

# Lessons at a Glance

## Lesson Overviews

The following overviews briefly summarize each lesson in the Science Skill Builders Module. A Big Idea is focused upon within each lesson. Along with the scientific Habits of Mind discussed on pages 6-7, these concepts are reinforced throughout the student's science activities.

## Doing Science

### Lesson 0 (Levels 1-3)

Children sharpen their awareness of scientific thinking as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

Big Idea: Doing science involves wondering, thinking, trying, observing, recording, and discovering.

### Lesson 0 (Levels 4-6)

Students sharpen their awareness of scientific thinking and become familiar with the “I Wonder” circle as they conduct a self-directed exploration and then reflect on the processes they engaged in. In the context of these experiences, they are introduced to the work of scientists and to the Science Companion “I Wonder” circle, which provides a visual representation of many of the facets of scientific inquiry, exploration, and discovery.

Big Idea: Doing science involves wondering, thinking, trying, observing, recording, and discovering. Scientists use experiments to test out their ideas and observations.

## Using Tools in Science

### Using Balances and Scales

Children compare the weight of various objects using balances and scales. They gain an appreciation and awareness of weight, and strengthen their measuring skills.

This lesson can be taught during mathematics.

Big Idea: Measuring how much something weighs is a basic scientific skill.

### Using a Compass

Children learn how to read a compass to find north, and from there to determine the other cardinal directions.

This lesson can be taught during social studies.

Big Idea: A compass can be used to find north and other directions.

### Using Magnifiers

Children learn how to use a magnifying lens, like the ones supplied in the Science Companion ExploraGear. There is also an extension in which children learn how to use a jeweler's loupe.

Big Idea: A magnifying lens makes things look larger than they really are. You can use a magnifying lens to examine objects closely and to see details that you might not see without it.

### Using Field Guides

Children learn how to use a field guide to identify and learn about a specimen. This lesson can be done with any field guide about any type of organism or object.

Parts or all of this lesson can be done during a class language arts period or during independent reading and writing times.

Big Idea: You can use a field guide to learn about and identify things in the natural world.

### Reading Science Books

Students familiarize themselves with the organization and layout of the Student Reference Book. They are encouraged to look through each section before they begin reading so they can use visual and text cues—such as headings, margin notes, and illustrations—to help them understand the material and its relationship to what they already know.

Ongoing reading strategies to help children absorb new information and vocabulary are included at the end of the lesson.

Big Idea: Paying attention to a book's organization can assist reading comprehension.

## Scientific Testing

### Measuring Small Things

Children practice measuring objects and rounding measurements to the nearest centimeter.

Big Idea: Measurements are not exact. It's all right to round to the nearest unit and say the object is "about \_\_\_ units long."

### Measuring Length and Circumference

Children practice measuring the length and circumference of objects and rounding them to the nearest centimeter.

Big Idea: You can measure the length of different sides of an object, or the distance around an object, or both, depending on its shape. Measurements are not exact; it's all right to round up or down to the nearest unit and say the object is "about \_\_\_ units long."

### Finding Elapsed Time

This lesson provides a basic introduction on how to find elapsed time. Children practice measuring time by calculating how much time has passed using a time line, clocks, calculators, watches, or any other tool they find that might help.

You can teach this lesson during mathematics.

Big Idea: Finding elapsed time is one way scientists measure changes, compare objects, or look for patterns during an investigation.

### Using Models in Science

Children study various types of models and learn how they are used in science. They also make models of their own.

Big Idea: Scientists use models to represent things that are too big, small, fast, slow, far away, or dangerous to observe in the real world.

### Accurately Measuring Weight and Volume

Taking accurate measurements of volume and weight and using graduated cylinders, beakers, calibrated cups, and scales are the skills students practice in this lesson. They compare their observations with observations made by others, and evaluate the accuracy of their measurements to learn that measurements are not exact.

Big Idea: Measurements are not exact, but trying to be accurate is one way scientists can make better comparisons of objects.

## Designing a Fair Test

Students analyze elements of an unfair test and discuss ways to make the test fair. They identify variables that could affect how high a ball bounces and strategize about how to change only one variable while keeping all other parts of the experiment the same.

Big Idea: Scientists plan and design fair tests so they can determine how the one variable being changed affects the results of an experiment.

## Measuring Temperature Accurately

Students use thermometers to practice taking accurate temperature measurements. They compare their observations with those of others and evaluate the accuracy of their measurements to learn that measurements are not exact.

Big Idea: Measurements are not exact, but trying to be accurate is one way scientists can make better comparisons of objects.

# Observation Skills

## Making Scientific Drawings

Children look at several scientific drawings, identify their characteristics, and discuss how they differ from other types of drawings. Then children make their own scientific drawings, with a focus on looking closely at and accurately drawing the object.

This lesson can be taught during art.

Big Idea: A scientific drawing is accurate. It contains details about its subject.

## Reading Number Scales on Thermometers

Children become familiar with the numbers and marks on their thermometers. They relate the color scale to numbers on the number scale, and then practice reading just the number scale. Teach this skill building activity to individual children as they are ready, or to the whole class.

This lesson can be taught during mathematics.

Big Idea: Number scales give precise temperature measurements.

## Observing and Describing

Children practice making accurate and detailed descriptions before and after observing a familiar object. In doing so, they discover the importance of careful observation and detailed description in science.

Big Idea: Observation is a powerful tool for learning about something. Detailed and accurate descriptions of your observations help you communicate them to others.

## Building to Scale

Children receive a concrete introduction to the concept of scale. They begin by thinking about when changes in scale might be useful in making scientific models. They use pattern blocks to build shapes at larger scales, and discuss the fractions that identify the scales they used. The lesson concludes with the children sharing toys that represent real objects, comparing the scales of similar objects, and creating models with objects of the same or similar scale.

This lesson is suitable for flexible implementation with mathematics.

Big Idea: Scale models represent real objects but are different sizes than the actual object. Scientists make scale models to help them look at something that is hard to study otherwise.

# Analysis and Conclusions

## Making Line Graphs

Scientists rely on graphs to help them analyze data they collect. A line graph is especially useful to scientists when they need to measure how data changes over a period of time. This activity provides a basic introduction on how to organize data on a line graph and how to use it as a tool to understand the data displayed. By looking for trends on a line graph, the students learn how to make educated predictions, a skill needed for many science activities.

This lesson is suitable for flexible implementation with mathematics.

Big Idea: Line graphs are charts that can be used to measure how data changes over a period of time.

## Writing Procedures

Many investigations require students to follow written procedures or to write their own. In this lesson, students write procedures for making a peanut butter and jelly sandwich, and then watch a “robot” follow them. By seeing unexpected outcomes, the lesson helps them understand what makes an accurate written procedure.

Big Idea: Scientists write clear procedures so that others can understand what they did and accurately repeat their investigations.

## Forming Conclusions

Students, using data provided to them, form and write conclusions. They evaluate their conclusions to check whether they are clear, supported by data and logical reasons, and seem plausible based on previous knowledge. Finally, they consider what kind of new data they would need to verify their conclusions or to answer new questions.

Big Idea: Scientists form conclusions about the world based on evidence from their investigations and what they already know about the world.