Investigating God's World

Fourth Edition

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SCIENCE / HEALTH SERIES

Elementary Science & Health Series

	Science	Health
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2	*Enjoying God's World*	• *Health, Safety, and Manners 2*
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4	*Understanding God's World*	• *Developing Good Health*
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Cataloging Data
Investigating God's world / Gregory Rickard . . .[et. al] — 4th edition
iv, 322 p. : col. ill.; 26 cm. (Abeka Book science series)
Includes index.
1. Science—study and teaching (Elementary) III. Abeka Book, Inc.
Library of Congress: Q161.2 I68 2009
Dewey System: 500

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1.1 The Mysteries Around Us

Do you like a good mystery? If so, you will enjoy studying science this year, for a scientist is like a detective searching for law and order as he or she investigates the mysteries of God's creation. You can share the work of the scientist by opening your eyes and investigating the things that you see every day.

A scientist begins his work by looking closely at the common things around him. He observes stars and stones, wheels and whales, motors and molars and molecules. He tries to think clearly about birds and butterflies, about seas and trees, about flowers and feathers and frogs. The scientist wants to know the laws that these objects of nature obey and how they all fit together in God's creation.

Puzzling questions

The scientist asks questions about the things he observes. Why do stones fall down and not up? How do our bodies change food into energy? Why do bees like flowers? How big is the universe? When is the best time to plant crops? Where does the moon go when we can't see it? Is there a cure for cancer? How do certain birds find their way from Alaska to Hawaii? How does the fragile monarch butterfly migrate from Canada to Mexico? What is light? These are just some of the questions that scientists (and other people) have asked through the centuries. Scientists have found the answers to some of these questions, but they are still investigating many others.

To answer their questions about nature, scientists search for clues and examine evidence. They try to determine how things are alike and how they are different from each other. They observe things changing and try to figure out why and how they change. Often they make sensible guesses, called hypotheses [hī·pŏth′ĭ·sēz′], and do experiments to test their guesses.

A world of law and order

Even though many of the questions scientists ask are very puzzling, scientists are confident that their questions do have answers. Most scientists recognize that ***we live in an orderly world that operates according to a well-designed plan.*** We can count on the sun to rise each morning, on the moon to go through certain phases each month, and on the stars to change position with the seasons. When we heat water

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to a certain temperature, we know it will boil, and when we jump up, we know we will come down again. All of these events show that nature has been carefully planned—that it is not just a product of chance.

If the world were not orderly and predictable, there could be no science, for **science *is a search for the laws of nature and for ways to use them for the benefit of mankind.*** The Christian knows that the laws of nature are God's laws which He established when He created the universe out of nothing, and most of the world's greatest scientific discoverers have believed this, also. You will learn about some of these scientists as you read this book.

Comprehension Check 1.1

1. What is science?
2. Describe what a scientist is like and what he does.

SCIENCE & You

Rules for outdoor investigators

As you study science this year, you will have many opportunities to observe nature firsthand. When you are investigating God's creation out of doors, it is important that you keep in mind a few rules so that you will be safe and will keep God's creation as you found it.

1. Get permission from your parents or an adult in charge of you before you go investigating away from home.
2. Take a friend along with you so that one of you can get help if anything happens.
3. Be sure to wear proper clothing. If you are going into a wooded area, it is especially important to wear long pants or socks and a long-sleeved shirt.
4. If you hike on someone else's property, be sure to get his permission first.
5. Find out whether there are any poisonous plants or animals in your area, and learn how to avoid them. Learn to recognize the poisonous organisms pictured on this page.
6. Leave things as you found them.


poison sumac

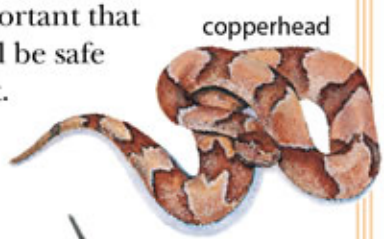

poison ivy


poison oak


black widow spider


brown recluse spider


coral snake


copperhead


cottonmouth


rattlesnake

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Living flower exhibit

A good way to share your investigations of God's world with your classmates is to have a classroom science museum. Here you can display objects that help you understand God's creation. The museum could contain collections of rocks, shells, seeds, feathers, bones, leaves, or butterflies. It could include a variety of lenses, mirrors, and small motors and a collection of things that use electricity. It could sometimes include a live visitor such as a turtle, toad, or tadpole. Throughout this book you will find ideas for the science museum.

