

# Talking Science Teacher's Guide

Written and Designed by Marlee Brooks, Caitlin Burnham, Jennifer Coon,  
Claire Romine, Susan Stark, and Hannah Thelen



**To be used with:**  
***Talking Science***  
**Written by Mary Wissinger**  
**Illustrations by Lilia Miceli**

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750 First St NE, Suite 700 • Washington, D.C., 20002

Office: 202-546-1674 • Fax: 202-558-2132

Info@PlatypusMedia.com • [www.PlatypusMedia.com](http://www.PlatypusMedia.com)



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# About the Author

**Mary Wissinger** was born in Wisconsin where she spent most of her childhood singing, reading, and daydreaming. She dove into storytelling through acting, singing, and writing (and writing and writing). While spending time as a classroom teacher sharing the magic of music, she saw firsthand the incredible life-changing power of stories. Mary lives in St. Louis, MO where she writes stories that inspire curiosity about the world and connection with others. She is also the author of Science Wide open series and the My First Science Textbook series. She can be reached at [Mary.Wissinger@ScienceNaturally.com](mailto:Mary.Wissinger@ScienceNaturally.com)



# About the Illustrator



**Lilia Miceli** grew up in Turin, Italy, where she loved to use her drawings to tell stories. She studied 2-D animation at the Centro Sperimentale di Cinematografia di Torino and is now a professional illustrator. She uses her creativity to make the world a better place by dealing with important topics and creating something beautiful that raises the soul of those who see it. She enjoys shating food and drinks with friends, cuddling every cute animal she meets, and pretending to be a mermaid.

# Teacher's Guide Contributors



Mary Wissinger  
*Author*



Lilia Miceli  
*Illustrator*



April Garnock  
*Teacher's Guide Editor*



Caitlin Burnham  
*Teacher's Guide Editor*



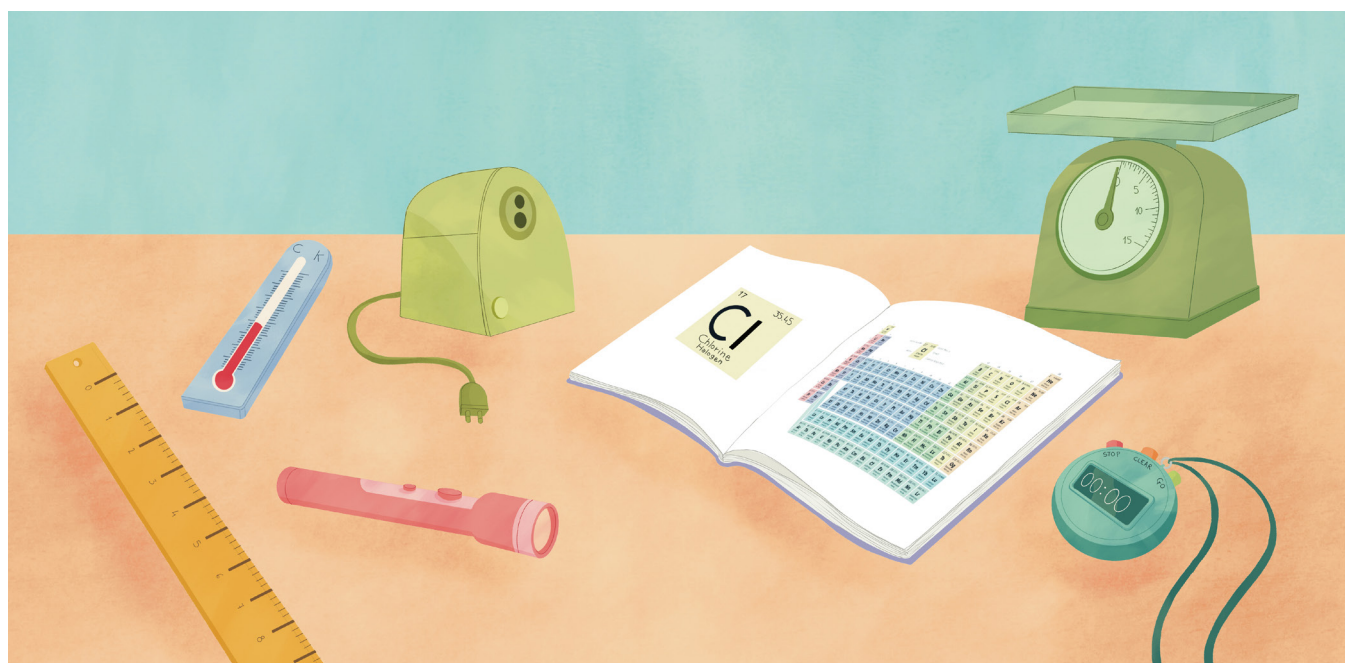
Hannah Thelen  
*Teacher's Guide Editor*



# Introduction

Before universal units of measurement were established, people communicated with makeshift measurements that not everyone knew. Universal units of measurement allow us to communicate with people all over the world and talk about science easily! Different units are used to measure different things, and the International System of Units lets us talk about anything in the universe.

