# **Learn STEM**

Innovative Model of learning STEM in secondary schools

School Education ERASMUS+

KA220-SCH -Cooperation partnerships in school education

**Reference Number:** 2022-1-TR01-KA220-SCH-000087583

Duration: 31.12.2022 to 30.12.2024 (24 months)



## LearnSTEM

Innovative Model of learning STEM in secondary schools

Learning Unit: Build a Balance Scale

Topic I: Recycling



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- 1. Definition of Balance Scale
- 2. Origin of Balance Scale
- 3. Examples of Weighing Instruments
- 4. Tips For Properly Using Balance Scales
- 5. Balance Scales Designs
- 6. Exploring Science: Building Your Own Balance Scale
- 7. Tasks For Learners







# **1. Definition of Balance Scale**



"a set of scales for measuring mass or weight"	(A Maths Dictionary for Kids, <u>http://www.amathsdictionaryforkids.com/qr/b/b</u> <u>alanceScales.html</u> )
"Balance scales are commonly used to compare the weights of objects or to weigh objects by balancing them with standard weights."	(Science A-Z, <u>https://www.sciencea-</u> <u>z.com/main/ProcessResource/unit/33/process-</u> <u>science/grades-3-4/balance-scales</u> )
"A balance scale is a device that measures the mass or weight of an object by comparing it to a known standard"	(Laboratory Tips Hub!, <u>https://schlaboratory.blog/balance-scale-</u> <u>definition-function-how-it-works-and-how-to-use-</u> <u>it/</u> )





# 2. Origin of Balance Scale



• The oldest evidence for the existence of weighing scales dates to c. 2400–1800 BC in the Indus River Valley.

- In Egypt, scales can be traced to around 1878 BC, but their usage probably extends much earlier.
- Balance scales have historically played a crucial role in trade and commerce. They were used to measure and compare the weights of goods, ensuring fair and accurate transactions.
- In many legal systems, the image of a pair of balance scales is used as a symbol of justice. This symbolizes the fair and equal distribution of justice, emphasizing the idea of weighing evidence and arguments impartially.









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# 4. Tips For Properly Using Balance Scales



"Zeroing: This is the process of adjusting the balance scale so that it shows zero when there is -6nothing on either pan.

"Calibrating: This is the process of checking and correcting the accuracy of the balance scale by using known standards."

"Handle with care: Always handle the balance scale with care. Avoid any abrupt movements or rough handling to preserve its precision and accuracy."

"Add weights gradually: When adding additional weights for balance, add them one at a time and observe the balance after each addition. This allows for more precise adjustments."

"Weighing: This is the process of measuring the mass or weight of an object by using balance scales."

Source: <u>https://schlaboratory.blog/balance-scale-definition-function-how-it-works-and-how-to-use-it/</u>





# **5. Balance Scales Designs**



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### What are the main factors that contribute to the precision of balance scales?

- Mechanical design: Balanced construction and arm length.
- Sensitivity: Enhanced capability to detect small weight differences.
- Materials used: High-quality materials for stability.
- Low friction components: Minimized friction, especially at pivot points.







# **5. Balance Scales Designs**



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# What are the main factors that contribute to the precision of balance scales?

- Environmental control: Stable temperature and minimal air currents.
- Calibration: Regular calibration with standard weights.
- Stability and rigidity: Strong structure to prevent unintended movements.
- User handling: Proper procedures and gentle handling for accuracy.







# 6. Exploring Science: Building Your Own Balance Scale

Here are several reasons why you might choose to build a balance scale:

- **1.** Understanding principles of physics
- 2. Learning about center of mass
- 3. Exploring weight and mass
- 4. Practicing measurement skills
- 5. Promoting critical thinking
- 6. Hands-on learning
- 7. Encouraging creativity
- 8. Connecting theory to practice
- 9. Fostering teamwork and collaboration
- **10.** Preparing for future STEM challenges







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**Interactive Video** 

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# 7. Tasks For Learners

H5P

### In what units is mass typically expressed?

O Newtons (N) or micrograms (µg).

O Kilograms (kg) or grams (g).

O Quarts (qt) or centigrams (cg).

O Miles (mi) or pounds (lbs).

