

Life Science

____ Grade 2 ____

Written by Tracy Bellaire

The experiments in this book fall under ten topics that relate to two aspects of life science: **Needs and Characteristics of Living Things and Exploring the Senses**. In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.



Tracy Bellaire is an experienced teacher who continues to be involved in various levels of education in her role as Differentiated Learning Resource Teacher in an elementary school in Ontario. She enjoys creating educational materials for all types of learners, and providing tools for teachers to further develop their skill set in the classroom. She hopes that these lessons help all to discover their love of science!

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Learning Intentions

	Invertebrates	A Study of Invertebrates	Birds	Fish	Reptiles and Amphibians	Mammals	Life Cycles	Human Development	Co-Existing	An Aboriginal Connection
Knowledge and Understanding Content										
Recognize different types of invertebrates and describe their physical characteristics	•									
Research and describe the behavioral characteristics of different types of invertebrates		•								
Recognize the physical characteristics of birds, make comparisons between birds in flight, and research to learn more about bird behavior			•							
Recognize the physical characteristics of fish, and research to learn more about fish behavior				•						
Recognize the physical characteristics of reptiles and amphibians, and research to learn more about a reptile or an amphibian					•					
Identify different categories of mammals and their physical characteristics; research to learn more about a mammal						•				
Identify and describe the life cycle stages of different animals							•			
Describe the life cycle stages of a human, and determine the types of food that is needed for growth and development								•		
Explain how animals and humans co-exist on Earth and describe how they depend on each other for survival									•	
Research and describe the importance of certain animals to the lives of Aboriginal people										•
Thinking Skills and Investigation Process										
Make predictions, formulate questions, and plan an investigation				•						•
Gather and record observations and findings using drawings, tables, written descriptions	•	•	•	•	•	•	•	•	•	•
Recognize and apply safety procedures in the classroom	•	•	•	•	•	•	•	•	•	•
Communication										
Communicate the procedure and conclusions of investigations using demonstrations, drawings, and oral or written descriptions, with use of science and technology vocabulary	•	•	•	•	•	•	•	•	•	•
Application of Knowledge and Skills to Society and the Environment										
Identify the impacts that animals and humans have on each other, and recognize ways negative impacts could be minimized									•	
Identify the positive impact that human activity has on animals and their habitat, and recognize ways this positive impact could be jeopardized									•	

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Teacher Assessment Rubric

Student's Name: _____

Date: _____

Success Criteria	Level 1	Level 2	Level 3	Level 4
Knowledge and Understanding Content				
Demonstrate an understanding of the concepts, ideas, terminology definitions, procedures and the safe use of equipment and materials	Demonstrates limited knowledge and understanding of the content	Demonstrates some knowledge and understanding of the content	Demonstrates considerable knowledge and understanding of the content	Demonstrates thorough knowledge and understanding of the content
Thinking Skills and Investigation Process				
Develop hypothesis, formulate questions, select strategies, plan an investigation	Uses planning and critical thinking skills with limited effectiveness	Uses planning and critical thinking skills with some effectiveness	Uses planning and critical thinking skills with considerable effectiveness	Uses planning and critical thinking skills with a high degree of effectiveness
Gather and record data, and make observations, using safety equipment	Uses investigative processing skills with limited effectiveness	Uses investigative processing skills with some effectiveness	Uses investigative processing skills with considerable effectiveness	Uses investigative processing skills with a high degree of effectiveness
Communication				
Organize and communicate ideas and information in oral, visual, and/or written forms	Organizes and communicates ideas and information with limited effectiveness	Organizes and communicates ideas and information with some effectiveness	Organizes and communicates ideas and information with considerable effectiveness	Organizes and communicates ideas and information with a high degree of effectiveness
Use science and technology vocabulary in the communication of ideas and information	Uses vocabulary and terminology with limited effectiveness	Uses vocabulary and terminology with some effectiveness	Uses vocabulary and terminology with considerable effectiveness	Uses vocabulary and terminology with a high degree of effectiveness
Application of Knowledge and Skills to Society and Environment				
Apply knowledge and skills to make connections between science and technology to society and the environment	Makes connections with limited effectiveness	Makes connections with some effectiveness	Makes connections with considerable effectiveness	Makes connections with a high degree of effectiveness
Propose action plans to address problems relating to science and technology, society, and environment	Proposes action plans with limited effectiveness	Proposes action plans with some effectiveness	Proposes action plans with considerable effectiveness	Proposes action plans with a high degree of effectiveness



