

FOCUS ON

ELEMENTARY

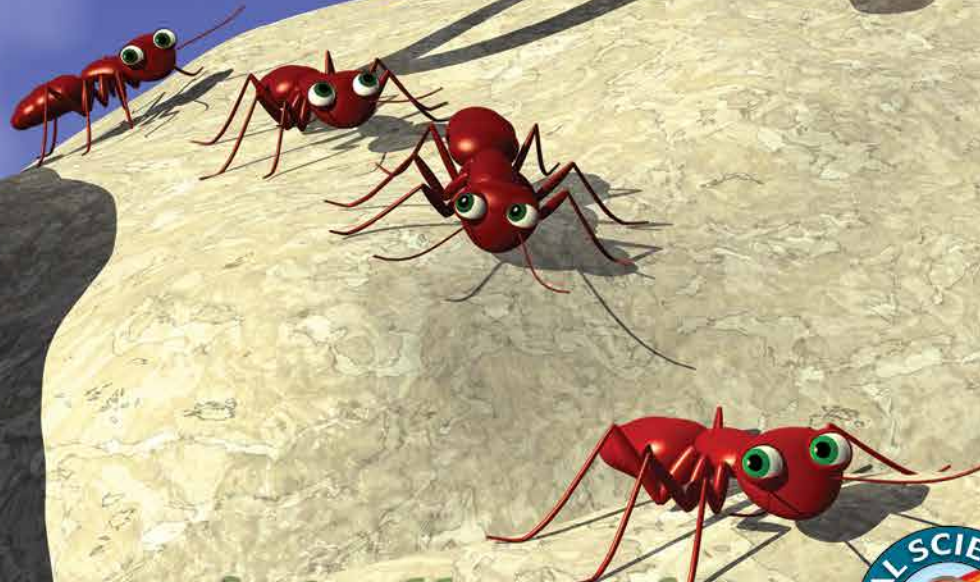
3rd Edition

Featuring Chapters from:

- Student Textbook
- Laboratory Notebook
- Teacher's Manual
- Lesson Plan
- Study Notebook
- Quizzes
- Graphics Package



Preview Booklet



Rebecca W. Keller, PhD



Introduction

Welcome to the *Focus On Elementary Biology 3rd Edition Preview Booklet* where you can take our one semester unit study program for a test run!

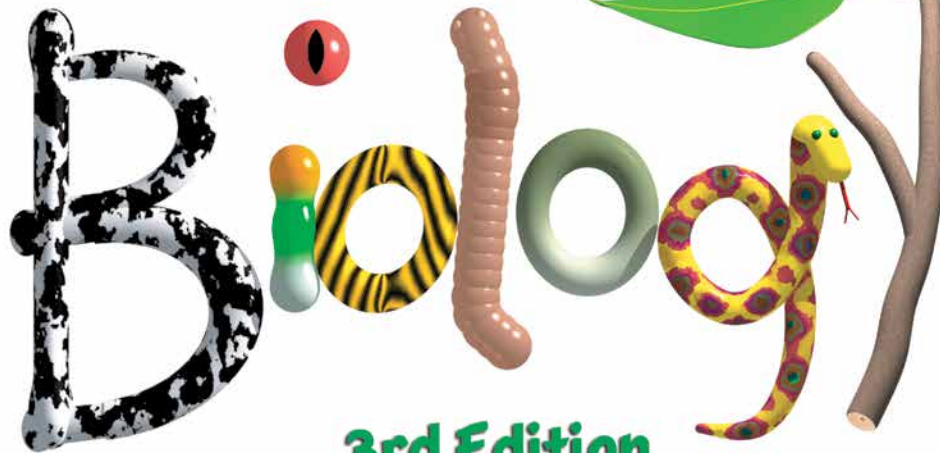
The materials sampled in this booklet are taken from a full semester course, with two chapters from each part of the curriculum:

- The *Focus On Elementary Biology Student Textbook–3rd Edition* provides foundational science concepts presented in a way that makes it easy for students to read and understand. The many colorful illustrations make each chapter fun to look at and reinforce concepts presented.
- With two science experiments for each chapter, the *Laboratory Notebook* helps young students learn how to make good observations, an important part of doing science. Open-ended questions help students think about what they are learning, and information is provided to assist students with understanding what they observed while performing their experiments.
- The *Teacher’s Manual* includes instructions for helping students conduct the experiments, as well as questions for guiding open inquiry. The commonly available, inexpensive materials used for all the experiments can be seen in the complete materials lists included in this booklet.
- Using the *Lesson Plan* makes it easy to keep track of daily teaching tasks. A page for each chapter in the *Student Textbook* has the objectives of the lesson and questions for further study that connect science with other areas of knowledge, such as history; philosophy; art, music, and math; technology; and language. Forms are included for students to use to do a review of material they’ve learned and to make up their own test for the chapter. Also included are icons that can be copied onto sticker sheets and used to help plan each day of the week.
- Different types of fun activities are presented in the *Study Notebook*. These help reinforce the concepts students are learning and include making observations, some simple experiments, matching, fill in the blank, cut and paste, writing, following directions, and more.
- The one final and two midterm *Quizzes* are self-explanatory. For those who are not fans of quizzes, students can use the self-test at the end of the *Lesson Plan* instead.
- Another type of teaching aid is provided in the *Graphics Package*, which has two full-color images from each chapter of the *Student Textbook*. These graphics can be used to create additional teaching aids such as flash cards, wall posters, PowerPoint lectures, or overhead projections.

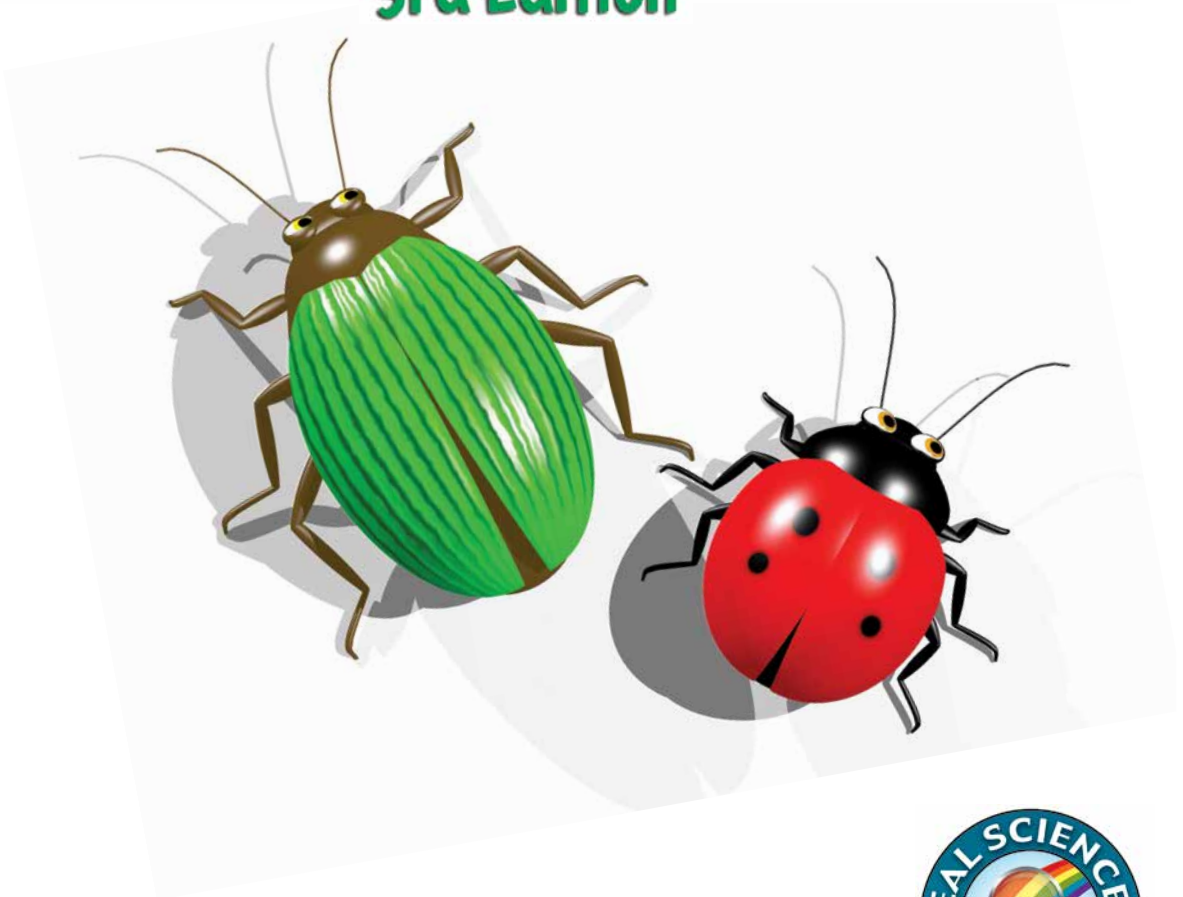
FOCUS ON

Grades K-4

ELEMENTARY



3rd Edition



Rebecca W. Keller, PhD





Real Science-4-Kids

Cover design: David Keller

Opening page illustrations: David Keller

Text illustrations: Janet Moneymaker, Rebecca W. Keller, PhD

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Student Textbook–3rd Edition (hardcover)
ISBN 978-1-941181-69-0

Published by Gravitas Publications Inc.
www.gravitaspublications.com
www.realscience4kids.com



Contents

CHAPTER 1	WHAT IS BIOLOGY?	1
1.1	Introduction	2
1.2	History of Biology	3
1.3	Modern Biology	4
1.4	Everyday Biology	6
1.5	Summary	8
1.6	Some Things to Think About	8
CHAPTER 2	BIOLOGIST'S TOOLBOX	9
2.1	Introduction	10
2.2	Brief History	10
2.3	Basic Biology Tools	12
2.4	Advanced Biology Tools	13
2.5	Summary	15
2.6	Some Things to Think About	15
CHAPTER 3	LIFE	17
3.1	Studying Life	18
3.2	Sorting Living Things	20
3.3	Domains and Kingdoms	23
3.4	Sorting Within Kingdoms	25
3.5	Naming	26
3.6	Summary	27
3.7	Some Things to Think About	28
CHAPTER 4	THE CELL: A TINY CITY	29
4.1	Creatures	30
4.2	The Cell	31
4.3	A Tiny City	33
4.4	Parts of a Cell	36
4.5	Summary	39
4.6	Some Things to Think About	39

CHAPTER 5	VIRUSES, BACTERIA, AND ARCHAEA	40
5.1	Introduction	41
5.2	Viruses	42
5.3	Bacteria	43
5.4	Archaea	47
5.5	Summary	48
5.6	Some Things to Think About	48
CHAPTER 6	PROTISTS MOVE	49
6.1	Tiny Creatures	50
6.2	Different Ways Protists Move	51
6.3	Summary	53
6.4	Some Things to Think About	54
CHAPTER 7	PROTISTS EAT	55
7.1	Euglena Eat	56
7.2	Paramecia Eat	57
7.3	Amoebas Eat	58
7.4	Other Protists Eat	59
7.5	Summary	60
7.6	Some Things to Think About	60
CHAPTER 8	FUNGI, MOLDS, MUSHROOMS, YEASTS	61
8.1	Introduction	62
8.2	Molds	63
8.3	Mushrooms	64
8.4	Yeasts	65
8.5	Summary	66
8.6	Some Things to Think About	66
CHAPTER 9	PLANTS	67
9.1	Introduction	68
9.2	So Many Plants!	68
9.3	Where Plants Live	69
9.4	Plant Cells	71
9.5	Summary	71
9.6	Some Things to Think About	72

CHAPTER 10	FOOD FOR PLANTS	73
10.1	Introduction	74
10.2	Factories	75
10.3	How Plants Make Food	76
10.4	Food Factories	76
10.5	Different Leaves	77
10.6	Summary	78
10.7	Some Things to Think About	78
CHAPTER 11	PLANT PARTS	80
11.1	Introduction	81
11.2	In the Ground: The Roots	82
11.3	Above the Soil: Leaves, Stems, Flowers	83
11.4	Other Places Plants Live	83
11.5	Summary	84
11.6	Some Things to Think About	85
CHAPTER 12	GROWING A PLANT	86
12.1	The Beginning: Seeds	87
12.2	The Middle: Baby Plants	88
12.3	The Finish: Flowers and Fruit	89
12.4	Starting Again: The Life Cycle	90
12.5	Summary	91
12.6	Some Things to Think About	91
CHAPTER 13	WHAT ARE ANIMALS?	93
13.1	Introduction	94
13.2	What Is an Animal?	95
13.3	Animal Cells	97
13.4	Animal Phyla	98
13.5	Summary	101
13.6	Some Things to Think About	101

CHAPTER 14 SQUISHY, SPINY, SLIMY ANIMALS	102
14.1 Introduction	103
14.2 Sponges	104
14.3 Jellyfish	106
14.4 Worms	107
14.5 Snails and Octopuses	109
14.6 Sea Stars, Sand Dollars, Sea Urchins	112
14.7 Summary	115
14.8 Some Things to Think About	115
CHAPTER 15 STINGING, CRAWLING, SQUIRMING ANIMALS	117
15.1 Introduction	118
15.2 Basic Body Plan	118
15.3 Insects	120
15.4 Spiders	126
15.5 Lobsters, Shrimp, and Crabs	127
15.6 Summary	128
15.7 Some Things to Think About	129
CHAPTER 16 SWIMMING, FLYING, SCALY, FURRY ANIMALS	130
16.1 Introduction	131
16.2 Fish	131
16.3 Frogs	134
16.4 Reptiles	138
16.5 Birds	141
16.6 Mammals	142
16.7 Summary	143
16.8 Some Things to Think About	144
GLOSSARY-INDEX	145

Chapter 1 What Is Biology?

1.1	Introduction	2
1.2	History of Biology	3
1.3	Modern Biology	4
1.4	Everyday Biology	6
1.5	Summary	8
1.6	Some Things to Think About	8



1.1 Introduction

Science is a way to study how things work. We can think of the different areas of study in science as building blocks that fit together. By combining what we learn in chemistry, biology, physics, geology, and astronomy, we can form a more complete picture of how things work.

In this book we will take a look at the building block of science called **biology**. Biology is the study of life. Biologists look at how plants and animals live, grow, and interact with each other.



1.2 History of Biology

People have been studying life for thousands of years. The first biologist is said to have been **Aristotle**. Aristotle lived in Greece from 384–322 B.C.E. Aristotle thought about the world around him, and he was particularly interested in living things.

But Aristotle didn't just think about living things, he also made **observations**. Making an observation happens when you examine something with your eyes, or touch something with your fingers, or smell something with your nose.



Aristotle made many observations of both plants and animals. He looked at the parts of animals, how animals move, and how animals breathe or sleep. He also observed how some animals are similar to each other and how some animals are different.

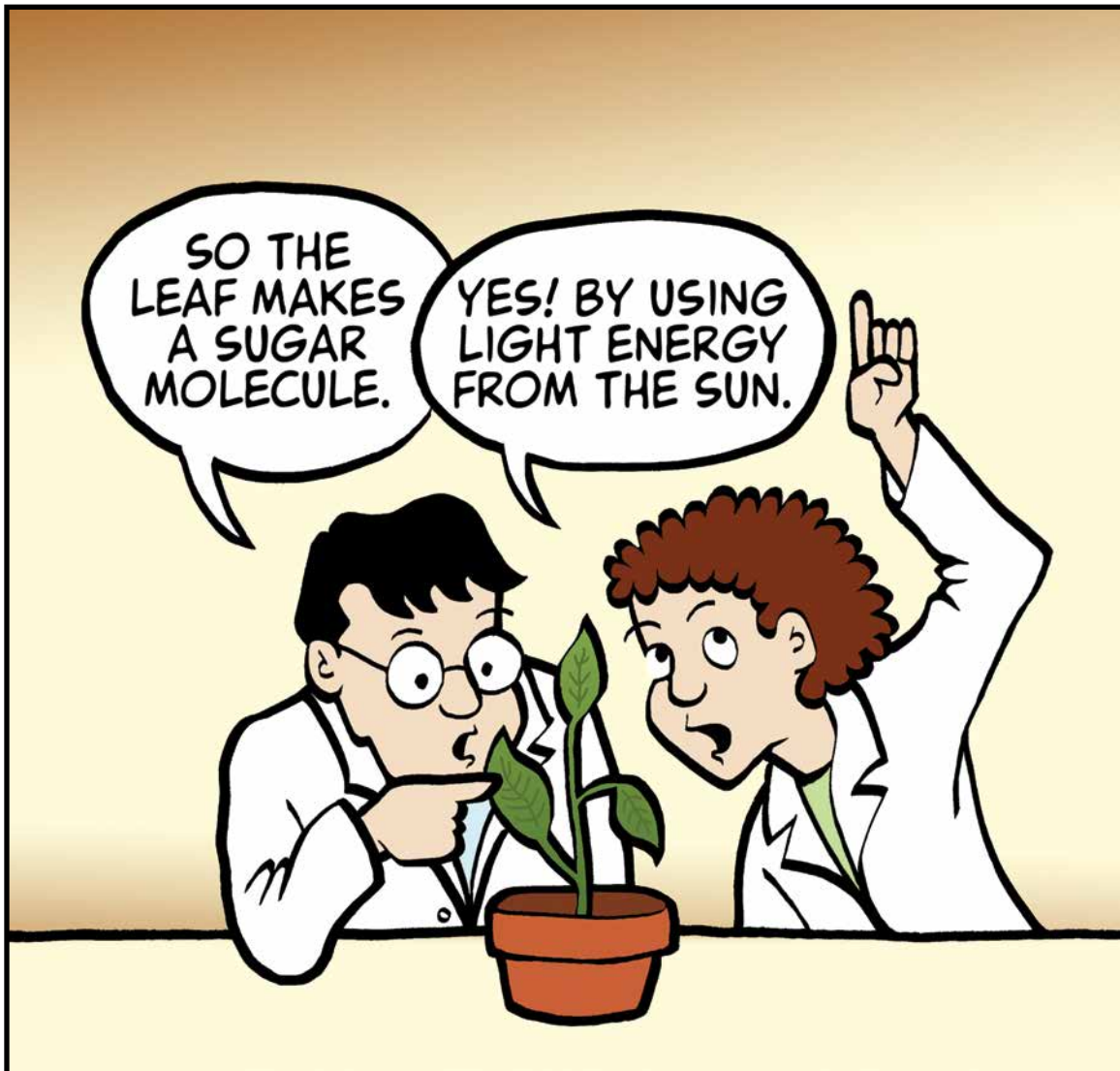


Aristotle had many ideas about life and he wrote many books to describe his ideas to others. In the same way, modern biologists observe life and write their ideas in books and papers so they can share those ideas with other biologists and other scientists.

