PRIMARY SCIENCE

BOOK C

Insects

Minibeasts

Rocks and Soils

Fossils

Properties of Materials

Recycling

Light and Shadows

Solar Energy

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Foreword

Primary Science C is one of series of seven blackline masters written for use in New Zealand primary schools. Each book presents eight units that cover the four strands of the New Zealand Curriculum: The Living World, Planet Earth and Beyond, The Physical World, The Material World.

Comprehensive teachers notes accompany each student activity. Concepts, knowledge and skills share an equal emphasis in each unit, along with developing positive attitudes to science.

Primary Science gives students the opportunity to enhance their knowledge of the world around them and to engage in collaborative learning that makes science interesting and exciting.

Indicators and assessment pages have been designed to match the New Zealand curriculum.

Titles in this series are:

- **Primary Science – Book A**
- **Primary Science – Book B**
- **Primary Science – Book C**
- **Primary Science – Book D**
- **Primary Science – Book E**
- **Primary Science – Book F**
- **Primary Science – Book G**

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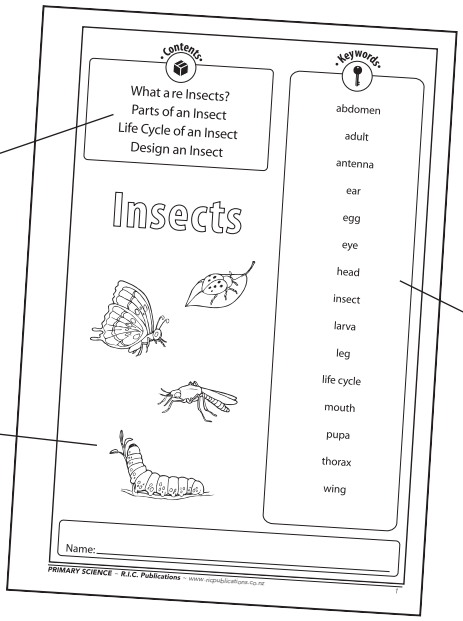
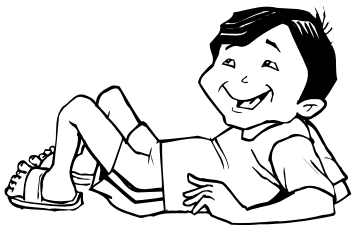
Teacher Information

Each book contains eight science units. Each unit is made up of ten pages, and contains:

- *a cover page;*
- *four teacher pages;*
- *four student pages;*
- *an assessment page.*

The **first page** of each unit is a cover page designed for the students. Listed are the titles of the four activities included in the unit.

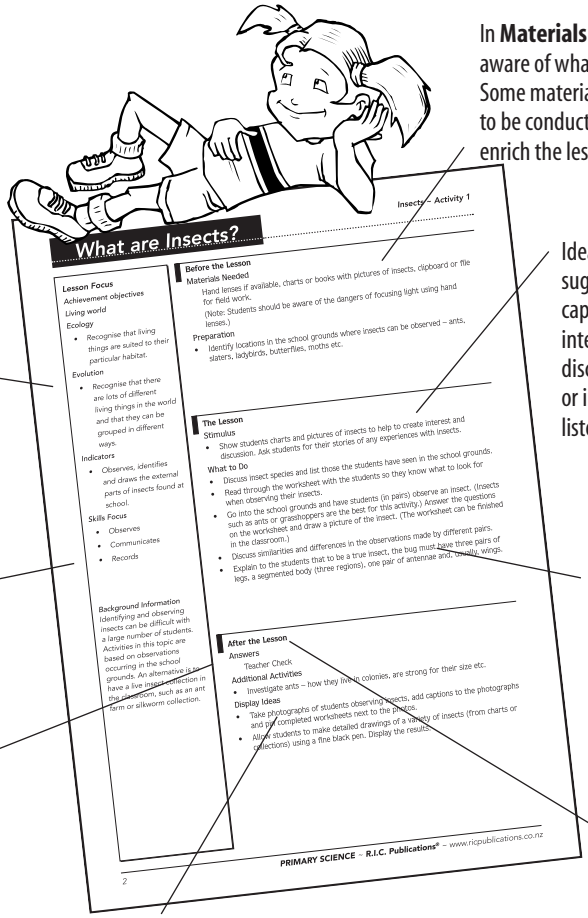




The cover page can be glued into student workbooks at the beginning of a unit or copied and attached to the completed blacklines at the end of the unit. The students can **colour** the title of the unit and the artwork on the page.