Student Self Assessment Rubric

Name: _____ Date: _____

Put a check mark ✓ in the box that best describes you:

	Always	Almost Always	Sometimes	Needs Improvement
I am a good listener.				
I followed the directions.				
I stayed on task and finished on time.				
I remembered safety.				
My writing is neat.				
My pictures are neat and colored.				
I reported the results of my experiment.				
I discussed the results of my experiment.				
I know what I am good at.				
I know what I need to work on.				

1. I liked _____

2. I learned _____

3. I want to learn more about _____



INTRODUCTION

The activities in this book have two intentions: to teach concepts related to life science and to provide students the opportunity to apply necessary skills needed for mastery of science and technology curriculum objectives.

Throughout the experiments, the scientific method is used. The scientific method is an investigative process which follows five steps to guide students to discover if evidence supports a hypothesis.

1. Consider a question to investigate.

For each experiment, a question is provided for students to consider. For example, “How many times per minute does a goldfish breathe?”

2. Predict what you think will happen.

A hypothesis is an educated guess about the answer to the question being investigated. For example, “I believe that a goldfish breathes about 20 times per minute”. A group discussion is ideal at this point.

3. Create a plan or procedure to investigate the hypothesis.

The plan will include a list of materials and a list of steps to follow. It forms the “experiment”.

4. Record all the observations of the investigation.

Results may be recorded in written, table, or picture form.

5. Draw a conclusion.

Do the results support the hypothesis? Encourage students to share their conclusions with their classmates, or in a large group discussion format.

The experiments in this book fall under ten topics that relate to two aspects of life science: **Small Crawling and Flying Animals; and Animal Growth and Changes**. In each section you will find teacher notes designed to provide you guidance with the learning intention, the success criteria, materials needed, a lesson outline, as well as provide some insight on what results to expect when the experiments are conducted. Suggestions for differentiation are also included so that all students can be successful in the learning environment.

ASSESSMENT AND EVALUATION:

Students can complete the Student Self-Assessment Rubric in order to determine their own strengths and areas for improvement. Assessment can be determined by observation of student participation in the investigation process. The classroom teacher can refer to the Teacher Assessment Rubric and complete it for each student to determine if the success criteria outlined in the lesson plan has been achieved. Determining an overall level of success for evaluation purposes can be done by viewing each student’s rubric to see what level of achievement predominantly appears throughout the rubric.

INVERTEBRATES

LEARNING INTENTION:

Students will learn about the different types of invertebrates and their physical characteristics.

SUCCESS CRITERIA:

- identify the body parts of an insect, a spider, a worm, and a crustacean
- list types of common insects
- research and retell some facts on spiders
- create a home for earthworms
- record observations about earthworm activity
- create a home for a hermit crab
- describe the needs of hermit crabs in order to live
- describe the growth and changes in a hermit crab over time

MATERIALS NEEDED:

- a copy of “What’s an Invertebrate? – Part One” worksheet 1, 2, 3, and 4 for each student
- a copy of “What’s an Invertebrate? – Part Two” worksheet 5 and 6 for each student
- a copy of “What’s an Invertebrate? – Part Three” worksheet 7 for each student
- a copy of “A Home for Earthworms” worksheet 8 and 9 for each student
- a copy of “What’s an Invertebrate? – Part Four” worksheet 10 for each student
- a copy of “A Home for a Hermit Crab” worksheet 11 and 12 for each student
- access to the internet or local library
- soil such as sand and loam or topsoil (enough to fill large jars for each student)
- a hammer and a nail, masking tape, a jug of water, a few small cups
- earthworms (2 or 3 per student)
- vegetable or fruit scraps

- large sheets of black construction paper (2 per student)
- chart paper, markers, pencil crayons, clipboards, pencils
- *painting paper, paint, paint brushes, modeling clay (optional materials)*
- *visit a local pet store or go on line at www.petsmart.com to gather the materials and information needed in order to create a home for a hermit crab

PROCEDURE:

***This lesson can be done as one long lesson, or be divided into six shorter lessons.**

1. Using worksheets 1 and 2, do a shared reading activity with the students. This will allow for reading practice and breaking down word parts to read the larger words. Along with the content, discussion of vocabulary words would be of benefit for their comprehension.