1.3 Modern Biology

Today, modern biologists continue to observe life like Aristotle did thousands of years ago. However, unlike Aristotle, modern biologists can use chemistry and physics to help understand how living things work.

For example, modern biologists can study how plants make food from light by studying the chemicals in plant leaves and the physics of light waves.



Modern biologists have many tools that Aristotle didn't have. With these tools it is possible for modern biologists to make many more observations about life than Aristotle was able to.



For example, modern biologists can use microscopes to see life that is too tiny to see with our eyes.

And modern biologists can also use airplanes to observe how animals move in large groups.

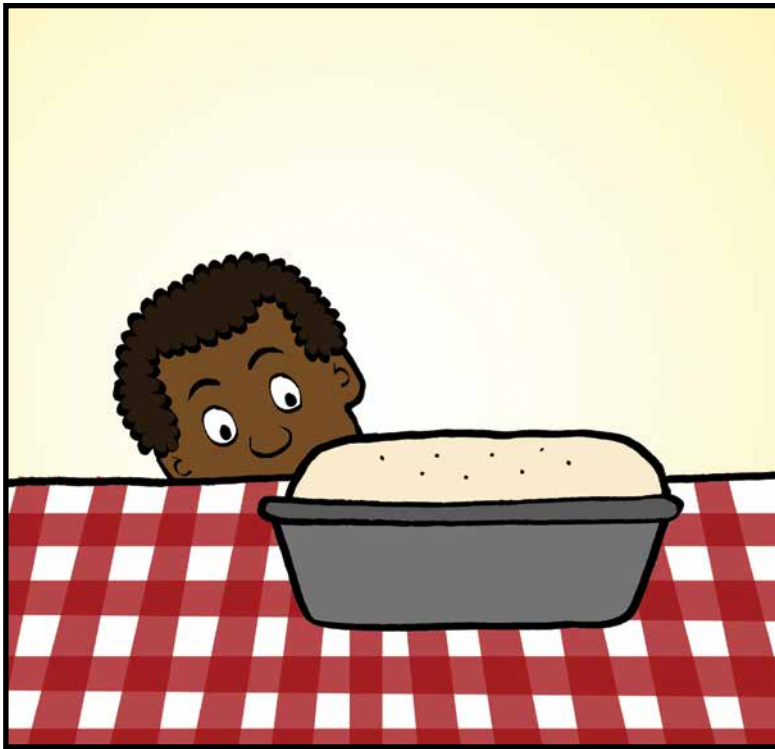
1.4 Everyday Biology

Learning about life is something everyone does.

If you care for a pet or observe an ant carry away your picnic food, you are doing biology.



When you plant a garden and observe how your vegetables grow, you are doing biology.



If you make yogurt or watch bread rise, you are doing biology.

Biology is simply observing, studying, and working with living things.

Biology can involve very complicated experiments or be as simple

as observing a spider trap a moth in a web. The more observations you make and the more details you observe, the more you will discover about biology!

1.5 Summary

- **Biology** is the study of life.
- **Aristotle** is considered to have been the first **biologist**.
- Modern **biologists** use **chemistry** and **physics** to understand living things.
- **Biology** is observing, studying, and working with living things.

1.6 Some Things to Think About

- What is your favorite animal?
Dog, Cat, Horse, Fish, Spider, Some other animal
- Look carefully at a plant. Write down all the different things you can observe about the plant. How many different things did you notice?
- What tools do you think modern biologists might use that Aristotle didn't have 2,000 years ago?
- Name some living things you observe almost every day. Which one is the smallest? Which one is the largest? Which one is the most interesting? Why?

Chapter 7 Protists Eat

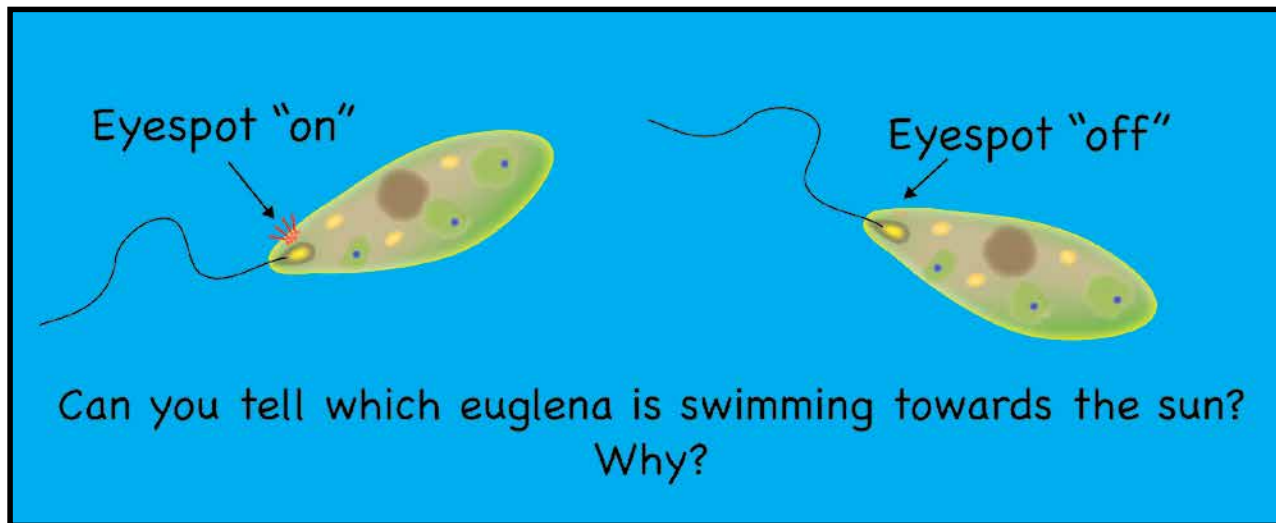
7.1	Euglena Eat	56
7.2	Paramecia Eat	57
7.3	Amoebas Eat	58
7.4	Other Protists Eat	59
7.5	Summary	60
7.6	Some Things to Think About	60



7.1 Euglena Eat

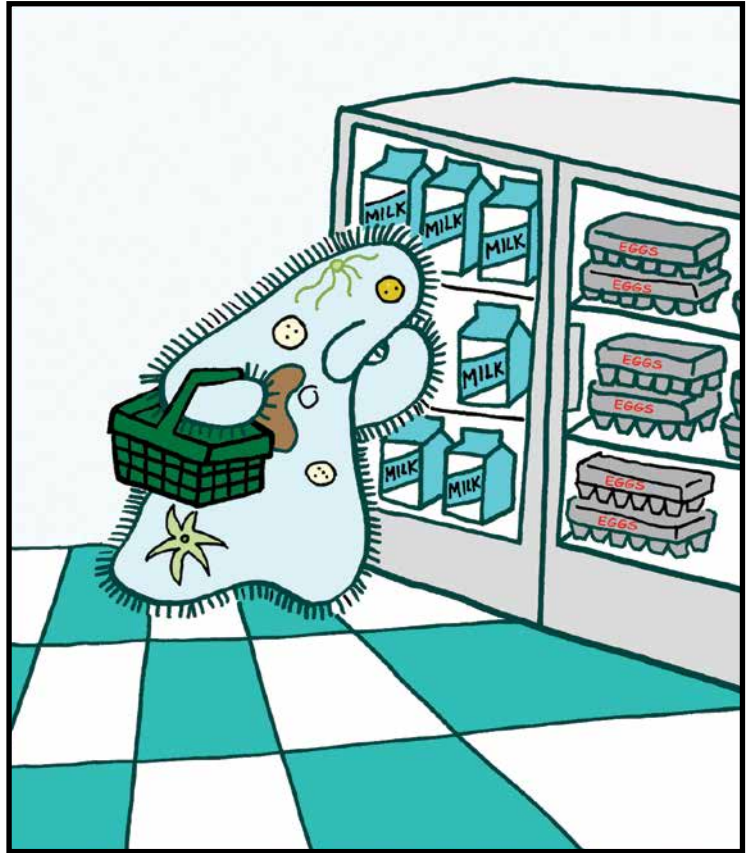
A euglena uses sunlight to make its own food. It changes sunlight to food by using **chloroplasts**. Chloroplasts are special parts inside a cell. A chloroplast contains **chlorophyll** which is a green substance that captures sunlight. Because chlorophyll is green, it gives euglena their green color.

A euglena will swim toward the sunlight that it uses to make food. A euglena has a little **eyespot** that helps it know where to find the sunlight.



7.2 Paramecia Eat

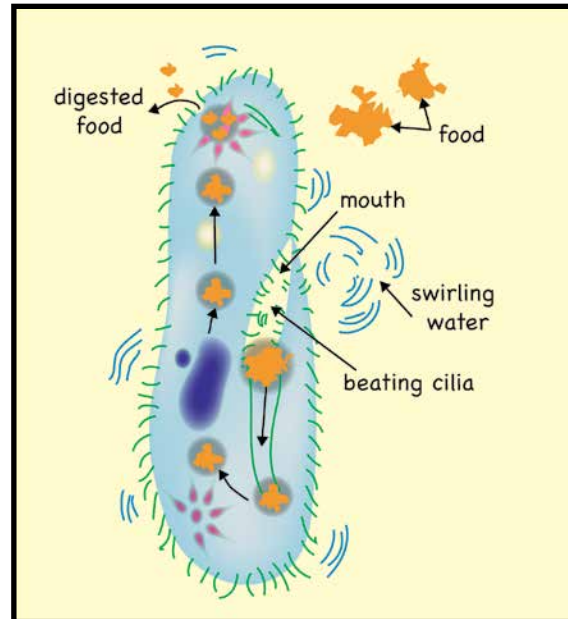
Not all protists can make their own food like a euglena does. A paramecium has to go find its food, just like we do! But a paramecium cannot go to the grocery store for eggs and milk like we can. It must swim around with its cilia to look for food in the water.



A paramecium eats other small creatures, such as other protozoa or bacteria. The paramecium has a mouth that it uses to capture food. The mouth does not move like a human mouth and it doesn't have any teeth.

The cilia around the mouth move, or beat, rapidly. This makes the water near the mouth of the paramecium swirl. Take your hands and move them in some water, and you can feel the water swirling around your hands.

A paramecium uses the swirling water to move food toward its mouth. When the food enters the mouth of the paramecium, it travels through a small tube into a tiny stomach and gets digested. The paramecium takes what it needs from the digested food, and the unused food is pushed out through a small hole.

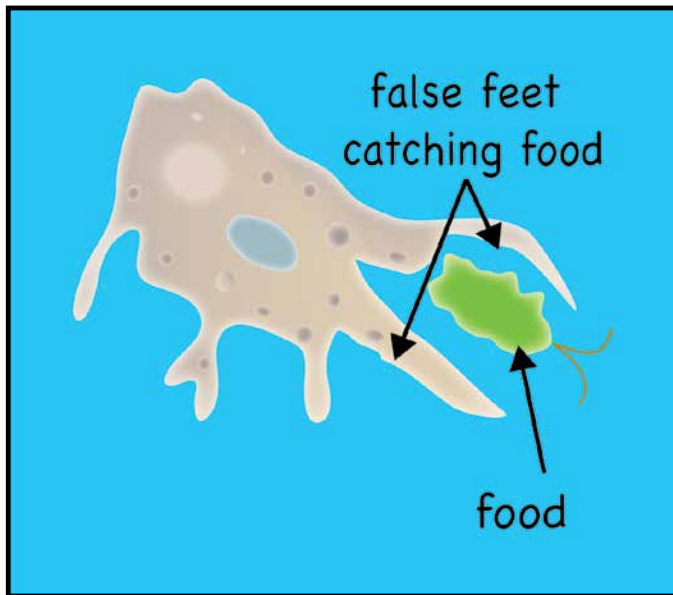


Although a paramecium has only one cell, it can move, eat, and digest food just like larger creatures. For being so small, the paramecium is an amazing creature.

7.3 Amoebas Eat



An amoeba eats with its feet! Can you imagine eating with your feet? It would be pretty hard for you to eat with your feet, but it isn't hard at all for an amoeba.



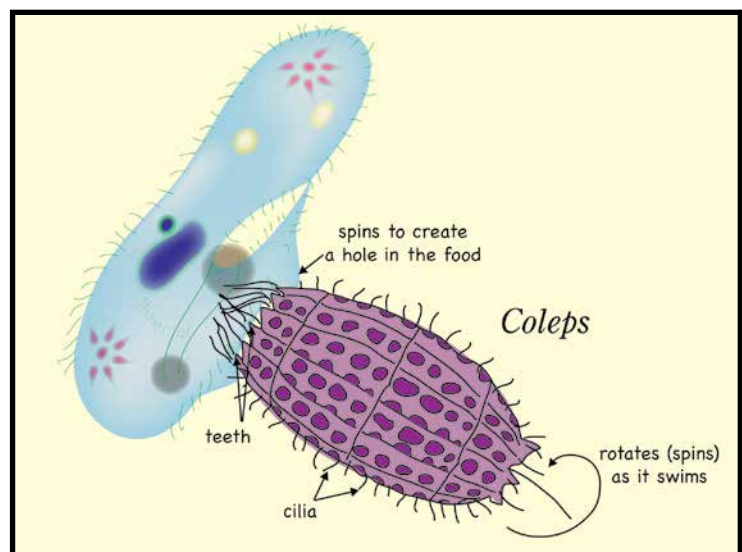
An amoeba uses its **false feet**, or **pseudopods**, to surround the food it wants to eat. Once the food is surrounded, the amoeba brings its feet together and makes something like a stomach out of the false feet that surround the food.

The stomach then **absorbs** the food into the body of the amoeba. That is how the amoeba eats with its feet!

7.4 Other Protists Eat

There are other protists that eat in other ways. For example, a protist called a **Coleps** rotates its whole body to swim through the water.

It also rotates as it eats. As it rotates, it uses its sharp teeth to bore through the food like a tiny drill. Then it eats the food it removes from the hole it has made with its teeth.



7.5 Summary

- A **euglena** uses **chloroplasts** to make its food.
- A **paramecium** uses **cilia** to swirl the water and sweep food into its mouth.
- An **ameoba** uses its **pseudopods**, or **false feet**, to capture food and eat.
- Other protists use other ways to eat.

7.6 Some Things to Think About

- What do you think would happen if a euglena did not have an eyespot?
- How would you describe the way a paramecium eats?
- Why do you think pseudopods are called false feet?
- How is the way a Coleps eats different from the way a paramecium eats? How is it different from the way an amoeba eats?

FOCUS ON

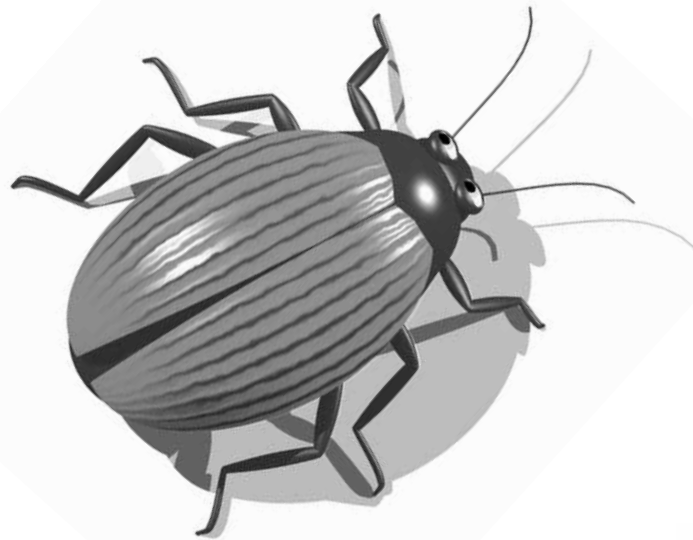
ELEMENTARY

Grades K-4



Laboratory Notebook

3rd Edition



Rebecca W. Keller, PhD





Real Science-4-Kids

Cover design: David Keller

Opening page: David Keller, Rebecca W. Keller, PhD

Illustrations: Janet Money maker and Rebecca W. Keller, PhD

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Laboratory Notebook—3rd Edition
ISBN 978-1-941181-34-8

Published by Gravitas Publications Inc.

www.gravitaspublications.com

www.realscience4kids.com



A Note From the Author

Hi!

In this curriculum you are going to learn the first step of the scientific method:

Making good observations!

In the science of biology, making good observations is very important.

Each experiment in this notebook has several different sections. In the section called *Observe It*, you will be asked to make observations. In the *Think About It* section you will answer questions. There is a section called *What Did You Discover?* where you will write down or draw what you observed from the experiment. And finally, in the section *Why?* you will learn about the reasons why you may have observed certain things during your experiment.

These experiments will help you learn the first step of the scientific method and.....they're lots of fun!

Enjoy!