Keywords have been given for each unit, in alphabetical order. These words can be introduced and discussed at the beginning of a unit or they can be a focus as they appear throughout the activities. Introducing scientific terminology to meet the needs of individual students is discussed on page v.

The **teacher pages** include information to assist the teacher with each lesson.



The activities in Primary Science have been written to the **New Zealand curriculum, Science strands**. The achievement objectives for the unit are listed and specific indicators that match each activity are included. These **Indicators** can be transferred to the assessment proforma on page ix.

In **Materials** and **Preparation**, the teacher is made aware of what needs to be done before the lesson. Some materials and tasks are required for the activity to be conducted; others are suggestions that will enrich the lesson.

Ideas under the **Stimulus** heading are suggested short activities or discussions to capture the students' attention and spark an interest in the topic. Teachers will also able to discover the existing knowledge of the class or individual students regarding the topic by listening to their responses and observations.

Background Information for each activity is included for the teacher.

What To Do gives suggested step-by-step instructions for the activity. The accompanying blackline may be the focus of the activity or it may be where the students record their observations and ideas after completing the task.

Additional Activities can be used to further develop the outcomes being assessed. These activities provide ideas to consolidate and clarify the concepts and skills taught in the unit.

The **Answers** for the activities on the blackline are included. Some answers will need a teacher check, while others may vary depending on the students' personal experiences or observations.

Display Ideas for the classroom give the teacher suggestions for the students in the topic and ways of presenting work that has been completed during the unit.

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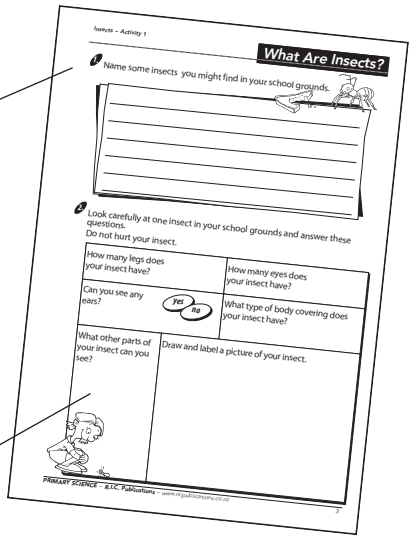
Teacher Information

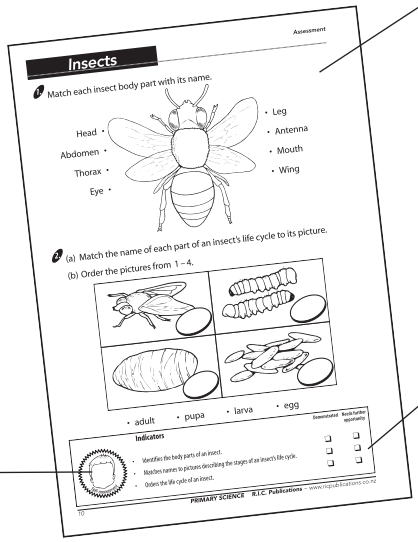
The **student pages** contain a variety of activities. The written activities may be the focus of the lesson or they may be where the students record their observations, investigation results and discoveries.

The focus of each blackline master is given in the indicators on the accompanying teachers' page.



In the early years, the students may respond to the written questions by drawing their answer, writing their answer or by having an adult scribe the answer for them.

On the final page of each unit is the **assessment page**. Questions have been written that will assess individual student knowledge and understanding of the main ideas in the unit. The questions have been written from the specific indicators and overall outcomes of the unit. Each assessment page places an emphasis on content and understanding as well as skills.



