

WVS EDUCATION UPPER KS2 GEOGRAPHY LESSON PLAN

The Impact of Infrastructure: How human activities affect environments and impact animals

Phase	Upper Key Stage 2
Subject	Geography/The world around us
WVS goal	To raise awareness of issues affecting animal welfare.
Curriculum Links	<p>England KS2 Geography</p> <p>Describe and understand key aspects of human geography, including: types of settlement and land use, economic activity including trade links, and the distribution of natural resources including energy, food, minerals and water</p> <p>Wales KS2 Geography</p> <p>Caring for places and environments and the importance of being a global citizen • How have people affected this place/ environment? How can I and other people look after this environment?</p> <p>Northern Ireland KS2 The world around us</p> <ul style="list-style-type: none"> • The effect of people on the natural and built environment over time • The effects of positive and negative changes globally and how we contribute to some of these changes <p>Scotland Second Sciences</p> <ul style="list-style-type: none"> • I can analyse how lifestyles can impact on the environment and Earth's resources and can make suggestions about how to live in a more sustainable way
Links to Sustainable Development Goals	<p>SDG 9 – Industry, Innovation and Infrastructure</p> <p>SDG 12 – Responsible Production and Consumption</p> <p>SDG 15 – Life on Land</p>

OVERVIEW

In this lesson, children will:

- Consider whether Costa Rica is an environmentally responsible country
- Research how developing infrastructure affects Howler Monkeys
- Raise awareness of how WVS and other charities are campaigning to make human activities safer

LESSON RESOURCES

Visual glossary: This printable lists vocabulary associated with the lesson and can be provided for additional support.

Printable 1 – environmentally responsible sorting cards. Prepare one set per pair.

Printable 2 – Howler Monkey factsheet. Prepare one copy per pair.

LESSON OVERVIEW

Part 1: Discover the issue

Entry ticket: Ask children to show with their fingers how sure they are that they can explain how human land use affects environments and impacts animals. Children can give their answers using the scale 1 to 4 on their fingers to indicate how sure they feel.

Pictures from a vet: Introduce the photographs showing powerlines in the rainforest. Use the Project Zero Thinking Routine, developed by Harvard, to help children analyse the photographs and make connections between them.

The **Think, Puzzle, Explore** Thinking Routine helps children recall what they already think they know about a topic and then invites them to identify puzzling questions or areas of interest to pursue. Further information can be found here: [Think Puzzle Explore_1.pdf \(harvard.edu\)](https://www.harvard.edu/think-puzzle-explore-1.pdf)

Ask children to explore the 3 questions as they look at the images of powerlines:

- What do you think you know about these pictures?
- What questions or puzzles do you have about what you can see?
- How might you explore your puzzles to find out more about this topic?

You could help to scaffold children's thinking by asking them why they think powerlines are needed in the rainforest, how they are installed and what dangers they might pose.

Vet report: Introduce the vet report from a WVS vet nurse working in Costa Rica. Explain that the vet has been taking care of a baby Howler Monkey called Valery. Valery and her mother were injured by unsafe powerlines. Valery suffered burns to her hands and her mother was sadly killed. You can use the visual glossary to support children who might be unfamiliar with some of the vocabulary.

There are 15 species of Howler Monkey and of these the Yucatan Black Howler and Northern Brown Howler are both endangered. In Costa Rica you find the Mantled Howler Monkey, which is not yet endangered. However, in the last 15 years sadly the population of Howler Monkeys in Costa Rica has declined by 50%, this is due to large areas of the forest having been cleared for construction. In addition to the deforestation many monkeys also end up getting electrocuted on uninsulated powerlines where their route through the canopy has gone.

Discover the issue: Explain that as countries develop, there are conflicts between different land uses. Infrastructure is needed to provide for a growing population but this has an impact on the natural environment. You might wish to discuss what is meant by the term infrastructure – the physical systems needed to support human productivity. This usually includes communication systems (mobile phone networks, phone lines, radio masts), roads, public transport, bridges, sewer systems, powerlines, water pipes etc.

Children will consider the development of infrastructure in Costa Rica, a country in Central America. Costa Rica is considered a good country for eco-tourists to visit due to its commitment to fostering biodiversity. However, as the country develops, there are increasing tensions between infrastructure and the environment.