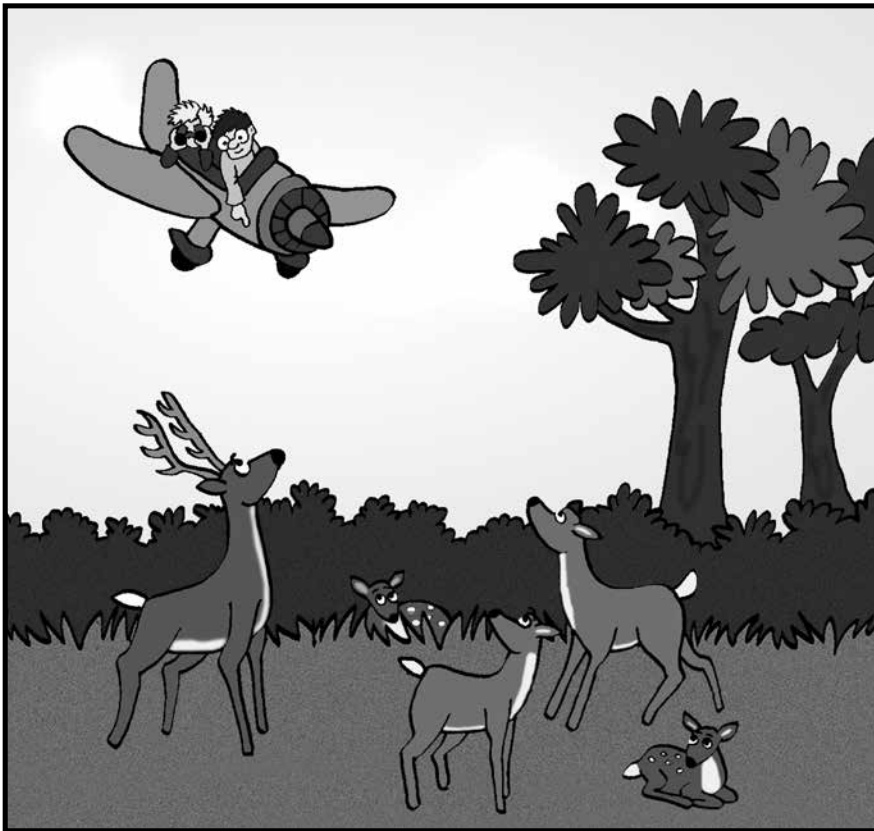
Rebecca W. Keller, PhD

Contents

Experiment 1:	WHAT IS LIFE?	1
Experiment 2:	TAKING NOTES	9
Experiment 3:	WHERE DOES IT GO?	23
Experiment 4:	WHAT DO YOU NEED?	38
Experiment 5:	YUMMY YOGURT	48
Experiment 6:	LITTLE CREATURES MOVE	53
Experiment 7:	LITTLE CREATURES EAT	65
Experiment 8:	OLDY MOLDY	77
Experiment 9:	NATURE WALK: OBSERVING PLANTS	85
Experiment 10:	WHO NEEDS LIGHT?	92
Experiment 11:	THIRSTY FLOWERS	105
Experiment 12:	GROWING SEEDS	116
Experiment 13:	NATURE WALK: OBSERVING ANIMALS	129
Experiment 14:	RED LIGHT, GREEN LIGHT	136
Experiment 15:	BUTTERFLIES FLUTTER BY	148
Experiment 16:	TADPOLES TO FROGS	160

Experiment 1

What Is Life?



I. Think About It

Biology is the study of life. In this experiment you will explore the differences between living things and non-living things.

- 1 What do you think the differences are between life and non-life?

- 2 What do you think makes you different from a rock?



II. Observe It

Find one living thing and one non-living thing to observe. Write the name of each thing in the space provided on the next page. Use the following questions to help with your observations.

- Can the item move?
- Does the item breathe?
- Does the item consume food?
- Can the item reproduce itself?
- What else can you notice?

Write or draw your observations in the spaces on the next page.



		Living Thing	Non-Living Thing
		_____	_____
Write		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____
		_____	_____

		Living Thing	Non-Living Thing
		_____	_____
Draw			



III. What Did You Discover?

- ① List four things that are different between living things and non-living things.

- ② If you traveled to a faraway planet, how would you know which things were alive and which were not alive?

- ③ Write your own definition of life.



IV. Why?

Biology is the study of life. The first step in studying life is knowing what is alive and what is not alive. It can be very easy to know the difference between something that is alive and something that is not alive. However, defining life can be challenging, even for scientists. In general, living things consume some sort of food source, reproduce themselves, and respond to their environment.

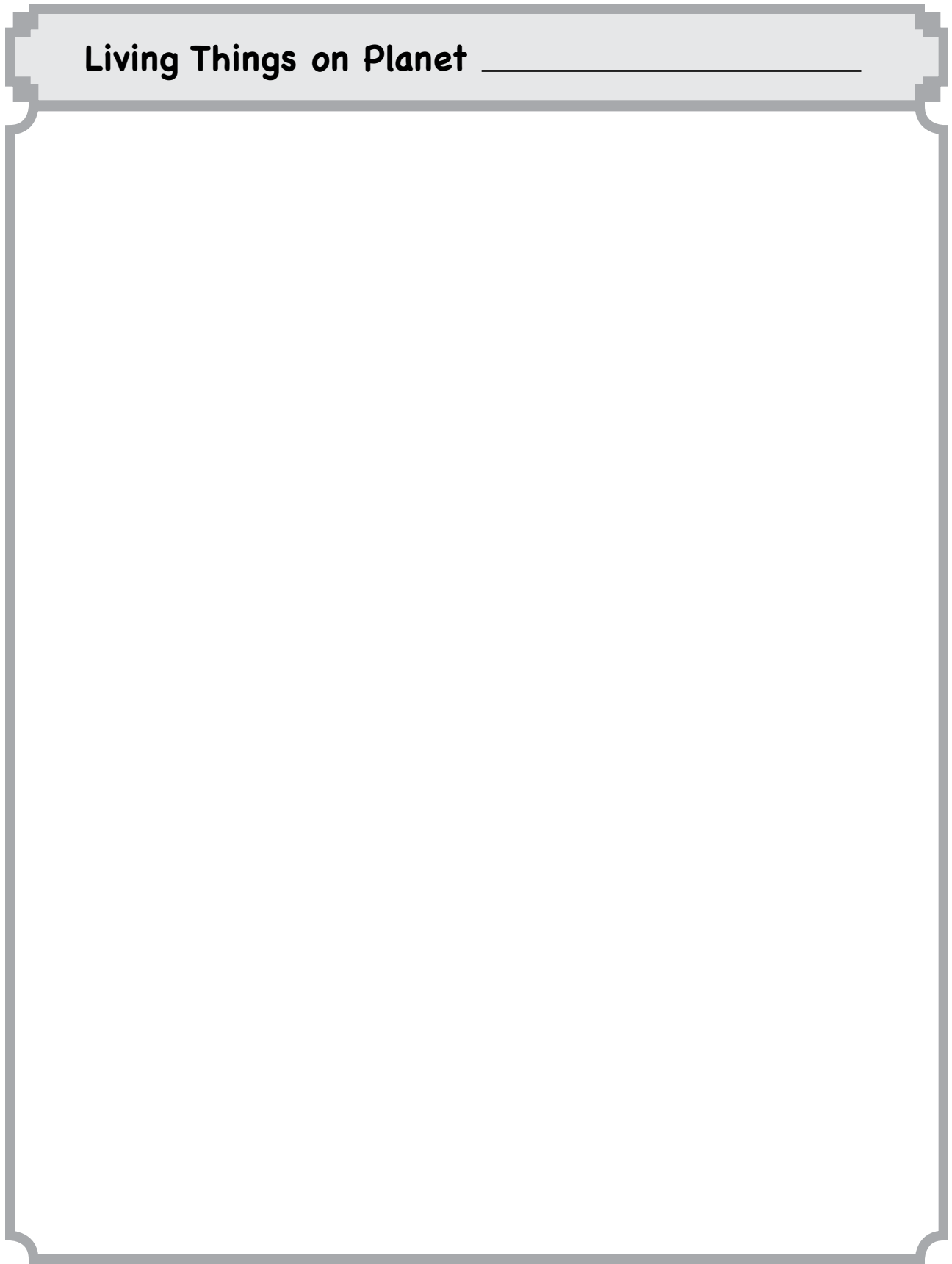
V. Just For Fun

Imagine that you have traveled to a faraway planet that no one has ever been to before. Using your imagination, think about the kinds of living things you might discover there. Think of as many details as you can, and then write about or draw pictures of these imagined living things on the faraway planet.

What would you name this planet? Do the imaginary creatures have names? Record your ideas on the next page.

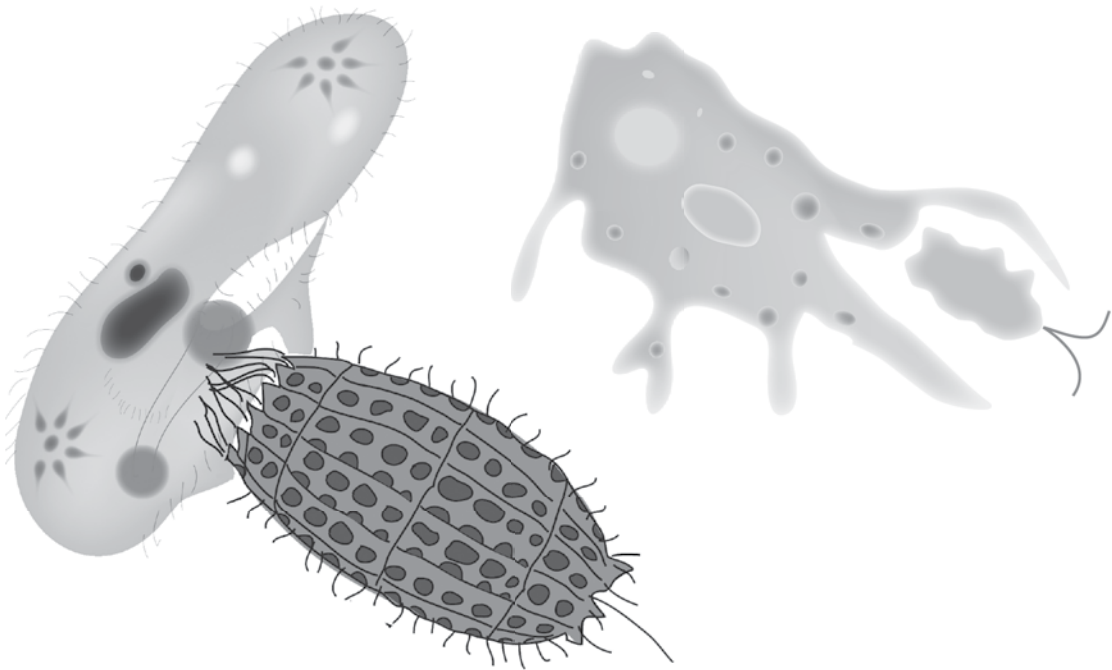


Living Things on Planet _____



Experiment 7

Little Creatures Eat

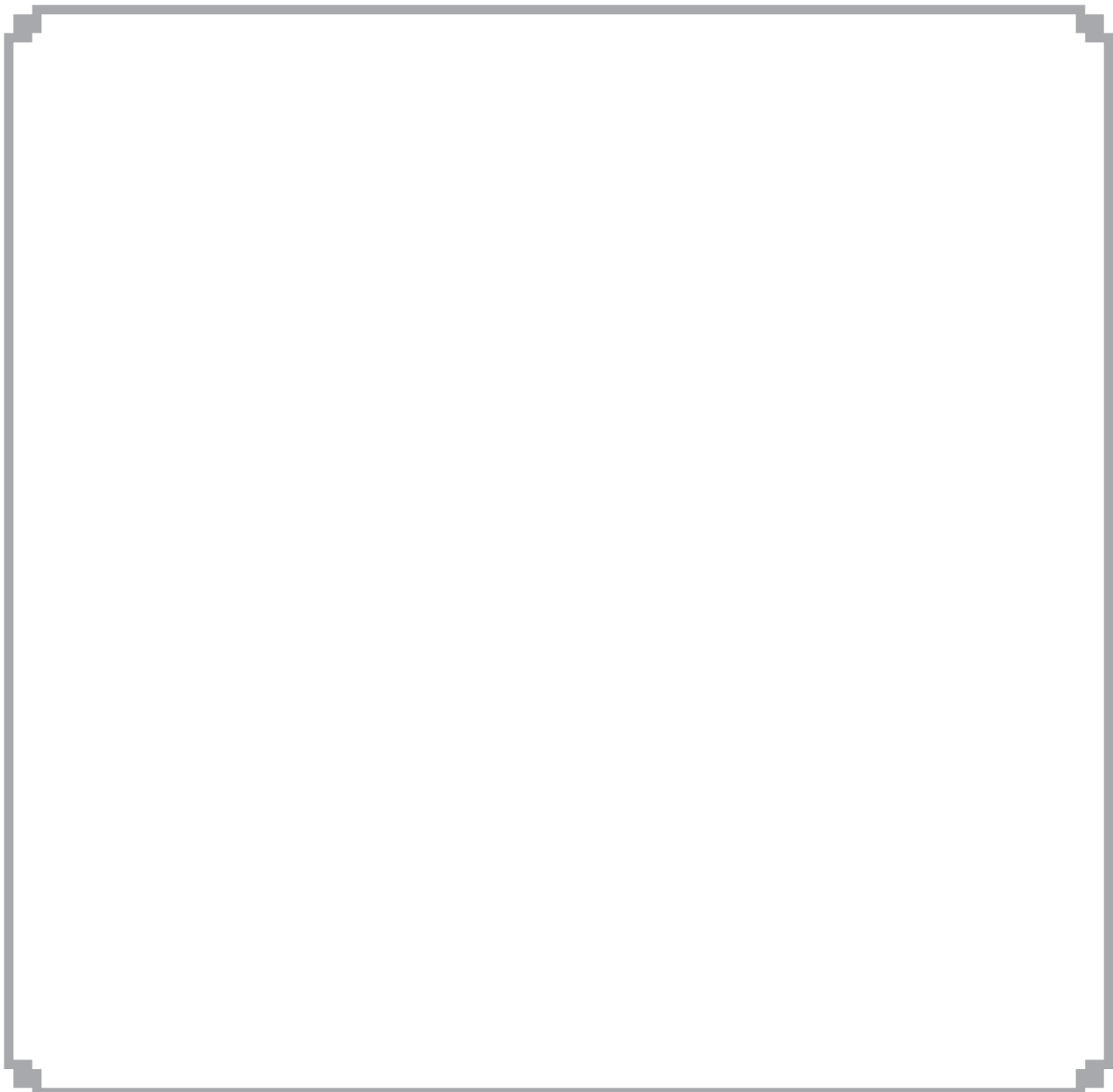


Introduction

In this experiment you will take another look at very tiny creatures and observe how they eat.

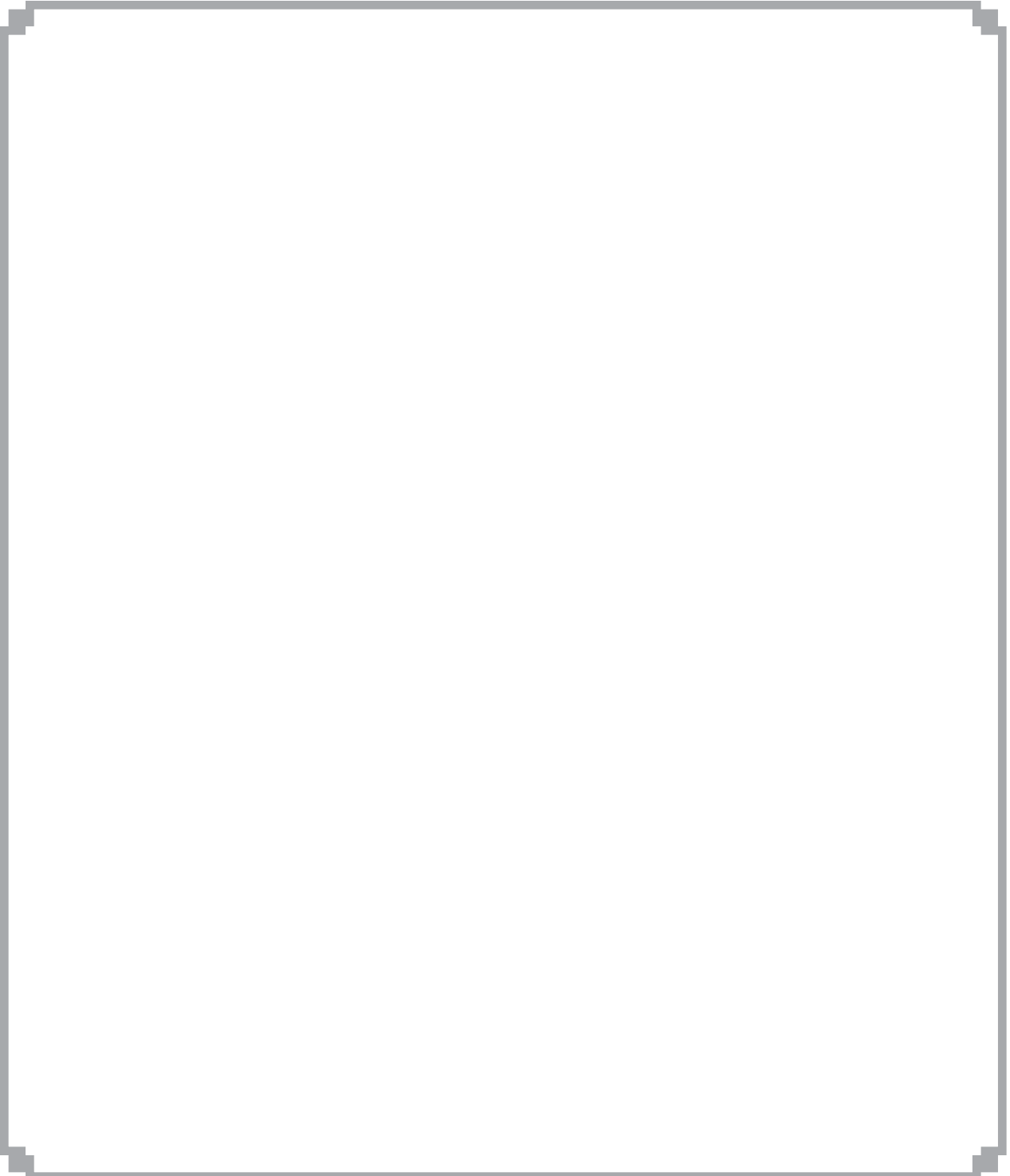
I. Think About It

If you use a microscope to look at a protist eating, what do you think you will see? Draw what you think you will see.

