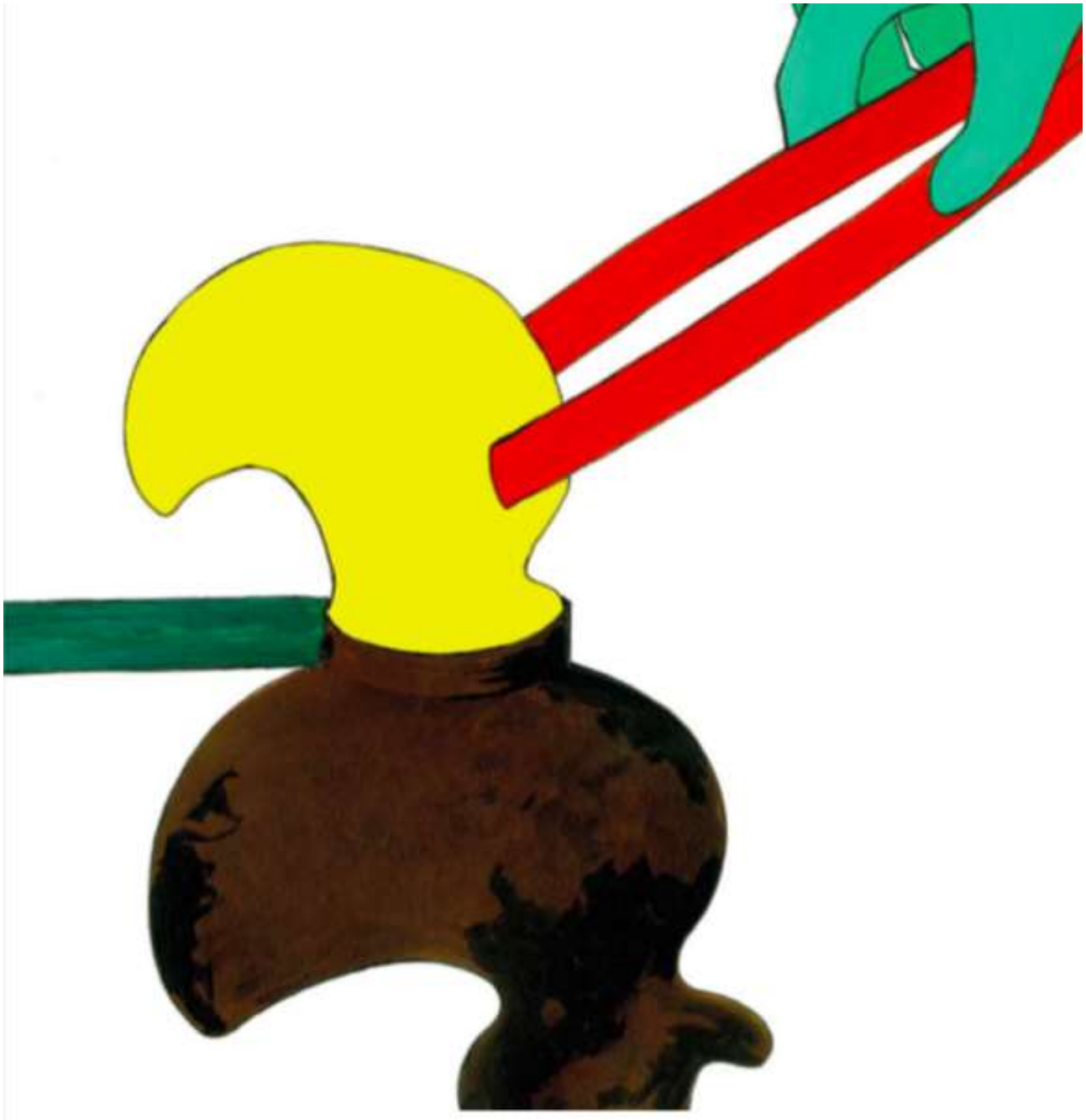
10.Use
After purchase, the duck does what it was made for: experiences adventures in the bathtub.

