Science Experiment

Physical and behavioural adaptations in caterpillars

Summary

Pupils will learn about the role of physical and behavioural adaptations using the caterpillars of butterflies and moths as an example. The pupils will learn the fundamental basis of how living things adapt to a range of environments through variations in body shape, predator avoidance behaviour, and how they move around. They will learn that exposure to chemical pollutants like pesticides can cause unwanted side-effects in butterfly and moth caterpillars. For example affecting how well a caterpillar can move to find food, or a safe place to hide from predators. The pupils will learn to work scientifically using observations and recording data to help answer questions, and formulate follow-up questions of their own.

Learning objectives:

Pupils will learn how to:

1. Carefully observe and use simple equipment to formulate answers to questions
2. Gather and record data
3. Use test results to formulate follow-up questions.

Links to the National curriculum:

KS1:

- ✓ asking simple questions and recognising that they can be answered in different ways
- ✓ observing closely, using simple equipment
- ✓ using their observations and ideas to suggest answers to questions
- ✓ gathering and recording data to help in answering questions.
- ✓ identify that most living things live in habitats to which they are suited and describe how different habitats provide for the basic needs of different kinds of animals and plants, and how they depend on each other

KS2:

- ✓ gathering, recording, classifying and presenting data in a variety of ways to help in answering questions
- ✓ recording findings using simple scientific language, drawings, labelled diagrams, keys, bar charts, and tables
- ✓ reporting on findings from enquiries, including oral and written explanations, displays or presentations of results and conclusions
- ✓ using results to draw simple conclusions, make predictions for new values, suggest improvements and raise further questions

- ✓ using straightforward scientific evidence to answer questions or to support their findings.
- ✓ recognise that environments can change and that this can sometimes pose dangers to living things
- ✓ identify how animals and plants are adapted to suit their environment in different ways and that adaptation may lead to evolution

Preparation and resources

- ✓ These activities work best with the aid of a computer and projector or a computer-linked smartboard to display the PowerPoint slides and show the science experiment video 'Find Host Plants'. If none are available, printouts of the slides could be used instead and completed without watching the science experiment video, but this will be less engaging.
- ✓ Video: Finding Host Plants
- ✓ Activity handout: Science Activity Worksheet
- ✓ Activity handout: Adaptations templates

Supporting information

- ✓ Power point presentations:

Part 4: Adaptations in butterfly and moth caterpillars (approx. 4.5 minutes)
Part 5: Adaptations in caterpillar movement behaviour (approx. 4.5 minutes)

- ✓ Transcript of power point presentations

- ✓ pdfs of power point presentation

Activity Plan

This resource pack is split into 2 main activities which have been designed to be stand-alone with cross-curricular components wherever possible.

Activity 1: Caterpillar defence adaptations

Location: classroom
Target age group: KS1 and KS2
Target group size: whole class
Duration: minimum 1hour
Cross-curricular: Science, Art

1. Using the Power point slides provided; "Part 4_Adaptations in butterfly and moth caterpillars", describe that they are prey for many different types of predators and discuss different physical and behavioural adaptations to protect caterpillars from predators
2. Use the "Adaptations" templates provided to either

i) ask pupils to use the caterpillar template to design a caterpillar with physical changes to their body to help them to be better protected from predators. Ask them to describe how these adaptations work to protect the caterpillar, or

ii) using the t-shirt template, ask the pupils to think about a place where they like to rest e.g. sitting on the sofa watching television, sitting on a bench in a park, sitting at a table eating a meal, lying in bed. Ask pupils to design a t-shirt for themselves that would help them to hide from predators. Ask them to describe how their t-shirt adaptations would work to protect them.

Activity 2 Science Experiment: How do pesticides affect caterpillars searching behaviour?

Location: classroom
Target age group: KS1 and KS2
Target group size: whole class
Duration: minimum 1hour
Cross-curricular: Science, English

1. Using the Power point slides provided; “Part 5_Adaptations in caterpillar movement behaviour”, remind pupils that chemical pollutants in the environment, like insecticides, may affect caterpillar food plant searching behaviour. We actually know surprisingly little of what happens to caterpillars when the pesticides do not kill them; will they be ill for their rest of their life, develop abnormally or display the wrong the behaviour at the wrong time? Explain that the pupils are going to complete an experiment to answer the question:

   How do pesticides affect the ability of butterfly caterpillars to find food?

2. Open the video ‘Finding host plants’. There is a short introduction for the pupils, approximately 2.5 minutes, describing the experiment, and detailing what the pupils will do. Then the pupils will see footage of a hungry caterpillar moving across a large area to find a plant to eat. Ask the pupils to watch the caterpillar moving, and then complete the accompanying Science Activity worksheet.

Pupil monitoring and evaluation

Monitor the pupil’s drawings, notes, and activity worksheets, and offer help if needed.

Delivery notes and additional scientific information

Vocabulary: caterpillar, life cycle, adaptation, predation, defence, pesticide, insecticide, prolegs, inching behaviour, head waving, habitat, searching behaviour.

Feedback

Please provide us with some feedback about the Science Experiment - Finding host plants. Thank you!

Linked activities (optional):

1. **English**: Ask the pupil's to write a short descriptive story or poem from the perspective of a lost and hungry caterpillar.
2. **English comprehension**: the butterfly species *Bicyclus anynana*
3. **Science Activity**: What happens inside a butterfly egg?
4. **Computer/Art Activity**: Caterpillar coding – grow your own paper chain caterpillar using binary code.

External resources

If you would like to do some more investigations using caterpillars take a look at the following resources from the Association for the Study of Animal Behaviour:

How to Avoid Being Eaten
Crawling Caterpillars