WHY ALL THE PLASTIC?

Ages 4 to 7 (Level 1)

Description:	The learner will have the opportunity to conduct science experiments to better understand the characteristics of plastic and its impact on the environment and present their learnings as a poster to convince their family to reduce – reuse – recycle
Leading question:	Can you develop an alternative to plastic?
Age group:	4 – 7-year-old
Subjects:	Environmental Studies, and Art and Design
Total time required:	4. 5 hours total over 5 days
Self-guided / Supervised activity:	Medium supervision by parents / guardians
Resources required:	A tool to dig with, any two sticks to write on, pens, any fruit core or green leaf, a piece of plastic. Pens, paper, discarded cloth, jute, paper, plastics etc.

Day	Time	Activity and Description
1	5 minutes	Discuss with the learner that they will have the opportunity to understand more about plastic
	5 minutes	Discuss the day of the week, the date of the month and the month of the year we are in
	20 minutes	Design your own weekly calendar on a large piece of paper with space to write the daily plan i.e. make 7 boxes and write the dates of the month. Learners will write the first letter of the month and first letter of the days of the week (if learners are unable to parents can support with the writing)
	20 minutes	For each of the days of the week, learners should mark or draw the project activity that they intend to do on the calendar i.e. Day 1: Make a calendar, Day 2: Dig and Bury (Learners can draw the digging tool) Day 3: Uses of plastic (Learners can draw something that is plastic) Day 4: Alternatives to plastic (and Day 5: What happens to plastic?)

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2	30 minutes	Learners will learn the word: biodegradable – something that breaks down naturally and turns into soil We will do an experiment to explore what happens to plastic and natural food items Dig two small holes in the soil of the garden / lawn / farm (or plant pots if a backyard is unavailable) Put any plastic trash in one and any fruit core or green leaf in the other hole Cover both the holes with soil and insert a stick marking the plastic hole with P and the fruit core / green leaf with F or L Learners will think about what they think they will find after a week
	20 minutes	Learners will now illustrate and label the process of garbage disposal in their home. They can actually track how the plastic items are trashed. For example: - Step 1: Buy relevant plastic item - Step 2: Item is thrown into the dustbin / trash bags in their home - Step 3: Item is then segregated and thrown into a trash chute - Step 4: Item is then collected by the garbage truck - Step 5: Item is then thrown into the sea / landfill
3	15 minutes	Learners will first identify 5 most common uses of plastic at home and make a list (or illustrate a list) Prompt: Grocery bags, Plastic containers, Toiletry bottles or sachets, Bags of Chips, Plastic toys etc.
	30 minutes	Learners will interview their grandparents and other members of their home and understand whether they used as much plastic for as many different things. (Prompt questions: Did you have as much plastic at home when you were growing up? What did you use instead of plastic?)
	15 minutes	Learners will draw comparison images of things in the past without plastic and in the present with plastic
4		We will try and design alternatives to plastic!

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	5 minutes 15 minutes 20 minutes 20 minutes	Learners will discuss with the family what material options can be used instead of plastic e.g. cloth, paper, jute, glass etc. Learners will try and identify the key characteristics that made plastic so special by testing it out to understanding why it is used so commonly Potential other materials include: cloth, paper, glass metal etc. Prompt questions: - Do other materials get wet? Do the items inside get wet? (e.g. cloth and paper) - Are other materials as durable - are they torn or destroyed as easily? (e.g. paper and glass) - Are other materials heavy and easy to carry or travel with? (e.g. metal and glass) - Can all materials be made into any shape? (e.g. paper and glass) Learners will pick 3 of the commonly used plastic items as identified the previous day Learners will experiment with trying to replace plastic with the chosen other material options (e.g. What else can you store shampoo in? How else can you package chips? Etc.) Learners will reflect on whether these new solutions would work or not given the previous experiment and whether this will meet all the special characteristics of plastic
5	20 minutes 20 minutes 10 minutes	Learners will dig around the holes and check the progress of the plastic and food. Based on their observation, they will share what they think will happen and why (It is advised to wait for 2 weeks to see real impact) Learners will compile all of their work from the week to do a presentation for their family to share including the images, lists, drawings and calendar and share their main learnings with the family Learners will design a chart of the top three plastic items that they would like to i) Reduce the use of, ii) Replace with something different, iii) Reuse by drawing different things in each of the columns
Assessment Criteria:		- Analytical thinking and observations made - Ability to prepare and ask meaningful questions and follow up questions - Critical thinking and problem solving to design alternatives to plastic. - Clarity of messages when drawing, writing or speaking

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Learning outcomes:	- Understanding what is biodegradable and composting - Historical understanding of the evolution of materials - Critical thinking and design
Required previous learning:	None
Inspiration:	None
Additional enrichment activities:	The activity can be extended with more time to observe the biodegradation that typically takes 4 months