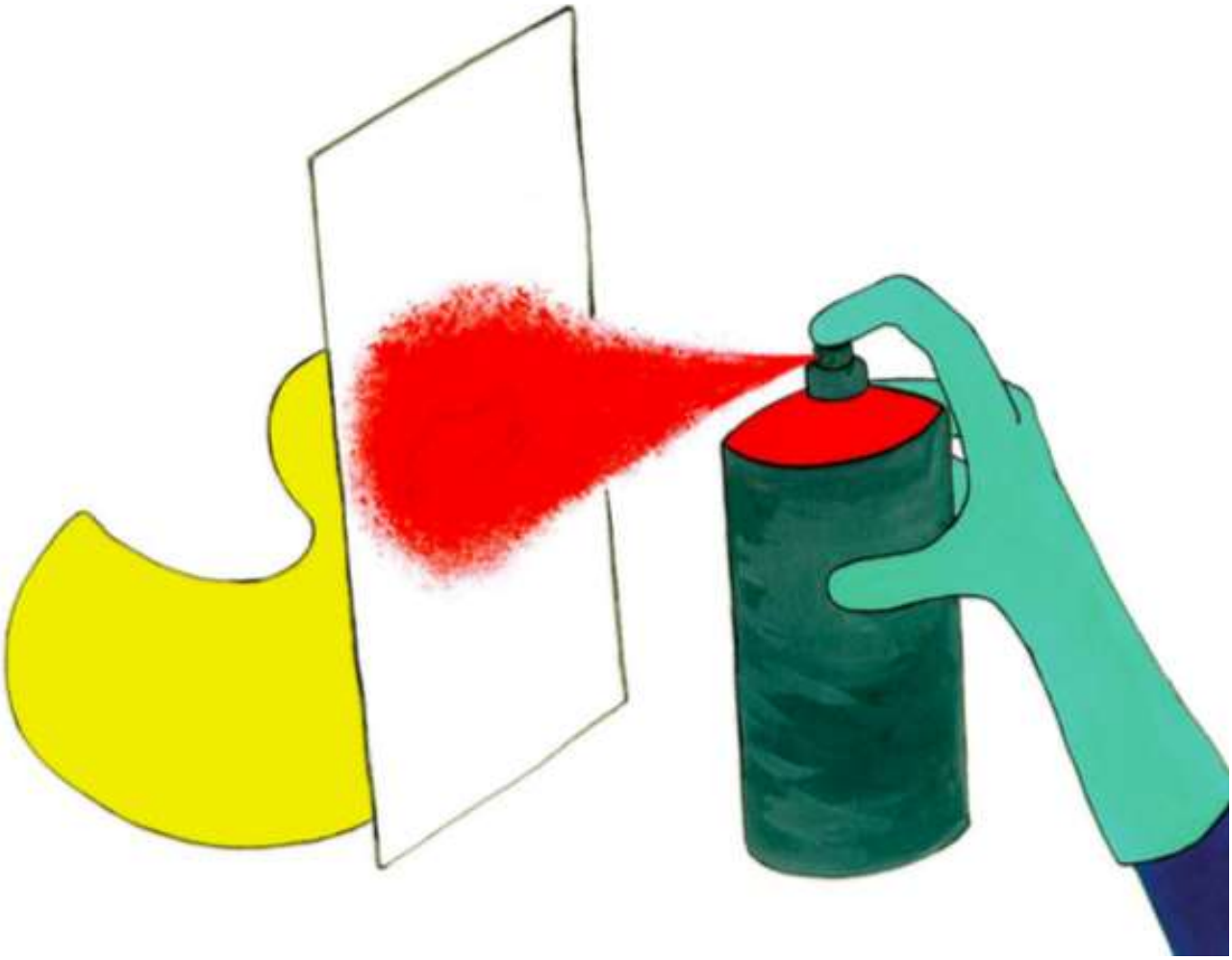
11.The duck in the trash
What happens if nobody plays with the duck anymore? She can’t be recycled, so must be put in the ordinary rubbish bin. This rubbish goes to landfill sites, or is incinerated. In some incinerators, the energy is used to heat homes. However, the valuable raw materials (oil and salt) are lost forever.