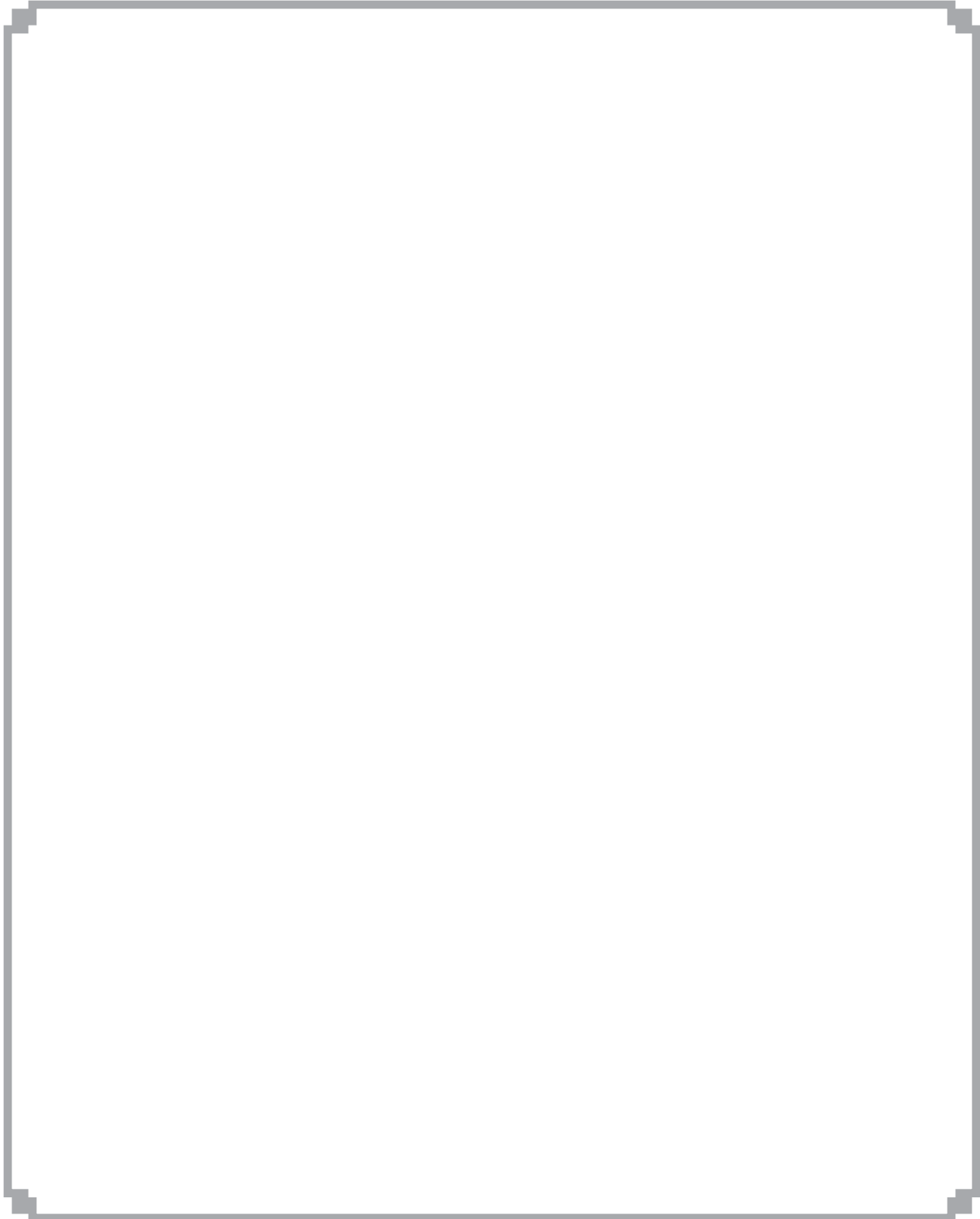


II. Observe It

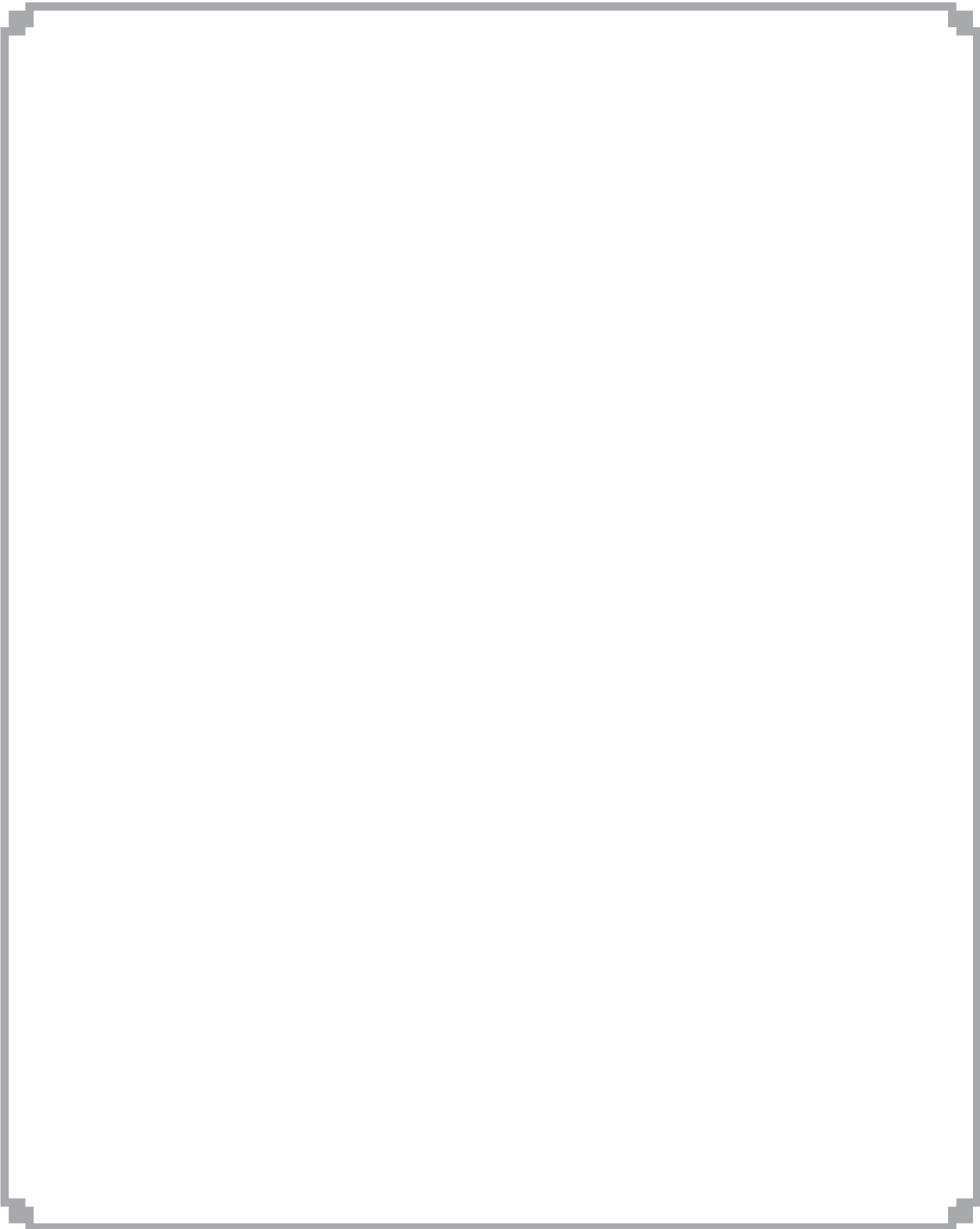
- 1 Take some pond water and put it under the microscope. Observe whether any protists are eating. Draw what you see.



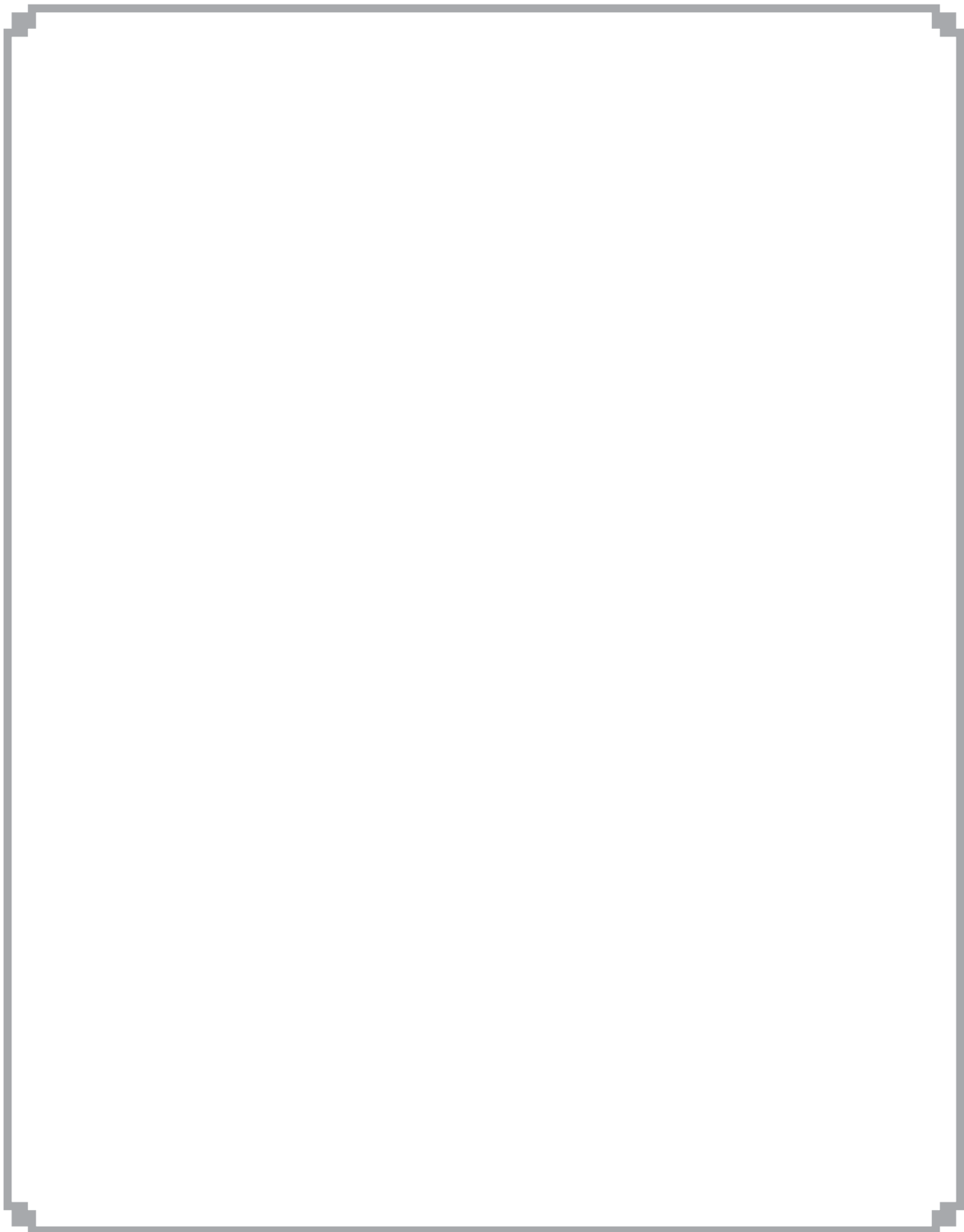
- ② See if you can observe different creatures that are eating.
Draw one below.



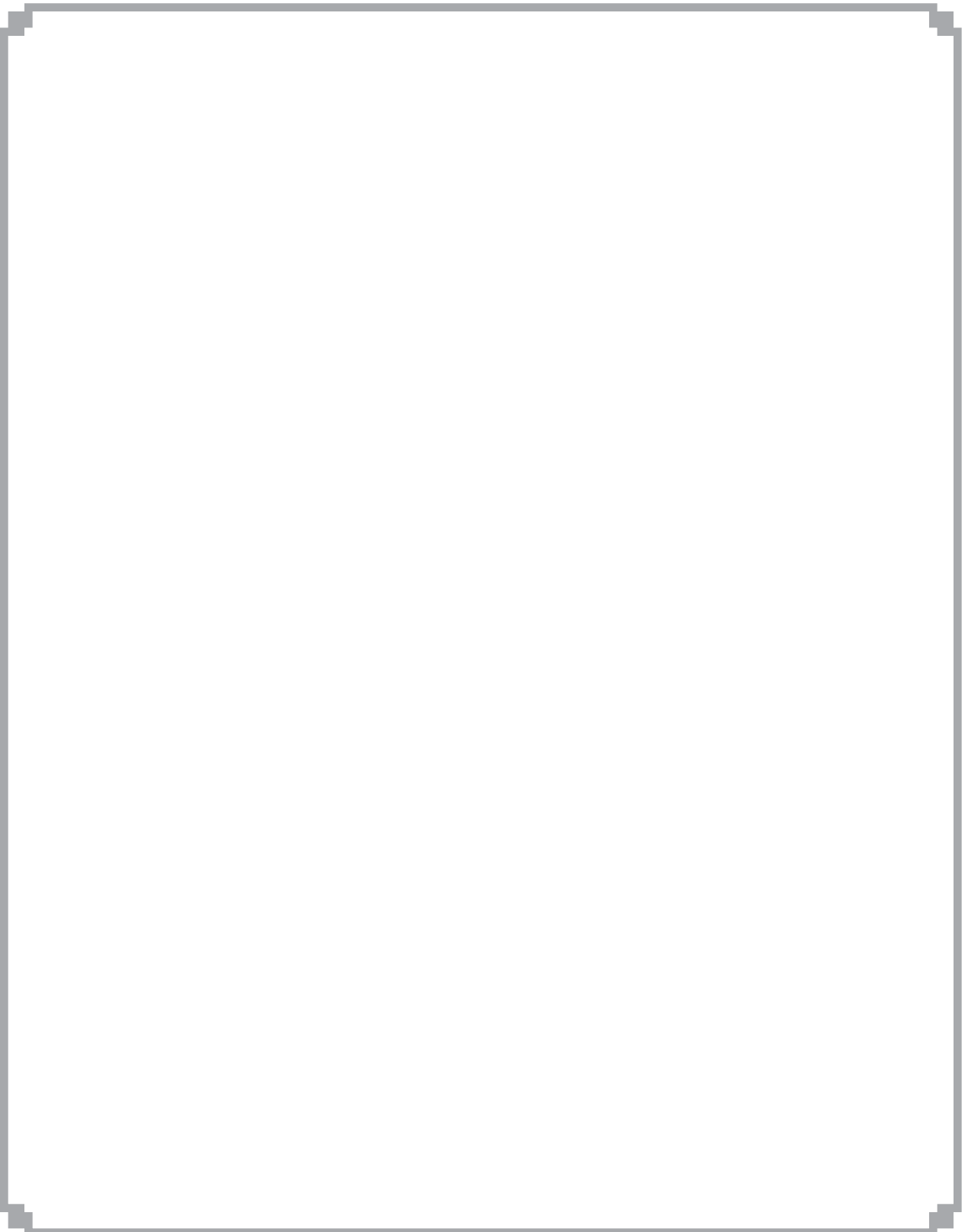
③ Draw a different creature that is eating.



