



Measuring Up to the Georgia Standards of Excellence for

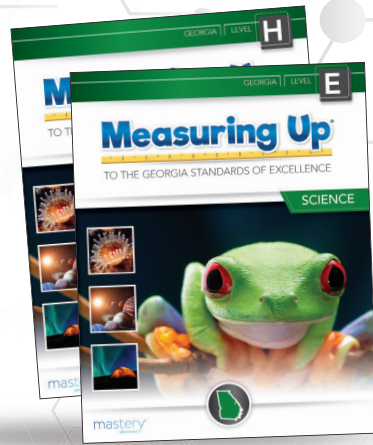
science meets the needs of the Georgia Milestones. The Instructional Worktexts promote the analysis and interpretation of data, critical thinking, problem solving, and connecting science curriculum to other subject areas.

Lessons feature:

- Coverage of the most tested GSE content for science.
- Lesson goals that outline what students will learn, connecting prior knowledge to scientific concepts.
- Independent practice with items that meet the rigor of the GSE for science.
- Building Stamina unit tests that check for student understanding.
- Hands-on activities, experiments, and investigations.



Available for grades 5 and 8



WHAT YOU'LL SEE IN EACH LESSON

WORDS TO KNOW:
Vocabulary students will encounter is listed and defined in context.

THE BIG IDEA:
Lesson objectives set the stage for what students will learn.

WHAT I NEED TO KNOW:
Quickly highlights and reviews the lesson concept.

UNIT 2

WORDS TO KNOW
evidence
mass

TURN AND TALK
Plants are living things that have needs. What do plants need to grow? If you have ever grown or taken care of a plant, share what you did to meet its needs.

Lesson 8

HOW DO PLANTS GET WHAT THEY NEED TO GROW?

THE BIG IDEA

- Air and water give plants most of the material they need to grow.

WHAT I NEED TO KNOW

Where have you seen plants grow? Plants grow in jungles and forests, on farms, and in gardens. They even grow in cracks in the sidewalk! People can grow plants, but most plants grow wild.

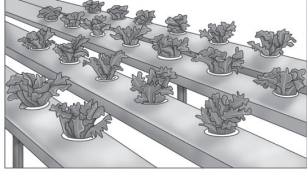
Plants need light from the sun for energy, but where do plants get the materials they need to grow stems, leaves, seeds, or fruit? They pull these materials from the air and water around them.

How did people figure this out? How can we tell that plants use materials from water and air and not from the soil? Scientists look for evidence, or information, that either supports or does not support a scientific idea. What do plants need to grow? Let's look at the evidence.

First, you may have observed that a plant will die without water. Even plants that grow in deserts need small amounts of water. Second, scientists have observed that a plant will die without air. Remember that air is a mixture of different kinds of gases, so air contains tiny pieces of matter, even though we cannot see them.

Third, scientists did experiments to carefully measure the mass, or the amount of matter, for a plant system as it grew. They measured the mass of the soil, the plant, and any water they added. The plant grew and had more mass, but the soil stayed at the same mass. If the plant took materials from the soil, the soil mass should get smaller. The plant must be adding mass from somewhere else.

Finally, some plants can grow without soil at all. Many farmers grow crops like tomatoes, strawberries, peppers, and lettuce using a method called *hydroponics*. "Hydro" comes from the Greek word for water. These plants, grown using only water and air, might even end up on your dinner table.



Even though plants are found in soil, the evidence shows that plants take matter from water and air to grow. They turn it into plant parts like stems, leaves, and flowers as they get bigger.

WHAT I HAVE LEARNED

1. A group of students have repeated the experiment measuring the mass of soil and a plant over time. The plant got heavier, and the soil stayed the same weight. One student argued that the increased mass of the plant was only from the water they gave it, and not from the air. Is the student correct or not, and why?

THINK ABOUT IT
Do you think farmers could grow more crops in soil or by hydroponics? Why do you think so? What might be the advantages of each method of growing plants?

HINT, HINT
Think about blowing up a balloon, blowing bubbles through a straw, and wind. What makes the balloon get bigger? What is a bubble made of? If air is nothing, how can we feel the wind?

ANSWERS:

A The student is correct because water has mass, but air does not.
 B The student is correct because air is basically nothing.
 C The student is incorrect because air provides energy to the plant.
 D The student is incorrect because air does have matter and mass.

Lesson 8 HOW DO PLANTS GET WHAT THEY NEED TO GROW?

2. A group of students observed and measured two bean plants.

	Day 1	Day 7	Day 14
Bean Plant #1 This plant did not get any water.	 1 inch tall	 1 inch tall	 ½ inch tall
Bean Plant #2 This plant got water every day.	 1 inch tall	 4 inches tall	 6 inches tall

Which of the following is the best summary of the students' experiment?

A This evidence shows that all bean plants grow at about the same rate.
 B This evidence shows that plants only grow when they are given water.
 C This evidence shows that not all plants will grow the same.
 D This evidence shows that more sunlight will dry up a plant.

Lesson 8 HOW DO PLANTS GET WHAT THEY NEED TO GROW?

3. Imagine an experiment in which air, soil, water, and a plant were tightly sealed in a large glass container. In this closed and controlled system, scientists could measure the mass of all the parts. They took measurements for a month and wrote this summary.