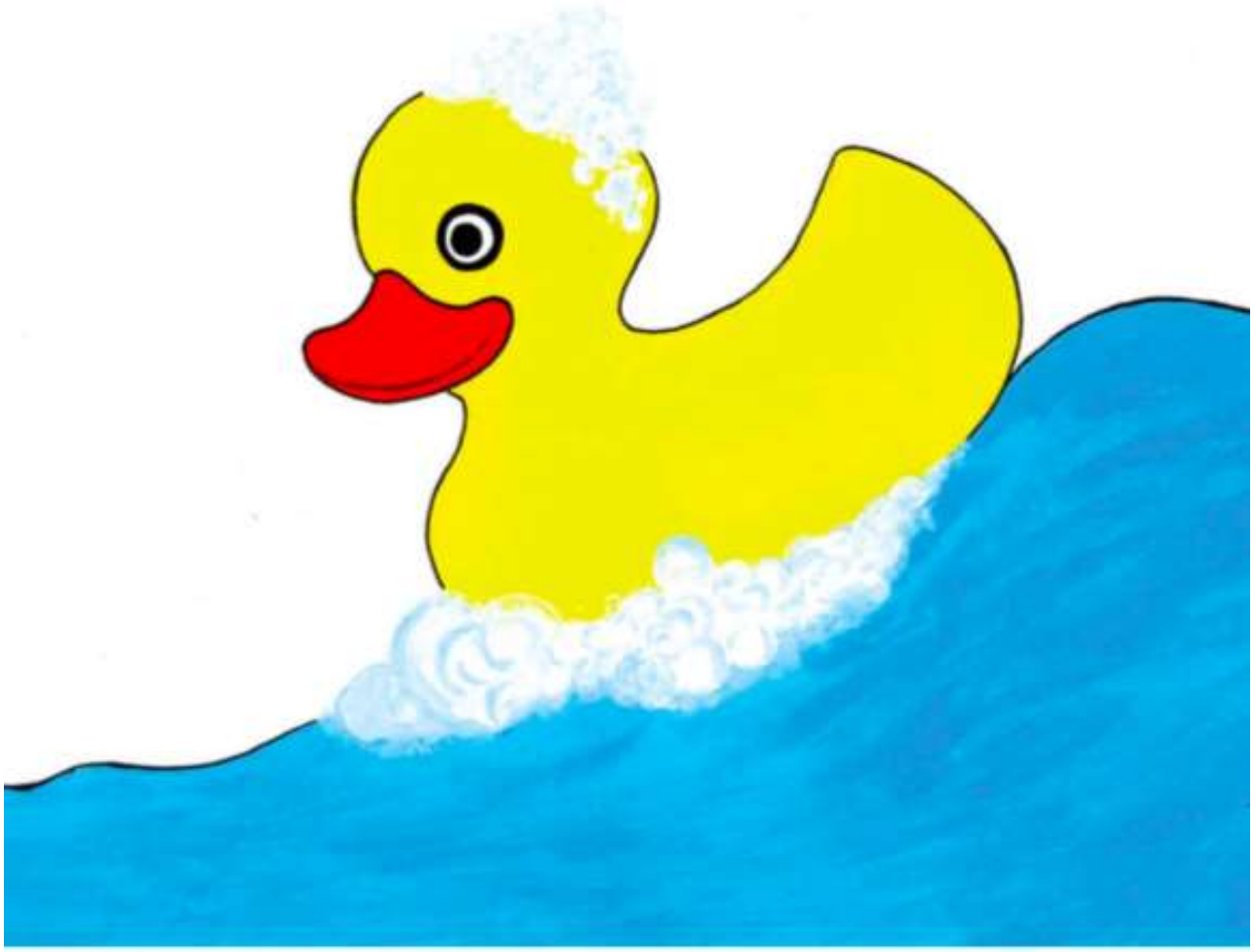
12. Reuse the duck
It is best for the environment if the duck is reused or given away to someone else. So she comes into a new family and can serve her original purpose: to go swimming with children and adults.