Is Costa Rica environmentally responsible? Children work in pairs to weigh up facts about Costa Rica's developing infrastructure and the impact it has on the environment. Distribute **Printable 1** sorting cards, one set per pair. You may want to read through the statements as a whole class to discuss the vocabulary. Children then decide whether the card shows that Costa Rica is being environmentally responsible, or if the statement relates to a development that could harm the environment and living things.

Answers to sorting cards:

Environmentally responsible statement:

- Costa Rica pledged to become carbon neutral by 2021.
- 80% of Costa Rica's energy is from renewable sources, mainly hydroelectric.
- Nearly 30% of the country has been made a national park or reserve.
- Costa Rica has a reforestation programme to offset carbon emissions by planting more trees.
- Costa Rica is a small country but incredibly contains 5% of the world's biodiversity. It relies on eco-tourism to provide jobs for local people.

Less environmentally responsible statements:

- As the country develops, areas of forest are being cleared to build infrastructure.
- Powerlines criss-cross the forest to supply energy.
- Powerlines are often not looked after. If the insulation around the cables breaks, then animals are at risk of electrocution.
- Animals such as Howler Monkeys cannot travel around the forest because trees are removed.
- Powerlines are constructed as cheaply as possible so are often uninsulated and unsafe.
- Powerlines are often connected to high-voltage transformers making them more dangerous.
- If trees are removed then animals use powerlines as aerial walkways to travel between areas of forest.

**Part 2:
Join the adventure**

Question to investigate: Introduce the enquiry question: What impact does developing infrastructure have on Howler Monkeys?

Children will use the factsheet in **Printable 2** to learn more about Howler Monkeys, their needs, their habitat and the impact powerlines have on their welfare.

In Costa Rica (and in many other developing countries) rapid development and construction has led to fragmentation of the natural habitat, and to many electrical powerlines being installed criss-crossing the forests. These powerlines are constructed as cheaply as possible, and so are often uninsulated and connected to high-voltage transformers. Thousands of arboreal (tree-living) animals such as monkeys, sloths and possums are being electrocuted by them every year. Monkeys such as the Howler Monkeys use the wires as aerial runways in fragmented parts of the forest where trees have been cleared.

Sadly, the monkeys cannot sense the danger of these powerlines and often receive fatal shocks or very bad burns and internal injuries. This means the survival rate of those that are rescued is also poor. Most of the monkeys that survive the shocks are babies who were clinging to their mothers when they were electrocuted. The babies often suffer burns on their hands, tail and feet. Many must have fingers or even legs amputated; but some escape with only minor burns.

Create a diorama: Children work in pairs to produce a diorama showing the jungle habitat with the electric wires and transformers. This task could be completed as part of wider learning about rainforest habitats so you may wish children to include additional information about layers in the rainforest, other species of plants/ animals and explain how the rainforest ecosystem works.

Part 3: Be the change

WVS and Howler Monkeys: WVS supports charities all over the world by providing medical supplies, equipment and by sending out volunteers. Refuge for Wildlife in Nosara in Costa Rica is one of these charities. WVS sends out supplies such as bandages and burn creams to treat injured monkeys, and equipment such as incubators for the baby monkeys that are rescued. WVS also sends out volunteers to support the work the charity is doing.

Refuge for Wildlife responds to over 100 Howler Monkey electrocutions a year and many of these monkeys do not survive. Whilst the surviving monkeys can be helped and hopefully eventually returned to the wild, the better solution is to prevent the electrocutions in the first place. Refuge for Wildlife has a campaign "Stop the Shocks" which raises money to try to prevent electrocutions by trimming trees to prevent wildlife accessing the power lines, building rope bridges to provide safe aerial pathways and insulating powerlines and transformers to prevent electrocution.

Be an animal champion! Give children the challenge make changes to their dioramas to reflect the work of WVS and Refuge for Wildlife in supporting environmentally responsible activities in the rainforest. They could include the 'Stop the Shocks' logo to the diorama to indicate the changes suggested by the Nosara refuge for Wildlife.

Children could:

- 'fix' broken powerlines
- insulate transformers
- construct aerial walkways between the trees
- ensure the trees in their model are not too close to the powerlines

Exit ticket: Ask children to show with their fingers how sure they are that they can explain how human land use affects environments and impacts animals. Children can give their answers using the scale 1 to 4 on their fingers to indicate how sure they feel.