



# Measuring Up.

## **Measuring Up to the Next Generation Science Standards**

meets the needs of the NGSS.

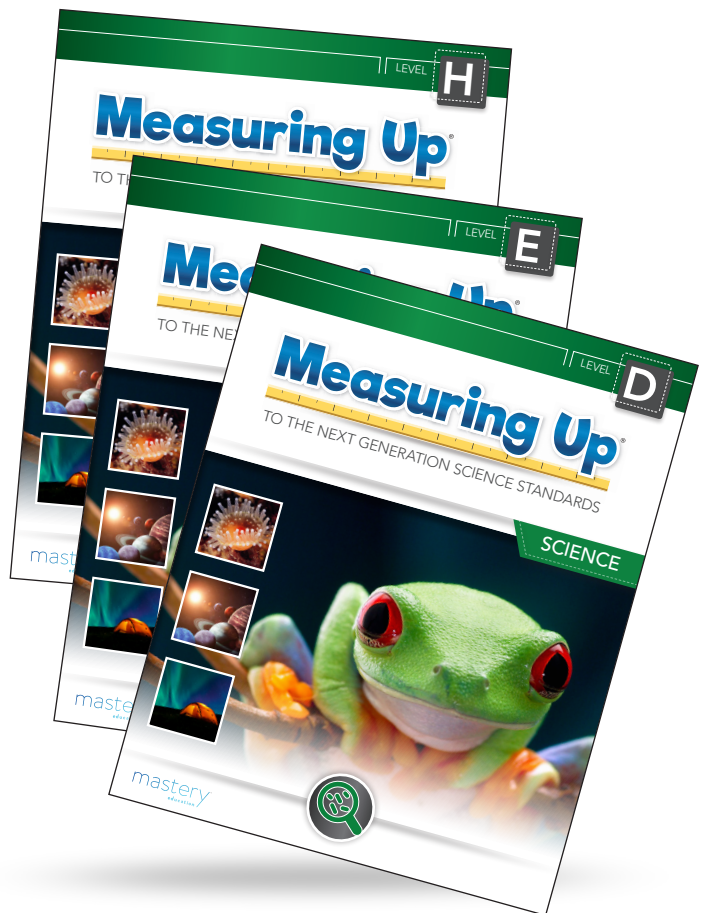
The instructional worktexts promote the analysis and interpretation of data, critical thinking, problem solving, and connecting science curriculum to other subject areas.

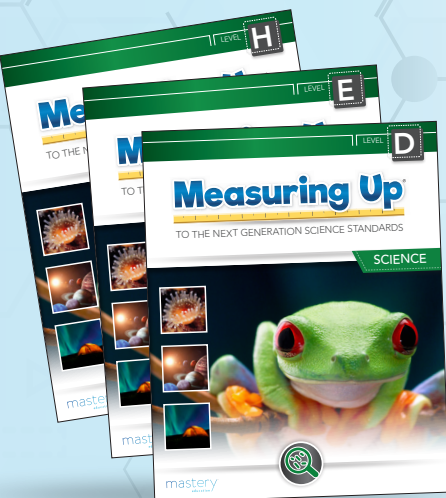
Lessons feature:

- 100% coverage of NGSS content.
- Lesson goals that outline what students will learn, connecting prior knowledge to scientific concepts.
- Independent practice with items that meet the rigor of the NGSS assessments.
- Building Stamina unit tests that check for student understanding.
- Hands-on activities, experiments, and investigations.

## **100% NGSS coverage**

Grades 4, 5, and middle school grades 6–8





### 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.

### LESSON PROMPTS:

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

# WHAT YOU'LL SEE IN EACH LESSON

## WORDS TO KNOW:

Vocabulary students will encounter is listed and defined in context.

## Lesson 1

### HOW CAN WE SEE MATTER?

#### THE BIG IDEA

- Matter is made of particles too small for the human eye to see, but we can observe it in other ways.
- A model can explain how gases consist of matter particles that are too small to see and move freely in space.

#### WHAT I NEED TO KNOW

Matter is all around us—in fact, we are matter! Matter is anything that has mass and takes up space.

You can make observations about matter. For example, you can bounce a ball and feel if it is soft or hard. You can even make changes to matter—such as tearing a piece of paper into smaller and smaller pieces. You can also measure its mass or volume.

While there are many examples of matter, the human eye cannot see the building blocks of all matter: atoms.

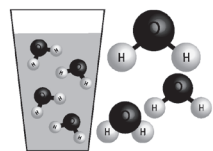
Individual atoms and molecules are not visible to the eye, but they make up everything around us. This includes matter that is or is not visible to the eye. Think for a moment: how can you observe matter if its tiny particles are not visible?

#### WORDS TO KNOW

matter  
atom  
molecule  
particle

#### THINK ABOUT IT

Light has particles called photons, but light is not matter. Why is that?



#### Lesson 1 HOW CAN WE SEE MATTER?

#### TURN AND TALK

Discuss with a partner. What is another example of matter you cannot see? How are you able to observe matter?

Air is an example of matter you cannot see, but you can observe it. We can observe air by looking at some of the ways air behaves. For example, think of a balloon. When you blow into a balloon, you can observe the air inflating the balloon and stretching the rubber until the balloon is fully inflated. If you let go, you can observe the air leaving the balloon. Can you think of another example of a way you can observe the way matter behaves, even if you cannot observe the matter particles?