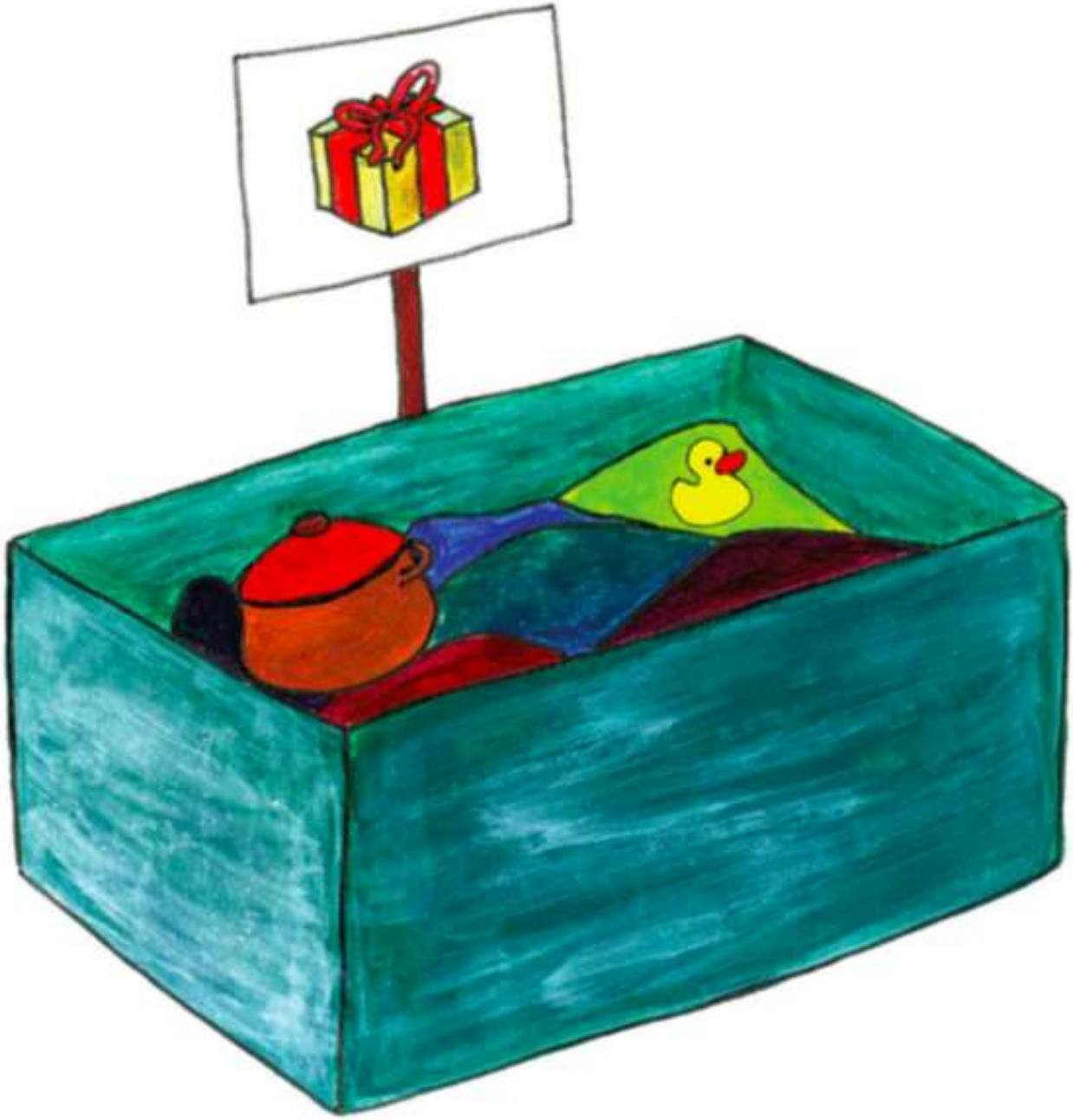












3. The adventurous journey of the duck

Step 1
Repeat the contents of pictures 10 and 11 with the pupils. Then you have the following short story of "Rosie" read aloud by different children, sentence by sentence. You could also retell the story in plenary.