After completing the unit, the students can assess themselves and provide feedback to the teacher and their parents by completing the **self-assessment** face. This face indicates how they felt about the topic. It is important that the self-assessment takes place prior to marking by a teacher.

Indicators have been written in language easily understood by parents, students and teachers and can be used as a point of reference in parent-teacher interviews or three-way conferences. These indicators can be transferred to the assessment proformas on pages ix and xi.

Assessment proformas have been included on pages ix and xi, with an explanation of how to use them on the preceding pages.

Each book of ***Primary Science*** has eight units. This gives teachers the opportunity to change topics every five weeks over one school year. However, there is no prescribed length of time for each unit. All units include some activities that can be completed in one lessons, others may go over two lessons, depending on a variety of factors, such as:

- *the stimulus suggesting learning about science outside the classroom;*
- *the students needing to make observations prior to the lesson;*
- *an experiment being conducted that needs to be observed over a number of days;*
- *the students being required to find information by researching, using the Internet, conducting surveys or interviews;*
- *a concept needing to be clarified further to ensure understanding.*

Primary Science has been written to the New Zealand curriculum. The units and activities can be followed precisely or adapted to meet the needs of specific schools and to suit individual styles of teaching. Suggestions for setting up a science classroom and for teaching science can be found on page iv. Ideas for teaching science to meet the special needs of individual students are discussed on page v, along with exciting ideas for presenting scientific information.

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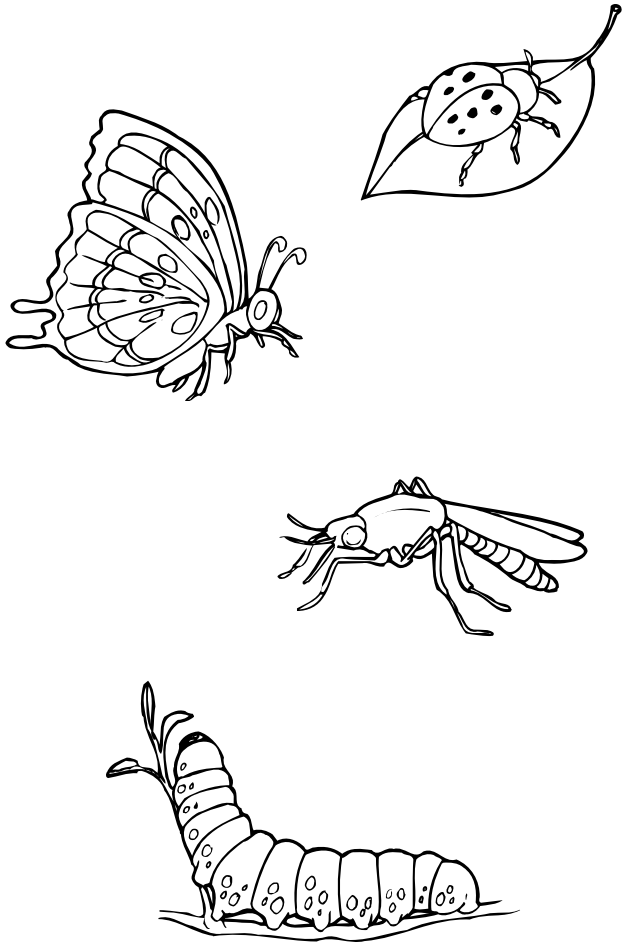
What are Insects?
Parts of an Insect
Life Cycle of an Insect
Design an Insect

Insects



Keywords

abdomen
adult
antenna
ear
egg
eye
head
insect
larva
leg
life cycle
mouth
pupa
thorax
wing

Name: _____

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What are Insects?

Lesson Focus

Achievement objectives

Living world

Ecology

- *Recognise that living things are suited to their particular habitat.*

Evolution

- *Recognise that there are lots of different living things in the world and that they can be grouped in different ways.*

Indicators

- *Observes, identifies and draws the external parts of insects found at school.*

Skills Focus

- *Observes*
- *Communicates*
- *Records*

Background Information
Identifying and observing insects can be difficult with a large number of students. Activities in this topic are based on observations occurring in the school grounds. An alternative is to have a live insect collection in the classroom, such as an ant farm or silkworm collection.