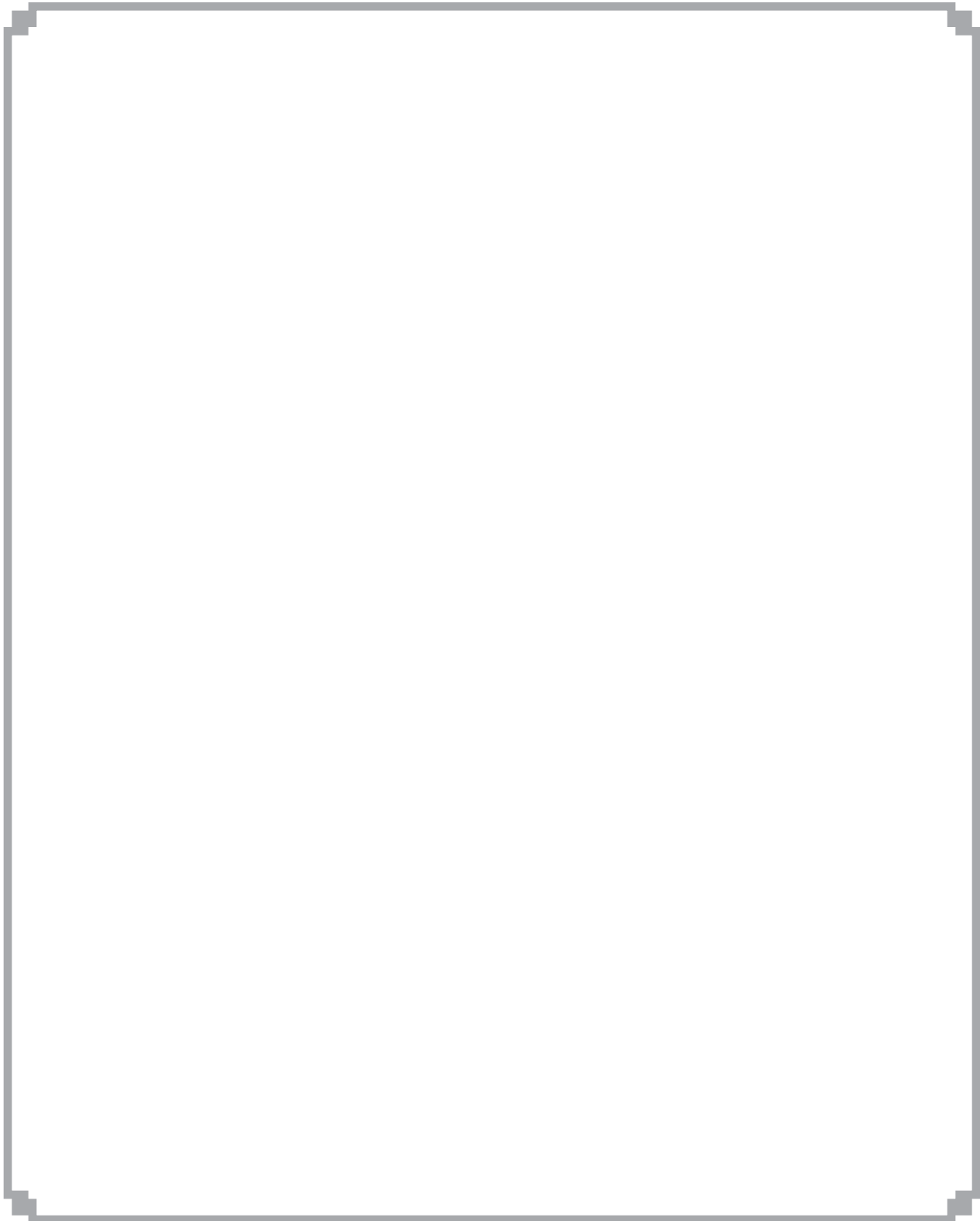
④ Draw another different creature that is eating.



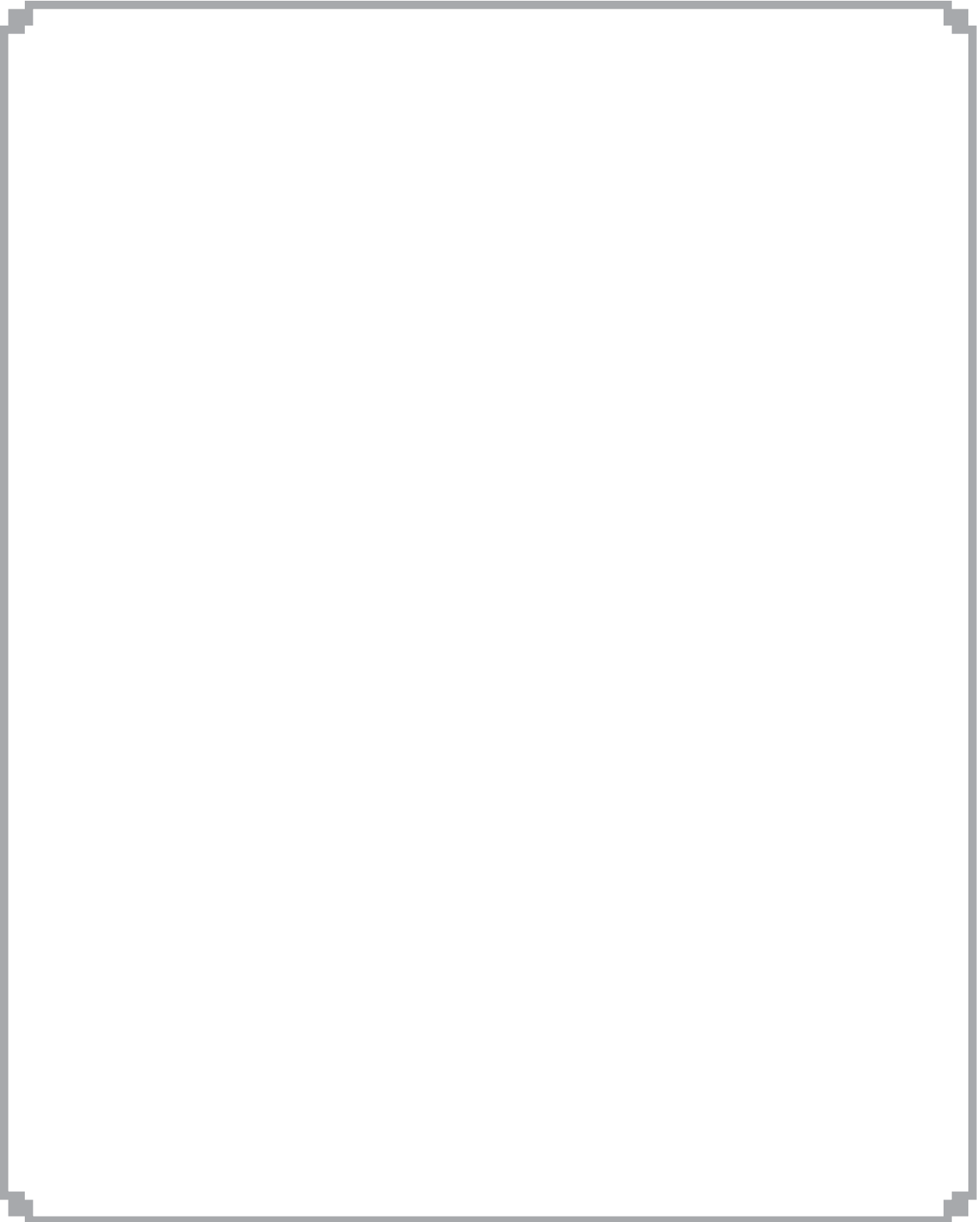
5 Draw the food one creature might be eating.



- ⑥ Are there two creatures that are eating in the same way?
Draw them below.



- ⑦ Are there two creatures that are eating in different ways?
Draw them below.



III. What Did You Discover?

❶ Did the protists eat like you thought they would? Why or why not?

❷ What was the first thing you noticed about the eating protists?

❸ Was there anything you did not expect to find while you were watching the protists eat? Describe it.

❹ How many different ways did they eat?

❺ Describe your favorite creature. Explain why it is your favorite.



IV. Why?

Protists eat in different ways. Some protists make their own food, like the green euglena does. Some protists use their tiny hairs to sweep food into their mouths, like the paramecium does. And other protists capture their food with their feet, like the amoeba does. Because there are lots of different kinds of protists, there are lots of different ways protists eat.

Protists can eat lots of different kinds of food. They can eat algae or other small plants. They can eat yeast, and they can eat other protists. Imagine what might happen when two protist-eating protists meet. Who gets to eat whom?

You also eat, but like most humans, you usually use your mouth to eat. Humans can eat both plants and animals. You usually don't need to hunt for your food—unless your brother steals your piece of cake! But you do need food. You are not like a euglena who can make its own food, and you can't catch your food with your feet like an amoeba. In a city, you need to rely on other people who can provide you with the food you need. You need milk from the dairy and bread from the bakery and eggs from the farm and just for fun—chocolate from the chocolate factory! A protist doesn't have other protists finding food for it—it must find its own food.

V. Just For Fun

Do protists like chocolate? Try it. Place a small piece of chocolate on the slide and see if protists eat it. Record your observations.



Protists and Chocolate



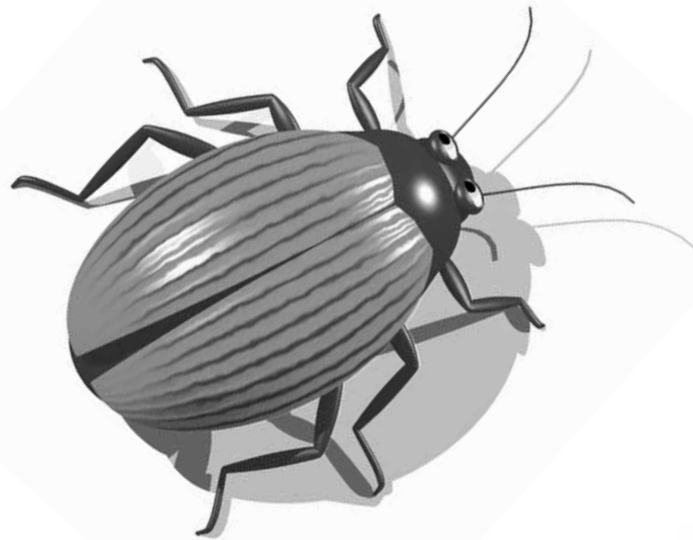
FOCUS ON

ELEMENTARY

Grades K-4



Teacher's Manual
3rd Edition



Rebecca W. Keller, PhD





Real Science-4-Kids

Cover design: David Keller

Opening page: David Keller, Rebecca W. Keller, PhD

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Teacher's Manual—3rd Edition
ISBN 978-1-941181-35-5

Published by Gravitas Publications Inc.
www.gravitaspublications.com
www.realscience4kids.com



A Note From the Author

This curriculum is designed to provide an introduction to biology for students in the elementary level grades. *Focus On Elementary Biology—3rd Edition* is intended to be used as the first step in developing a framework for the study of real scientific concepts and terminology in biology. This *Teacher's Manual* will help you guide students through the series of experiments in the *Laboratory Notebook*. These experiments will help the students develop the skills needed for the first step in the scientific method — making good observations.

There are several sections in each chapter. The section called *Observe It* helps the students explore how to make good observations. The *Think About It* section provides questions for the students to think about and use to make further observations. In every chapter there is a *What Did You Discover?* section that gives the students an opportunity to summarize the observations they have made. A section called *Why?* provides a short explanation of what students may or may not have observed. And finally, in each chapter there is a section called *Just For Fun* that contains an additional activity.

The experiments take up to 1 hour. The materials needed for each experiment are listed on the next page and also at the beginning of each experiment.

Enjoy!

Rebecca W. Keller, PhD

Materials at a Glance

Experiment 1	Experiment 3	Experiment 4	Experiment 5	Experiment 6
non-living object to observe (such as a rock or piece of wood) living thing to observe (such as an ant, frog, bird, cat, or dog) colored pencils	cotton balls rubber ball tennis ball banana apple rocks Legos other objects colored pencils	internet access and/or reference books colored pencils	milk, .25 l (1 cup) plain yogurt, .5 liter (2 cups) fork spoon cups or small bowls (several) food items such as honey, berries, chopped fruit or vegetables, spices, herbs, cocoa, chocolate chips, etc. (<i>Just For Fun</i> section)	microscope with a 10x or 20x objective lens (see the following How to Buy a Microscope section) plastic microscope slides ¹ eye dropper pond water or protozoa kit ¹ Protists (protozoa) can also be observed in hay water. To make hay water, cover a clump of dry hay with water and let it stand for several days at room temperature. Add water as needed
Experiment 2				
magnifying glass colored pencils				

Experiment 7	Experiment 8	Experiment 9	Experiment 10	Experiment 11
(see Experiment 6) small piece of chocolate Optional baker's yeast Eosin Y stain ² distilled water	6-8 sealable plastic bags waterproof disposable gloves piece of newspaper or plastic 2 pieces of fruit 2-3 pieces of bread (works best if bread does not have preservatives) marking pen water Optional colored pencils	notebook or drawing pad with blank pages (not ruled) to make a nature journal pencil colored pencils Optional camera and printer tape backpack snack and bottle of water	2 small houseplants of the same kind and size 2 more small houseplants of the same kind and size water measuring cup closet or cardboard box colored pencils	2-4 white carnations 1 or more other white flowers (rose, lily, etc.) 2-3 small jars food coloring water tape knife colored pencils Optional magnifying glass

¹ As of this writing, the following materials are available from Home Science Tools, www.hometrainingtools.com: plastic microscope slides, MS-SLIDSPL or MS-SLPL144, Basic Protozoa Set, LD-PROBASC

² Eosin Y stain, CH-EOSIN (Home Science Tools)

Experiment 12	Experiment 13	Experiment 14	Experiment 15	Experiment 16
<p>1-2 small clear glass jars</p> <p>2 or more dried beans (white, pinto, soldier, etc.)</p> <p>2 or more additional dried beans (different kind) or other seeds</p> <p>absorbent white paper</p> <p>scissors</p> <p>knife</p> <p>plastic wrap</p> <p>clear tape</p> <p>rubber band</p> <p>water</p> <p>Optional</p> <p>magnifying glass</p>	<p>student's field notebook</p> <p>pencil, pen</p> <p>colored pencils</p> <p>Optional</p> <p>camera and printer</p> <p>tape</p> <p>backpack</p> <p>snack and bottle of water</p>	<p>large tray or plastic box, at least .3 m (1 ft.) on each side, and cover</p> <p>garden dirt (with lots of organic material)</p> <p>spoon or garden trowel</p> <p>12 snails/slugs and/or 20-40 worms ³</p> <p>holding box for the snails/worms to keep them moist and dark</p> <p>water</p> <p>experimental snail and worm barriers.</p> <p>Set the amount you are going to use in an open container in the sun for a few days.</p> <p>table or rock salt plus three of the following:</p> <p>cinnamon</p> <p>baking soda</p> <p>black pepper</p> <p>cornstarch</p> <p>flour</p> <p>borax</p> <p>an active anthill</p>	<p>butterfly kit</p> <p>small cage</p> <p>Butterfly kits can be purchased from a variety of different sources, such as:</p> <p>Home Science Tools: www.hometrainingtools.com</p> <p>Insect Lore: www.insectlore.com</p>	<p>tadpole kit (or tadpoles or frog eggs collected locally)</p> <p>A tadpole kit can be purchased from Home Science Tools: www.hometrainingtools.com.</p> <p>aquarium</p> <p>water</p> <p>tadpole food</p>

³ Look for online or local sources of snails and/or earthworms. Or you and your students may be able to collect them yourselves.

Materials: Quantities Needed for All Experiments

Equipment	Materials	Materials (continued)
aquarium cage, small cup, measuring cups or small bowls (several) eye dropper fork jars, 2-3 small, clear glass knife Legos magnifying glass microscope with a 10x or 20x objective lens ¹ scissors spoon spoon or garden trowel tray or plastic box, large, at least .3 m (1 ft.) on each side, and cover Optional camera and printer magnifying glass camera backpack	ball, rubber ball, tennis box for snails/worms to keep them moist and dark butterfly kit ² carnations, 2-4 white cotton balls dirt, garden (with lots of organic material) flowers (rose, lily, etc.), white, 1 or more (not carnations) food coloring gloves, waterproof, disposable houseplants, 2 small - same kind and size houseplants, 2 additional, small - same kind and size living thing to observe (such as an ant, frog, bird, cat, or dog) microscope slides, plastic ² newspaper or plastic, 1 piece notebook or drawing pad with blank pages (not ruled) non-living object to observe (such as a rock or piece of wood) objects, misc. paper, absorbent white pen pen, marking pencil pencils, colored plastic bags, sealable, 6-8 plastic wrap pond water or protozoa kit protists (protozoa) ² rocks rubber band snail and worm barriers, student choice of materials snails/slugs, 12, and/or 20-40 worms ³	table or rock salt plus three of the following: cinnamon, baking soda, black pepper, cornstarch, flour, borax tadpole food tadpole kit (or tadpoles or frog eggs collected locally) ² tape tape, clear water Optional Eosin Y stain ² water, distilled
Foods		Other
apple banana beans, dried (white, pinto, soldier, etc.), 2 or more beans, dried (different from above) or other seeds, 2 or more bread, 2-3 pieces (best without preservatives) chocolate, small piece food items such as honey, berries, chopped fruit or vegetables, spices, herbs, cocoa, chocolate chips, etc. fruit, 2 pieces milk, .25 l (1 cup) yogurt, plain, .5 liter (2 cups) Optional baker's yeast snack and bottle of water		anthill, active closet or cardboard box internet access and/or reference books

¹ See the following *How to Buy a Microscope* section for recommendations.

² As of this writing, the following materials are available from Home Science Tools, www.hometrainingtools.com:

Butterfly kit (can also be purchased from Insect Lore: www.insectlore.com)

Eosin Y stain, CH-EOSIN

Plastic microscope slides, MS-SLIDSPL or MS-SLPL144

Basic Protozoa Set, LD-PROBASC

Tadpole kit

³ Look for online or local sources of snails and/or earthworms. Or you and your students may be able to collect them.

How to Buy a Microscope

What to Look For

- A metal mechanical stage.
- A metal body painted with a resistant finish.
- DIN Achromatic Glass objective lenses at 4X, 10X, 40X (a 100X lens is optional but recommended).
- A focusable condenser (lens that focuses the light on the sample).
- Metal gears and screws with ball bearings for movable parts.
- Monocular (single tube) “wide field” ocular lens.
- Fluorescent lighting with an iris diaphragm.

Price Range

\$50-\$150: Not recommended: These microscopes do not have the best construction or parts and are often made of plastic. These microscopes will cause frustration, discouraging students.

\$150-\$350: A good quality standard student microscope can be found in this price range. We recommend Great Scopes for a solid student microscope with the best parts and optics in this price range. <http://www.greatscopes.com>

Above \$350: There are many higher end microscopes that can be purchased, but for most students these are too much microscope for their needs. However, if you have a child who is really interested in microscopy, wants to enter the medical or scientific profession, or may become a serious hobbyist, a higher end microscope would be a valuable asset.

Objective lenses: Magnification/Resolution/Field of View/Focal Length

The objective lenses are the most important parts of the microscope. An objective lens not only magnifies the sample, but also determines the resolution. However, higher powered objective lenses with better resolution have a smaller field of view and a shorter focal length.