Plant	Weight increased.
Soil	Weight stayed the same.
Water	Weight decreased.
Air	Weight decreased.

What would be a reasonable conclusion from this data?

A The experiment provides evidence that plants grow using matter from air and water.
 B The experiment is wrong because the scientists tried to weigh the air, which has no weight.
 C The experiment shows that plants need fertilizer in the soil.
 D The experiment provides evidence that plants need soil to grow.

TEACHER EDITION

The **Teacher Edition** includes support for:

- performance expectations
- disciplinary core ideas
- cross cutting concepts
- prerequisite knowledge and standards
- misconceptions
- working with struggling, advanced, and English language learners

Full-length, grade-level practice tests built to the Georgia Standards of Excellence for Science.

LESSON PROMPTS:
Hints, Turn and Talk, Sketch It, and other prompts guide students throughout the lesson.

WHAT I HAVE LEARNED:
Offers independent practice with item types that meet the rigor of the Georgia Milestones exam.

CRITICAL-THINKING ITEMS:
Starred items indicate critical-thinking questions.

Lesson 8 HOW DO PLANTS GET WHAT THEY NEED TO GROW?

TEACHER NOTES

ELA Connection

ELAGSE8U1 Quote accurately from a text when explaining what the text says explicitly and when drawing inferences from the text.

ELAGSE8IP9 Integrate information from several texts on the same topic in order to write or speak knowledgeably about the subject.

ELAGSE8W1 Write opinion pieces on topics or texts, supporting a point of view with reasons and information.

Misconceptions

- Plant "food" comes from an outside organism. (3)
- Sunlight is helpful but not critical for plants. (3)
- Sunlight helps plants grow by keeping them warm. (3)
- Plants need people to provide things, (water, nutrients, light) (3)
- Soil provides the "food" for plants. (3)
- Plants obtain their energy directly from the sun. (3)

Lesson 8 HOW DO PLANTS GET WHAT THEY NEED TO GROW?

TEACHER NOTES

STANDARDS 5LS1.b

The Big Idea
Air and water give plants most of the material they need to grow.

Prerequisite Knowledge & Standards

5LS1 Obtain, evaluate, and communicate information about the basic needs of plants and animals.

5LS1.b Ask questions to compare and contrast the basic needs of plants (air, water, light, and nutrients) and animals (air, water, food, and shelter).

5LS1.c Design a solution to ensure that a plant or animal has all of its needs met.

5LS1 Obtain, evaluate, and communicate information about the life cycles of different living organisms.

5LS1.c Construct an explanation of an animal's role in dispersing seeds or in the pollination of plants.

5LS2 Obtain, evaluate, and communicate information about the effects of pollution (air, land, and water) and humans on the environment.

5LS2.a Ask questions to collect information and create records of sources and effects of pollution on the plants and animals.

5LS4 Obtain, evaluate, and communicate information about the roles of organisms and the flow of energy within an ecosystem.

5SA1.b Develop simple models to illustrate the flow of energy through a food web/food chain beginning with sunlight and including producers, consumers, and decomposers.

Math Connection

MP2 Reason abstractly and quantitatively.

MP4 Model with mathematics.

MP5 Use appropriate tools strategically.

MGSES.MD.1 Convert among different sized standard measurement units (mass, weight, length, time, etc.) within a given measurement system (customary and metric) (e.g., convert 5cm to 0.05m), and use these conversions in solving multi-step, real-world problems.

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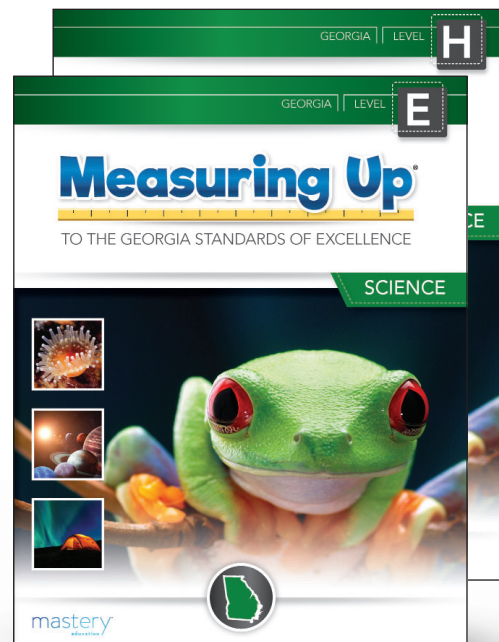
Measuring Up[®]

Science



measuring Up
reach

Quick, yet comprehensive Georgia Standards of Excellence science coverage



Grades 5 and 8

Lessons feature:

- Comprehensive GSE science content with independent practice items that meet the rigor of the Georgia Milestones.
- Building Stamina unit tests that check for student understanding.
- Hands-on activities, experiments, and investigations.

Each grade level covers a wide variety of scientific concepts including life, earth, and physical science.

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SCIENCE ANNOTATED TEACHER EDITION		
978-1-64090-110-0	E/5	\$32.95
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*20 minimum quantity purchase of Student Edition.
Free TE with purchase of 25 Student Editions.

Grade 5

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- Energy and Matter
- Earth's Systems
- Space Systems

Grade 8

- Properties of Matter
- Forces and Motion
- Energy and Its Transformations
- Energy in Waves
- Electricity and Magnetism

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