Step 2
The pupils now have the task of thinking about how the story continues. Is the duck thrown away? Where is she going? What happens to her there? Or is she still escaping her fate and allowed to go swimming again? The children can choose to create a cartoon or write the end of the story themselves. You have the rest of the hour to do that.

Step 3
The results are presented in the classroom, all children present their stories briefly.

Rosie, the rubber duck

Rosie was a happy rubber duck. She lived with family Bowman. The Bowmans had a small but bright bathroom. Of course they also had a bathtub.Rosie had her place at the edge of the tub.

Every morning she watched the two children Laura and Max brush their teeth. But even during the day it was never boring, because the family dog Luna played with her. She carried her through the house and played with her around the garden. In summer everyone bathed together in the Laura and Max's paddling pool.

Sunday was Rosie's favourite day. It was bath day. But this Sunday was different than the Sundays before. Mum came to the bathroombut not to turn on the water. She took Rosie from the side of the bathtub and went to the kitchen. "The children are too old for a rubber duck," said mum, and opened the rubbish bin ...

Garden of (not) disappearing things

Age of students: key stage 2
Subjects: Science
Duration: 2-3 lessons

Overview:
In the UK, around million tonnes of plastic waste is generated each year (http://plasticfree.co.uk/plastic-stats/). And a lot of waste ends up in the environment. Through rivers, large amounts of plastic can even reach the oceans. So much so that real garbage islands made of plastic have formed there, some of them twice as big as the UK. One reason for this is that plastic remains so long. It takes about 450 years for a plastic bottle to decompose. In this material, the theme is rotting. Decomposition times of various objects are compared with each other playfully. The focus is on building a mini-compost heap, which the students can follow over the school year, observing different materials as theyrot and seeing what is still "there" at the end of the year.

Learning goals:
The students know what rotting is. They recognize that there are materials that decompose quickly and others that can never be decomposed. The students practise experimentation. They recognize the need for recycling.

1. What is rotting?

Preparation:
Print the three pictures of the apple on A4 or A3.

Instructions:

Step 1
Ask the students to describe the sequence of pictures. What do you see in the pictures? What has happened there? Now the pupils describe what they see, depending on previous knowledge: that the apple "rots" or "goes mouldy" and becomes wrinkled.

Step 2
Explain to students that the process is called "decay" or "rotting," and write the words on the board. Ask the students if they have ever seen something else that is rotting or rotten. Some of them may have already seen mouldy fruit and vegetables at home, or an old, decaying tree in the forest. Explore these stories.

Step 3
Depending on the age of the pupils, you can explain here that there are very small organisms, microorganisms, that decompose food, but also deciduous trees and dead trees, so that it becomes earth, humus, upon which new plants can grow again. This process is thus an important basis for life on earth.

Step 4
Now head over and ask if anyone has seen anything plastic going mouldy or rotten. Probably nobody. Have children guess why a plastic bottle does not rot.

Here's the solution: The microorganisms cannot completely decompose plastics because they are very stable. It takes up to 450 years for plastic to decompose. During decomposition, the plastic is split into smaller and smaller particles until it can only be seen under the microscope, but it does not turn into humus, like the apple. Instead, small plastic particles are left behind in the environment. And there is more and more plastic building up in the environment. Beaches are already partly made of plastic sand and in the sea carpets are made of plastic "plankton". These are eaten by marine animals, but they do not receive any nutrition and starve to death with a full stomach. (http://www.bbc.co.uk/newsround/42810179)

Photo resources – a rotting apple

2. Creating a mini-compost heap

Preparation

If you have a school garden, you can use one to two square metres of this for the compost heap. You can also use a large terrarium or fish tank. The tank offers the advantage that pupils can see how things change or do not change. In the garden you have to dig it out again after some time.

