

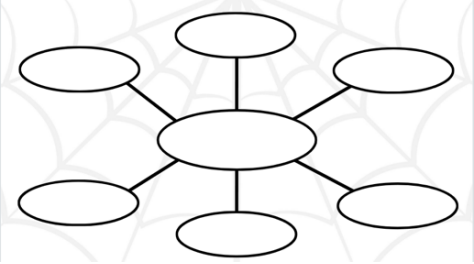
PRESERVE AND PROTECT! (LEVEL 3)

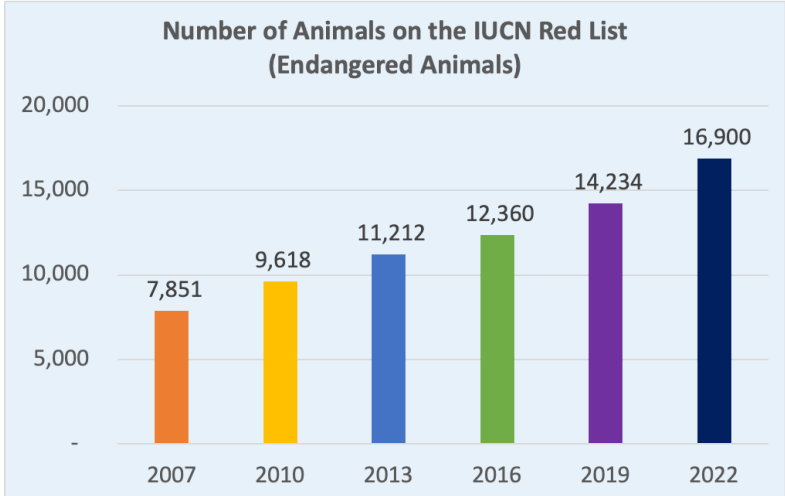
Description	Learners will learn about why biodiversity matters and how humans affect it. They will look into the causes and solutions of water and air pollution, make a tool to reduce pollution in their area and run a campaign to raise awareness about protecting biodiversity and reducing pollution.
Leading question	How can we encourage our community to protect the environment?
Subjects covered	Science, Art and Design, English, Math
Total time required	40-60 minutes a day for 5 days
Resources required	water, a pen, paper/ notebook, a glass jar, dry leaves, a few pins, vinegar/ lemon juice, crayons/ sketch pens (optional)
Learning outcomes:	<p>By the end of this project, learners will be able to:</p> <p>Knowledge-Based Outcomes:</p> <ol style="list-style-type: none"> 1. Describe the importance of biodiversity and its role in maintaining the balance of the environment. 2. Explain the causes, effects and preventive measures of air and water pollution. 3. Discuss the harmful effects of air and water pollution on the environment, and try to create awareness about its prevention. <p>21st Century Skill Outcomes:</p> <ol style="list-style-type: none"> 1. Critically think through analysing which activities cause pollution and how they affect us. 2. Creatively generate ideas on how to prevent pollution and make posters. 3. Communicate in writing and spoken form through the creation of posters and presentations. 4. Collaborate with their peers or the teacher to brainstorm ideas on the causes of pollution and develop possible solutions for its prevention.
Previous Learning	Living and non-living things Basic addition and subtraction
Supervision required	Medium

Day 1 -

Today, you will do a nature walk to identify the biodiversity around you. You will then explore the importance of biodiversity and identify the impact of human activities on it.