Ages 8 to 10 (Level 2)

Description:	The learner will have the opportunity to explore and understand the qualities of plastic including what makes it special and it's usage in their homes. Learners will then determine how we can reduce, reuse or replace it at home. Learners will develop alternatives to plastic and convince family members to adopt it.
Leading question:	Can you develop an alternative to plastic?
Age group:	8 – 10-year olds
Subjects:	Environmental Studies, Science , and Art and Design
Total time required:	5.5 hours total over 5 days
Self-guided / Supervised activity:	Low supervision by parents / guardians
Resources required:	A tool to dig with, any two sticks to write on, pens, any fruit core or green leaf, a piece of plastic. Pens, paper, discarded cloth, jute, paper, plastics etc.

<table>
<tr><th>Day</th><th>Time</th><th>Activity and Description</th></tr>
<tr><td>1</td><td>5 minutes

10 minutes

15 minutes

10 minutes</td><td>Discuss with the learner that they will have the opportunity to understand more about plastic

Learners will design their home plastic diary for a week to tally their home usage of plastic. Their sheet will include columns for i) the item, ii) number of uses per day, iii) single use, iv) total usage over the week, v) suggested reuse or alternative

Learners will identify the seven most commonly used plastic items in their home, by exploring their home, discussing with family members etc. Examples can include: Bottles, straws, cups, packaging, bags, food packaging, toiletry sachets etc.

Learners will then make a tally marks depending on how many of that particular piece of plastic were used that day
<table>
<tr><th>Item</th><th>Number of items used in a week</th><th>Single use</th><th>Total no of uses</th><th>Reduce / Reuse / Replace</th></tr>
<tr><td> 
Plastic Bag</td><td>Monday:
Tuesday:
Wednesday:
Thursday:
Friday:</td><td>Yes</td><td>Student Guess: 5

Family Guess: 5</td><td>Reduce: This is how we can reduce the use

Reuse: This is how we can repurpose and use it</td></tr>
</table>
</td></tr>
</table>

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					Actual Total: 3	Replace: Based on the alternative developed by the students	

	10 minutes	Learners will add a column of whether this plastic is “single use” which means that it is only used once before being discarded. Learners will think about how many of these plastic items were discarded after one use and mark this with a tick or cross in the single use category daily
	10 minutes	Learners will guess which of the plastic items they think is used the most in their home in the week based on an investigation of usage patterns. Learners will also interview their family members to discuss and make the same guess
2	20 minutes	Learners will explore the concept of biodegradable – something that breaks down naturally and turns into soil - We will do an experiment to explore what happens to plastic and natural food items - Dig two small holes in the soil of the garden / lawn / farm (or plant pots if a backyard is unavailable) - Put any plastic trash in one and any fruit core or green leaf in the other hole - Cover both the holes with soil and insert a stick marking the plastic hole with Plastic and the fruit core / green leaf with Fruit or Leaf
	10 minutes	Learners will think about what they think they will find after a week and write it down
	20 minutes	Learners will think about how families dispose plastic and what happens to it? If they have access to investigate the lifecycle of the plastic based on the attached. - https://www.wwf.org.uk/sites/default/files/2020-02/WWF_Plastics_Explainer.pdf - Learners can draw where they see plastic that has been discarded - Prompts: Piles of discarded plastic on the roadside / in water bodies etc. Many of these plastics break into small pieces and get eaten by sea animals making them very ill
	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items
3	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items

	10 minutes	Learners will interview their grandparents and other members of their home and understand whether they used as much plastic for as many different things. Learners will think about the alternatives that were used prior to plastic (Prompt questions: Did you have as much plastic at home when you were growing up? What did you use instead of plastic?)
	15 minutes	Learners will draw comparison images of things in the past without plastic and in the present with plastic
	20 minutes	Learners will fill out the below worksheet for each of the plastic items to plan for their re-use, reduce and replace chart. Some of the core questions include: - i) What is the use or purpose of this plastic item? - ii) How important is this plastic item – what is it used for? - iii) Do we have any options to the plastic? - iv) Can we reduce this plastic item?
4	30 minutes	Learners will begin to think of the reduce, reuse or replace framework designing the alternatives to plastic - Learners will first think of the plastic items that they can replace - Learners will discuss with the family what material options can be used instead of plastic e.g. cloth, paper, jute, glass etc. - Learners will experiment with trying to replace plastic with the chosen other material options (e.g. what else can you store shampoo in? How else can you package chips? Etc.) - Learners will reflect on whether these new solutions would work or not. Learners will try and identify the key characteristics that made plastic so special and used so commonly
	20 minutes	Prompt questions: - Do other materials get wet? Do the items inside get wet? (e.g. cloth and paper) - Are other materials as durable - are they torn or destroyed as easily? (e.g. paper and glass) - Are other materials heavy and easy to carry or travel with? (e.g. metal and glass) Can all materials be made into any shape?
	20 minutes	Learners will think of the plastic items that cannot be replaced with alternatives and plan on how their usage can be reduced. Learners will think of a plan on how