Materials

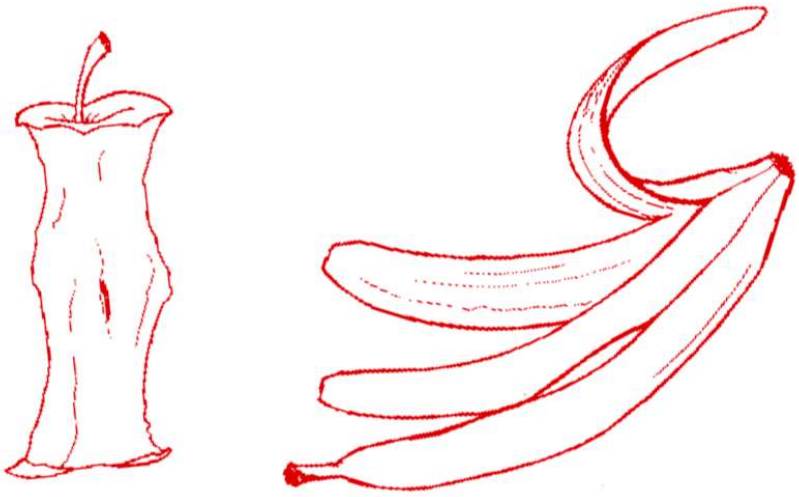
1-2m^2 ground in the school garden or a terrarium with small signs (eg sticks used for gardening) for marking.
Various items of choice, e.g. plastic, newspaper, banana peel, apple slice, a piece of cotton etc.

Instructions

Step 1
Have students label signs with the names of the items to be buried. The signs can then be used to mark where this item was buried.

Step2
Pick holes in the garden or fill the terrarium with soil. Then bury the items and mark the spot.

Step3
Now, at weekly or monthly intervals, students can have the items viewed. Tip: Take a picture with your mobile phone or tablet! Thus, the respective weekly or monthly status can be recorded and documented



3. Quiz

Preparation

Print out five sets of quiz cards and cut them up so students can use them in small groups.

Instructions

Step 1

The students work in 5 small groups. Each group gets a set of pictures and time periods. Explain to the students that they now have to guess the amount of time Nature needs to decompose the subject in the picture.

Step 2

Solve the quiz by going through the list from rapid decomposition to "indefinite".

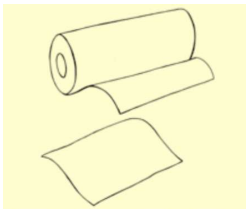
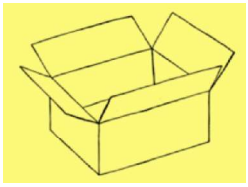
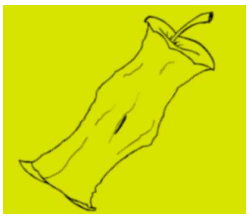
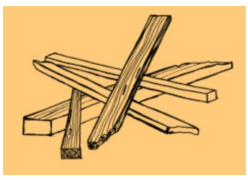
Step 3

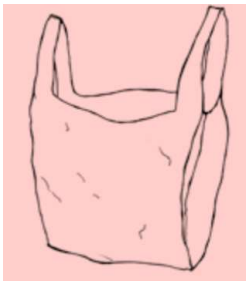
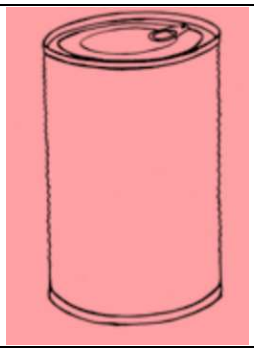
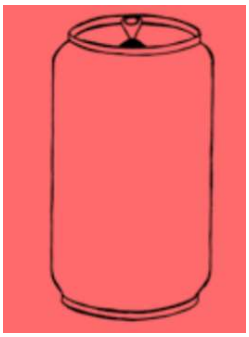
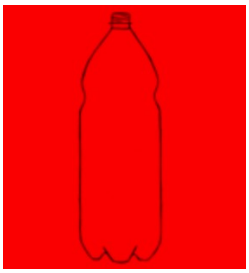
Put the apple slice and the banana peel in the foreground again. Both are fruits and take different amounts of time to rot. Let the students try to explain why this might be.