Time	Activity and Description
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20 minutes	<p>Nature Walk</p> <p>Note: Take learners to a nearby garden or park and ask them to answer the following questions.</p> <ol style="list-style-type: none"> 1. What are some living things that you see around you? 2. List all the plants, animals and insects that you see. 3. What do these living things need to survive? 4. How do they depend on each other to survive? <p style="text-align: center;">OR</p> <p>Think and list all the plants, animals and insects that live in your neighbourhood/ village/ town/ city.</p> <p>Note: Please choose the second option only if a garden/ park is not accessible within a 5-minute walk range. Bring learners back into the class for the next activity.</p>
10 minutes	<p>Importance of Biodiversity</p> <p>The variety of plants and animals that you listed is called biodiversity.</p> <ul style="list-style-type: none"> - bio = life - diversity = variety <p>How is biodiversity important for the environment?</p> <p>Record the ideas in the shown format.</p> <div style="text-align: center;">  </div> <p>Note: Ask learners to think about how plants and animals help each other to survive, and provide other prompts such as balance in nature, food chain, pollinators, scavengers, and resources we get from plants and animals.</p> <ul style="list-style-type: none"> - Now, let us create a food chain based on the organisms that live around us. - Include a producer > primary consumer > secondary consumer > tertiary consumer/scavenger. - For example, grass > rabbit > fox > lion <p>Now, think about what would happen if one of these species became extinct. (If one of these species becomes extinct, the predators that rely on it for food may face scarcity, leading to their decline and therefore affecting the entire biodiversity one after the other.)</p>
5 minutes	<p>Human Impact on Biodiversity</p> <ol style="list-style-type: none"> 1. What do plants and animals (biodiversity) need to survive? 2. What human activities affect the quality of these resources? How? <p>Note: Record logical answers in a similar format as the one used in the previous activity. Assign one of these activities to each learner and ask them to discuss how the assigned</p>

	<p><i>activity affects biodiversity. In the case of only one learner, ask them to pick any and note down how it affects biodiversity in their notebook.</i></p> <p>Many plants and animals have become endangered and extinct as a result of various human activities that harm biodiversity. This could either happen by directly harming plants and animals, such as through deforestation or hunting, or by affecting the quality of resources they need to survive, such as polluting air and air. Because biodiversity is important for the environment, we need to find ways to reduce the impact caused by human activities on biodiversity.</p> <p>Tip:</p> <ol style="list-style-type: none"> <i>If learners struggle to come up with logical human activities that affect biodiversity, ask if activities such as dumping garbage on the roadside/ in water bodies and burning wastes affect biodiversity, and record them.</i> <i>When learners think about how humans affect biodiversity, ask them to think about how humans affect the resources that plants and animals need to survive.</i> 														
5 minutes	<p>Introduction to the Project: In this project, we will:</p> <ul style="list-style-type: none"> - First, think about how human activities impact two key resources that are important for biodiversity - clean air and water. We will interview our community members to understand these problems better. - Then, design a tool that can help reduce pollution. - Finally, conduct an awareness campaign for our community members to showcase the tool and share the things that we can together do to protect biodiversity. 														
At-home activities	<p>Speak to family or community members and find out more about human activities that affect biodiversity. Find out about what different activities cause water pollution in your region.</p>														
Optional Literacy/ Numeracy Activity	<p>Data Analysis Below is a graph that shows the number of endangered species.</p>  <table border="1"> <caption>Number of Animals on the IUCN Red List (Endangered Animals)</caption> <thead> <tr> <th>Year</th> <th>Number of Animals</th> </tr> </thead> <tbody> <tr> <td>2007</td> <td>7,851</td> </tr> <tr> <td>2010</td> <td>9,618</td> </tr> <tr> <td>2013</td> <td>11,212</td> </tr> <tr> <td>2016</td> <td>12,360</td> </tr> <tr> <td>2019</td> <td>14,234</td> </tr> <tr> <td>2022</td> <td>16,900</td> </tr> </tbody> </table> <p>Note: Guide learners on how to read a bar graph if needed. You can draw this without the subdivisions.</p>	Year	Number of Animals	2007	7,851	2010	9,618	2013	11,212	2016	12,360	2019	14,234	2022	16,900
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	<p>Observe the bar graph and answer the questions that follow.</p> <ol style="list-style-type: none"> 1. How many species were endangered in 2013? 2. How many additional species become endangered between 2016 and 2022? 3. What problem do you think this graph shows?
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Day 2

Today, you will perform an experiment to demonstrate the effects of water pollution. Then, you will identify human activities in your community that cause water pollution and suggest solutions.

