

Lesson plan (3) activities for children

This lesson plan contains lesson plans for children, both classroom based and outside. If you are working with schools you could also provide them with other posters and PDFs from the resource catalogue.

Note: these activities are pitched towards younger children aged from 5-10. For older children and teenagers, it's recommended you use a version of Lesson Plan (2) On site,


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On site - Filtration Activity

Lesson objective: demonstrate how natural materials can be used to clear water and soil.

Content covered:

- What is pollution? (sometimes it's litter, sometimes it's invisible!)
- Filtration activity: demonstrates that natural materials can clean, be sure to explain that in your project the leaves/twigs etc. represent natural organisms.
- Bioremediation: natural materials (organisms) to clean our rivers and soil.

Step		Direction	Learning Point	Resources/ Equipment
LESSON PREP				
		<p>Print the right number of 'Get involved' worksheets.</p> <p>For the filtration activity:</p> <p>Make dirty water. Mixing soil, mud, and water in a large clear bottle. It's even better if the soil contains bits of dried leaf, grass, and other debris. Shake it well to mix.</p> <p>Make a pile of filtration materials. Organic materials from outside (such as coarse soil, small pebbles, mosses, twigs, leaves or grass)</p> <p>Use scissors to cut the clean, empty plastic bottles. Cut the top third off, it doesn't need to be an exact measurement as long as the bottom section of the bottle is noticeably bigger than the top part.</p> <p>.</p> <p>Set up tables or stations with the same equipment on each. One cut empty bottle, cotton wool, paper napkins, and gravel or stones. Set up one table for each group, it's up to you how many groups you want to have.</p> <p>For examples of this experiment, see: https://www.ontariosciencecentre.ca/science-at-home/diy-science-fun/wetland-in-a-bottle</p>		<p>Scissors</p> <p>Cotton wool balls</p> <p>Clean, empty plastic bottles</p> <p>Paper napkins</p> <p>Gravel</p> <p>Sand</p> <p>Soil</p> <p>Mud</p> <p>Twigs</p> <p>'Get involved' worksheets</p>
LESSON BREAK DOWN				
1.	5min s	<p>INTRODUCE the class by welcoming them to the site.</p> <p>EXPLAIN that this is where you complete scientific work called bioremediation and today you need their help with an experiment.</p>		
2.		<p>EXPLAIN that bioremediation is a process we use to remove pollution from our environment.</p>		

	5 mins	<p>ASK the class to look around and tell you what they see. If they need prompting, ask again: what do you like about the nature you can see here?</p> <p>EXPLAIN that all they're answers describe part of a thriving ecosystem.</p> <p>SAY One thing they can't see is the pollution, because it can be invisible! pollution can be visible or invisible. Litter is visible but some chemicals and substances that are polluting our soil and water are hard to spot because they don't leave a trace.</p>	What is pollution?	
3.	10 mins	<p>SAY Don't worry, nature is very good at coming up with its own solutions. It even contains lots of organisms and processes that are built to clean! That's what we're going to do today, we're going to use things we find in nature to clean dirty water. So, first we need to find the natural material. I need you to complete a scavenger hunt.</p> <p>EXPLAIN that the class needs to split into groups (each with an adult accompanying them). They need to look around the site and collect leaves, stones and sticks.</p> <p>ENSURE you have a pre-prepared pile. Children are just adding the final leaves/sticks.</p>		
4.	20 mins	<p>ENSURE children are grouped near a plastic bottle set-up.</p> <p>DIRECT them to put the top of the lid backwards. Show them your muddy water and tell them that you're going to create a way to clean it. They need to add the materials in front of them, plus the natural ones, to the bottle top.</p>	What is bioremediation?	


		Give them 15 minutes. At this point, take the dirty water and pour it into each of the bottles and watch as it cleans.		
5.	5 mins	<p>EXPLAIN that the water is getting clearer because the leaves and sticks prevent the bad stuff getting through.</p> <p>We usually think of cleaning as a bad thing, like when you need to tidy your room, but there are lots of natural things like mushrooms, plants and even mussels that love to clean. When scientists like us add them to polluted areas they gobble up all the bad stuff! Making the water or soil cleaner, just like we've done today!</p> <p>When these natural organisms are added to clean up pollution, that clean-up process is called bioremediation. They make the water and soil healthier so the plants can grow, and the animals are safe and protected.</p>	<p>What is a natural organism?</p> <p>What is bioremediation?</p>	
6.	5mins	<p>THANK students for attending but tell them the work isn't over yet. They have some bioremediation to do at home.</p> <p>GIVE students one of the 'Bioremediation games' worksheets to take home.</p> <p>EXPLAIN that on the worksheet they need to guide each organism into water/soil. Once they're safely in the water/soil, cleaning up all the pollution, you can draw the plants and animals that are happily living in this newly healthy environment</p>		
			Total	50 mins

Classroom - Pollution Activity

Lesson objective: demonstrate that pollution can come in many forms and explain how bioremediation can protect our environment from pollution.

