

LESSON PLAN

CREATED FOR TEACHERS BY EDEN'S EDUCATION TEAM

Rainforest Adaptations – Thriving in a Challenging Ecosystem

Overview - The rainforest is one of the most extreme and challenging ecosystems on the planet. Yet plants have evolved adaptations which enable them not only to overcome the challenges, but to thrive here! This lesson challenges students to think more deeply and creatively about challenges that organisms face in their habitats and their adaptations - moving them far beyond the standard fare of polar bears, rabbits and foxes!

Who: KS3 – KS4 Science. This lesson will be differentiated by outcome. The teacher can also use progressive questioning to explore the students understanding. Some extension ideas have been included to stretch the more able groups.

How long: 90 minutes

Objectives and curriculum links

This lesson enables students to:

- Begin to develop an understanding of the rainforest ecosystem.
- Describe the challenges faced by plants living in the rainforest.
- Explain how various adaptations help the plants thrive in this extreme ecosystem.

We've designed the lesson to help teachers cover the following subject areas:

KS3 Science

- adaptations of leaves for photosynthesis.
- the variation between species and between individuals of the same species means some organisms compete more successfully, which can drive natural selection
- changes in the environment may leave individuals within a species, and some entire species, less well adapted to compete successfully and reproduce, which in turn may lead to extinction

KS4 Science

- the characteristics of a living organism are influenced by its genome and its interaction with the environment
- living organisms are interdependent and show adaptations to their environment
- describe the importance of interdependence and competition in a community
- explain how some abiotic and biotic factors affect communities

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Resources

Junk materials for making models:

- All sorts of junk/scrap. For example - boxes, buttons, coloured acetate, ribbons, pipe cleaners, foam, shower hoses, bottle tops, fabric offcuts, materials, coloured cards and paper, pipes, old bottles. You could pay a visit to your nearest scrap store to collect the materials you need (e.g. www.cornwallscrapstore.co.uk) or you could get the students to bring these things in.
- Masking tape, Sellotape
- Plasticine
- Scissors

Other resources:

- Computer, projector, speakers, internet access – YouTube.
- Big whiteboard and wipe able pens (several colours)
- A3 plain paper
- Felt tips.

Pre-starter (0 - 5 minutes)

Write this on the board: - 'Where do we find the world's Tropical Rainforest? Can you name any?'

They can think about this as they walk in and settle.

Once they are settled get some feedback. Tropical Rainforests are found between the Tropic of Cancer and Tropic of Capricorn (e.g. Amazon, Congo, Borneo etc.)

You could show this map: - <http://kids.mongabay.com/elementary/002.html>

Getting Started (5 - 15 minutes)

Place the pupils into pairs. They will work in these pairs for today's lesson. Give each pair a piece of A3 and access to some coloured pens.

Communicate the objectives of the lesson to the students.

Explain to the students that they are going to watch a short video about adaptations that plants have evolved to survive in the rainforest. Encourage the pairs of students to record key bits of information as they watch. For example – the main challenges the plants face and perhaps some of the adaptations that the plants have.

<http://www.youtube.com/watch?v=C1Ib0-BIBKU>

Video feedback (15 - 30 minutes)

After the video collect feedback on what the main challenges for the plants are - make a note of these challenges on the board. You could also record any other information about plant adaptations that the students feel is important. This would probably be done most

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successfully as a mind map on the whiteboard. In this way the students could easily make connections between the challenges the plants face and the adaptations evolved to deal with them.

*Extension 1: For higher ability students you could underline in different colours - those challenges presented by the living (**biotic conditions**) and those presented by the non-living aspects of the environment (**abiotic conditions**).*

Extension 2: At this point you could extend this into a conversation about how the abiotic conditions change at different layers of the rainforest. For example the forest floor is dark, hot, humid, sheltered and wet. As you move higher the amount of sunlight increases, it is drier and there is more exposure to strong wind, heavy rainfall and storms. The biotic conditions also change in the different layers of rainforest strata. These changing conditions results in a myriad of different niches which can be occupied.

This webpage gives a good summary of the biotic and abiotic conditions at each layer of rainforest strata and also has a good picture you could use.

<http://www.mbgnet.net/sets/rforest/explore/layers.htm>

The students might want to bear these things in mind for the challenge.

The Challenge (30 - 70 minutes)

Challenge students to make a 'junk' plant that they think would be well adapted to life in the rainforest. Use the mind map on the board to help you design adaptations that would give your plant the edge. Each pair makes one plant model.

Things for the students to consider:

- Where does it live in the rainforest?
Remember – the challenges on the forest floor will be different to those found higher up in the understory, canopy and emergent layer.
- What are conditions like there? What are the main challenges?
- What adaptations does it have to meet those challenges?

Group Presentation (70 - 80 minutes)

Small groups - Divide the class in 4 groups. Each group should have around 4 pairs of students in it. Get the students to present their plant to the rest of their group clearly explaining where it lives (habitat), its set of adaptations and why they are important.



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Keep a close eye on how the groups are getting on and select a couple of pairs with well thought out ideas to stand at the front and present their plant to the class. Encourage the rest of the students to ask questions, suggest improvements and give constructive criticism. How well do they think these plants would get on in the rainforest?

Plenary (80 - 90 minutes)

Wipe the mind map from the board!

Use this short game to check learning against the objectives by simply thinking of questions that you can ask based on the content covered in the lesson.

Stand the whole class in a circle (roughly is fine). Throw a soft ball to a random student and ask them a question – e.g. – ‘Give me one of the challenges faced by plants in the rainforest?’ They answer and gently throw the ball to the next random person who gets the next question. Ask questions in such a way that you are linking the adaptations to the challenges faced.