Time	Activity and Description						
5 minutes	<p>Recap</p> <ul style="list-style-type: none"> - What is biodiversity? - What does biodiversity need to survive? - What human activities that affect biodiversity did you find out about at home? <p>You know that water and air are two important resources that biodiversity needs. Today, we will focus on how human activities affect the quality of water and what we can do to preserve it.</p>						
10 minutes	<p>Effects of Water Pollution</p> <p>Can we drink the water that we get from lakes and rivers directly? Why?</p> <p>Pollution of water is a major challenge around the world. Let us do an experiment to find out some effects of water pollution.</p> <p>Note: Ask learners to draw the following table in their notebooks, fill out the hypothesis, and keep filling the other sections out as they observe the experiment.</p> <table border="1" style="width: 100%;"> <tr> <td style="width: 20%;">Hypothesis:</td> <td>Waste added to water makes it unusable and harmful.</td> </tr> <tr> <td>Materials Needed:</td> <td>2 jars, drinking water, some waste materials (such as bits of paper, mud and ash), paper, pen, glue/tape</td> </tr> <tr> <td>Method:</td> <td> <ol style="list-style-type: none"> 1. With your partner, fill half of each jar with drinking water. 2. To one jar, add the waste materials and mix or shake thoroughly. Label this jar as 'Polluted water'. 3. Label the other jar as 'Clean water.' 4. Store the jars safely, and leave them undisturbed for a day. </td> </tr> </table> 	Hypothesis:	Waste added to water makes it unusable and harmful.	Materials Needed:	2 jars, drinking water, some waste materials (such as bits of paper, mud and ash), paper, pen, glue/tape	Method:	<ol style="list-style-type: none"> 1. With your partner, fill half of each jar with drinking water. 2. To one jar, add the waste materials and mix or shake thoroughly. Label this jar as 'Polluted water'. 3. Label the other jar as 'Clean water.' 4. Store the jars safely, and leave them undisturbed for a day.
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15 minutes	<p>Solutions to Water Pollution Think and list down activities that take place in your neighbourhood or community that contribute to water pollution.</p> <p>Once done, think of what your community members can do to reduce or avoid water pollution caused by each of these activities. Record your ideas in the table shown.</p> <table border="1"> <thead> <tr> <th>Human Activity Causing Water Pollution</th> <th>What Can My Community Do About This?</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> </tr> <tr> <td> </td> <td> </td> </tr> </tbody> </table> <p>We will use these ideas when we plan an exciting awareness campaign for our community members!</p> <p><i>Tip: If learners struggle to come up with human activities and solutions, give prompts such as “throwing plastic into water bodies” and “encouraging the community to place more dustbins in different areas and use them.”</i></p>	Human Activity Causing Water Pollution	What Can My Community Do About This?				
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10 minutes	<p>Peer Feedback Share the table in which you recorded your ideas with an adult or partner. Feedback will be given on the following questions:</p> <ul style="list-style-type: none"> - Does each activity listed cause water pollution? If not, what alternatives can I suggest? - Does each solution suggest reducing or avoiding water pollution? If not, what alternatives can I suggest? - Are the ideas easy to implement for the community? If not, what more effective alternatives can I suggest? 						
At-home activities	<p>Get feedback from some elders in the community on human activities that cause water pollution and suggest solutions. With their help,</p> <ul style="list-style-type: none"> - add any activities that you may have missed, - add solutions for each of these activities, and - improve any already listed solutions. 						

Day 3 –

Today, you will discuss the causes of air pollution and perform an experiment to understand the effects of acid rain. You will then think of steps that can be taken to prevent air pollution to use in your campaign.