The resolution and working distance (focal length) of a lens is determined by its numerical aperture (NA). Following is a list of magnifications, numerical aperture, and working distance for some common achromatic objective lenses.

How to Buy a Microscope (Continued)

Magnification	Numerical Aperture	Working Distance (mm)
4X	0.10	30.00
10X	0.25	6.10
20X	0.40	2.10
40X	0.65	0.65
60X	0.80	0.30
100X (oil)	1.25	0.18

You can see as the magnification increases the numerical aperture increases (which means the resolution increases) and the working distance decreases.

Choosing the right lens for the right sample is part of the art of microscopy.

Most student projects can be achieved with a 40X objective, however a 100X objective lens can be added to make observing bacteria and small cell structures possible.

Below is a general chart showing the recommended objective lens to use for different types of samples.

Bulky Samples	Hair	Protists	Plant Cell	Animal Cell	Organ-elles	E. coli	Cell Structure
2 mm	400 um	200 um	100 um	20 um	10 um	2 um	2 um-200nm
← 4X →		← 10X →			← 40X →		← 100X →

Contents



Experiment 1:	WHAT IS LIFE?	1
Experiment 2:	TAKING NOTES	4
Experiment 3:	WHERE DOES IT GO?	7
Experiment 4:	WHAT DO YOU NEED?	13
Experiment 5:	YUMMY YOGURT	18
Experiment 6:	LITTLE CREATURES MOVE	21
Experiment 7:	LITTLE CREATURES EAT	25
Experiment 8:	OLDY MOLDY	29
Experiment 9:	NATURE WALK: OBSERVING PLANTS	33
Experiment 10:	WHO NEEDS LIGHT?	36
Experiment 11:	THIRSTY FLOWERS	40
Experiment 12:	GROWING SEEDS	44
Experiment 13:	NATURE WALK: OBSERVING ANIMALS	48
Experiment 14:	RED LIGHT, GREEN LIGHT	51
Experiment 15:	BUTTERFLIES FLUTTER BY	55
Experiment 16:	TADPOLES TO FROGS	58

Experiment 1

What Is Life?

Materials Needed

- non-living object to observe, such as a rock or piece of wood
- living thing to observe, such as an ant, frog, bird, cat, or dog
- colored pencils

Objectives

In this experiment students will explore the differences between living and non-living things.

The objectives of this lesson are for students to:

- Observe features of living and non-living things.
- Think about the definition of life.

Experiment

I. Think About It

Read this section of the *Laboratory Notebook* with your students.

- 1-4 Help the students think about and answer the questions in this section. There are no right answers for these questions. Just allow the students to explore their own ideas about life and non-life.

II. Observe It

Read this section of the *Laboratory Notebook* with your students.

Help your students find a living thing and a non-living thing to observe. Have them write the name of each item in the space provided. In one column they will list or draw their observations for the living thing and in the other column their observations for the non-living thing.

Help them explore each item by asking the following questions.

- *Can the item move?*
- *Does the item breathe?*
- *Does the item consume food?*
- *Can the item reproduce itself?*

In the space provided have the students write or draw what they see.

III. What Did You Discover?

Read the questions with your students.

- ❶-❸ Have the students answer the questions. These can be answered orally or in writing. There are no right answers, and their answers will depend on what they actually observed.

IV. Why?

Read this section of the *Laboratory Notebook* with your students.

Discuss any questions that might come up.

V. Just For Fun

Read this section of the *Laboratory Notebook* with your students.

Have the students imagine what life on another planet might look like. Help them think about what characteristics they might include, such as how the creatures would move, what sort of appendages they would have and how many, their skin or fur color, the environment they'd live in, etc.

Have them write about and/or draw their imaginary living things. They can assign a name to the planet and name their creatures.

Experiment 7

Little Creatures Eat

Materials Needed

- microscope with a 10X or 20x objective lens (look online for sources such as Great Scopes or Carolina Biological Supply)
- plastic microscope slides
- eye dropper
- pond water or protozoa kit
- small piece of chocolate

Optional

- baker's yeast
- Eosin Y stain
- distilled water

Protists (protozoa) can also be observed in hay water. To make hay water, cover a clump of dry hay with water, and let it stand for several days at room temperature. Add water as needed.

As of this writing, the following materials are available from Home Science Tools, www.hometrainingtools.com:

- plastic microscope slides, MS-SLIDSPL or MS-SLPL144
- Basic Protozoa Set, LD-PROBASC
- Eosin Y stain, CH-EOSIN

Objectives

In this unit students will look at pond water, hay water, or water from a protozoa kit to observe how protists (protozoa) eat.

The objectives of this lesson are for students to:

- Make careful observations of protists eating.
- Practice using a microscope.

Experiment

In this experiment students will focus on protists that are eating. If pond water or hay water is being used, there should be plenty of food for the protists to eat.

Baker's yeast stained with Eosin Y can be added to any of the kinds of protozoa water. The Eosin Y stained yeast will be ingested by the protists. Once ingested, the red stained yeast will turn blue. It may take some time for this observation.

To make baker's yeast and Eosin Y stain:

- Add 5 milliliters (one teaspoon) of dried yeast to 120 milliliters (1/2 cup) of distilled water. Allow it to dissolve. Let the mixture sit for a few minutes, then add one dropper of Eosin Y to one dropper of the baker's yeast solution and let sit for a few minutes.
- Look at a droplet of the mixture under the microscope. You should be able to see individual yeast cells that are stained red.

I. Think About It

Read this section of the *Laboratory Notebook* with your students.

The students have read about how protists eat. Have them first think about what it might look like for a protist to eat. Help them explore their ideas with questions such as:

- *How do you think a paramecium eats?*
- *Do you think you can watch it eat?*
- *Do you think you can tell if the food is going inside?*
- *How do you think an amoeba eats?*
- *Do you think an amoeba can eat fast moving food? Why or why not?*
- *What else do you think you might see as the protists eat?*

Have the students draw what they think they will observe through the microscope as they watch protists eat.

II. Observe It

Read this section of the *Laboratory Notebook* with your students.

- ❶ a) Help the students place a small droplet of the protozoa solution onto a microscope slide.
- b) If using Eosin Y stained baker's yeast, have the students add a droplet of the stained baker's yeast to the protozoa water on the slide.
- c) Help the students carefully place the slide in the microscope.
- d) Have the students look through the eyepiece at the protozoa water on the slide.

(You may also position the slide correctly in the microscope and then add the liquids to it.)

It is important for students to practice observing as many different details as possible. Have them draw what they observe.

- ❷–❸ There are several drawing frames in the *Laboratory Notebook* for students to fill in with drawings of their observations of protists eating. Encourage the students to spend plenty of time looking at all the different features they observe. You can encourage them to stay at the microscope by engaging them with questions such as:

- *What kind of protist do you think you are seeing?*
- *Is it eating?*
- *Can you tell what it is eating?*
- *Can you tell if the protist is eating another protist or something else?*
- *How fast does it eat?*

- ❹–❺ Have the students compare some of the protists they are observing. They can make comparisons between different protists of the same kind (two paramecia, for example) and protists of different kinds (possibly a paramecium and an amoeba).

III. What Did You Discover?

Read this section of the *Laboratory Notebook* with your students.

Have students answer the questions about the protists they observed. Encourage them to summarize their answers based on their observations. They should have been able to see different protists eating. Have them explain what their favorite protist was, how it was eating, and why it was their favorite. Help them notice any differences between what they thought they would observe and what they actually observed.

IV. Why?

Read this section of the *Laboratory Notebook* with your students.

Different protists eat in different ways. Your students may or may not have been able to observe the protists eating. Explain to them that watching protists eat is sometimes like watching the tigers eat at the zoo. They may not be hungry. Repeat the experiment at a different time if your student was not able to observe protists eating.

V. Just For Fun

Help the students put a tiny piece of chocolate on the slide with the protozoa water. Have them look through the microscope to see if the protozoa will eat chocolate. Have them record their observations in the space provided.

FOCUS ON

Grades K-4

ELEMENTARY



LESSON PLAN

3rd Edition



Rebecca W. Keller, PhD





Real Science-4-Kids

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Lesson Plan—3rd Edition

Published by Gravitas Publications Inc.

www.gravitaspublications.com

www.realscience4kids.com



LESSON PLAN INSTRUCTIONS

This *Lesson Plan* accompanies the *Focus On Elementary Biology Student Textbook, Laboratory Notebook, and Teacher's Manual— 3rd Edition*. It is designed to be flexible to accommodate a varying schedule as you go through the year's study. And it makes it easy to chart weekly study sessions and create a portfolio of your student's yearlong performance. The PDF format allows you to print pages as you need them.

This Lesson Plan file includes:

- Weekly Sheets
- Sticker Templates
- Self-Review Sheet
- Self-Test Sheet

Materials recommended but not included:

- 3-ring binder
- Indexing dividers (3)
- Labels—24 per sheet, 1.5" x 1.5" (Avery 22805)

Use the Weekly Sheets to map out daily activities and keep track of student progress. For each week you decide when to read the text, do the experiment, explore the optional connections, review the text, and administer tests. For those families and schools needing to provide records of student performance and show compliance to standards, there is a section on the Weekly Sheets that shows how the content aligns to the National Science Standards.

To use this Lesson Plan:

- Print the Weekly Sheets
- Print Self-Review Sheets
- Print Self-Test Sheets
- Print the stickers on 1.5" x 1.5" labels
- Place all the printed sheets in a three-ring binder separated by index dividers

At the beginning of each week, use the squares under each weekday to plan your daily activities. You can attach printed stickers to the appropriate boxes or write in the daily activities. At the end of the week, use the Notes section to record student progress and performance for that week.

WEEKLY LESSON PLAN SAMPLES

LESSON PLAN—Exploring the BUILDING BLOCKS of SCIENCE BOOK 1
CHAPTER 1: WHAT IS SCIENCE?

Monday	Tuesday	Wednesday	Thursday	Friday
READ	EXPERIMENT	CONNECTIONS	REVIEW	TEST

Objectives To introduce students to the basic building blocks of science: chemistry, biology, physics, geology, and astronomy.

Educational Standard* Content Standard A: Science as Inquiry—Grade K-4
Scientists experiment to investigate and develop explanations.

*From the National Science Educational Standards (1996) and the Framework for K-12 Science Education (2012) National Academies Press

Activity
 Laboratory Experiment 1
 Other _____

Connections
 Ask your child about their own history. When were they born? Where were they born? What time were they born? Explain that this is their "history" and that science also has a history.
 History
 Look up the word "philosophy" in a dictionary, encyclopedia, or online resource. Discuss the meaning of the word "philosophy."
 Philosophy
 Pick one area and discuss how science is connected to art, music, or math. For example, scientists use math to understand data, artists use points that are made with chemistry, understanding sound helps us make music, and so on.
 Art, Music, Math
 Technology
 Discuss how the understanding of science helped people invent the airplane, computer, or cell phone.
 Language
 Look up the word science in a dictionary, encyclopedia, or online resource. Discuss the meaning of the word science.

Assessment
 Self-review
 Self-test
 Other _____

Notes
This week we decided to explore the art connection. We looked up the chemistry of red paint and found out what makes it red. This was a great week - lots of fun!

Here is a sample of a normal week.

The recommended sequence is

- 1 - Read the student textbook on the first day.
- 2 - Do the laboratory experiment on the second day.
- 3 - Pick one or more connections to explore on the third day.
- 4 - Do the self-review sheet on the fourth day.
- 5 - Administer the self-test or another exam on the fifth day.



Here is a sample of a week with other activities

- 1 - Find at least one day to READ the text.
- 2 - Find a day to perform the EXPERIMENT.
- 3 - Find a day to do the REVIEW or TEST.

Any activity that is missed can be rescheduled for the following week. However, keep to the main sequence of reading the text, doing the experiment, and reviewing what has been covered. If an activity needs to be missed, choose the CONNECTIONS or SELF-TEST.



LESSON PLAN—Exploring the BUILDING BLOCKS of SCIENCE BOOK 1
CHAPTER 1: WHAT IS SCIENCE?

Monday	Tuesday	Wednesday	Thursday	Friday
READ	BIRTHDAY	EXPERIMENT	FIELD TRIP	REVIEW

Objectives To introduce students to the basic building blocks of science: chemistry, biology, physics, geology, and astronomy.

Educational Standard* Content Standard A: Science as Inquiry—Grade K-4
Scientists experiment to investigate and develop explanations.

*From the National Science Educational Standards (1996) and the Framework for K-12 Science Education (2012) National Academies Press

Activity
 Laboratory Experiment 1
 Other _____

Connections
 Ask your child about their own history. When were they born? Where were they born? What time were they born? Explain that this is their "history" and that science also has a history.
 History
 Look up the word "philosophy" in a dictionary, encyclopedia, or online resource. Discuss the meaning of the word "philosophy."
 Philosophy
 Pick one area and discuss how science is connected to art, music, or math. For example, scientists use math to understand data, artists use points that are made with chemistry, understanding sound helps us make music, and so on.
 Art, Music, Math
 Technology
 Discuss how the understanding of science helped people invent the airplane, computer, or cell phone.
 Language
 Look up the word science in a dictionary, encyclopedia, or online resource. Discuss the meaning of the word science.

Assessment
 Self-review
 Self-test
 Other Oral quiz

Notes
We had a birthday this week and decided to go on the field trip. We did the self-review and I had the kids take an oral quiz in the car on the way home from the field trip.

Week _____

CHAPTER 1: WHAT IS BIOLOGY?

Monday

Tuesday

Wednesday

Thursday

Friday

--	--	--	--	--

Objectives To introduce students to the scientific discipline called biology.

Educational Standard* **Content Standard 1-LS1-1.A**
All organisms have different parts that they use in different ways.

*From the Next Generation Science Standards (NGSS)

Activity

- Laboratory Experiment 1
- Other _____

Connections

- History Look up the history of biology on the internet or in the library. Discuss how ancient people used biology in their everyday lives, including growing plants and raising animals for food.
- Philosophy Look up the Greek philosopher Aristotle on the internet or in the library. Discuss how Aristotle made observations about living things and how he helped shape modern biology.
- Art, Music, Math Discuss how animals make sounds and songs. Discuss how animal songs have inspired musical pieces, such as Peter and the Wolf by Sergei Prokofiev, 1938.
- Technology Discuss how new technologies allow scientists to study how animals communicate.
- Language Look up the word *biology* in a dictionary, encyclopedia, or online resource. Discuss the meaning of the word *biology*.

Assessment

- Self-review
- Self-test
- Other _____

Notes



Week _____

CHAPTER 7: PROTISTS EAT

Monday	Tuesday	Wednesday	Thursday	Friday

Objectives To introduce students to the microscopic organisms called protists.

Educational Standard* **Content Standard 4-LS1.D**
Different organisms have specialized receptors for getting information.

*From the Next Generation Science Standards (NGSS)

Activity

- Laboratory Experiment 7
- Other _____

Connections

- History** Continue to explore the history of protists. What were the first protists to be discovered?
- Philosophy** Look up Anton van Leeuwenhoek and continue to explore how his discovery changed the way we understand the world around us.
- Art, Music, Math** Explore the intricate designs of protists and how these designs have inspired artists and architects.
- Technology** What technologies have allowed us to learn more about protists? Discuss how learning about protists can be useful to us.
- Language** Look up the word *pseudopod* in a dictionary or encyclopedia. Discuss the meaning of the word *pseudopod*.

Assessment

- Self-review
- Self-test
- Other _____

Notes



READ



READ



READ



READ



REVIEW



REVIEW



REVIEW



REVIEW



EXPERIMENT



EXPERIMENT



EXPERIMENT



EXPERIMENT



CONNECTIONS



CONNECTIONS



CONNECTIONS



CONNECTIONS



TEST



TEST



TEST



TEST



READ



READ



READ



READ



HOLIDAY



HOLIDAY



HOLIDAY



HOLIDAY



FIELD TRIP



FIELD TRIP



FIELD TRIP



FIELD TRIP



BIRTHDAY



BIRTHDAY



BIRTHDAY



BIRTHDAY



REST DAY



REST DAY



REST DAY



REST DAY



REST DAY



REST DAY



REST DAY



REST DAY



SICK DAY



SICK DAY



SICK DAY



SICK DAY



FOCUS ON
ELEMENTARY

Grades K-4



STUDY NOTEBOOK
3rd Edition



Rebecca W. Keller, PhD



(Print this page and glue to the front of your Study Notebook.)



Real Science-4-Kids

Illustrations: Janet Money maker

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be used or reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Study Notebook— 3rd Edition

Published by Gravitas Publications Inc.

Real Science-4-Kids®

www.realscience4kids.com

www.gravitaspublications.com



FOCUS ON ELEMENTARY BIOLOGY STUDY NOTEBOOK

This Study Notebook has activities for you to do that will help you learn the ideas presented in each chapter of the Student Textbook.

Materials you will need

- 8.5 x 11 white paper
- color printer
- scissors
- glue or clear tape
- colored pencils
- 1 manila file folder
- 3 brad paper fasteners or 3-ring binder
- 3-hole punch

STEP 1 Printing

- Download the Study Notebook file for the chapter you are reading.
- Use the printer settings: portrait, letter, 8.5 x 11.
- Print the pages single sided.

STEP 2 Activities

- The little blue boxes on the left-hand side of the main pages show you which section of the Student Textbook has the information for that activity.
- For the chapter you are studying, do the activities on the two main pages (those that have page numbers at the bottom): fill in the blanks, answer questions, and follow the directions for other types of activities.
- On the **Stuff to Cut Out** pages, follow the directions for cutting out the pieces and gluing or taping them to the main pages.

STEP 3 Make the Study Notebook pages into a Book

- Cut the file folder in half along the fold.
- Use a 3-hole punch to make holes along the cut edge of the file folder pieces.
- Use the two pieces for the front and back covers.
- As you complete each chapter, punch holes in the pages and insert them between the front and back covers of your Study Notebook.