Check

### Weight is the force exerted on a body by gravity ?





The value of acceleration due to gravity (g) on Earth is approximately:

O 6.7 m/s <sup>2</sup>		
O 5.2 m/s <sup>2</sup>		
O 9.8 m/s²		
O 12.5 m/s <sup>2</sup>		



### In which unit is weight expressed?

O Kilograms (kg) or grams (g)

O Liters (L)

O Meters per second (m/s)

O Newtons (N)



How should you measure the mass of an object using a balance scale?

O By observing its color under specific lighting

O By restoring balance on the scale

O By measuring its length and width

O By comparing it to a known volume of water





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### **Youtube Additional Videos**



### https://www.youtube.com/watch?v= Z0X0yE8loc



### https://www.youtube.com/watch?v=J -DF5nYw7E&t=72s



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http://www.amathsdictionaryforkids.com/qr/b/balanceScales.html

https://www.sciencea-z.com/main/ProcessResource/unit/33/process-science/grades-3-4/balance-scales

https://schlaboratory.blog/balance-scale-definition-function-how-it-works-and-how-to-use-it/

https://www.youtube.com/watch?v=\_Z0X0yE8loc

https://www.youtube.com/watch?v=J\_-DF5nYw7E&t=72s

www.pngwing.com

www.freepik.com







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# LearnSTEM

Innovative Model of learning STEM in secondary schools

Learning Unit: Collect and Sort Garbage Topic I: Recycling



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# Content

- 1. Definition of Garbage
- 2. Origin of Garbage
- 3. How to Sort Garbage
- 4. The 3rs: A Blueprint For Responsible Waste Management
- 5. The Advantages of Selective Waste Collection
- 6. Tasks For Learners







# **1. Definition of Garbage**



"waste material or unwanted things that you throw away"	(Cambridge Dictionary, https://dictionary.cambridge.org/dictionary/english /garbage)
"waste material, such as paper, empty containers, and food thrown away" "stupid words, ideas etc"	(Longman Dictionary, https://www.ldoceonline.com/dictionary/garbage)
"waste food, paper, etc. that you throw away" "a place or container where waste food, paper, etc. can be placed" "something stupid or not true"	(Oxford Learner's Dictionaries, https://www.oxfordlearnersdictionaries.com/defini tion/american_english/garbage)





# 2. Origin of Garbage

The long history of landfills stretches back well before our modern era. The earliest known landfill was established around 3,000 B.C. in Knossos, Crete. People at that time dug deep holes to conceal their waste, covering it with dirt. Around 500 B.C., Athens, the Greek city, implemented one of the earliest-known garbage regulations. Residents were prohibited from tossing waste into the streets. Instead, the law mandated that garbage be carried and dumped a mile away from the city to preserve its appearance and prevent the spread of disease.

For many centuries, waste management and sanitation weren't given much importance, impacting living conditions and contributing to historical events like the notorious bubonic plague.

The concerns related to plagues caused by waste still persist in some present-day cities where inefficiencies in trash collection have reached a critical point.

Major cities were the first to address these challenges on a larger scale, prompted by the severity of the issues. In the 15th century, Paris sought to improve its unsanitary reputation by introducing mandatory street cleaning and employing thousands of waste collectors to transport garbage outside the city. However, the city faced difficulties defending itself from attackers as garbage heaps grew to towering heights just beyond its walls.

### Source: <a href="https://www.roadrunnerwm.com/blog/history-of-garbage">https://www.roadrunnerwm.com/blog/history-of-garbage</a>









# 3. How to Sort Garbage

If you're eager to make a positive impact on the environment by sorting your waste responsibly and creating a healthier world, here are some simple tips to help you get started:

### 1. Understand your local waste management system

Every community has its own way of managing waste, complete with specific guidelines for sorting. Take the time to acquaint yourself with the local system and understand which materials can be recycled or composted in your area.

### 2. Set up separate bins for different types of waste

Make waste sorting a breeze by setting up distinct bins for recyclables, compostables, and regular trash. This simple practice ensures that each type of waste gets disposed of properly.

### 5. Dispose of hazardous materials properly

Certain items, such as batteries, chemicals, and electronics, require special attention to prevent environmental harm. Make sure to follow your local guidelines for the proper disposal of these materials, ensuring they are handled correctly.