#### WHAT I HAVE LEARNED

1. Which is the best definition of matter?

- A Anything that is visible
- B Anything that has a mass and takes up space
- C Things that can change from visible to invisible
- D Things that cannot be seen but its behavior can be observed

2. Wind is air that moves from areas of high air pressure to areas of low air pressure. What is one way you observe the wind?

- A Watch for particles of air.
- B Watch for individual air atoms.
- C Watch for air that moves tree branches.
- D Watch for air molecules that become visible.

#### WHAT I HAVE LEARNED:

Offers independent practice with item types that meet the rigor of the NGSS.

#### Lesson 1 HOW CAN WE SEE MATTER?

3. A student places several ice cubes in 100 milliliters of water. She leaves for several minutes. When she comes back, there is no ice in the glass, just water. How can she observe that the matter in the ice did not disappear but only changed?

- A She can feel the water.
- B She can look carefully for small particles of ice.
- C She can ask if anyone saw the ice melt while she was away.
- D She can measure the volume of the water to see if it has increased.

#### HINT, HINT

Think about a property that can be observed and measured to show the water is still there, but in a different form.

4. A student has made a simple model. It involves a capped syringe and a plunger (there is no needle). The plunger is depressed halfway down the syringe before it can no longer move. What idea is this simple model illustrating?

- A The matter in the syringe increases with pressure.
- B The matter in the syringe decreases with pressure.
- C The matter in the air expands when pressure is added.
- D The matter in the air compresses when pressure is added.



5. Which of the following is not matter?

- A An idea
- B An atom
- C A building
- D A molecule

#### Lesson 1 HOW CAN WE SEE MATTER?

#### SKETCH IT

Sketch the carbon and oxygen atoms for each of the 7 carbon dioxide molecules the student needs to draw. There are 2 oxygen atoms and 1 carbon atom in each molecule.

6. Carbon dioxide molecules are composed of one carbon atom and two oxygen atoms. If a student wants to draw a model of seven carbon dioxide molecules, how many individual atoms does he need to draw?

- A 7
- B 10
- C 14
- D 21

7. Pete measures the mass of a wooden log. After he burns the log in a fireplace, he measures the mass of the ash. He finds that the ash has a much smaller mass than the log. What should Pete conclude?

- A Mass was lost during the reaction.
- B His measurements were incorrect.
- C Gases were released when the wood burned.
- D Energy was released as the wood burned.

#### HINT, HINT

Notice that the particles are not visible. You are looking for an example that would allow you to see the particles.

8. Which of the following examples describes an investigation that would allow a student to see particles that at one time were not visible?

- A Blow up an empty basketball with air.
- B Tear apart a slice of bread into tiny pieces.
- C Dissolve a spoonful of sugar into a glass of water.
- D Evaporate the water from a glass of salt water.

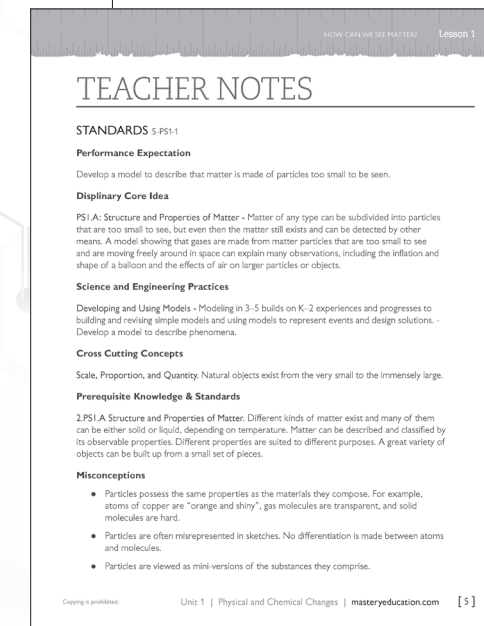
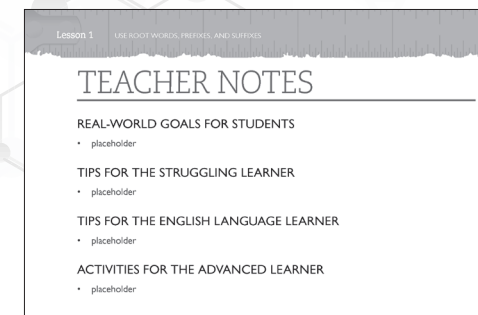
**CRITICAL-THINKING ITEMS:**  
Starred items indicate critical-thinking questions.

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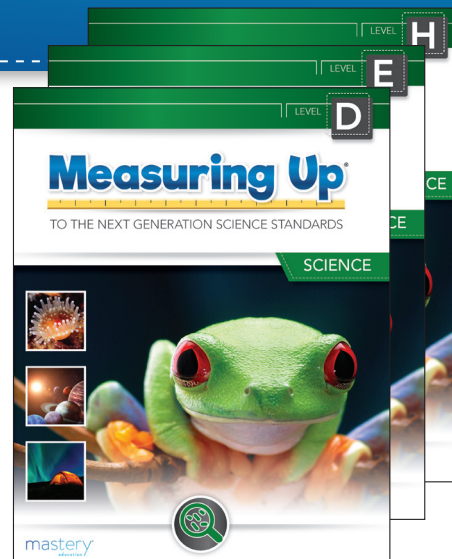
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