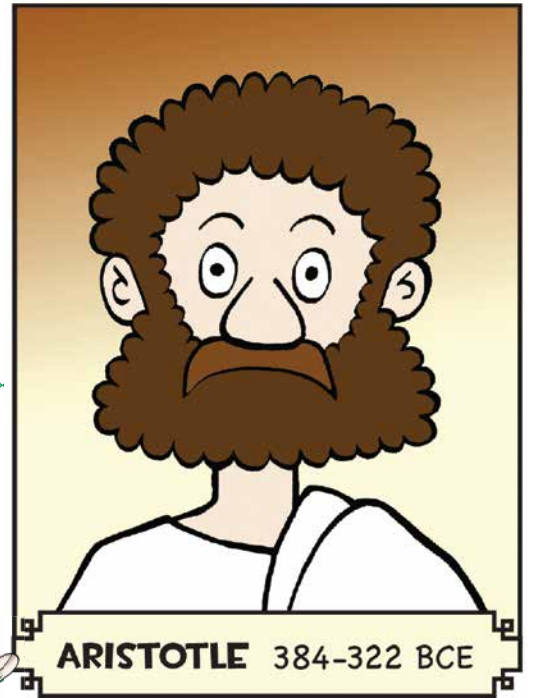
This is **YOUR** book! Add color to the pages along with doodles, squiggles, and notes in the margins. The backs of the pages are great for writing observations and ideas. Add your own pages with more ideas, observations, questions, science news you have heard about, and anything else you want to remember.

1. What Is Biology?

BIOLOGY

is the study of

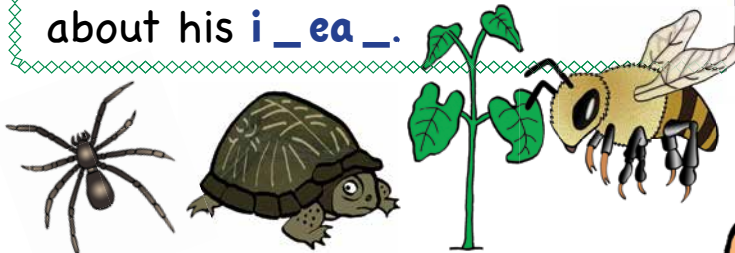
L _ _ _ _



1.1

1.2

Ar _ st _ t _ _ made many
o _ s _ rv _ tio _ _ of plants and
animals and wrote B _ _ KS
about his i _ ea _ .



Make your own BIOLOGY BOOK!

Find instructions and pages in
the **Stuff to Cut Out for Chapter 1**
section.



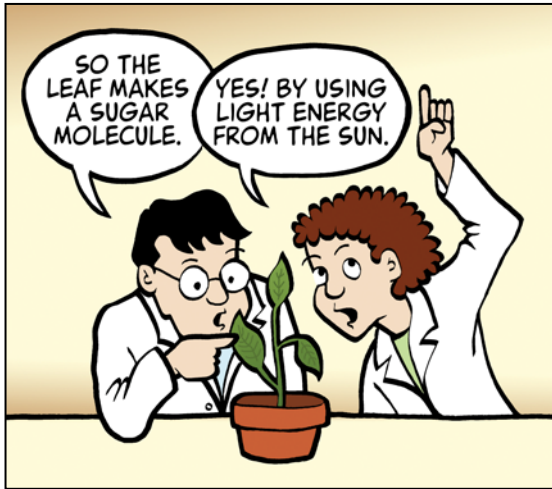
↑
Open end of pocket goes here.

Make a pocket to keep your book in.

Glue or tape the pocket for your book
here. Find the pocket in the
Stuff to Cut Out for Chapter 1 section.

Punch holes on this edge.

1.3



Are **YOU** surprised to find out that **p _ _ nts** make **s _ g _ r** molecules by using **E _ _ RG _** from the **Sun**?

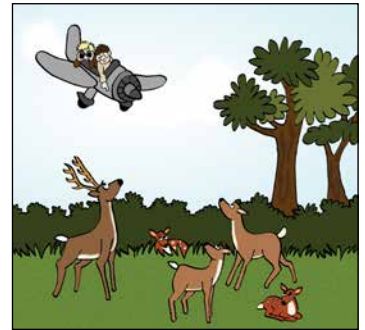
YES! **NO!**



What is your **favorite biology tool**?

(Circle one)

- Airplane**
- Magnifying glass**
- Microscope**
- Eyes**



1.4

Question:

How do **YOU** think **you** use **biology** every day?

Answer:

MAKE A LIST!

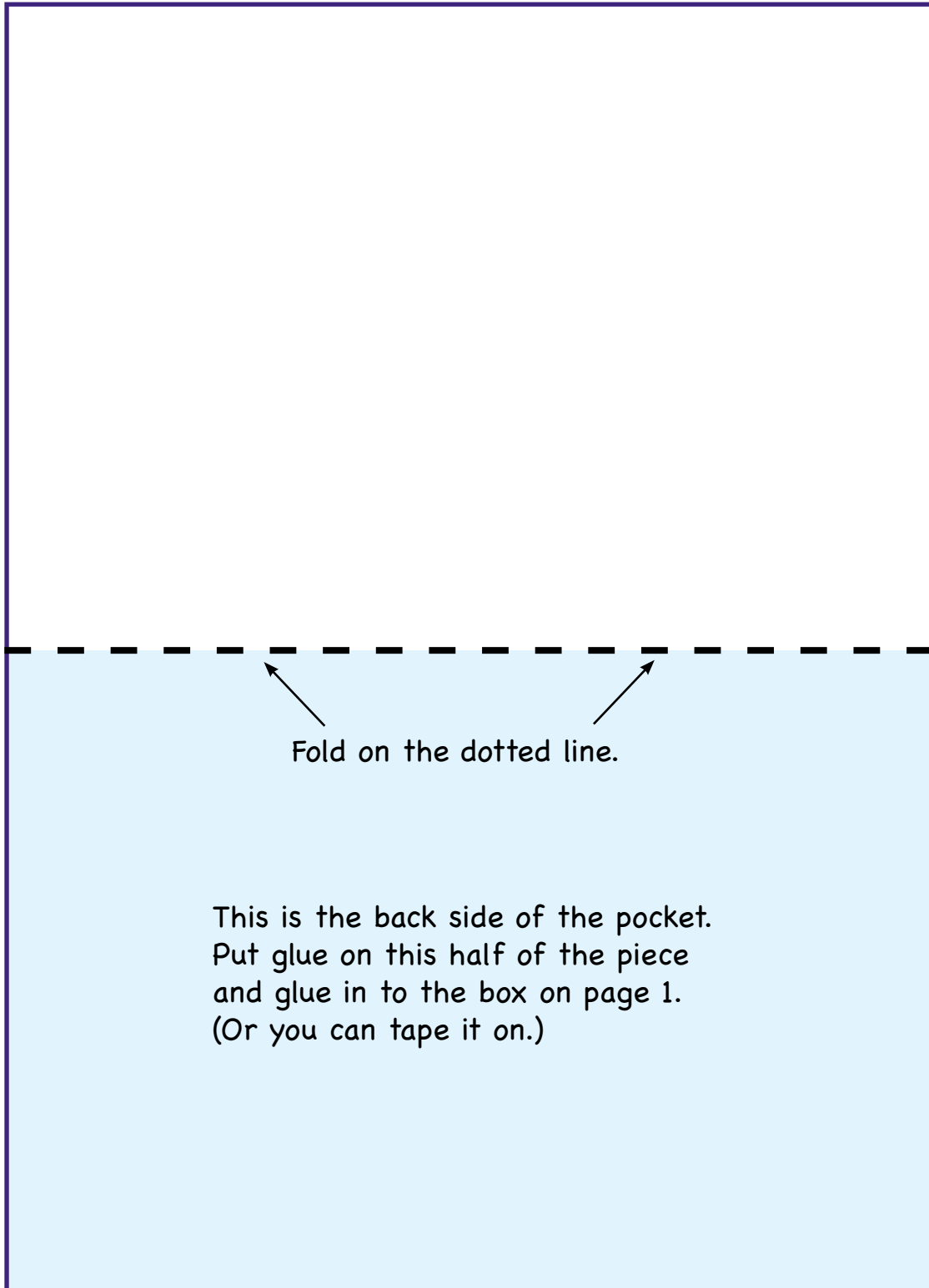
Stuff to Cut Out for Chapter 1

Make a pocket for your book of biology observations.

Cut out this piece on the solid outline. Fold it in half on the dotted line. Glue or tape the left-hand and right hand sides. The top will be open. Then glue or tape this pocket in the box on page 1. Decorate the book pocket.

This end of the pocket will be open.

After the pocket is folded, glue or tape the front to the back along this edge.



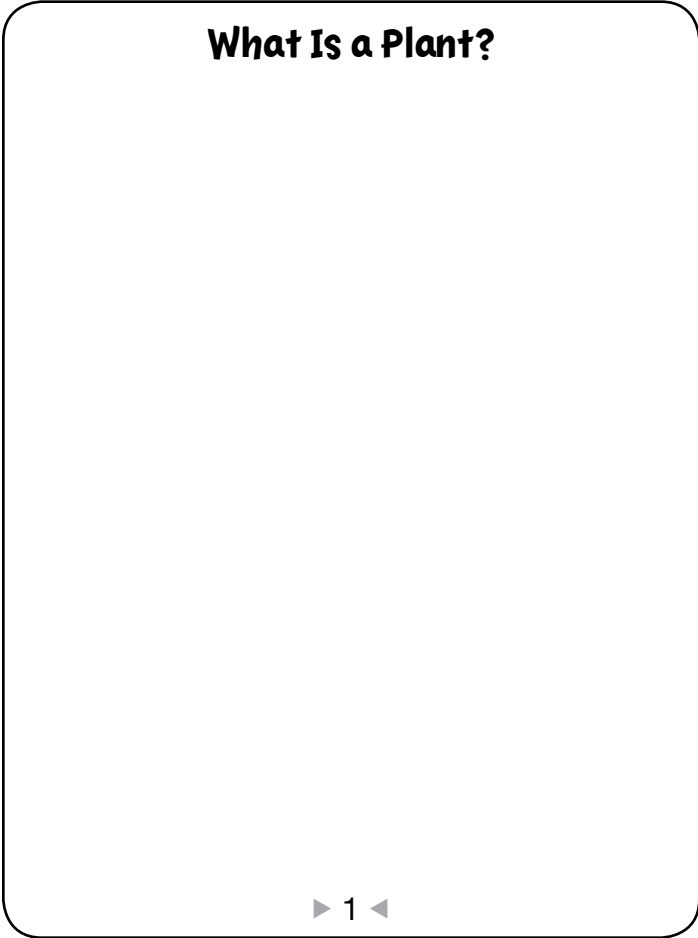
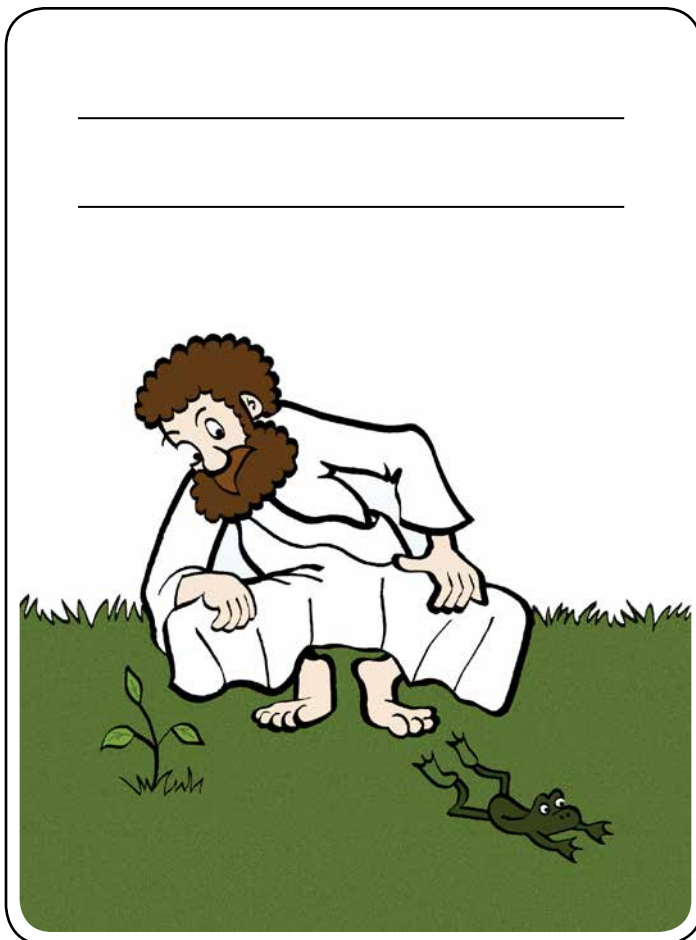
After the pocket is folded, glue or tape the front to the back along this edge.

More Stuff to Cut Out for Chapter 1

Pages for your own book of biology observations

Cut out each of these pieces on their solid outline. These are pages for your book. After you cut out all the pages, stack them up and put three staples in the left-hand edge of your book. Go outside for some walks and observe plants and animals. You can also observe plants and animals in your house. Write and draw your observations in your book.

This is the book cover.
Give your book a title.



↑
Put three staples along the left edge when you have all the pages cut out and stacked up.

These Are Plants

▶ 2 ◀

These Are Parts of a Plant

▶ 3 ◀

These Plants Look Different

▶ 4 ◀

What Is An Animal?

▶ 5 ◀

These Are Animals

▶ 6 ◀

These Are Parts of an Animal


▶ 7 ◀


These Animals Look Different


▶ 8 ◀


▶ ◀

Extra pages for your book or to make another book. Print as many as you like.









7. Protists Eat!

What do **PROTISTS** eat and **how** do they eat it?



7.1

It is **silly** to think that **any** **PR _ T _ _T** can make its own **f _ _ d!**

YES!

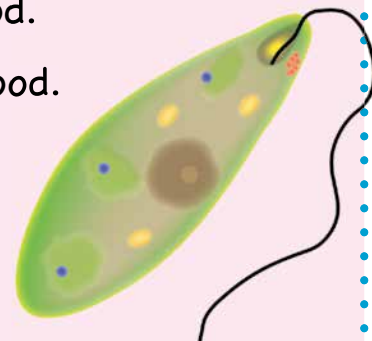
NO!

7.1

EUGLENA FACTS!

(Put a **T** in front of statements that are **true** and an **F** in front of statements that are **false**.)

- Euglena use sugars to make their own food.
- Euglena use sunlight to make their own food.
- Euglena don't make their own food.
- Chlorophyll is a red substance.
- Chlorophyll gives a euglena its color.
- An eyelid helps the euglena find sunlight.



7.2

THE AMAZING PARAMECIUM!

How is a **paramecium's mouth** **different** from **YOUR** mouth?



How does a paramecium get its food?
(Circle your answers.)

- Swirls water** **Uses a flagellum** **Shops**
- Uses false feet** **Uses cilia** **Swims around**
- Uses a mouth** **Uses chlorophyll** **Uses a fork**

What are some things that make a paramecium an amazing creature?

Punch holes on this edge.



Punch holes on this edge.

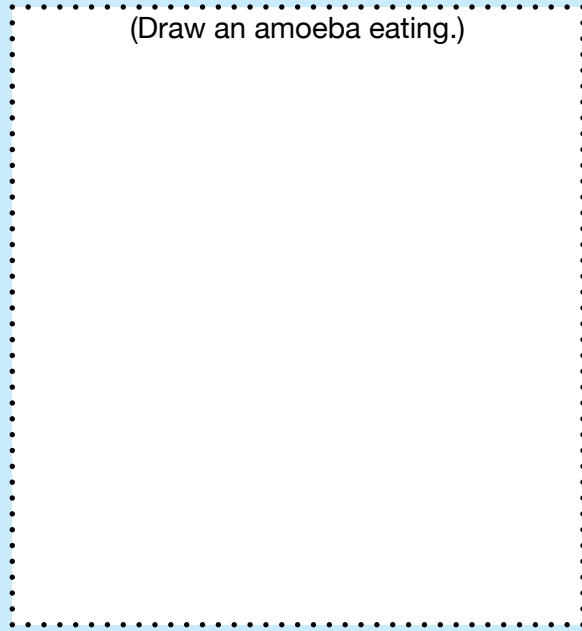


7.3

Do **YOU** think it is **Disgusting** to an **amoeba** that it has to eat with its **feet**?

NO! Because it uses its
p _ _ _ _ _ which are
F _ _ _ **F** _ _ _ !

(Draw an amoeba eating.)



7.4

How is a **COLEPS** that is **SWIMMING** like a **COLEPS** that is **EATING**?

(Draw a Coleps.)



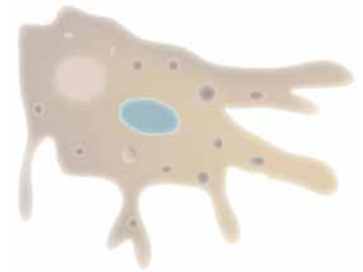
7.1

7.2

7.3

A DAY IN THE LIFE OF AN AMOEBIA

(Write a short story about a day in the life of an amoeba.)



(See directions in **Stuff to Cut Out** section.)

Glue **TAB 7A** Here

More Stuff to Cut Out for Chapter 7

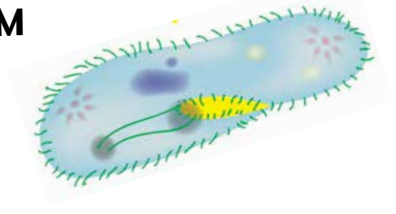
Cut out this **Book Page** on its solid outline and write your story. Then match **yellow TAB 7B** to the **green Glue TAB 7B Here** on page 14.