Before the Lesson

Materials Needed

Hand lenses if available, charts or books with pictures of insects, clipboard or file for field work.

(Note: Students should be aware of the dangers of focusing light using hand lenses.)

Preparation

- Identify locations in the school grounds where insects can be observed – ants, slaters, ladybirds, butterflies, moths etc.

The Lesson

Stimulus

- Show students charts and pictures of insects to help to create interest and discussion. Ask students for their stories of any experiences with insects.

What to Do

- Discuss insect species and list those the students have seen in the school grounds.
- Read through the worksheet with the students so they know what to look for when observing their insects.
- Go into the school grounds and have students (in pairs) observe an insect. (Insects such as ants or grasshoppers are the best for this activity.) Answer the questions on the worksheet and draw a picture of the insect. (The worksheet can be finished in the classroom.)
- Discuss similarities and differences in the observations made by different pairs.
- Explain to the students that to be a true insect, the bug must have three pairs of legs, a segmented body (three regions), one pair of antennae and, usually, wings.

After the Lesson

Answers

Teacher Check

Additional Activities

- Investigate ants – how they live in colonies, are strong for their size etc.

Display Ideas

- Take photographs of students observing insects, add captions to the photographs and pin completed worksheets next to the photos.
- Allow students to make detailed drawings of a variety of insects (from charts or collections) using a fine black pen. Display the results.

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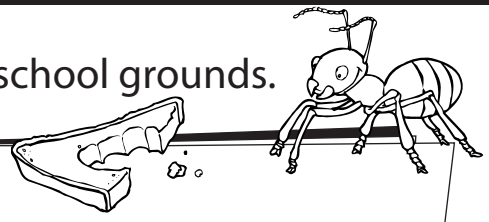
What are Insects?

1. Name some insects you might find in your school grounds.



2. Look carefully at one insect in your school grounds and answer these questions.
Do not hurt your insect.

How many legs does your insect have?	How many eyes does your insect have?
Can you see any ears? yes no	What type of body covering does your insect have?
What other parts of your insect can you see?	Draw and label a picture of your insect.

2. (a) Is your insect a true insect? yes no

(b) Circle the insects in the top box that are true insects.

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Parts of an Insect

Lesson Focus

Achievement objectives

Living world

Ecology

- *Recognise that living things are suited to their particular habitat.*
- *Observe how living things are structured.*

Indicators

- *Observes, identifies and names the main body parts of an insect.*

Skills Focus

- *Observes*
- *Communicates*
- *Matches labels*

Background Information

An insect's body parts perform the following functions.

Head: includes the mouth, eyes and antennae, but not the ears. (Many insects 'hear' by means of hairs on their bodies. Others have 'ears' on their legs or sides. They can not be seen.) The mouth is surrounded by mouthparts which vary according to how the insect feeds. The eyes are mostly large 'compound' eyes. Each compound eye is made up of hundreds of separate lenses. The antennae are used to smell and feel.

Thorax: the legs and wings are attached to the thorax, which has three fused parts. One pair of legs is attached to each part of the thorax. Most insects have wings, either two or four, which are attached to the thorax.

Abdomen: in the abdomen are the essential organs for digestion, reproduction and waste products. The abdomen of most insects can expand and contract. Some insects have a poisonous sting at the end of the abdomen.

Before the Lesson

Materials Needed

Chart or books showing pictures of insects from Activity 1.

Preparation

- No extra preparation needed.

The Lesson

Stimulus

- Review results of Activity 1. Use the worksheet to discuss each of the body parts of an insect. Write on the board common words used to describe insects.

What to Do

- Have students suggest functions for each body part before discussing the actual functions, as detailed in the background information.
- Students cut and paste body part labels onto the diagram.

After the Lesson

Answers

Teacher check

Additional Activities

- On the whiteboard, make up a chart with insect and other animal parts listed vertically. Horizontally, list Insect, Mammal, Bird, Fish etc. Tick what parts each has and discuss the results.

