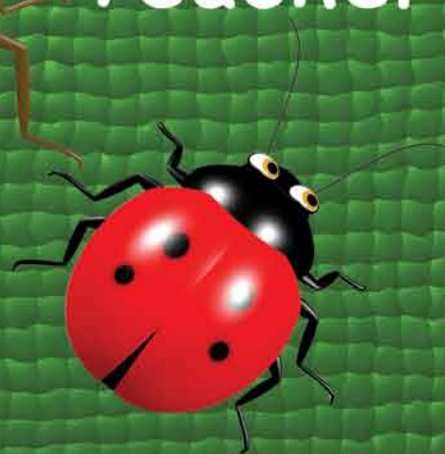


Real Science-4-Kids



Pre-Level I

Teacher's Manual



Rebecca W. Keller, Ph.D.



Cover design: David Keller

Opening page: David Keller, Rebecca W. Keller, Ph.D.

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Real Science-4-Kids: Biology Pre-Level I Teacher's Manual

ISBN 978-0-9799459-2-2

Published by Gravitas Publications, Inc.
4116 Jackie Road SE, Suite 101
Rio Rancho, NM 87124
www.gravitaspublications.com

Printed in United States



A Note from the Author

This curriculum is designed to provide an introduction to Biology for students in kindergarten through third grade. The student laboratory workbook is intended to be the first step in developing a framework for real science. The series of experiments in the laboratory workbook will help students develop the skills required for the first step in the scientific method: making good observations.

There are different sections in each chapter. One section is called “Observe it.” This section helps the students focus on their observations during the experiment. The “Think about it” section provides questions for the students to think about before they begin the experiment or after they have made their initial 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. And finally, in each chapter there is a section called “Why?” that provides a short explanation of what they may or may not have observed.

The experiments take up to 1 hour. The materials needed for each experiment are listed on the next page.

Enjoy!

Rebecca W. Keller, Ph.D.

Experiment 1	Experiment 2	Experiment 3	Experiment 4	Experiment 5
cotton balls rubber ball tennis ball banana apple rocks Legos or building blocks other objects	pencil paper	2 small house plants of the same kind and size water measuring cup optional: cardboard box	2-4 white carnations 2-3 small jars food coloring water tape knife	1-2 small jars 2 or more dried beans (white, pinto, etc.) absorbent white paper plastic wrap clear tape 1-2 rubber bands water

Experiment 6	Experiment 7	Experiment 8	Experiment 9	Experiment 10
microscope with a 10X objective (Gravitas Publications, Inc., M001) plastic culture slides (WARD's 14-D-3510) eye dropper pond water or protozoa kit (WARD's Protist Set 1, 87-D-1530) **	same materials as Experiment 6 optional: baker's yeast Eosin Y (WARD's 945 V 4102)	butterfly kit *** small cage	tadpoles **** aquarium water tadpole food	clear glass or plastic tank soil small plants small bugs, such as: worms ants beetles water plastic wrap

** 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.

*** Butterfly kits can be purchased from a variety of different sources such as Insect Lore at www.insectlore.com.

**** Tadpole kits can be purchased from Home Science Tools at www.hometrainingtools.com.

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Experiment 1

Where does it go?

Materials needed:

- cotton balls
- rubber ball
- tennis ball
- banana
- apple
- rocks
- Legos or building blocks
- other objects

Objectives

In this unit, the students will try to sort different items into different groups.

The objectives of this lesson are:

1. to help students understand that there are different ways to sort objects.
2. to develop a vocabulary to describe the objects they observe.

Experiment

I. Observe it

In this section the students will make careful observations for each object they have collected.

- ❶ Put the objects on the table and have the students look carefully at each item.
- ❷ Encourage the students to use both words and pictures to describe the object. Help them observe different details such as size, color, shape and texture for each item. Use questions to help them describe the object.
 - What color is a cotton ball?
 - What color is a banana?
 - What is the shape of a cotton ball?
 - What is the shape of a rock?
 - How would you describe the surface of a tennis ball?

Encourage the students to use as many different describing words as possible for each item. Their answers may look something like this:

cotton ball

fuzzy

round

soft

white

--

tennis ball

fuzzy

round

hard

yellow

--

rock

hard

gray

smooth

heavy

--

building block

square

hard

blue

plastic

--

③ Help them notice features that are similar and different between items.

- Is a rubber ball larger or smaller than a cotton ball?
- Is a rubber ball harder or softer than a cotton ball?
- Is a rock like a banana? Why or why not?
- Is a tennis ball similar to a banana? Why or why not?

Next, have the students look at the different objects and the different ways they have described the objects. Help them think about how they might group the objects.

④ Have the students pick five different groups, and help them write the names of the groups in the space provided. Have the students sort the objects they have collected into the different groups. Each object can only go into ONE group.

<i>round</i>	<i>yellow</i>	<i>small</i>	<i>hard</i>	<i>white</i>
<u>tennis ball</u>	<u>banana</u>	<u>rock</u>	<u>block</u>	<u>cotton ball</u>
_____	_____	_____	<u>rubber ball</u>	<u>apple</u>
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____
_____	_____	_____	_____	_____

II. Think about it

Help the students notice that some items can fit into more than one group. For example, if they picked both “round” and “yellow,” a tennis ball can fit into both groups. Have the students think about how they might rearrange the groups, picking different items that go into each group. They can re-sort their items into the groups they’ve already chosen, or they can pick new groups.

There are no “right” answers, so encourage the students to think about all of the different ways they may want to sort the items.

III. What did you discover?

The questions can be answered verbally or in writing, depending on the writing ability of the student. With these questions, help the students think about their observations. Again, there are no “right” answers to these questions, and it is important for the students to write or discuss what they actually observed. Help them write about or describe which objects could fit in more than one group.

IV. Why?

It is important for students to understand that science is often a dynamic endeavor, and the “answers” that science provides can sometimes change. The identification and grouping of living things can be fairly complicated, and determining exactly which group a living thing belongs to is not trivial. There are different criteria used to group living things. Most living things are first grouped according to the types of cells they have—plant cells, animal cells, bacterial cells, etc. Once the organism is grouped according to cell type, then the scientist looks for other features to use in categorizing the organism.