		they can reduce the usage of the item e.g. buy a bigger size of chips bag to last longer etc.
	10 minutes	Learners will think of the plastic items that cannot be replaced or reduced and think of whether they can be re-used. For example, refill a plastic bag with grains or ration, reuse a plastic grocery bag for trash etc.
	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items
5	15 minutes	Learners will dig around the holes and check the progress of the plastic and food. Based on their observation, they will share what they think will happen and why
	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items
	30 minutes	Learners will compile all of their work from the week to make a poster to convince family members to reduce, reuse or replace plastic - Learners can present this in the framework of: - i) How much plastic we use, ii) Why is plastic bad? Iii) What makes plastic special? Iv) What can we reduce, reuse or replace? Learners can chose to make a poster, campaign or use their diary etc. to share during their presentation Learners need to consider the criteria of a clear message to the family on why plastic is harmful and how much it is used and a convincing argument on reducing, reusing or replacing it
	15 minutes	Learners will present their argument to the family and notice how many were convinced with it – they will reflect on why other family members were not convinced and think of what they could do differently
Assessment Criteria:		- Analytical thinking and observations made - Ability to prepare and ask meaningful questions and follow up questions - Critical thinking and problem solving to design alternatives to plastic. - Clarity of messages when drawing, writing or speaking

Learning outcomes:	- Understanding what is biodegradable and composting - Historical understanding of the evolution of materials - Critical thinking and design
Required previous learning:	None

Inspiration:	None
Additional enrichment activities:	The activity can be extended with more time to observe the biodegradation that typically takes 4 months
Modifications to simplify	Learners can make a weekly plastic diary and focus on what can be reduced and reused

Ages 11 to 14 (Level 3)

Description:	The learner will have the opportunity to understand the history and properties of plastic, as well as think about its impact on the environment. Learners will then design alternatives and think of how we can safely dispose plastic. They will eventually convince their family to adopt their newly designed products or recycle
Leading question:	Where makes plastic so special, dangerous and difficult to eliminate?
Age group:	11 – 14 years
Subjects:	Environmental Science, Science, Art and Design
Total time required:	5.5 hours over 5 days
Self-guided / Supervised activity:	Low Supervision
Resources required:	A tool to dig with, any two sticks to write on, pens, any fruit core or green leaf, a piece of plastic. Pens, paper, discarded cloth, jute, paper, plastics, etc.

<table>
<tr><th>Day</th><th>Time</th><th>Activity and Description</th></tr>
<tr><td>1</td><td>5 minutes</td><td>Discuss with the learner that they will have the opportunity to understand more about plastic and identify alternatives</td></tr>
<tr><td></td><td>10 minutes</td><td>Learners will explore how common plastic is by making a no plastic list. Learners will make a list of the 10 things in their home that do not have any plastic. Learners will reflect on how hard it was for them to find items that have no plastic

Tip: Even items like books come wrapped in plastic or have plastic in their synthetic covers or electronic items like TV’s the cords are wrapped with plastic.</td></tr>
<tr><td></td><td>15 minutes</td><td>Learners will design their home plastic diary for a week to tally their home usage of plastic. Their sheet will include columns for i) the item, ii) number of uses daily, iii) single use, iv) total usage over the week, v) suggested reuse or alternative</td></tr>
<tr><td></td><td>30 minutes</td><td>Learners will identify the ten most commonly used plastic items in their home, by exploring their home, discussing with family members etc. Examples can include: Bottles, straws, cups, packaging, bags, food packaging, toiletry sachets, etc.

<table>
<tr><th>Item</th><th>Number of items used in a week</th><th>Single use</th><th>Total no of uses</th><th>Reduce / Reuse / Replace</th></tr>
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		 Plastic Bag | Monday: Tuesday: Wednesday: Thursday: Friday: | Yes | Student Guess: 5 Family Guess: 5 Actual Total: 3 | Reduce: This is how we can reduce the use Reuse: This is how we can repurpose and use it Replace: Based on the alternative developed by the students Learners will add a column of whether this plastic is "single use" which means that it is only used once before being discarded. Learners will think about how many of these plastic items were discarded after one use and mark this with a tick or cross in the single use category daily Learners will guess which of the plastic items they think is used the most in their home in the week based on an investigation of usage patterns. Learners will also interview their family members to discuss and make the same guess
2	20 minutes 10 minutes 15 minutes	Learners will explore the issues and consequences of plastic on the environment Learners will explore the concept of biodegradable – something that breaks down naturally and turns into soil - We will do an experiment to explore what happens to plastic and natural food items - Dig two small holes in the soil of the garden / lawn / farm (or plant pots if a backyard is unavailable) - Put any plastic trash in one and any fruit core or green leaf in the other hole - Cover both the holes with soil and insert a stick marking the plastic hole with Plastic and the fruit core / green leaf with Fruit or Leaf - Learners will think about what they think they will find after a week and write it down Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items Learners will begin to think of the reduce, reuse or replace framework designing the alternatives to plastic