Display Ideas

- Students can make a collage or 3-D models of an insect and label the parts.

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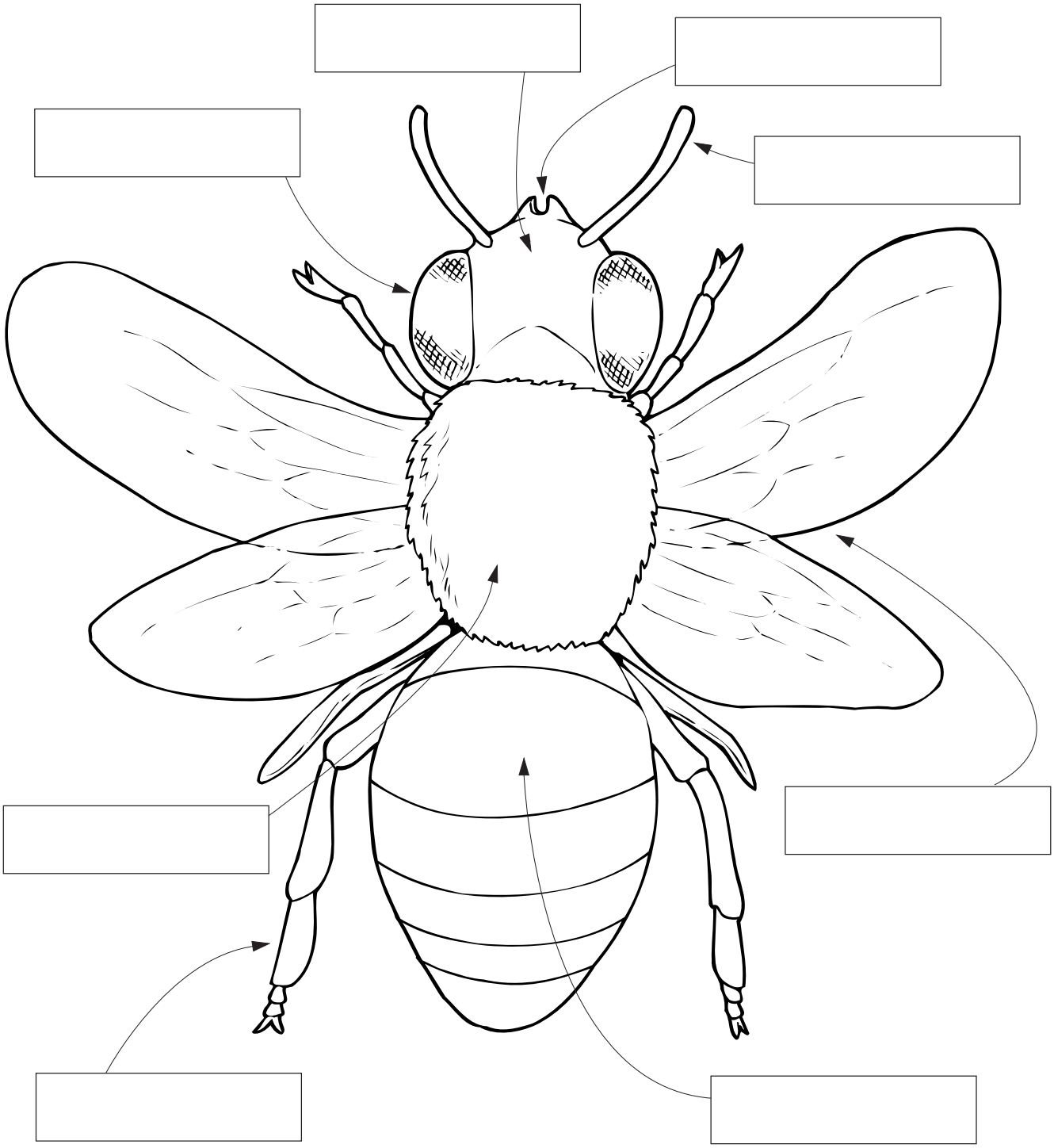
Parts of an Insect

Insects have many different shapes, colours and sizes. However, all insects have the same body parts.

