

Teachers' Notes

Predators and Prey Insects and Plants

Chapters

Funnel Web Spider
Cross Spider
Wasp Spider
Sundew Plant
Venus Flytrap
Diving Water Beetle
Dragonfly Nymph
Praying Mantis
Ant Lion

Synopsis of Video

The video deals with the ways in which several species of spiders, insects and plants trap or ambush their prey. It includes information about the following:

- the ways in which funnel web spiders, cross spiders and wasp spiders trap their prey
- the way that spiders dissolve the soft inner tissue of their prey before sucking up their food
- the ways in which plants such as the sundew and the venus flytrap, trap and digest their prey
- how ambusher insects such as the diving water beetle, the larva of the diving beetle and the dragon fly nymph catch their prey
- how the praying mantis uses camouflage to ambush its prey
- how the ant lion hides to ambush its prey.

Background Information

Spiders

Spiders are arachnids. They have two body parts. The first body part is the head and thorax (called cephalothorax). The second body part is the abdomen. Spiders have eight legs. Each leg has 7 segments. Spiders have tiny claws at the end of each leg. Spiders who weave webs use these claws to walk on their webs without sticking to them. Spiders have fangs. They also have two appendages near their mouths. These are their pedipalps. Pedipalps are used by spiders to hold their prey while feeding. Spiders do not have antennae. Most spiders have eight eyes but some spiders have six eyes, some have four eyes and some have two eyes. Most spiders have poor eyesight but hunting spiders have excellent eyesight. The spider's body is covered by tiny hairs which are sensitive to vibration. This is useful when an insect gets caught on a spider's web. The spider feels the vibrations rather than sees the victim. Spiders have an exoskeleton over the cephalothorax and legs. They also have an internal skeleton. Half of all spiders use silk to trap prey. Trapper spider species include funnel web spiders, cross spiders and wasp spiders and trap door spiders. The rest of the spiders ambush their prey. Ambushers include the wolf spider, huntsman, jumping spiders and crab spiders. Spiders are carnivorous. They use their fangs to inject poison into their captured prey to paralyse it. Then they inject the victim with a liquid that dissolves muscles and organs. The spider then sucks up the innards like a drink. Spiders cannot chew. All spiders make silk. They use their spinnerets to spin the silk, making different kinds of silk for different purposes. They use one kind to protect their egg, different kinds for different parts of their webs, and a different kind for wrapping their prey. Spider silk is twice as strong as steel. It is also stretchy. Each spider species builds a different kind of web. Some spiders produce orb webs others produce funnel shaped webs or webs like sheets. Web weaving spiders can wait for prey to become tangled in the trap. A funnel web spider's web is shaped like a tube. The spider hides in the tube and waits for a victim. When it senses movement on the trip wires at the entrance to the tube it comes out to catch its prey. Trapdoor spiders usually dig burrows and make a door for

their burrows out of dirt and silk. They hide behind the door ready to ambush prey. They can also hold the door closed against predators.

Plants

There are more than 500 species of carnivorous plants on earth. These are plants that eat meat. Plants can't move to hunt or ambush their food so carnivorous plants need to trap their prey. Some plants have fast moving traps, others have fly-paper traps which use a sticky substance to glue the prey to its trap, and others don't move at all but lure their prey inside and then the insects can't crawl back out of the slippery plant and drown. Special liquid produced by meat eating plants works to dissolve the prey so that it can be absorbed by the plant.

The Venus flytrap is the best known of carnivorous plants. Its leaves can snap shut in less than a second after an animal sets off its trigger hairs. The trap remains closed for 8 -10 days after which it reopens and only the skeleton is left.

The sundew is a flypaper trap. Its leaves are covered with tentacles tipped with a sweet nectar to lure prey. Once an insect lands on the tentacles it becomes stuck fast. The tentacles secrete digestive juice to dissolve the insect. The largest sundews in the world grow in Australia. They can grow up to 90cm tall. Other carnivorous plants include the butterwort, bladderworts and pitcher plants.

Insects

An insect body consists of three parts: the head, the thorax and the abdomen. All adult insects have six jointed legs and an exoskeleton. The head has a pair of antennae and mouthparts which are adapted for the particular diets of each insect. Some mouthparts are made to bite, others to suck or lick. Most adult insects have one or two pair of wings. Most insects are plant eaters or herbivores. Some insects are carnivorous in their larva stage but herbivorous as adults. There are more than 80, 000 species of insects living in Australia.

There are two main insect life cycles.

1. The nymph hatches from an egg. It looks like a small adult of the species. The nymph grows to become an adult. A grasshopper is a species with this kind of life cycle.
2. The larva hatches from an egg. The larva does not look like the adult of the species and eats different foods from the adult. The larva forms a chrysalis and changes into its adult form. A butterfly is an example of an insect who has this kind of life cycle.