	15 minutes	Learners will think of how we can reduce the usage of common plastic items. Learners will think of a plan on how they can reduce the usage of the item e.g. buy a bigger size of chips bag to last longer etc. Learners will think of the how we can re-use the commonly used plastic items e.g. refill a plastic bag with grains or ration, reuse a plastic grocery bag for trash etc.
3		Learners will explore the properties of plastic and what makes it special to design alternatives to plastic
	15 minutes	Learners will begin thinking about alternatives to the most used plastic items in their home and begin making a plan. Some of the core questions include: - i) What is the use or purpose of the plastic? - ii) How important is the plastic? - iii) Are / were there alternatives to plastic? - iv) What other materials can you use? - v) What is required from the material to be effective?
	10 minutes	Learners will discuss with the family what material options can be used instead of plastic e.g. cloth, paper, jute, glass etc.
	20 minutes	Learners will experiment with trying to replace plastic with the chosen other material options (e.g. What else can you store shampoo in? How else can you package chips? Etc.) Learners will reflect on whether these new solutions would work or not.
	15 minutes	Learners will try and identify the key characteristics that made plastic so special and used so commonly. Learners make a list of what they believe are the special characteristics of plastic Prompt questions: Do other materials get wet? Are other materials as durable - do they get torn or destroyed as easily? (strong, light-weight, flexible, inexpensive, sanitary, resistant to chemicals, insulator)
	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items
4	50 minutes	As learners discovered, plastic is “indestructible” and they will write an essay with illustrations on what they think happens to plastic when it is thrown away into seas, landfills or is burned?

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		- Learners can write the essay from the perspective of a fish and / or a bird that has to manage the plastic pollution and think and suggest an innovation or idea to clean the oceans and landfills? ***Tip: If they have access to investigate the lifecycle of the plastic based on the attached***. https://www.wwf.org.uk/sites/default/files/2020-02/WWF_Plastics_Explainer.pdf Prompt questions include: - What if the plastic ends up in the oceans and seas? What do you think happens to marine animals if they eat the plastic? What do you think will happen to us when we eat seafood with plastic? - What happens if you burn plastic? What do you think will be in the impact on air pollution given that plastic is made of chemicals? Most of the most dangerous chemicals are packaged in plastic and it is resistant to these chemicals. - What happens if plastics are left in landfills, what do you think will happen to our land usage – homes / forests, what happens to birds that eat it, what happens to plants?
	10 minutes	Learners will mark on their weekly plastic diary the uses of plastic for the day across all the items
5	15 minutes	Learners will dig around the holes and check the progress of the plastic and food. Based on their observation, they will record what they think will happen and why
	15 minutes	Learners will now calculate what percentage of plastic is reused in their home across each of the different plastic items e.g. if only 4 of the 10 plastic bags are re-used in their homes that is 4/10*100 = 40% or if 2 of the 12 plastic bottles used in their home in a week are reused that is 2/12*100 = 16.7%
	15 minutes	Learners will now make a bar graph to compare the usage of different plastic items at home.
	30 minutes	Learners will compile all of their work from the week to make a poster to convince family members to reduce, reuse or replace plastic Learners will design a poster on what they learned about plastic all week including: - How commonly it is used and how much it is used? - What makes plastic special? - How can we reduce, reuse or replace it? - What is the impact of plastic on the environment? - How can we save our oceans and landfills?

	10 minutes 5 minutes	Learners need to consider the criteria of a clear message to the family on why plastic is harmful and how much it is used and a convincing argument on reducing, reusing or replacing it. Learners will present their argument to the family and notice how many were convinced with it – Learners will reflect on why other family members were not convinced and think of what they could do differently
Assessment Criteria:		- Analytical thinking and observations made - Ability to prepare and ask meaningful questions and follow up questions - Critical thinking and problem solving to design alternatives to plastic and how to save the environment. - Clarity of messages when drawing, writing or speaking

Learning outcomes:	- Understanding what is biodegradable and composting - Historical understanding of the evolution of materials - Life cycle of plastic in the landfills and oceans.
Required previous learning:	None
Inspiration:	None
Additional enrichment activities:	The activity can be extended with more time to observe the biodegradation that typically takes 4 months
Modifications to simplify	- Design a plastic diary and suggest how plastic can be reduced, reused or replaced. - Write an essay about the impact wastage and innovation on how to save our oceans or landfills.