Content covered:

- Clean water experiment: pollution can come in many different forms and effect the environment in different ways
- Bioremediation is a process that can be used to clean our environment and protect our favourite animals
- Scientist apply natural organisms to places where pollution is getting really bad

Step		Direction	Learning Point	Resources & equipment
LESSON PREP				
		<p>Print the right number of 'My favourite' and 'Get involved' worksheets.</p> <p>Prepare the equipment listed for the clean water experiment. Option to pre-fill the glasses of water and place them around the room.</p>		<p>'My favourite' worksheets</p> <p>Optional: 'Bioremediation games' worksheets</p> <p>Cups of water</p> <p>Food colouring</p> <p>Vinegar</p> <p>Salt</p> <p>If you have white lab coats you can bring, that would add to the story!</p>
KIDS - LESSON PLAN - CLASSROOM				
1.	15 mins	<p>INTRODUCE the class by welcoming the kids to the session - today they're going to become scientists!</p> <p>SAY As scientists we do alot of evaluation. This is where we look at the world around us and record what we see. First step of our lab experiments today is to assess our environment and think about what we want to protect.</p>	n/a	
2.	15 mins	<p>HANDOUT the 'my favourite' worksheets'. Allow 15 minutes to fill them in and ask some children to share their favourite flower/tree/animal with the class.</p>	n/a	'My Favourite' worksheets

4.	10 mins	<p>EXPLAIN that to protect this wildlife we need to make sure they're not affected by pollution.</p> <p>ASK the class to raise their hands with examples of pollution. Most likely they will focus on litter.</p>	What is pollution?	
5.	2 mins	<p>SAY Did you know that pollution can be invisible?!</p> <p>EXPLAIN that pollution can be visible or invisible. Litter is visible but some chemicals and substances that are polluting our soil and water are hard to spot because they don't leave a trace.</p> <p>SAY We're going to test this out.</p>	Polluting chemicals	
6.	20mins	<p>Complete the Clean Water Experiment.</p> <p>Give each student/group in your class a cup of clean water - this is their test sample they need to look after it. Explain that you're going to be acting like pollution, adding different things to the water so we can scientifically assess the results.</p> <p>You will then go around the class, adding a few drops of food colouring to each cup of water. Ask these groups to stir their sample - what is happening now?</p> <ul style="list-style-type: none"> ● It's turning a bright colour ● So some pollutants are easy to spot, like litter and this food colouring <p>Repeat the process again but add vinegar to the next round of cups. Ask these groups to stir their sample - what is happening now?</p>	Identifying pollution	Cups of water Food colouring Vinegar Salt

		<ul style="list-style-type: none"> ● It's really stinky! (encourage other groups to have a sniff) ● Some types of pollutants you can't see, but do have a bad smell. ● Have they ever thought the river or a muddy bit of ground was a bit stinky? ● You could add here that drinking this would make us sick - just like nasty chemicals in the river/soil affect our health <p>Repeat the process for a final time, this time adding salt. Ask these groups to mix their samples for quite a while. What's happening now?</p> <ul style="list-style-type: none"> ● Nothing! It disappears and we cant see or smell it anymore ● See if anyone is brave enough to taste some ● This is just like some pollution in real life, it disappears into the water and soil until we can't see it anymore! 		
7.	3mins	<p>AFTER you have cleared away, recap what you've learnt.</p> <ul style="list-style-type: none"> ● Some pollution you can see (litter) ● Some pollution you can smell (stinky rivers, stinky mud) ● Some are invisible! But, you can still see its effects. <p>EXPLAIN how this pollution is affecting your site.</p>	Identifying pollution	
8.	5mins	<p>SAY Don't worry, nature is very good at coming up with its own solutions. It even contains lots of organisms and processes that are built to clean!</p> <p>We usually think of cleaning as a bad thing, like when you need to tidy your room, but these organisms are on our site. When scientists like us add them to polluted areas they gobble up all the bad stuff!</p> <p>When we apply these organisms to the places that are polluted, they complete a process called bioremediation. They make the water and soil healthier so the plants can grow and the animals are safe and protected.</p>	What is a bioremediation/ natural organism?	

		<p>They come in all shapes and forms, mushrooms, plants and even mussels.</p> <p>OPTION to expand on your chosen bioremediation strategy. “We’re currently using...”</p>		
9.	10mins	<p>HANDOUT ‘Get involved’ worksheet. Option to give this as a takeaway.</p> <p>SAY Now we need your help to complete the bioremediation process. On your worksheet, guide each organism into water/soil. Once they’re safely in the water/soil, cleaning up all the pollution, you can draw the plants and animals that are happily living in this newly healthy environment.</p>	Bioremediation process cycle.	
	5 mins	<p>THANK the class for helping you conduct the experiment today, they have completed some important work!</p> <p>OPTION to leave class with the pollution spotting worksheets.</p>		
			Total	1hr15