### If you're eager to make a positive impact



# **3.** Educate yourself on the types of materials that can be recycled or composted

Not all materials can be recycled or composted, so it's important to understand which materials are acceptable in your local recycling and composting programs.

# 4. Rinse and clean recyclables and compostables before placing them in the appropriate bins

Contamination can make it hard or impossible to recycle or compost certain materials, so be sure to wash and clean items before putting them in the right bins.







# 4. The 3rs: A Blueprint For Responsible Waste Management

The principles of reduce, reuse, and recycle collectively contribute to a significant reduction in the volume of waste we discard. They effectively preserve natural resources, diminish the demand for landfill space, and conserve energy. Additionally, the adoption of these practices not only safeguards land but also results in cost savings for communities by reducing the funds allocated for waste disposal in landfills.



### **Reduce: Reuse: Recycle:** Transform waste into Minimize waste production Give items a second life resources Choose products with Use reusable bags, Sort materials into less packaging. containers, and water bottles. recycling bins. Embrace a minimalist Repair and repurpose items Support recycling lifestyle. instead of discarding. programs in your community.



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# 5. The Advantages of Selective Waste Collection

Do you know the benefits of selective waste collection?

- Conserve natural resources;
- Reduce harmful air emissions reduce pollution;

Reduce waste;

• Eliminate the transformation of areas into infection hotspots;

• Save energy;

- Keep a cleaner environment for us and future generations;
- Increase the quality of life and health of children;
- Decrease costs, keeping costs within affordable limits;









### **Interactive Video**

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Every plastic object has a symbol on it. The symbol, known as SPI code helps us identify the type of plastic, how to sort it and the biodegradability. There are 7 SPI codes:

The first one is called PET which is short for Polyethylene Terephthalate. First used in the '40s, commonly found in beverage and food containers. It's mostly considered safe, but it can become dangerous if exposed to heat, causing the antimony in it to leak out.

Antimony is a metallic substance belonging to the nitrogen group. It causes eye and skin sensitivity and heart, lung or stomach issues. It takes hundreds of years to decompose because bacteria cannot break down the chemicals contained in it. On the bright side, PET plastic can be easily converted into fiber for winter garments, carpet or furniture.

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### Wheel of Names - https://wheelofnames.com

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Wheel of Names is a fun and free tool for randomly selecting winners or names. But guess what?

Teachers and tutors can get creative and use it for all sorts of cool stuff in both online and in-person classes!





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### H5P

### How many SPI codes are known for the correct identification of the type of plastic?

5			
7			
3			

### Polystyrene or PS is:

a plastic with a simple, highly flexible chemical structure.

an cheap, insulating plastic, a basic element in the food industry.

resistant to bacteria and has a very low risk of leaking into the contents it stores.



### Nanoplastics, or MNPs, cannot infiltrate into the human body.



### Once collected, the recyclable material will be sorted, cleaned, baled and sent to a factory to be transformed into a raw material which can be commercialised.





### What type of plastic doesn't contain BPA?

Polystyrene

Polypropylene

LDPE (low density polyethylene)





### **Youtube Additional Videos**



V podpatcích v odpadcích

https://www.youtube.com/watch?v=b-0eajX7Xlo

### Translation

Title: V podpatcích v odpadcích = In heels in the garbage

- 1: Život má smysl, když je vše na svém místě = Life makes sense when everything is in its place
- 2: Má to smysl, třídit odpad = It makes sense, sort your waste



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Sorting and Recycling Facility - Follow the Process

https://www.youtube.com/watch?v=3Lzsu8SXaWY



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# Sources

https://dictionary.cambridge.org/dictionary/english/garbage

https://www.ldoceonline.com/dictionary/garbage

https://www.oxfordlearnersdictionaries.com/definition/american\_english/garbage

https://www.roadrunnerwm.com/blog/history-of-garbage

https://ecoresources.net.au/why-is-waste-sorting-important/

https://wheelofnames.com

https://www.youtube.com/watch?v=b-0eajX7Xlo

https://www.youtube.com/watch?v=3Lzsu8SXaWY









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# LearnSTEM

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Learning Unit: Composting in a Bottle and Creation of a Composter - Reuse of Biodegradable Waste

Topic I: Recycling



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# Content

- 1. Definition of Compost
- 2. Origin of Compost
- 3. Examples of Materials to Use and Avoid in Composting
- 4. How to Use Compost
- 5. Benefits of Composting
- 6. Tasks For Learners







