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CELEBRATE BASIC SCIENCE SKILLS

Basic does not mean boring! There is certainly nothing dull about. . .

. . . searching for science in a backpack, on a roller coaster or at a rock concert
. . . snooping around to solve mysteries involving atom bombs, chromosomes, pyramids and quasars
. . . knowing how to tell an ornithologist from an ichthyologist
. . . exploring the wonders of inventions like DVDs, EKGs, fax machines and inner tubes
. . . tracking down the difference between the Chaos Theory and the Quark Theory
. . . showing off that you know how life is affected by a GPS or an aqualung
. . . fooling around with singing glasses, tongue maps, falling eggs and swinging forks
. . . deciding what's harmful about electric scooters, credit cards and the Internet.

These are just some of the adventures students can explore as they celebrate basic science skills. The idea of celebrating the basics is just what it sounds like – enjoying and getting good at knowing all about the big ideas of science and the processes scientists use to understand the natural world. Each page invites learners to try a high-interest, appealing exercise that will sharpen or review one specific science skill, concept or process. This is no ordinary fill-in-the-blanks way to learn! These exercises are fun and surprising. Students will do the useful work of deepening science knowledge while they enjoy working with five clever scientists who lead them to explore and deepen their understanding of science concepts and processes.

The pages in this book can be used in many ways:

- to sharpen or review a skill with one student
- to reinforce the skill with a small or large group
- by students working on their own
- by students working under the direction of a parent or teacher.

Each page may be used to introduce a new skill, to reinforce a skill or to assess a student's performance or understanding. And there's more here than just the great student activity pages. You'll also find an appendix of resources helpful to students and teachers – including a ready-to-use test for assessing science concepts and process skills.

The pages are written with the assumption that an adult will be available to assist students with their learning and practice. It will be helpful for students to have access to science resources such as a science textbook, encyclopaedias and Internet reference sources.

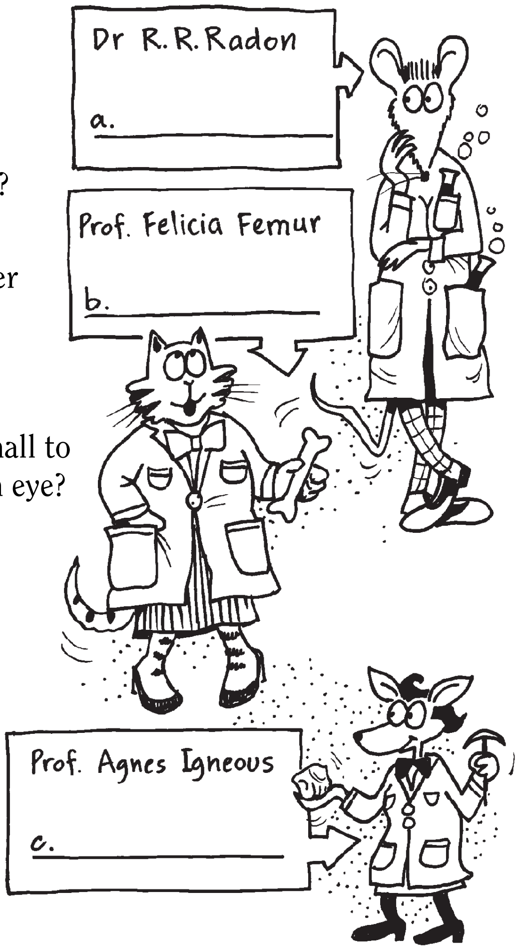
As your students take on the challenges of these adventures with science concepts and processes, they will grow. As you watch them check off the basic science skills they have sharpened, you can celebrate with them!

The Skills Test (pages 50–53)
Use the skills test as a pre-test and/or a post-test. This will help you check the students' mastery of basic skills and understandings in the area of science concepts and processes. It can also prepare them for success on tests of standards, instructional goals or other individual achievement.

WHO STUDIES WHAT?

There are dozens of different kinds of scientists, all asking dozens of questions about the way the world works. If you follow a scientist around for a while, you would notice what kinds of things she or he studies. Here are just a few of the things scientists study. Which scientist from which field of study would study which topic? Choose the best answer for each area of study on this page and page 7.

Which scientist would study . . .