The ant lion lacewing is an insect with a life cycle that includes a larva stage. The larva of the ant lion lacewing is a ferocious predator. It digs a cone-shaped hole in the sand and hides in the hole waiting for an ant to fall in. The larva of the ant lion has powerful jaws which it uses to catch and eat ants. The larva spin cocoons and the adults emerge from the cocoons. The adult ant lion lacewing has four large wings with lacework patterns of veins on them. The adult eats sap-sucking insects such as aphids. Ant lion lacewings are helpful to farmers because they can help to control the numbers of insects which destroy crops. Dragonflies live near water. The female lays eggs in the water or on a waterplant. The dragon fly nymph hatches from an egg. It breathes with gills, living in the water for a year and molting about ten times before becoming an adult. Dragonflies and their nymphs eat other insects.

Praying mantis is the name commonly given to mantids. There are at least 1800 species of mantids. Mantids are well camouflaged. They can grow to 12cm long. The female cannot fly but the male can. They use their spiky front legs to catch and hold their prey.

ACTIVITIES

OUTCOMES

The activities suggested in this unit will assist student achievement of the following outcomes:

Science

- 3.13 Develop and use strategies for making investigations
- 3.14 Organise and use equipment together information about living things.
- 3.18 Recognise scientific method and approach topics scientifically.

Studies of Society and Environment

Investigation

- 3.16 Frame questions and identifies sources of information.

Communication

- 3.17 Present information to explore a key idea.

Participation

- 3.18 Choose a suitable technique to achieve a group purpose.

English

Talking and Listening

- 3.1 Interact for specific purposes with people in the classroom and school community using a small range of text types.

Reading and Viewing

- 3.5 Interpret and discuss some relationships between ideas, information and events in written texts and on video.

Writing

- 3.9 Experiment with interrelating ideas and information when writing about familiar topics within a small range of factual text types.

BEFORE VIEWING THE VIDEO

The unit is aimed at students in middle primary. However teachers can select from the activities suggested those which best suit the needs of their students. The unit offers a variety of individual, paired and group work. The activities are suggested in a suitable teaching/learning sequence.

Preparation

Ask the school's teacher-librarian to organise a bulk loan of literary and factual texts which deal with insects, carnivorous plants and spiders. If possible organise to borrow a 'Museum in a Box' kit on spiders and/or insects. Purchase a carnivorous classroom plant such as a venus flytrap or a sundew. These plants can be easy to grow. The following title is a user-friendly guide to growing your own. It is winner of the Children's Book Council of Australia Eve Pownall Award: Cheers, Gordon and Silk, Julie (1996) *Killer Plants and How to Grow Them* - Puffin, Ringwood, Victoria. Set up an ant farm in the classroom. Assist students to observe living creatures first hand in their natural environment as often as possible. It is also possible to capture some creatures and observe them in containers in the classroom. If engaging students in this activity ensure that students show respect for the creatures and always release them back into the wild as quickly as possible where they found them. Some insects have bites and stings. Ensure that students are careful when handling them. Encourage students to leave living things alone.

Introducing the video

Tell students that they will be learning about the ways that some creatures catch their food. Tell them the specifically they will be learning about insects, plants and spiders which are carnivorous and that have to catch meat.

Tell students they are going to see a video which deals with some of these creatures. Some of them are insects, some are spiders and some are plants. Ask students to suggest the difference between plants, spiders and insects. Create a chart with three columns and write in the columns the things that students suggest to identify plants, spiders and insects. Add to the chart as the unit progresses and students find out more about the broad classifications.

Dramatisation

Divide the class into groups and ask each group to create a dramatisation or movement piece that demonstrates the concepts of 'trap' and 'ambush'. Allow students to use dictionaries to help define the terms for their groups to work with. Tell them that although the video deals with insects, plants and spiders, their dramatisations do not

have to deal with these things but can demonstrate an understanding of the concepts in any way the students can imagine. Have groups perform for the class. Discuss students' representations of the concepts 'trap' and 'ambush'.

VIEWING THE VIDEO

Show students the video. Discuss students' understanding of the content of the video. Ask what they liked in the video, what they enjoyed finding out, what they found interesting, what they would like to find out more about, what they didn't understand, and any other comments.

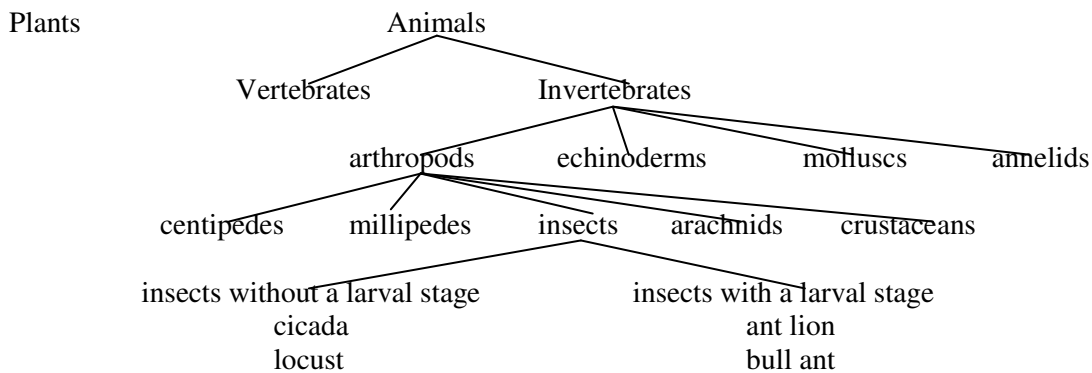
Making Notes

Have students view the video again and make notes as they watch to summarise the main points made. After viewing give students time to work in small groups to expand on their notes and to recreate the script for the video, to the best of their combined ability. Come together as a whole class and compare the summaries made by each group. Create a semantic web to record the main points.