Solution: Bananas grow in tropical areas of the earth, where it is warm and humid. Heat and moisture accelerate the process of decomposition. But with us it is cooler, and that's why the banana needs more than twice as long to decompose here than the apple slice, which is native to us. However, the indications given by the time periods are only guideline values. Because the micro-organisms that decompose the substances "sleep" at temperatures below 8°c, in winter and also in high mountains, substances don’t decompose, or only do so very, very slowly.

Reflection questions

If it takes so long to break down some things in nature, what should you do with those things?
Where does the waste go if it is picked up by household waste collection truck?
Why is waste separated?
What is recycling?

	Kitchen towel	4 weeks
	Newspaper	6 weeks
	Cardboard box	2 months
	Apple core	2 months
	Cotton t-shirt	5 months
	Banana skin	2 years
	Ply wood	3 years

	Wool socks	5 years
	Plastic bag	20 years
	Tin can	50 years
	Drink can	200 years
	Plastic bottle	450 years
	Glass bottle	unknown

How do you pack your picnic?

Age of students: key stage 2
Duration: 20 minutes

Overview:
(Disposable) plastic as a packaging material is nowadays indispensable. Starting with pasta, sweets to fruits and vegetables, it almost seems like there are no more alternatives. Is that correct? In this lesson, you will first learn how to pack your own sandwich or snack. What material is the packaging, from which raw material? How is it properly disposed of? What are the concerns of plastic packaging? And finally, the sandwich itself tells how it came to its own, sustainable packaging ...

Learning goals:
The students reflect on existing packaging materials. The students expand their knowledge about the correct disposal of their waste. They practise their reading skills. They will learn more about alternative, sustainable packaging types.

Preparation

Print out the four packaging labels on A4.

- Option 1: You bring their own different packaging (glass jar, tetrapack, sweets / bread packaging, etc.) into the classroom.
- Option 2: You print the sample cards with the different foods and then cut them out.
- Option 3: You ask the children to bring different packages from home.

Instructions

Step 1
Students are asked which packaging they know. Afterwards, products are discussed that are available in different packaging. For example, pasta is available in plastic and cardboard packaging, cooking oil is either filled in glass or plastic bottles.

Step 2
Depending on which option was chosen, the pupils assign the food to the four types of packaging.

Reflection questions

Where does something belong? Is it always clear which packaging comes in and where? Which subdivisions are still available? (Paper board, white glass,coloured glass, metal: aluminum cans - tinplate boxes, wooden packaging)

RESOURCE – Packaging materials

Glass	**Paper/card**
Metal	**Plastic**

MATERIAL "sample cards"

Cheese	**Milk**
Lemonade	**Sandwich**
Sweets	**Biscuits**
Yoghurt	**Salad**

The Sandwich's new clothes

Preparation

Print one blank text per pupil (if possible, the second page in colour to better recognize the images).

Instructions

Step 1

Draw attention to the name of the story: Does the title seem familiar? Which fairy tale is mentioned here? What is the story about? Part 1 of the story either read aloud, or print for all. Prepare Part 2 for each pupil. The children fill in the gaps with the help of the pictures.

Reflection

Discuss with the children what packaging they use for their packed lunch. You can ask these or similar questions: How are your sandwiches packed? Do you know what material the packaging is made from? Can you reuse this packaging? What similarities can you see between this story and the fairy tale?

Further questions / alternatives: Which food can be packed in reusable packaging? Do I have a good, washable lunch box and a reusable drinking bottle (made of glass or of BPA-free plastic) at home? Why is aluminum foil not an environmentally friendly alternative to plastic? (Aluminum is very harmful to the environment / resource-intensive in production).

Where can students buy unpacked / differently packaged food? (in a packaging-free supermarket, on the farm, at the farmer's market, ...)

Infobox

How much plastic packaging is produced in the UK per year?

The amount of plastic waste generated annually in the UK is estimated to be nearly 5 million tonnes. Most families throw away about 40kg of plastic per year, which could otherwise be recycled.
(http://plasticfree.co.uk/plastic-stats/)

Packaging-free supermarkets,have started to open in some countries, but there are not many yet in the UK. Ask in your local area for zero-waste shops.

