

# 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><b>England</b> KS2 Geography</p> <p>Describe and understand key aspects of human geography, including: types of settlement and <b>land use</b>, economic activity including trade links, and the <b>distribution of natural resources including energy</b>, food, minerals and water</p> <p><b>Wales</b> 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><b>Northern Ireland</b> KS2 The world around us</p> <ul style="list-style-type: none"> <li>• The effect of people on the natural and built environment over time</li> <li>• The effects of positive and negative changes globally and how we contribute to some of these changes</li> </ul> <p><b>Scotland Second</b> Sciences</p> <ul style="list-style-type: none"> <li>• 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</li> </ul>
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.

## INFRASTRUCTURE



Things needed for communities to function, such as roads, power and buildings.

**Infrastructure is created by humans.**

## ELECTROCUTION



Injury caused by an electric shock from a power source.

**Howler monkeys are at risk of electrocution from powerlines.**

## ENVIRONMENTALLY RESPONSIBLE



Acting in the best interest of the surroundings in which people, animals and plants live.

**A country should be environmentally responsible.**

## POWERLINE



Cables which carry electricity, usually supported by a pole or pylon.

**Powerlines carry electricity across the rainforest.**

## TRANSFORMER



A device which carries electricity between different parts of the power system.

**Transformers need to be insulated.**

## CARBON NEUTRAL



Having a balance between the amount of carbon put out into the atmosphere and the amount absorbed.

**Costa Rica has pledged to be carbon neutral by 2021.**



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 into a national park or reserve.	Costa Rica has a reforestation programme to offset carbon emissions by planting trees.
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, animals use powerlines as aerial walkways to travel between areas of forest.	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.

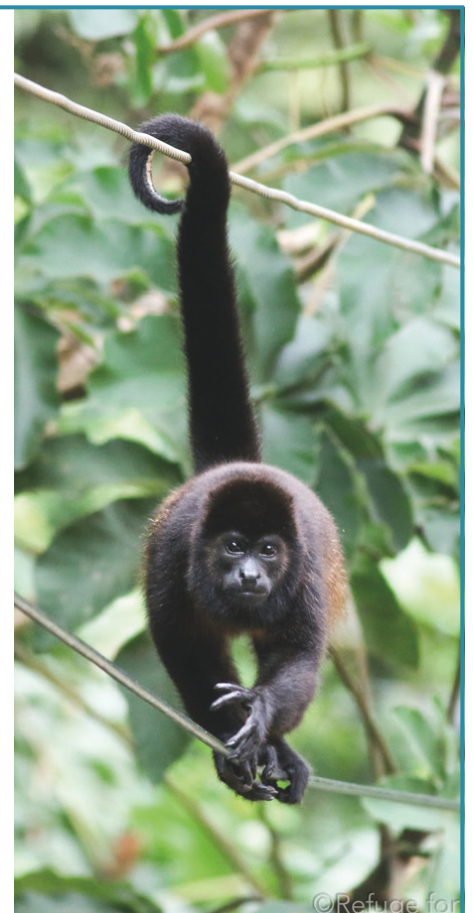
# HOWLER MONKEYS

## ABOUT HOWLER MONKEYS.

Howler Monkeys are known for their call which can be heard up to 3 miles away. They live in groups called troops. The calls are most commonly heard at dawn and dusk. The male monkeys have special vocal chambers which allow them to make this noise and it is used to tell other monkeys that the territory is occupied. Howler Monkeys are entirely vegetarian and spend all their time in the canopy, rarely coming to the ground as they find their food high up in the trees. Howler monkeys are quite big monkeys and are excellent climbers. They have a prehensile tail which means they can use it to grab onto branches as they swing through the canopy. 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 endangered but whose numbers have sadly declined by 50%.

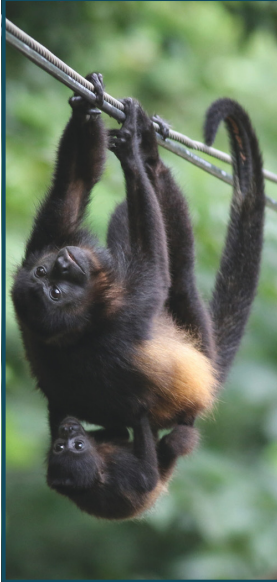
## DEVELOPMENT IN COSTA RICA AND HABITAT LOSS

Man's rapid development causes problems for wildlife with habitat destruction and fragmentation. The need for electricity to support this development means that powerlines are going up all over the world. Costa Rica is marketed as one of the most ecofriendly countries to visit with 25% of its land set aside to parks, reserves, and protected land. It gets 75% of its electricity through renewable energy and is working to achieve carbon-neutrality by 2021. It has a diverse wildlife with 5% of the world's biodiversity in Costa Rica and it is applauded for its eco-tourism. Even though there are these policies in place, as the country develops, large areas of forest have been cleared for construction. This has put pressure on the wildlife as their natural habitats have been reduced. For the Howler Monkeys as their habitat has been reduced the routes that they took through the canopy have disappeared. Many electrical power lines are also being installed criss-crossing the forests. These power lines are constructed as cheaply as possible and so are often uninsulated and are connected to high voltage transformers. The Howler Monkeys and other animals that live in the canopy will use the wires as aerial runways in parts of the forest where trees have been cleared. If the power lines are not insulated these leads to electrocution.





# ELECTROCUTION OF HOWLER MONKEYS



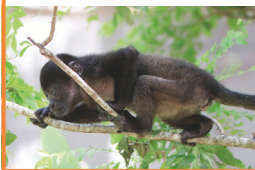
Electrocution of wildlife is not just a problem in Costa Rica. Powerlines are going up all over the world as development takes place and electrocution of wildlife has become a global issue. There have been cases of electrocutions of elephants in India, gibbons in Myanmar and birds like falcons in Mongolia. In Costa Rica these powerlines are a hidden danger to the Howler Monkeys along with other arboreal (tree-living) animals such as sloths and possums. The charity Refuge for Wildlife based at Nosara on the north west coast of Costa Rica responds to over 100 electrocutions a year. The monkeys cannot sense the danger of these powerlines and often receive fatal shocks or very bad burns and internal injuries which 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.



## HOW ARE ORPHANED MONKEYS HELPED?

Refuge for Wildlife is a charity supported by WVS which specialises in the rescue of Howler Monkeys, although it rescues many other animals as well. It has a 24-hour hotline and a rescue team who will go out to rescue animals trapped on the cables, animals who would otherwise die.

The goal is to take in the animals, treat them, and return them to the wild as quickly as possible. The refuge has a team of vets and volunteers who treat the immediate needs of the animals and provide long-term care where necessary. Because many of the surviving Howler Monkeys are babies, the refuge has several special nurseries for different-age monkeys. There is an infant, juvenile and young-adult nursery. In these nurseries the monkeys learn to socialise and climb and, once they are ready, they are released back into the wild. One of the ways that WVS works is to support 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 the charities we support. We send 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.

## STOP THE SHOCKS

Whilst the surviving monkeys can be helped and, hopefully, be returned to the wild, the better solution would be to prevent the electrocutions in the first place. There are laws in the country which are supposed to protect the environment and wildlife from development but sadly these are not properly enforced. To help the situation Refuge for Wildlife run their own local community-based campaign called "Stop the Shocks" to try and prevent electrocutions. They raise money and then work in three ways:

1. They trim trees to prevent wildlife accessing the power lines.
2. They build rope bridges to provide safe aerial pathways, so the animals don't have to travel along the powerlines
3. They insulate the power lines and transformers to prevent electrocution.