# **1. Definition of Compost**



"to collect and store plant material so it can decay and be added to soil to improve its quality"	(Cambridge Dictionary, <u>https://dictionary.cambridge.org/dictionary/engli</u> <u>sh/compost</u> )
"compost is a mixture of decayed plants and vegetable waste which is added to the soil to help plants grow."	(Collins Dictionary, <u>https://www.collinsdictionary.com/dictionary/en</u> <u>glish/compost</u> )
" a mixture of decayed (= destroyed by natural processes) plants, food, etc. that can be added to soil to help plants grow"	(Oxford Learner's Dictionaries, <u>https://www.oxfordlearnersdictionaries.com/definition/english/compost 1</u> )





# 2. Origin of Compost

• The application of reclaimed organic material, commonly known as compost, to cultivated fields has ancient roots dating back to at least the Stone Age. Archaeological evidence from the British Isles suggests that as far back as 12,000 years ago, Scots enhanced their small-scale farms by incorporating compost.

• From the Stone Age onwards, it took another 10,000 years before the concept of compost found its way into written records. The Akkadians in Mesopotamia, known for establishing the first functional bureaucracy, left traces of this agricultural practice in cuneiform inscriptions on clay tablets. Some tablets from King Sargon's reign around 2300 B.C. are believed to contain the earliest written reference to compost.

• The use of compost was not limited to Mesopotamia; it was a widespread practice. In Mediterranean regions like Greece and Italy, farmers commonly recycled agricultural "waste" from one operation to another. Chinese farmers also applied composting techniques, specifically anaerobic methods, to fertilize their rice paddies, where oxygen is deliberately excluded from the process.







# 2. Origin of Compost

• In the early 20th century, compost fell out of favor, giving way to artificial fertilizers. This shift was influenced by German scientist Justus von Liebig's 1840 research, which emphasized the role of chemical solutions in plant nutrition. Liebig dismissed the significance of humus, deeming it irrelevant due to its insolubility in water.

- Not everyone felt that artificial fertilisers were the answer. Sir Albert Howard, based in India from 1905, spent almost 30 years experimenting with organic gardening and farming. His book, *An Agriculture Testament*, published in 1943 resulted in a renewal of interest in organic methods of agriculture.
- In the 1943 George Washington Carver taught that compost was vital to fertility of the land and urged farmers to "Make your own fertilizer... compost can be done with little labour and practically no cash outlay" a sentiment that still appeals too many of us today.

Source: <u>https://www.carryoncomposting.com/142941469.html</u>







# 3. Examples of Materials to Use and Avoid in Composting



### COMPOST ...

### **GREENS**:

- fresh vegetable & fruit scraps
- egg shells (crushed!)
- cut flowers & green plants
- most garden & grass clippings
- coffee grounds & filters
- tea bags (no staples!)

### **BROWNS**:

- fall leaves
- untreated straw
- shredded newspaper
- plant stalks, twigs, & branches
- untreated wood chips & shavings

### DO NOT COMPOST ....

### ANY OF THE FOLLOWING:

- cooked foods
- cheese & dairy
- meat & bones
- pet waste
- used tissues & paper towels
- produce stickers
- oils & greases
- glossy or coated paper
- treated or painted wood
- aggressive weeds & grasses
- poisonous or diseased plants





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# 4. How to Use Compost

Before utilizing compost, it is crucial for it to reach complete stabilization and maturation. Immature compost not only carries the risk of harming your plants but may also attract rodents and other pests. Recognizing finished compost involves observing specific characteristics:

Texture: Crumbly and smooth, without recognizable scraps.

**Smell:** Like a forest on a rainy day, or rich earth. Traces of ammonia or sour odors means the compost needs more time to mature.