TAB 7B

Glue **TAB 7C Here**

A DAY IN THE LIFE OF A PARAMECIUM

(Write a short story about a day in the life of a paramecium.)



Make a cover for your stories about protists. In the box below, fill in a title for your little book and draw the three main characters of your stories. Then cut out this piece on its solid outline and match **yellow TAB 7C** to the **green Glue TAB 7C Here** on page 14.

TAB 7C

17. A chloroplast... (Check all that apply.) (10 points)

- Is the same as an eyespot.
- Contains chlorophyll.
- Is used to make food.
- Makes amoebas green in color.
- Captures sunlight.
- Is found in euglena.
- Is found in paramecia.

Focus On Elementary Biology 3rd Edition, Final Quiz

Chapters 1-16, 32 questions, 10 points each

1. Biologists don't need to use chemistry and physics to help them understand living things. (10 points)

- True
- False

2. You are doing biology when you... (10 points)

- Observe and study living things.
- Care for a dog.
- Watch birds build a nest.
- Plant seeds and care for the plants that grow from them.
- Observe ants gathering food.

13. A euglena eats by using cilia to swirl food into its mouth. (10 points)

- True
- False

14. Check all the statements that are true for protists. (10 points)

- All protists can make their own food.
- A paramecium eats other small creatures.
- Protists use cilia, flagella, or pseudopods to help them get food.
- Coleps rotates its body to swim and to eat.
- A euglena eats paramecia.
- A euglena uses chlorophyll to make its own food.
- An amoeba surrounds its food with pseudopods.

Focus On Elementary Biology 3rd Edition, Midterm 1

Chapters 1-8, 20 questions, 10 points each

1. True
2. Use different tools to make observations., Study how plants make food from light., Study chemicals in the leaves of plants., Use observations to make discoveries., Perform both simple and complicated experiments.
3. Aristotle

15. It swims with cilia to find food and swirl the food into its mouth.
16. False
17. Contains chlorophyll., Is used to make food., Captures sunlight., Is found in euglena.

Focus On Elementary Biology 3rd Edition, Final Quiz

Chapters 1-16, 32 questions, 10 points each

1. False
2. Observe and study living things., Care for a dog., Watch birds build a nest., Plant seeds and care for the plants that grow from them., Observe ants gathering food.

13. False
14. A paramecium eats other small creatures., Protists use cilia, flagella, or pseudopods to help them get food., Coleps rotates its body to swim and to eat., A euglena uses chlorophyll to make its own food., An amoeba surrounds its food with pseudopods.

FOCUS ON

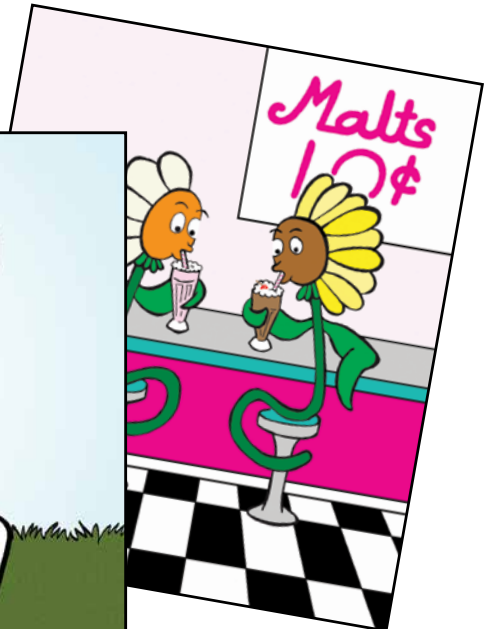
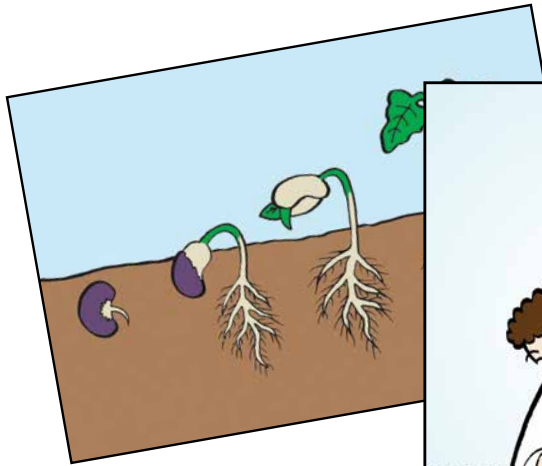
Grades K-4

ELEMENTARY



GRAPHICS

3rd Edition





Real Science-4-Kids

Illustrations: Janet Moneymaker

Copyright © 2019 Gravitas Publications, Inc.

All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording, or otherwise, without prior written permission from the publisher. No part of this book may be used or reproduced in any manner whatsoever without written permission.

Focus On Elementary Biology Graphics Package— 3rd Edition

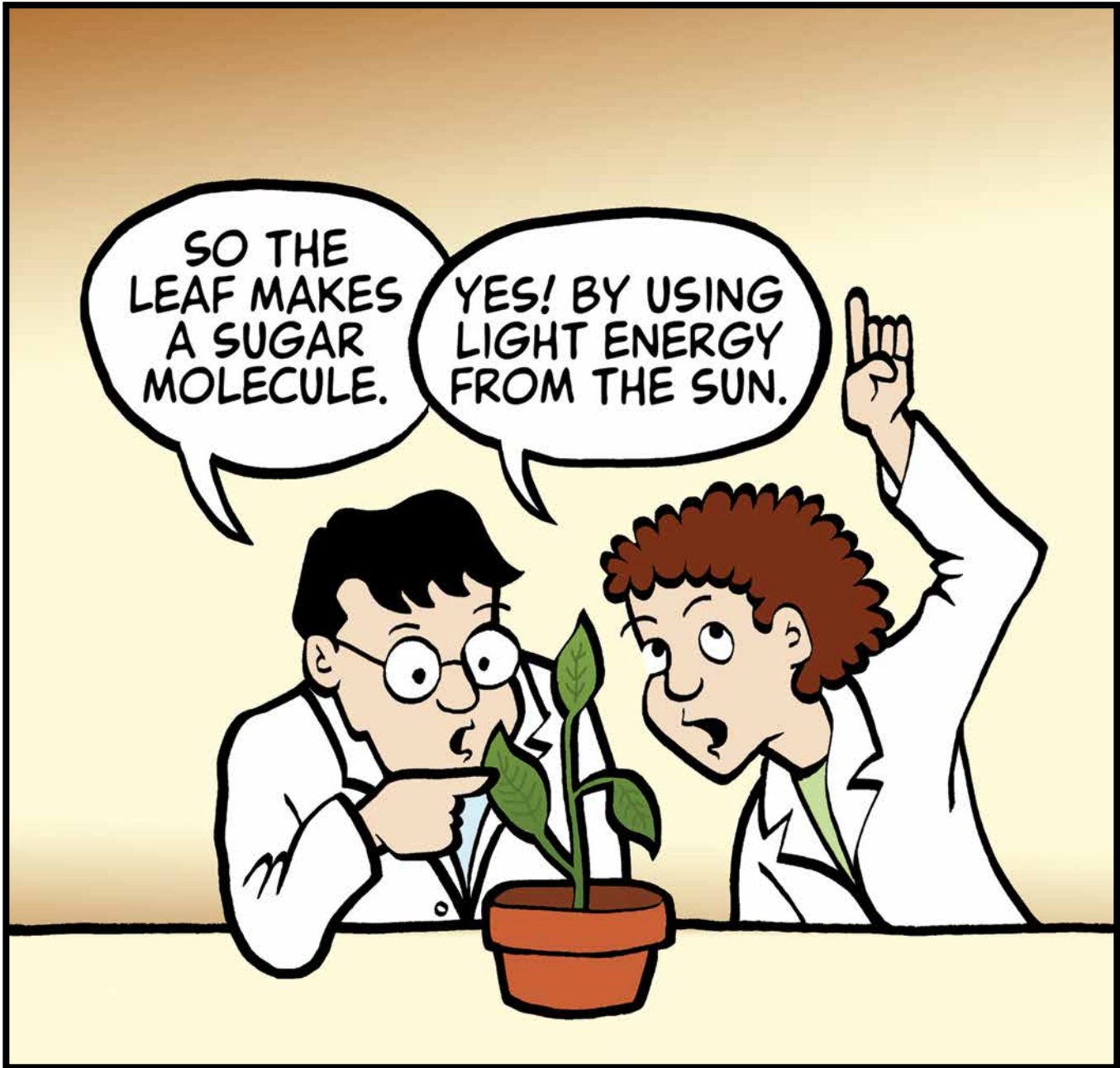
Published by Gravitas Publications Inc.

Real Science-4-Kids®

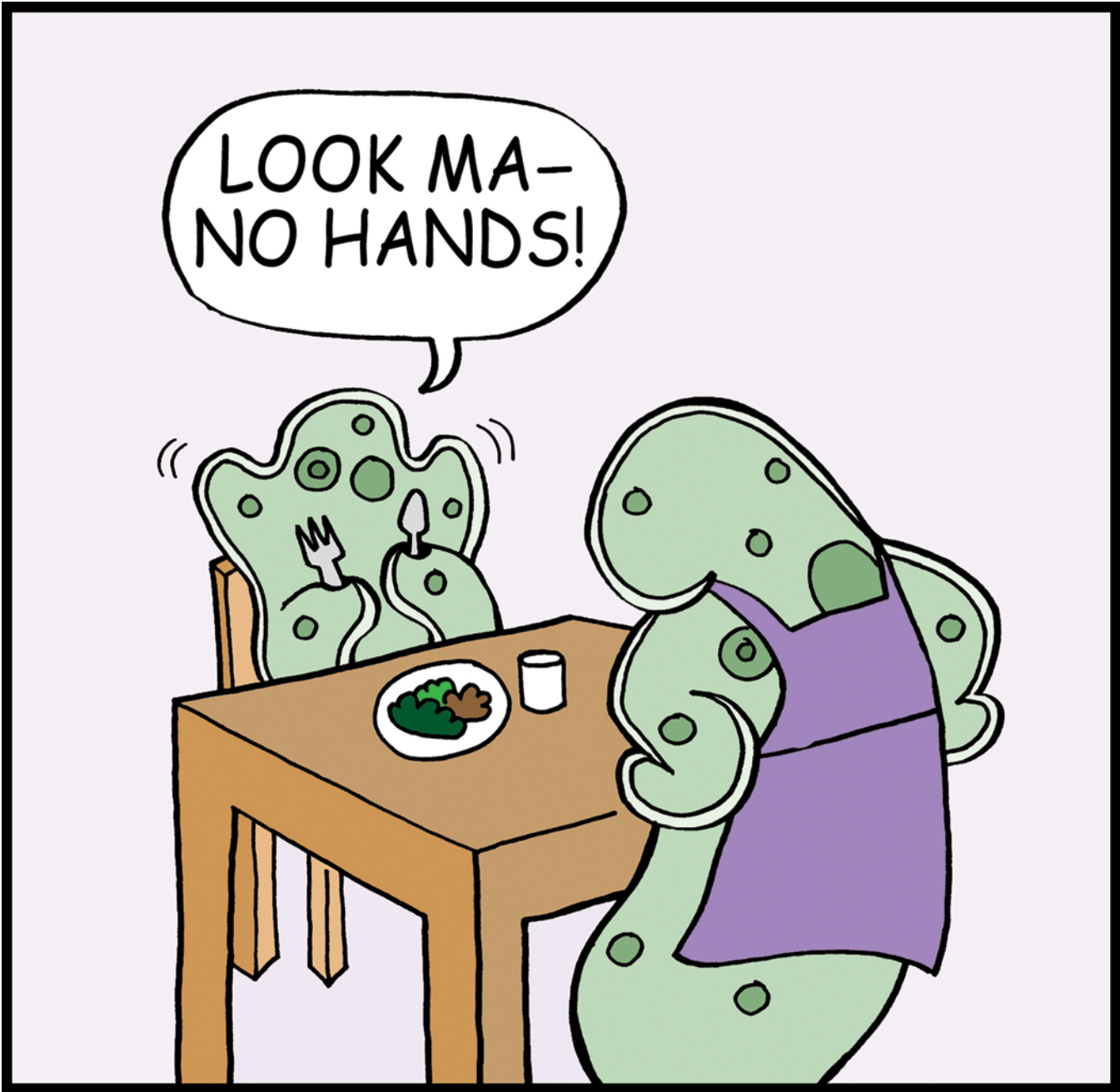
www.realscience4kids.com

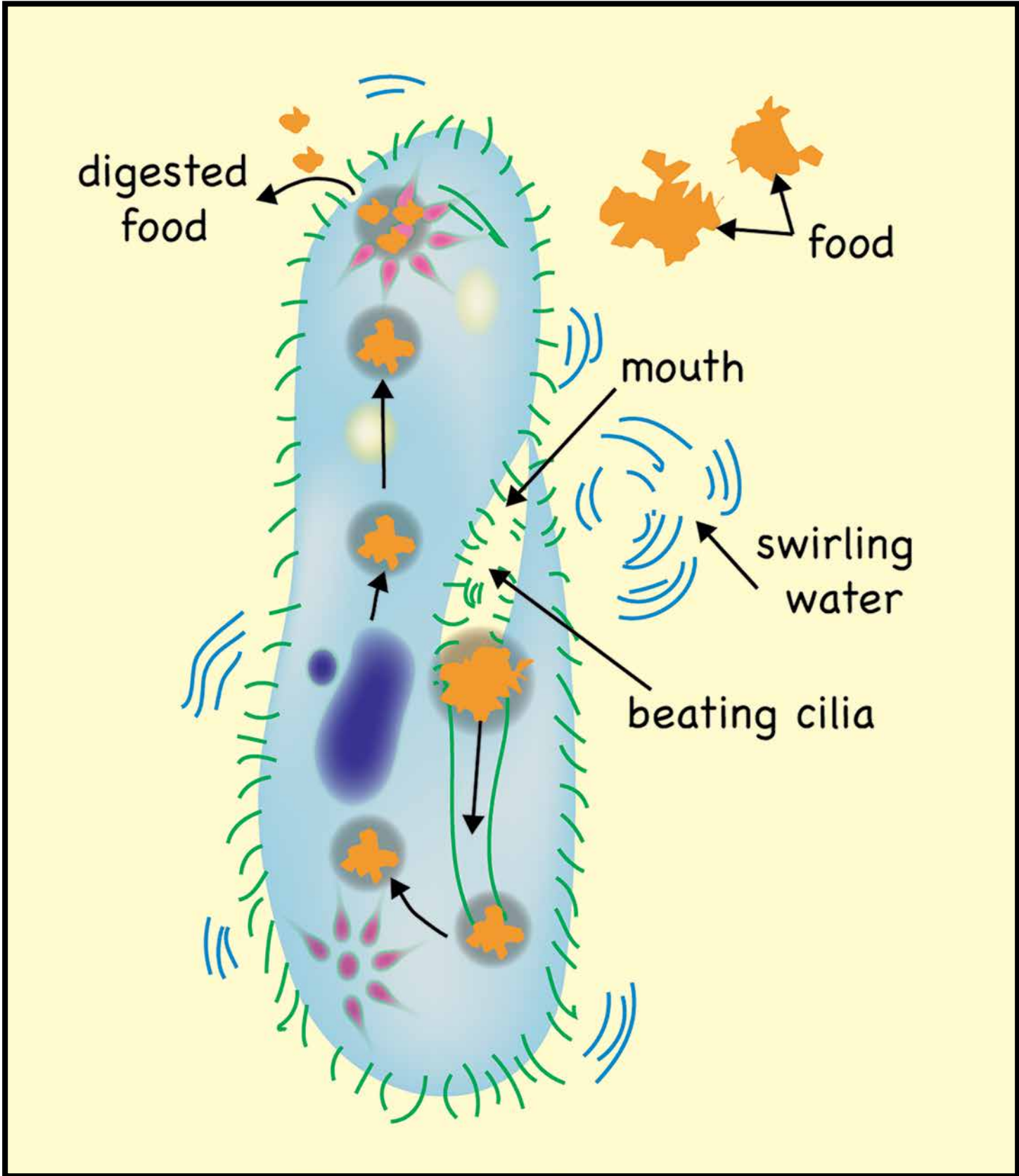
www.gravitaspublications.com













More REAL SCIENCE-4-KIDS Books by Rebecca W. Keller, PhD

Building Blocks Series yearlong study program — each Student Textbook has accompanying Laboratory Notebook, Teacher's Manual, Lesson Plan, Study Notebook, Quizzes, and Graphics Package

- Exploring Science Book K (Activity Book)
- Exploring Science Book 1
- Exploring Science Book 2
- Exploring Science Book 3
- Exploring Science Book 4
- Exploring Science Book 5
- Exploring Science Book 6
- Exploring Science Book 7
- Exploring Science Book 8



Focus On Series unit study program — each title has a Student Textbook with accompanying Laboratory Notebook, Teacher's Manual, Lesson Plan, Study Notebook, Quizzes, and Graphics Package

- Focus On Elementary Chemistry
- Focus On Elementary Biology
- Focus On Elementary Physics
- Focus On Elementary Geology
- Focus On Elementary Astronomy
- Focus On Middle School Chemistry
- Focus On Middle School Biology
- Focus On Middle School Physics
- Focus On Middle School Geology
- Focus On Middle School Astronomy
- Focus On High School Chemistry



Super Simple Science Experiments

- 21 Super Simple Chemistry Experiments
- 21 Super Simple Biology Experiments
- 21 Super Simple Physics Experiments
- 21 Super Simple Geology Experiments
- 21 Super Simple Astronomy Experiments
- 101 Super Simple Science Experiments

Note: A few titles may still be in production.

Gravitas Publications Inc.
www.gravitaspublications.com
www.realscience4kids.com