Be sure to keep hand lenses and field guides in the museum, as well as any other science books that interest you. Pictures and posters will be a good addition, also.

To begin with, you could set up a ***living flower exhibit.*** You will need *a shoe box or other cardboard box, scissors, and some plastic pill bottles.*

Cut holes in the top or bottom of the box and turn the box so the bottles can stand in the holes. You should be able to store 6 to 12 bottles filled with water. Place one kind of flower in each bottle, using only flowers which are plentiful in your region. You may want to display several stages of the same flower at the same time (such as a bud, a partially opened flower, and a fully opened flower). If you can find the name of the flower, write it on a small card and tape it to the front of the box. Keep changing the flowers regularly and you will have a beautiful and interesting display. Fall is the best time to have a living flower exhibit, because the fall wildflowers are usually hardy and plentiful. You should be more careful about picking spring wildflowers, especially the fragile woodland varieties.

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1.2 The Detective's Tools

To carry out his detective work, a scientist uses a number of tools. Some of the tools are God-given, and some were invented by man.

Senses

First, a scientist uses most of his five senses—sight, hearing, touch, smell, and taste. As you investigate nature, you will need to use your senses, too. With your *eyes,* you can gaze on a star billions of miles away or inspect the tiny ridges on the tip of your finger. With your *ears,* you can enjoy the songs of grasshoppers, birds, and frogs, the rushing of a river, or the whisper of the wind. With your sense of *touch* you can detect the smoothness of a stone, the roughness of tree bark, the sharpness of a thistle's stem, and the softness of the thistle's down. Your sense of *smell* can increase your admiration of cedars and roses and your respect for skunks and stinkbugs.

To be safe, you should usually not use your other sense, your sense of *taste,* while you are investigating nature. Too many common things are poisonous if tasted, and others carry diseases. Your other senses will give you plenty of information about the natural world.

Intelligence

One of God's greatest gifts to man is the ability to think, and He expects us to use our minds as we work to understand nature and use it for man's benefit. So do not just look and listen when you are investigating science: THINK! Ask questions. Try to figure out what will happen next and why. Be curious. Write things down. Draw pictures. Learn to concentrate and remember things. Try to think of ways to use what you know to help others.

Books

Go to the library and check out books on science topics that interest you. Scientists spend much of their time reading the writings of other scientists. For now, especially look for **field guides,** books that show pictures and give information about the trees, birds, insects, rocks, shells, stars, mammals, flowers, and other objects of nature that are all around you. Learn to use the **range maps** in the field guides. Range maps show the **range** of a plant or animal, or where on the continent it is found.

Equipment

Scientists have developed many tools for helping them to see better, hear better, catch things, keep things, and do experiments. There are telescopes for seeing

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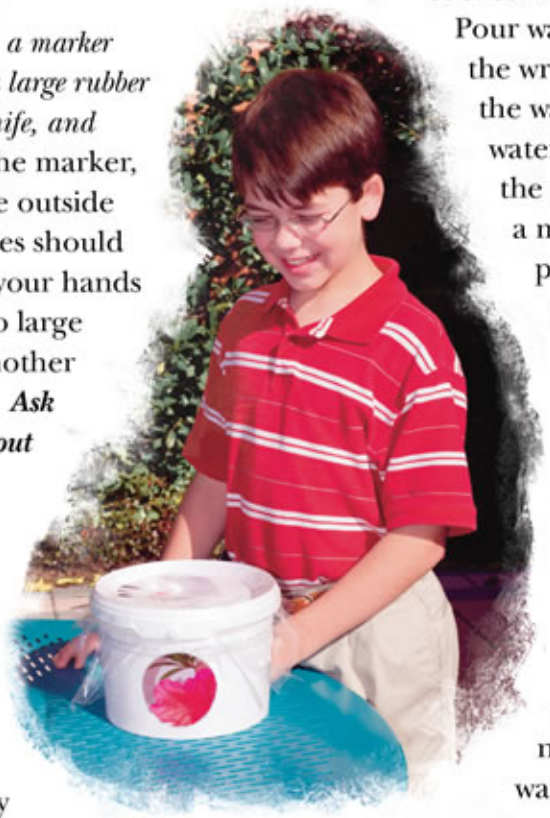
"close-ups" of the stars, microscopes for seeing tiny creatures too small for the naked eye, and recording devices for capturing the sounds of birds and insects. There are insect nets, aquariums, terrariums, and innumerable other pieces of equipment.