Some interesting vocabulary words to focus on are:

- | | |
|----------------|---------------|
| • invertebrate | • head |
| • antennae | • facets |
| • complex eyes | • exoskeleton |
| • thorax | • organs |
| • image | • simple eyes |
| • insect | • abdomen |
| • mandibles | |

2. Give students worksheets 3 and 4. They will list 5 insects that they know, and then compare lists with a classmate. Students *may* need to access the internet or visit a local library to find out more about the physical appearance of the insect they choose to draw and label, and to find out what it looked like upon hatching.



3. Using worksheets 5 and 6, do a shared reading activity with the students. This will allow for reading practice and breaking down word parts to read the larger words. Along with the content, discussion of vocabulary words would be of benefit for their comprehension. Students will also need to access the internet or visit a library to find facts about spiders. An option is to come back as a large group and have students share their facts.

Some interesting vocabulary words to focus on are:

- arachnids
- poisonous glands
- vibrations
- abdomen
- venom
- fangs
- silk
- cephalothorax
- spinnerets
- prey

4. Using worksheet 7, do a shared reading activity with the students. This will allow for reading practice and breaking down word parts to read the larger words. Along with the content, discussion of vocabulary words would be of benefit for their comprehension.

Some interesting vocabulary words to focus on are:

- slither
- digests
- vegetation
- crumbly
- burrows
- earthworm
- castings
- tunnels
- moist
- soil
- creature
- nutrients

5. Students will create a home for earthworms. Give them worksheets 8 and 9, and the materials needed. Read through the materials needed, and what to do sections on worksheet 8 with the students to ensure their understanding of the task. Students will make and record observations of the earthworms home as it is created and 48 hours later. They will make a conclusion about the purpose earthworms have in creating nutrient rich soil.
6. Using worksheet 10, do a shared reading activity with the students. This will allow for reading practice and breaking down word parts to read the larger words. Along with the

content, discussion of vocabulary words would be of benefit for their comprehension.

Some interesting vocabulary words to focus on are:

- crustaceans
- environment
- thorax
- protects
- head
- exoskeleton
- antennae
- abdomen
- jointed
- dangers

7. Together as a class, create a home for a hermit crab that can be maintained in the classroom. You will need to visit a local pet store, or go online at www.petsmart.com to gather the information on the materials you will need and how to care for it daily.
8. Once the hermit crab's home is created, give students worksheet 11. They will illustrate what it looks like.
9. After a few weeks or months, give students worksheet 12. They will detail how to care for the hermit crab and comment on any changes they have noticed.

DIFFERENTIATION:

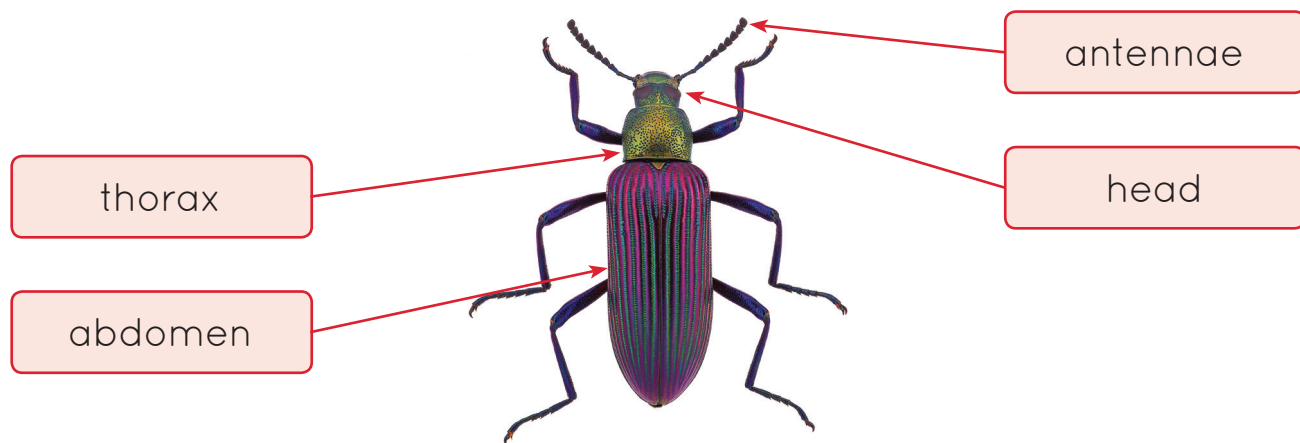
Slower learners may benefit by working in a small group with teacher support to orally answer the questions on worksheet 12. Responses could be recorded on one large chart paper, and then displayed in the classroom or on a bulletin board. This chart paper could then be surrounded by an art activity (painting) done by students that depicts the hermit crab in its environment.