Time	Activity and Description				
5 minutes	<p>Observation of Polluted Water</p> <p>Observe the two jars we worked on yesterday. Make a note of your observations.</p> <ul style="list-style-type: none"> - You can open and smell the water in the two jars as well. - Fill out your observations and inferences in the table. <p>How do you think such polluted water would affect</p> <ul style="list-style-type: none"> - the organisms living inside the water? - the organisms that drink this water? - plants that absorb this water from their roots? - you, if you drink it? <p>From this, we can understand the importance and need for solving the problem of water pollution.</p>				
5 minutes	<p>Effects of Air Pollution</p> <p>Now, we will focus on how human activities affect the quality of air and what we can do to preserve it.</p> <ul style="list-style-type: none"> - Is the air around you clean? If not, what pollutes it and makes it dirty? - What happens when these poisonous gases mix with rain? - How can polluted air affect biodiversity? <p>The air around may not be clean as they are polluted by vehicle emissions, industrial activities and other sources.</p> <ul style="list-style-type: none"> - When these poisonous gases mix with rainwater, it makes them acidic and harmful. - This is called acid rain. - When these acids fall on the earth, they can not only harm living organisms but also non-living things. <p>Let us do an experiment to see how this happens!</p>				
10 minutes	<p>Acid Rain</p> <p>Note: Ask learners to draw the following table in their notebooks, fill out the hypothesis (in what way acid rain would affect plants and animals), and keep filling the other sections out as they observe the experiment.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tbody> <tr> <td style="width: 20%;">Hypothesis:</td> <td>Acid rain causes leaves to turn brown.</td> </tr> <tr> <td>Materials Needed:</td> <td>2 jars, water, 2 leaves, 2 pins/paper clips, vinegar/lemon juice, paper, pen, tape/glue</td> </tr> </tbody> </table>	Hypothesis:	Acid rain causes leaves to turn brown.	Materials Needed:	2 jars, water, 2 leaves, 2 pins/paper clips, vinegar/lemon juice, paper, pen, tape/glue
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	<p>Method:</p>	<ol style="list-style-type: none"> 1. Place one leaf and pin in jar 1. 2. Fill this jar with clean water and close it. 3. Label this jar 'Clean Rain'. 4. Place one leaf and pin in Jar 2. 5. Fill this jar with a mixture of water and vinegar (1:1). 6. Label this jar 'Acid Rain' 7. Leave the jars like this for a day. 						
	<p>Observations:</p>	<p><i>To be filled the next day.</i></p>						
	<p>Inferences:</p>	<p><i>To be filled the next day.</i></p>						
<p>10 minutes</p>	<p>How do you think the lead and the pin in the two jars will look different the next day?</p> <p>Solutions to Air Pollution Think and list down activities that take place in your neighbourhood or community that contribute to air pollution.</p> <p>Once done, think of what your community members can do to reduce or avoid air pollution caused by each of these activities. Record your ideas in the table shown.</p> <table border="1"> <thead> <tr> <th>Human Activity Causing Air Pollution</th> <th>What Can My Community Do About This?</th> </tr> </thead> <tbody> <tr> <td></td> <td></td> </tr> <tr> <td></td> <td></td> </tr> </tbody> </table> <p>We will use these ideas when we plan an exciting awareness campaign for our community members!</p>		Human Activity Causing Air Pollution	What Can My Community Do About This?				
Human Activity Causing Air Pollution	What Can My Community Do About This?							
<p>10 minutes</p>	<p>Designing a Tool: Now based on our understanding of the causes of water and air pollution in our community, design a tool that can be used to reduce this pollution.</p> <ul style="list-style-type: none"> - This could be something that exists or something that you think could be made. - For example, a net to catch solid waste in water or a filter to place over coal fires to purify air. <p>Note: Ask learners to think of which type of pollution they wish to tackle, what their tool will be and how it can be used to reduce pollution.</p>							
<p>At-home activities</p>	<p>Get feedback from some elders in the community on human activities that cause air pollution and suggest solutions. With their help,</p> <ul style="list-style-type: none"> - add any activities that you may have missed, - add solutions for each of these activities, and - improve any already listed solutions. 							