1. stars and planets?
   a. an anatomist
   b. an electrician
   c. an astronomer
   d. a physician

2. prehistoric forms of life?
   a. a palaeontologist
   b. a mechanical engineer
   c. a hydrologist
   d. a political scientist

3. living organisms too small to be seen with the human eye?
   a. a microeconomist
   b. a psychologist
   c. a sociologist
   d. a microbiologist

4. birds?
   a. an entomologist
   b. a botanist
   c. an embryologist
   d. an ornithologist

5. rocks?
   a. an astronomer
   b. a petrologist
   c. a haematologist
   d. a rheumatologist

6. ways the body can be protected against disease?
   a. a metallurgist
   b. an immunologist
   c. an ophthalmologist
   d. an ecologist

7. soil and cropping?
   a. a psychiatrist
   b. an aeronautical engineer
   c. an agronomist
   d. an anatomist

8. structure of matter?
   a. a statistician
   b. a political scientist
   c. a chemist
   d. a cytologist

9. behaviour of human groups?
   a. a sociologist
   b. a civil engineer
   c. a physicist
   d. an organic chemist

10. development of language?
    a. an oncologist
    b. a morphologist
    c. a linguist
    d. a haematologist

11. tides and waves?
    a. an oceanographer
    b. a mineralogist
    c. a microeconomist
    d. a geologist

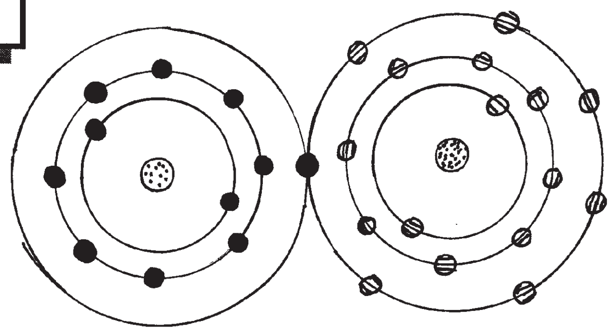
Use with page 7.

Name

NOT THE REAL THING

To **USE MODELS** is to use some sort of a structure or scheme that visually represents real objects or events.

Many models are three-dimensional. Imagine that Professor Asteroid's representation of two atoms is three-dimensional. Use information from the model to fill in the blanks in his explanation.



1. This model shows a chemical reaction between the elements ____________ and ____________.

2. _______________ has only 1 electron in its outer ring, making it ____________(stable, unstable).

3. _______________ has only 7 electrons in its outer ring, making it ___________(stable, unstable).

4. When the two chemicals combine, the element _______________ takes the extra electron from _______________. This way, its last ring is filled. The other element, ________________, has lost one electron, but now its outer orbit (second ring) is full. Both elements are happy with the combination!

5. Which formula is a model (representation) of a chemical reaction between magnesium and chlorine to produce magnesium chloride?

A. $Mn + 2\ C + 2\ O = MnC_2O_2$

B. $Mn + 2O = MnO_2$

C. $Mg + 2\ Cl = MgCl_2$

D. $3\ Md + Cl = Md_3\ Cl$

E. $Mg + Cl = MgCl$

Name

SO, WHY DOES THE EGG FLOAT?

Dr Radon has been trying to get an egg to float. He has succeeded, but no one can learn anything from his experiment if he does not share it and try to explain its meaning. Scientific discoveries, answers to questions, and results of inquiries do not do much good if they are kept secret.

> To **INTERPRET** is to explain or tell the meaning of the results in an experiment.
> To **COMMUNICATE** is to tell or show others the process and results of the experiment.

Read about Dr Radon's inquiry and the results. Then help with the explanation.

Observation: A friend showed him an egg floating in water, but Reginald could not get an egg to float. Then he remembered how easily he could float in the ocean.

Hypothesis: Objects will float more easily in salt water than in fresh water.

Experimental Process: He filled a glass two-thirds full with fresh water. He set an egg in the glass. Then he stirred in some salt. He kept adding salt and stirring.

Results: At first, the egg sank. As he added more salt, the egg floated higher and higher.

1. **INTERPRETATION:** Explain the meaning of Dr Radon's results.

   ____

   ____

2. **EVIDENCE:** An explanation or interpretation should be based on evidence. What evidence led you to the explanation you gave?

   ____

3. **FURTHER QUESTIONS:** A good inquiry usually raises new questions, even while it provides some answers. Write at least one question you have after reading Dr Radon's results.

   ____

Name