For enrichment, faster learners could use modeling clay to create three dimensional models of the four types of invertebrates (insect, spider, worm, crustacean). These could be left on a display table.

What is an Invertebrate? – Part One

An **invertebrate** is an animal with no backbone. Some invertebrates like **insects** have an **exoskeleton**, which is a skeleton that is on the outside of their bodies.

Insects have bodies that are made up of three parts. These parts are the **head**, the **thorax**, and the **abdomen**. They have three pairs of legs that grow out from the front, middle, and back of the thorax. The head of an insect has two **antennae**.



Winged insects like the dragonfly, have four wings that also grow out from the thorax.



Did you know that the antennae on some insects, like this red ant, have organs for smell as well as touch?

Did you know that insects can have a pair of **complex eyes** and **simple eyes** too? Let's learn more about this!

Complex eyes have many small lenses called **facets**, and they can see colour. The parts that each facet sees, comes together to make one sharp image. So, insects see very well with their complex eyes.



A housefly has about 4000 lenses inside of each of its compound eyes.



If an insect has simple eyes too, they will be found in a form of three on top of its head. These eyes are simple because they can only see light and dark, not colour.

A form of 3 simple eyes, sit on the top of this paper wasp's head.

FAST FACT!

Many insects have mandibles, which are a pair of jaws. The jaws of an insect close sideways, unlike our own which close up and down.

1. List 5 insects that you know:

- ◆ _____
- ◆ _____
- ◆ _____
- ◆ _____
- ◆ _____

2. Compare your list with another classmate's list. Name 2 insects from their list that are not on yours.

- ◆ _____
- ◆ _____

DID YOU KNOW?

All invertebrates lay eggs. That means all the insects on your list are egg laying creatures!