	<p>Also, get feedback on your tool design from your family or community members.</p> <p>Carry any materials needed to make the tool's model and campaign posters.</p>
Optional Literacy Activity	<p>Formal Letter to the Local Authority</p> <p><i>Guide learners to write a formal letter to the local authority seeking support in reducing air and water pollution. Ask them to think about what this "support" can look like - can dustbins be placed in the community to make sure people do not throw garbage everywhere? can public areas be cleaned more regularly? etc.</i></p> <p><i>Teach the given structure:</i></p> <div style="border: 1px solid black; padding: 10px; margin: 10px 0;"> <div style="display: flex; justify-content: space-between;"> <div style="border: 1px solid black; padding: 5px; width: 40%;"> <p>Recipient's address Reference number if available</p> </div> <div style="border: 1px solid black; padding: 5px; width: 40%;"> <p>Sender's address and other contact info: Email Telephone Fax</p> </div> </div> <div style="border: 1px solid black; padding: 5px; width: 20%; margin-left: auto;"> <p>Date</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Dear..... (If name is unknown use Sir/Madam)</p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <ul style="list-style-type: none"> It may be appropriate to start with a reference line <i>Re:.....</i> Do not use contracted forms - write all words in full. Use formal standard English - no slang Keep sentences precise and get straight to the point Keep business letters focussed and do not waffle on! If complaining, be polite and use intelligent vocabulary. </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Sum up your main point and state that you look forward to a response to your letter / query / complaint etc if appropriate. <i>Thank you, in advance, for taking time to respond to my</i></p> </div> <div style="border: 1px solid black; padding: 5px; margin-top: 10px;"> <p>Yours faithfully – (if greeting is to Sir/Madam) Yours sincerely – (if name is given)</p> </div> </div>

Day 4 –

Today, you will create the plan for the awareness event, prepare posters and create models for it.

Time	Activity and Description
5 minutes	<p>Observation of Acid Rain Experiment</p> <p>Observe the two jars we worked on yesterday.</p>

	<ul style="list-style-type: none"> - Take a look at how both living and non-living things were affected by the acid. - Fill out your observations and inferences in the table. <p>How do you think acid rain would affect</p> <ul style="list-style-type: none"> - humans and plants? - the organisms living inside the water? <p>From this, we can understand the importance and need for solving the problem of air pollution.</p>
35 minutes	<p>Event Plan</p> <p>Note:</p> <ul style="list-style-type: none"> - <i>If there are 2 or more learners, divide poster making, model making and event planning among learners. In the case of one learner, you can ask them to complete the pending work as homework.</i> - <i>In case of group work, inform them that poster makers will make posters to use during the campaign, model makers will create the model that will be showcased to the community members, and event planners will make a plan for the entire event including the time allotted to each activity.</i> <p><u>Poster Making:</u></p> <ul style="list-style-type: none"> - Posters should include the causes and solutions of air/water pollution. <p><u>Model Making:</u></p> <ul style="list-style-type: none"> - Use the design created in the previous class to create a prototype of the tool they will use to help reduce pollution. - Use your materials to create an actual model - Then write down its features and how it can be used to reduce pollution. <p><u>Event Planning:</u></p> <p>Event planners will think about logistics, such as:</p> <ul style="list-style-type: none"> - where will they carry the event out. - how many community members would they like to invite - what would the seating arrangement look like - when will the event be conducted. - how will they invite community members. <p>Note: <i>Ask event planners to discuss with other learners write out a plan for the event and create invites for family, friends and community members. Let them know that they will have 15 minutes to execute.</i></p>
At-home activities	<ul style="list-style-type: none"> - Complete any pending tasks (posters/models/invitations) related to the event. - Practise your parts in the awareness campaign - Distribute invitation cards to your family, friends and community members.

Day 5 -

Today, you will finish your puberty comic book and present it to your friends.

Time	Activity and Description
30 minutes	<p>Awareness Campaign</p> <p><i>Note: Learners will carry out the awareness campaign using their posters and models, following the plan they prepared. Help structure the campaign by first introducing family, friends and community members about what learners are trying to do and then calling learners to present.</i></p>
10 minutes	<p>Reflection:</p> <ul style="list-style-type: none"> - What went well? - What did not go well? - What would we do differently the next time we organise a campaign?

Additional enrichment activities:	<ul style="list-style-type: none"> - Learners can prepare a street play on protecting the environment and perform it for their school/ parents.
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ASSESSMENT CRITERIA

A majority of my learners were able to:

- Describe the importance of biodiversity and its role in the balance of the environment.
 - Explain the causes, effects and preventive measures of air and water pollution.
 - Plan an event from start to finish collaboratively.
 - Create posters and models explaining the causes and solutions of water and air pollution.
-