1. Cut and glue the body part names in the correct place.



Head	Thorax	Abdomen	Mouth
Antenna	Eye	Leg	Wing

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Life Cycle of an Insect

Lesson Focus

Achievement objectives

Living world

Life processes

- *Recognise that all living things have certain requirements so they can stay alive.*
- *Observe life cycles.*

Indicators

- *Students identify and observe stages in the life cycle of an insect.*

Skills Focus

- *Observes*
- *Matches labels*

Background Information

Insects have three patterns of growth or life cycles. This activity focuses on 'complete metamorphosis'. The other two cycles are 'simple growth' (egg hatches to adult form) and 'incomplete metamorphosis' (egg to nymph to adult). Complete metamorphosis is the life cycle of the large majority of insects.

Before the Lesson

Materials Needed

The Hungry Caterpillar by Eric Carle

Preparation

- Locate areas in the school grounds where students can observe insects at various stages in their life cycles; for example, a pupa in a piece of bark.

The Lesson

Stimulus

- Read the story *The Hungry Caterpillar* by Eric Carle, which is about an insect going through the stages of complete metamorphosis.

What to Do

- Discuss the life cycle, referring to the story and asking students for their own experiences.
- Students complete and colour the worksheet.
- Take students into the school grounds. Identify insects and indicate which stage of the life cycle each is in.

After the Lesson

Answers

Teacher check

Additional Activities

- Create a living example of the insect life cycle by using silkworms or equivalent insects.

Display Ideas

- In craft, construct 3-D life cycles of different insects; for example, a butterfly, a moth, a bee or a beetle.

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Life Cycle of an Insect

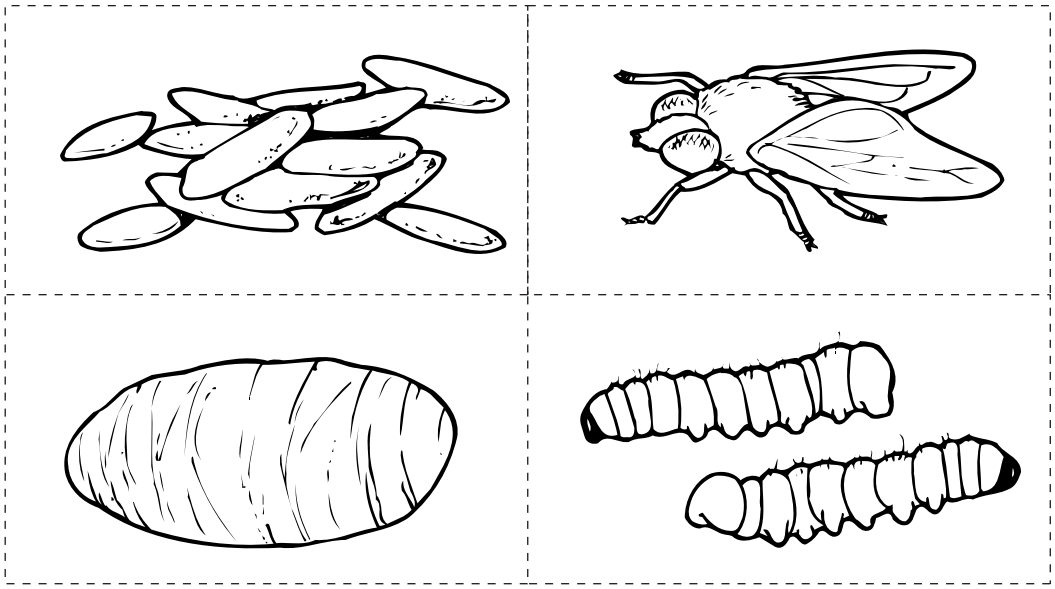
Colour, then cut and glue the pictures below into the correct place on the life cycle.

Egg: Eggs are laid by the adult female.

Larva: The eggs hatch into grubs or larvae that look very different from the adult.