Color: Dark and rich

Size: One-third the original size of your pile

**Temperature:** Within 10 degrees Fahrenheit of the temperature outside (especially in the middle of the pile)

### Source: <a href="https://www.nrdc.org/stories/composting-101#types">https://www.nrdc.org/stories/composting-101#types</a>



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# 4. How to Use Compost

### Once you have confirmed that your compost is mature, here are some ways you can put it to use:

- Use it as mulch;
- Add it to potting soil;
- Work it into crop beds;
- Distribute it on lawns;
- Mix it into garden beds;
- Feed it to potted plants;
- Add it to soil around fruit trees;



### Source: <u>https://www.nrdc.org/stories/composting-101#types</u>







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# **5. Benefits of Composting**

Reduces the waste stream;

Cuts methane emissions from landfills;

Improves soil health and lessens erosion;

Reduces personal food waste;

Conserves water;



### Source: <a href="https://www.nrdc.org/stories/composting-101#types">https://www.nrdc.org/stories/composting-101#types</a>









### **Interactive Video**



Learning Unit: Composting in a bottle and creation of a composter reuse of biodegradable waste Topic I: Recycling





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Hi!

the European I



becomes fertilizer with the help of bacteria.

generally seen as worthless.

Recycling is using waste as an input to create new outputs thereby reducing the amount of new materials used. Vaste represents any substance being discarded after use,

Composting is the process in which organic waste or residue

Compost is a dry, brittle mixture of vegetal waste highly rich

in nutrients. It doesn't pollute the environment, perfect for home gardening !

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My name is Jack, and today I will show you how I got my mom into recycling!





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### The compost includes:

vegetable waste from the kitchen, hay and straw, eggshells, meat

feathers, seedless weeds, bones

cardboard and paper, leaves, cut grass, coffee grounds

The growth phase, in the fermentation process, is the temperature rise phase and depends on the composition of the waste, humidity and air.



Check

The optimum moisture content recommended for fermentation to obtain compost is:

50-55%	
10%	
35%	

### Organic products made from straw contain carbon.

O True	O False
Unde Inde	U raisr

The materials used to prepare compost, which are rich in nitrogen, include:

flowers, vegetable waste, grass, eggshells, rice

coffee grounds, coffee beans, tea bags, leaves, seaweed or weeds

vegetable waste from vegetable crops, coffee grounds, animal hair



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### **Youtube Additional Videos**



The Choice: Compost vs Landfill

### https://www.youtube.com/watch?v=O4dI4YIjMZk



Why Composting is Important

https://www.youtube.com/watch?v=pi-vsJOaduk



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# Sources

https://dictionary.cambridge.org/dictionary/english/compost

https://www.collinsdictionary.com/dictionary/english/compost

https://www.oxfordlearnersdictionaries.com/definition/english/compost\_1

https://www.carryoncomposting.com/142941469.html

https://www.nrdc.org/stories/composting-101#types

https://www.youtube.com/watch?v=O4dI4YIjMZk

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Learning Unit: Upcycling - Reuse of Plastic

**Topic I: Recycling** 



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- 2. Origin of Upcycling
- 3. Examples of Upcycled Products.
- 4. The Plastic Problem
- 5. Benefits of Upcycling.
- 6. Upcycling Projects: Build a Bird Feeder
- 7. Task For Learners







# **1. Definition of Upcycling**



"the activity of making new furniture, objects, etc. out of old or used things or waste material"	(Cambridge Dictionary, <u>https://dictionary.cambridge.org/dictionary/engli</u> <u>sh/upcycling</u> )
"to treat an item that has already been used in such a way that you make something of greater quality or value than the original item"	(Oxford Learner's Dictionaries, <u>https://www.oxfordlearnersdictionaries.com/defi</u> <u>nition/english/upcycle</u> )
"upcycling means creating something new from discarded materials by repairing, refurbishing, or repurposing them."	(Treehugger, <u>https://www.treehugger.com/what-</u> <u>is-upcycling-5116081</u> )





# 2. Origin of Upcycling

 Upcycling has historical origins rooted in resourcefulness, particularly during times of scarcity, where people repurposed items out of necessity.

- The term gained prominence in the 1990s as part of the environmental movement, with a focus on reducing waste and promoting the reuse of materials.
- The term "**upcycling**" is attributed to Reiner Pilz, a German engineer, who first used it in an interview in 1994. Pilz used the term to describe the process of taking waste materials and converting them into higher-value products.
- One influential book often credited with popularizing upcycling is "Cradle to Cradle: Remaking the Way We Make Things" by *William McDonough* and *Michael Braungart*, published in 2002. While not exclusively focused on upcycling, the book emphasizes sustainable design principles, including the idea of creating products with the intention of repurposing or recycling them at the end of their life cycle.
- Upcycling is now a prominent feature in contemporary design and art, creatively transforming discarded materials into unique products.