Reusable snack boxes:

When buying snack boxes make sure that they are food safe and dishwasher safe! Plastics PP and PE are suitable, meanwhile there are already alternative snack boxes made of bio-plastic or stainless steel.

Reusable drinking water:

You can carry your own reusable glass or BPA-free plastic drinking bottles. BPA (bisphenol A) is an ingredient found in many common plastic products. Since bisphenol A is harmful to your health, plastic bottles should be BPA-free! Further information can be found at
https://www.food.gov.uk/science/bpa/foodcontactmaterialsbpafaq

Once upon a time there was a sandwich…

Once upon a time there was a sandwich in search of new packaging. It went to a supermarket, because it knew that there are a lot of packaged foods there.

In the supermarket, the sandwich first spoke to a small banana with brown freckles:

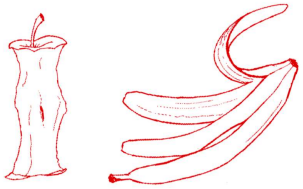
"You are not packed!"

"True, I do not need any packaging, because I have a thick shell. Some people grab me and put me into a plastic bag anyway, but it's really not necessary", the banana answered.

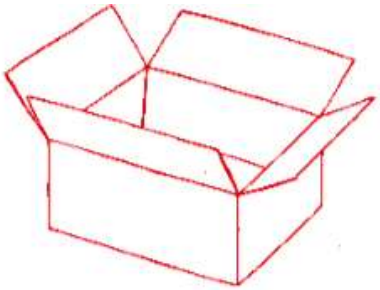
The sandwich thought "No, I cannot go without packaging, otherwise someone's backpack will get dirty".

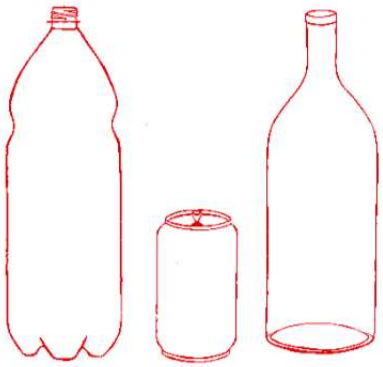
Next, the sandwich asked some noodles: "Your packaging is so colourful, can you reuse it?"

The noodles answered him: "No, our packaging has been made just for us. When we are eaten, it just goes into the bin."



Sandwich thought, "I want packaging that you can use more than once. I've heard of a place where pasta and other foods are packaged differently than in the supermarket."





The sandwich continued on its way

Curious, the sandwich made its way to a shop called "Love and Loose". In this shop, there was no plastic packaging that was used only once. The sandwich was astonished!

In the fridge there were_____(1) and _____(2) in glass containers.

The _____(3) was loose in a container, wrapped only with paper.

For the different colourful _____(4) to pack, there were many empty _____(5) to fill.

Sandwich spoke to a few pink and yellow _____(6). "Say, how will you be carried? If you are not in packets, do you make people's backpacks and bags dirty?!"

"We will be packed first," they answered toSandwich. Now he was curious. "And what does your packaging look like?"

"Well, it depends. Sometimes we're packed in paper bags, then sometimes in _____(7). And sometimes in glass."

The Sandwich was surprised and wanted to know more: "And what happens to your packaging afterwards? Will it all be thrown away, like the packaging of pasta in the supermarket?" "No, they can be filled with new food again. The people who shop here often bring along their own packaging, and have their groceries put straight into their own bags or containers."

① 

② 

③ 

④ 

⑤ 

⑥ 

⑦ 

"Great!" thought the Sandwich, "I'll choose a beautiful packaging right away!"

About this resource

This resource was created by Suedwind (www.suedwind.at) and translated into English by Cumbria Development Education Centre (www.cdec.org.uk). It was developed as part of the EU funded 'Global Schools' project (www.globalschools.education). The project aims to strengthen global learning in schools.17 partner organizations (NGOs, local authorities and universities) from ten European countries are working together as part of the project from 2015 to 2018. In the UK, the project is carried out by CDEC. The pan-European coordination of the project is carried out by the Autonomous Province of Trento (Italy).