AFTER THE VIDEO

Classification of living things

Draw a flow chart to show students the order of classification of living things and how spiders, insects and plants fit into the classification. For example:



Reading

Read students a number of the display books about insects and spiders and allow students free time to look through the resources for themselves. Discuss aspects of the books such as the title pages, the pictures and photographs, index, table of contents, glossaries and other features that help people recognise what a book is about and how to locate the necessary information when using the books to research for the following activity. Also show students how to use encyclopedia CD-ROMS if this facility is available. Parents or older students may be able to assist.

Glossary

Begin a class glossary that lists and defines the terminology that students come across during their work in this unit. Students can use the glossary for language, vocabulary and spelling activities. Add to the glossary as the unit progresses or allocate responsibility for the glossary to a small group of students.

Research

Divide the class into groups and allocate one of the living things mentioned in the video (funnel web spiders, cross spiders, wasp spiders, sundew, Venus fly trap, diving water beetle, larva of the diving beetle, dragon fly, praying mantis, ant lion) to each group to research.

Tell students that they need to find the following information:

What does it look like?

What does it eat?

How does it get its food?

How does it eat its food?

What is its life cycle?

Where can it be found?

Other characteristics or interesting facts.

Teach students how to write their research findings as reports then collate the reports as a class book. Jointly construct a table of contents and index for the class information book. Ask for volunteers to create a cover for the book. Ensure that students illustrate their pages for the book using anatomically correct drawings.

Have students present their reports orally to the class. (Make sure that students divide the duties and responsibilities of research and presentation evenly amongst group members.) Tell students to use pictures, maps, photographs, drawings and books to enhance their spoken presentations.

Making models

Provide clay or play dough and have students make anatomically correct models of the subjects of their research. Suggest that they display their models on cardboard so that the body parts can be labeled. Use wax paper to create any wings and draw the veins on the wings in felt-tipped pen.

Observing living things

Divide the class into pairs and have each pair use string to mark out a section of the school grounds. Tell students that they need to observe the number and variety of insects and spiders which use this ground over a period of time - perhaps 15 minutes. Ensure that students choose varied sections of the ground - grass areas, bushes, plants, flowers, tree trunks and so on. Tell students to decide for themselves the ways to record the information that they are gathering. Come together as a whole class and discuss students' findings.

Procedure

Have each student choose a carnivorous plant, insect or spider to research for information about how to look after it in the classroom. Tell them to write their findings as a procedure. A procedure is a text that tells 'how' to do something. For example: 'How to grow a venus flytrap'. Allow students to publish their procedural texts using computers. Try to obtain at least one of the creatures/plants researched and follow the instructions for looking after it.

Experimenting

The following experiment will help students gain an understanding of an insect's exoskeleton and the molting process.

Blow up a balloon to the size of a rock melon. Clamp the end with a clothes peg. Cover the balloon with papier maché. Wait till the glue is dry. The papier maché is the insect's exoskeleton. When an insect grows its exoskeleton starts to become too small and a new exoskeleton starts to form under the old one. The old exoskeleton splits and the insect crawls out. This is called molting. Remove the clothes peg and blow more air into the balloon. Ask students to notice the shell separates from the 'insect's' body.

Encourage students to find out about the web designs of various spiders and to attempt to spin webs using string or wool.

Video scripts

Have students choose a carnivorous creature, that ambushes or traps its prey, which has not already been dealt with in the video. Ask your school's teacher-librarian to suggest interesting creatures for the students to find out about. For example crocodiles, sea anemones, frogs, chameleons, heron and so on.

Have students research the creature as follows:

What does it look like?

What does it eat?

How does it catch its prey?

How does it eat its prey?

Where can it be found?

Other characteristics or interesting facts.

Once students have gathered their research information have them write the script for a video on carnivorous creatures who ambush and trappers. Provide tape recorders so that they can tape themselves reading their scripts.

Storyboard

Show students how to create storyboards for their videos. A storyboard is a shooting script for a film or video. It shows a summary of the main events in picture form. Tell students to consider which of the images will be shown in close up, mid shot or long shot. Provide time for students to listen to each other's video voice overs and view their storyboards.

Construction

Use construction and collage materials available in your classroom and have students construct spiders, carnivorous plants or insects. Suggest that students work in pairs or threes if they wish. Ensure that they use photos and diagrams so that their constructions are as accurate as scientifically possible. The finished construction should have labels which tell where the creature/plant lives, what it eats, its life cycle and other interesting information. Present the constructions to the rest of the class.

Alternatively have students construct dioramas using smaller scale constructions placed in a box setting which shows the creature/plant's natural environment.

Reflection

Provide time for students to think about what they learned during the unit and from the video. Have them write their thoughts and impressions in a journal.