# **3. Examples of Upcycled Products.**



### Sustainable fashion accessories:

- Bags;
- Wallets;
- Clothes;
- Belts;
- Jewelry;

# Can you name other upcycled products?



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### www.pixabay.com

### Sustainable art and decorations:

- Holders for pens;
- Toys;
- Decorations;
- Pictures;



### www.pixabay.com

### Sustainable Furniture:

- Tables;
- Chairs;
- Lamps;
- Closets;
- Beds;



### www.pexels.com



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# 4. The Plastic Problem

### Have you heard of microplastic?

Microplastics, tiny plastic particles measuring less than five millimeters, are causing growing concern globally.

They are formed in two ways: primary microplastics, designed for commercial use such as cosmetics and textiles, and secondary microplastics, which result from the breakdown of larger plastic items due to environmental factors like sunlight and ocean waves.

Despite their small size, microplastics pose a significant environmental threat, persisting for hundreds of years without breaking down harmlessly.

This pollution is visible on beaches and is consumed by marine animals, entering the food chain.







# 4. The Plastic Problem

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### Why Do Seabirds Eat Plastic?

• In situations where there is a lack of natural prey due to overfishing or environmental change, seabirds may become more desperate for food. This can lead them to ingest a wider range of items, including plastic, out of hunger.

- In some cases, adult seabirds may unintentionally feed plastic to their chicks.
- Plastic ingestion can create the illusion of satiety for birds. Because their stomachs can be filled with plastic instead of real food, this can lead to the birds' death by starvation as they do not get the nutrients they need to survive.





# 5. Benefits of Upcycling



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Environmental

benefits of upcycling

Saving materials from landfill Reducing what goes into landfill Minimal use of natural resources Social and economic benefits of upcycling

Artisanal Celebration Supporting local and rural industry Reduced manufacturing costs Personal benefits of upcycling Environmental Contribution Craftsmanship Skills Unique Possessions



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# 6. Upcycling Projects: Build a Bird Feeder

### Why should you build a bird feeder?

- Support local wildlife
- Bird watching;
- Educational experience
- Contribution to biodiversity
- Seasonal changes observation



### • <u>https://www.recyclingbins.co.uk/blog/upcycling-projects-to-try-bird-feeder/</u>













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Upcycling means creating something new from discarded materials by repairing, refurbishing, or repurposing them.

O True	O False
Check	



What environmental issue, characterized by tiny plastic particles measuring less than five millimeters, is causing increasing global concern?

O Biodegradable plastics		
O Nanoplastics		
O Microplastics		
O Microfibers		
O Macroplastics		



What are the two types of microplastics, one intentionally produced and the other resulting from the breakdown of larger plastic items?

O Primary microplastics and secondary microplastics O Synthetic microplastics and organic microplastics O Micro and macro microplastics O Intentional microplastics and incidental microplastics



O True **O** False

Check

### New research shows that seabirds are suffering from a plastic-induced illness named:

O Marine Debris Affliction (MDA)

O Polythene Poisoning Syndrome (PPS)

O Avian Polymerosis Syndrome (APS)

**O** Plasticosis

Check



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### **Youtube Additional Videos**



Upcycling: Trash To Treasure | World Environment Day Special | Channel NewsAsia Connect

https://www.youtube.com/watch?v=rd7qP9FdTal



(PLASTIK) - A short film to end plastic pollution in South-East Asia

https://www.youtube.com/watch?v=P5OBWbZDZIc



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# Sources

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https://www.oxfordlearnersdictionaries.com/definition/english/upcycle

https://dictionary.cambridge.org/dictionary/english/upcycling

https://www.treehugger.com/what-is-upcycling-5116081

https://oceanblueproject.org/the-effects-of-plastic-p-on-seabirds/

https://www.futurelearn.com/info/courses/upcycling-for-change-from-green-ideas-to-startupbusinesses/0/steps/67684

https://www.recyclingbins.co.uk/blog/upcycling-projects-to-try-bird-feeder/

https://www.youtube.com/watch?v=rd7qP9FdTal

https://www.youtube.com/watch?v=P5OBWbZDZIc

www.pixabay.com

www.pexels.com







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