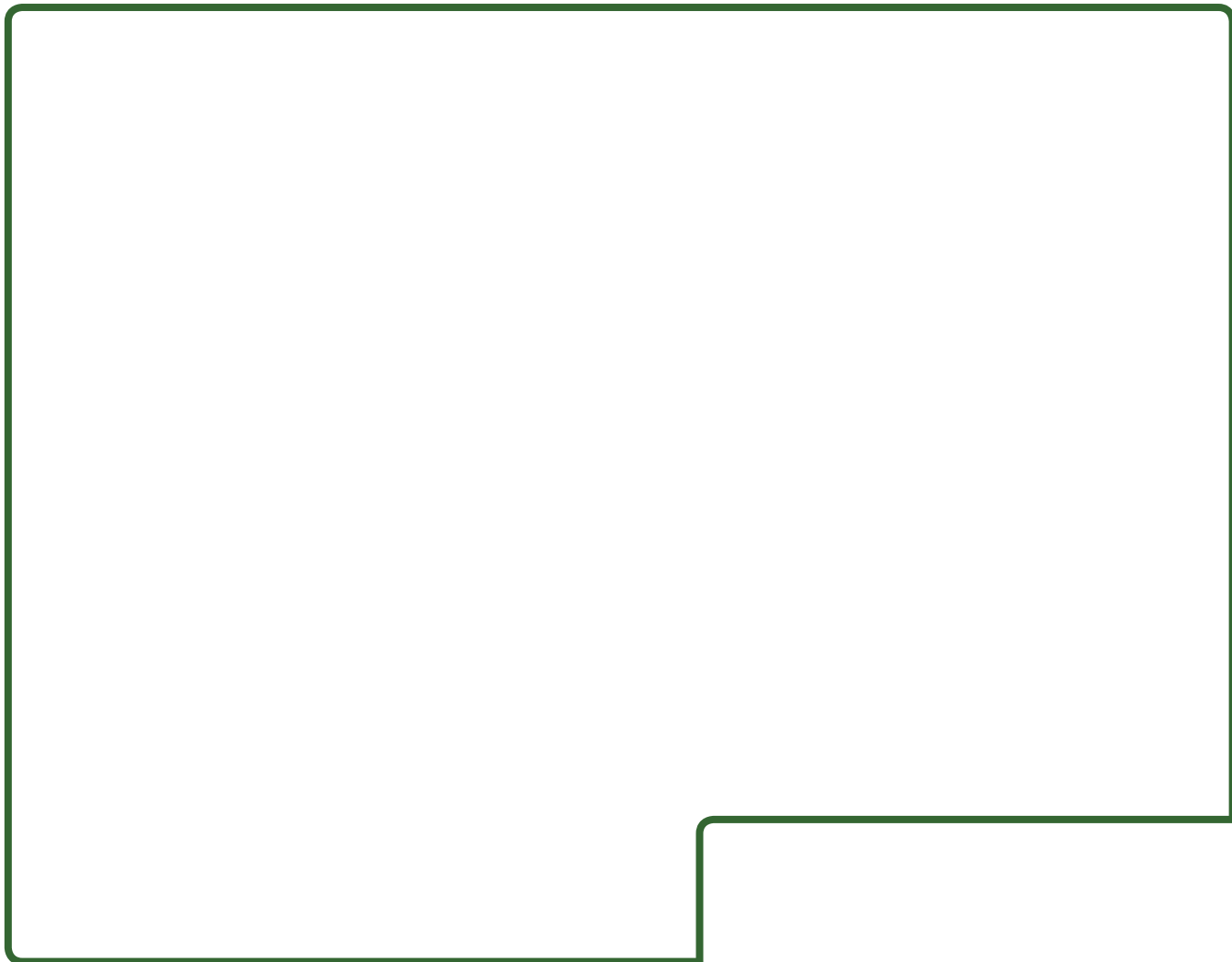
For some insects, when they hatch out of the egg, they look like their adults. For example, when an ant is hatched, it looks like a small ant.

For some insects, when they hatch out of the egg, they go through changes before they look like their adults. For example, when a caterpillar is hatched, it will become a pupa before it turns into an adult butterfly.



Choose one insect from your list.

1. Draw it in the box below.
2. Label its **antennae, head, thorax, abdomen, legs, eyes, mandibles.**
3. Label its **wings** if it has some.



Draw what your insect
looked like when it
hatched from its egg.



What is an Invertebrate? – Part Two

Another group of invertebrates are **arachnids**. Arachnids are creatures that have bodies made up of two parts. They have eight legs. They do not have wings or antennae. Can you guess what creature is part of this group? It is the spider!

A spider, like all other invertebrates, does not have a backbone. It has an **exoskeleton**. As the spider grows, it sheds its first exoskeleton and then stretches out as a new, larger exoskeleton forms.



The front part of a spider is called the **cephalothorax**.

The cephalothorax has the spider's eyes, brain, mouth fangs, and stomach. A spider's eight legs grow out of this part of its body.

If a spider was poisonous, this is where its poisonous glands would be.

The back part of the spider is called the **abdomen**.

A spider's **spinnerets** are at the back end of the abdomen. A spider makes **silk** in its spinnerets. Some spiders use this silk to spin webs.

Did you know that a spider's body has oil on it that helps it from sticking to its own web?

SPINNING OUT THE FACTS!

Did you know that a spider has 48 knees? Each one of its 8 legs has 6 joints on it! At the end of each of its legs, a spider has small claws.

There are many hairs that cover a spider's legs. These hairs can sense vibrations or movements. They can also pick up smells in the air.

Some spiders have venom in their fangs. They use the venom in their fangs to catch their prey. The shot of venom stills their prey, and then the spider goes in for a tasty snack!

Some spiders have poisonous venom. If a spider's prey gets poked by its fangs, the poison will turn its guts to liquid. Then, the spider will suck it out!

Now it is your turn to spin out the facts! Use the internet or visit a local library to learn about spiders. Tell two facts about spiders.

1. _____

2. _____