Pupa: When the larva is fully grown it turns into a pupa. Some pupae have a protective coating. Inside the coating the adult is forming.

Adult: The adult hatches from the pupa.



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Design an Insect

Lesson Focus

Achievement objectives

Living world

Ecology

- *Recognise that living things are suited to their particular habitat.*
- *Observe how living things are structured.*

Indicators

- *Indicates knowledge of insect body parts by designing and constructing an insect.*

Skills Focus

- *Interprets observations*
- *Communicates*
- *Cooperates*

Background Information

An insect's body parts perform the following functions.

Head: includes the mouth, eyes and antennae, but not the ears. (Many insects 'hear' by means of hairs on their bodies. Others have 'ears' on their legs or sides. They can not be seen.) The mouth is surrounded by mouthparts which vary according to how the insect feeds. The eyes are mostly large 'compound' eyes. Each compound eye is made up of hundreds of separate lenses. The antennae are used to smell and feel.

Thorax: the legs and wings are attached to the thorax, which has three fused parts. One pair of legs is attached to each part of the thorax. Most insects have wings, either two or four, which are attached to the thorax.

Abdomen: in the abdomen are the essential organs for digestion, reproduction and waste products. The abdomen of most insects can expand and contract. Some insects have a poisonous sting at the end of the abdomen.

Before the Lesson

Materials Needed

Collect a range of materials including plastic bottles, drinking straws, pipe-cleaners, buttons, cardboard boxes, cardboard rolls, soft drink cans, masking tape, modelling clay, rubber bands etc.

Preparation

- Group materials for ease of use.

The Lesson

Stimulus

- Discuss the body parts of insects. Review worksheet from Lesson 2. Review the materials collected. Students suggest what materials most resemble insect body parts and how they can be joined.

What to Do

- Place students in small groups. Have the groups complete the worksheet based on their own plan of an insect. Have the students label body parts with the materials they intend to use.
- Distribute materials and have students assemble their insect.
- Review each group's insect. Check off all required body parts.

After the Lesson

Answers

Teacher check

Additional Activities

- Sort the completed insects into species; for example, beetles, ants etc., or by what they eat or what they can do.

Display Ideas

- Display the finished insects from the ceiling or on ledges, along with a short description of what each can do, eat, its name etc.

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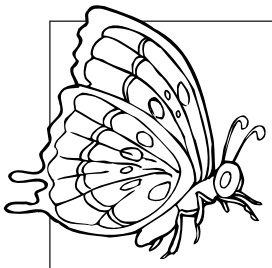
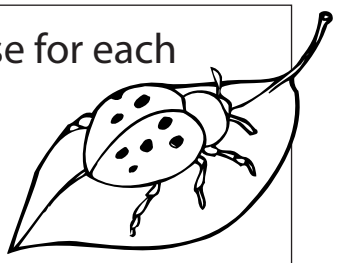
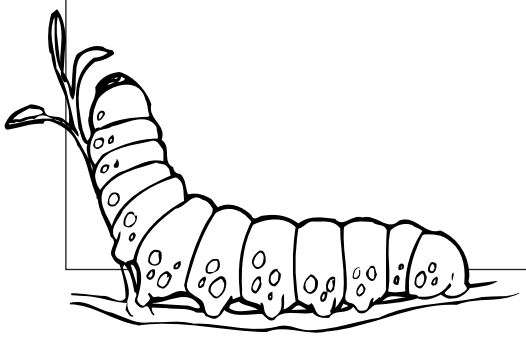
Design an Insect

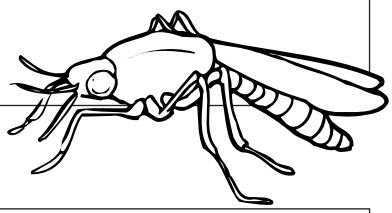
Type of Insect _____



Draw and label the materials you will use for each body part.







Describe what this insect can do.