For now, the tool that would help most is a **magnifying lens.** No good detective should be without one! With it you can see the hairs on a housefly, the pollen on a flower, and the flea on your dog's back. You can examine the patterns of a pebble, the colors of a seashell, and the variety of creatures that dwell in the soil. You can buy a lens quite cheaply, or you might enjoy making a temporary one to use out in your own back yard.

Private InvestiGator

A water lens

To make a simple lens which is fun to use, you will need *a plastic bucket, a marker that will write on plastic, a large rubber band, scissors or a razor knife, and clear plastic wrap.* With the marker, draw three circles on the outside of the bucket. The circles should be large enough to put your hands through them but not so large that they overlap one another and weaken the bucket. ***Ask an adult to cut the circles out for you, using the razor knife or scissors.*** Now you have a bucket with three holes in the sides of it. Take the clear plastic wrap (food wrap will do, but dry-cleaning bags work better because they stretch more) and place it loosely on the top of the bucket. Secure the wrap to the bucket with the large rubber band. Pour water onto the wrap until the wrap sags with the weight of the water. The weight of the water causes the wrap to form the same shape as the lens of a magnifying glass. You can place items in the bottom of the bucket through the holes in the sides, and they will be magnified by the water. Try experimenting with different amounts of water and other clear liquids such as salad oil. It would be best to use your water magnifier outside or in a tub or sink so that you will not damage anything if the water should be spilled.



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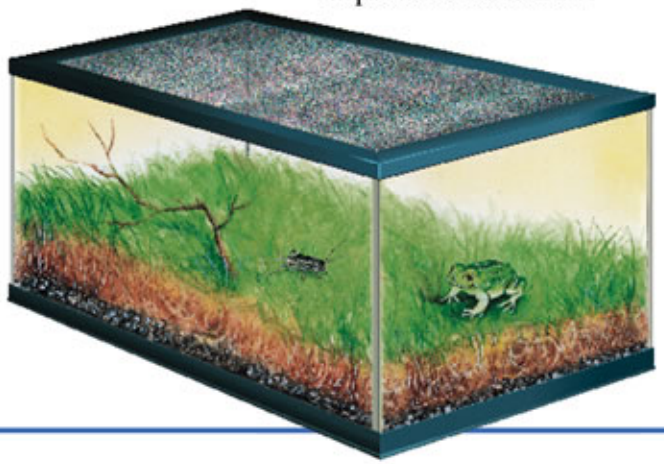
Outside in: a meadow terrarium

You can bring the outdoors into your classroom by setting up a terrarium. This will give you an opportunity to observe interesting changes in living things and to see for yourself how things work together in God's creation.

Start with a *glass terrarium or aquarium* with a lid of *fine wire screening.* Place the terrarium in a bright place, but not in direct sunlight. Cover the bottom with a layer of small pebbles. Then add a 3" thick piece of sod (growing grass with its roots and soil) to cover the pebbles. Put the screen on top of the container, and spray the sod regularly with water. Watch for a few days before you add any animals to the container. The grass will grow, weed seeds will sprout, and you will discover much animal life that you did not know was there, such as earthworms, beetle grubs, and ants.

Add some small rocks and a twig to your meadow. Then collect any harmless insects and spiders that you can find on or around a goldenrod plant or some other plant that hosts many insects. Be sure to cut some of the plant and put it into the container. Add new plant parts when the original begins to wilt.

Think of other creatures that would feel at home in your meadow. You might want to include crickets, grasshoppers, a toad, and some caterpillars and cocoons. Do not overpopulate the meadow, though. Be sure that each creature is supplied with suitable food—which often means some other creature. Bits of cut-up fruits and vegetables will be welcomed by some. If you do not want a certain animal to be eaten, you had better keep it in a separate container!



Comprehension Check 1.2

1. Name the four basic tools you have to investigate nature.
2. What is the one sense you should *not* use?

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