_____

_____

_____

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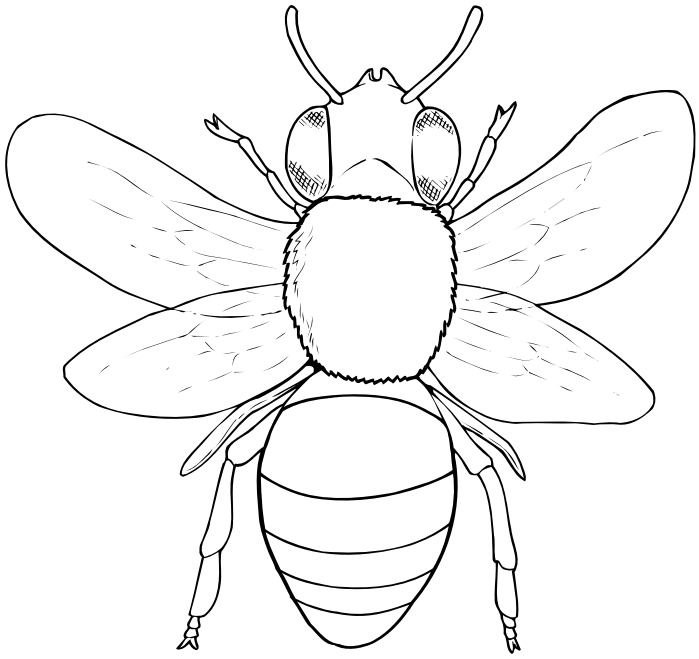
Insects

1. Match each insect body part with its name.

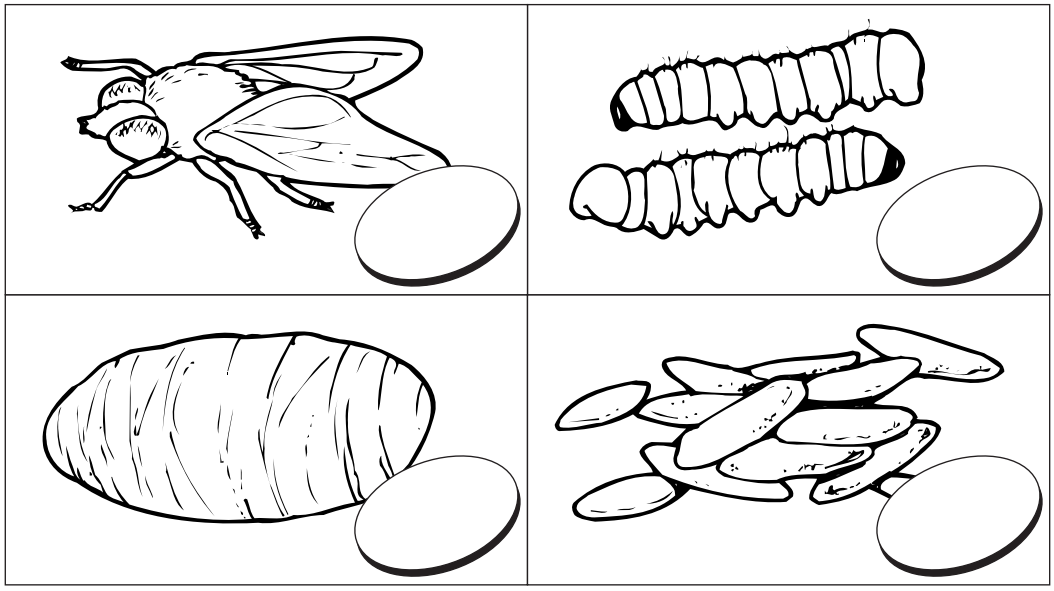
- Head
- Abdomen
- Thorax
- Eye



- Leg
- Antenna
- Mouth
- Wing

2. (a) Match the name of each part of an insect's life cycle to its picture.

(b) Order the pictures from 1 – 4.



- adult
- pupa
- larva
- egg

Indicators	Demonstrated	Needs further opportunity
• Identifies the body parts of an insect.	❑	❑
• Matches names to pictures describing the stages of an insect's life cycle.	❑	❑
• Orders the life cycle of an insect.	❑	❑

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