To talk about length you would use meters, while talking about time you would use seconds. Understanding units of measurement helps us discover and share information about the world around us. Measurement can be a confusing topic for young students to grasp, so this guide includes activities and visual aids to deepen understanding.



# Resources

The listed resources are a way for students to expand their knowledge about the subjects covered in *Talking Science*.

## **YouTube videos to introduce measuring concepts:**

*Measuring! Mini Math Movies* by Scratch Garden

*Units of Measurement* by Peekaboo Kidz

*Measurement Song* by Mr. R's Songs for Teaching

*Math for Kids: How Do You Measure Up?* by Kids Educational Games

*SI Units of Measurement* by MooMath and Science

## **Books to foster curiosity:**

*How Tall, How Short, How Far Away?* by David Adler

*Millions to Measure* by David E. Schwartz

*Peg + Cat: The Puddle* by Jennifer Oxley and Billy Aronson

*How Long or How Wide? A Measuring Guide* by Brian Cleary

*Me and the Measure of Things* by Joan Sweeney

## **Websites to interact with:**

<https://www.rulergame.net>

<https://pbskids.org/games/measurement>

# Pre-Reading: Learning with Legos

**Grades:** K - 3rd Grade

**NGSS:** Practices: Developing and Using Models

**Materials:** *Talking Science*, Legos

**Skills:** Critical thinking

**Subject:** Measurement

**Background:** *Talking Science* teaches students about the International System of Units and how helpful it is when talking about science and the world we live in. Before you read to your students, show them that there are other units you can measure in, but it can be hard to translate those units to the real world.

## Activity:

1. Give your students a set of legos that are all the same size bricks.
2. Have your students build a structure they like for a few minutes.
3. Ask your students to measure the height of their structures in lego bricks.
  - a. Ex. My structure is three legos high.

**Discussion:** This activity shows students that you can measure with any units, like legos, but having an International System of Units makes it easier to communicate with others. After your students have discussed and measured their lego structures, ask them if they they could guess how tall something is just by hearing the lego measurements (such as 10 legos high). Would it be easy to measure other things in legos? How do you communicate with someone who doesn't know what a lego is? Are there other ways to measure the things around us? How do you think we can make sure everyone understands the same measurements? Follow the discussion by reading *Talking Science* together as a class.

# After Reading: Seconds as a Measurement

**Grades:** K - 3rd Grade

**NGSS:** Practices: Analyzing and Interpreting Data

**Materials:** *Talking Science*, clock optional

**Skills:** Critical thinking, analyzing data

**Subject:** Measurement, counting

**Background:** Seconds are the way we measure time according to the International System of Units. Even though seconds are commonly used, we don't always think of time as something to be measured like height or weight. A measurement allows us to compare things, like how long it takes two different people to run a race. This activity will help students understand seconds as a unit of measurement and the purpose of measuring.

## Activity:

1. Read *Talking Science* aloud to your class.
2. Have one of your students get up and go to one side of the classroom.
3. Have the student walk the length of the classroom at their normal pace.
4. As the student is walking, have the other students count in seconds aloud until the student reaches the opposite side of the classroom.
  - a. You can have your students count in time with the second hand on a clock if they have trouble keeping a consistent pace.
6. Repeat with multiple students.

**Discussion:** Have your students discuss and compare how long it took each student to walk across the room. When do we use seconds? Why are seconds a useful measurement to use and understand? What other things do you think we can measure? Can you only measure things you can touch and see? Why do you think measuring is important? How does measuring help us talk about our world?



# After Reading: Kelvins or Fahrenheit?

**Grades:** 1st – 3rd Grade

**Subject:** Temperature

**Materials:** *Talking Science*, thermometer to measure kelvins, thermometer to measure fahrenheit, bowl, warm water, ice

**NGSS:** Practices: Analyzing and Interpreting Data

**Skills:** Analyzing data, critical thinking

**Background:** Kelvins are used to measure temperature, and is a different unit of measurement than Fahrenheit or Celsius, which we use in our everyday lives. Kelvins are primarily used by scientists, as it allows them to understand temperature in the context of the entire universe, which has much colder and hotter temperatures than we find on Earth. This activity can help demonstrate to your students why we use Fahrenheit (in the United States) rather than kelvins most of the time.

## Activity:

1. Read *Talking Science* aloud to your students.
2. Fill a bowl with warm water.
3. Using a thermometer that measures kelvins, determine the temperature of the warm water.
4. Using a thermometer that measures Fahrenheit, determine the temperature of the warm water (you could also do this activity using Celsius instead of Fahrenheit).
5. Progressively add ice to the water.
6. Measure the water again in kelvins.
7. Measure the water again in Fahrenheit.
8. Show your students how the temperature changes in both Fahrenheit and kelvins, and discuss which unit is more useful in different situations.

**Discussion:** Ask your students what they noticed as ice was added to the water. How much did the temperature change in kelvins? How much did it change in Fahrenheit? In what situations should we use kelvins? In what situations should we use Fahrenheit? Why do you think regular people use Fahrenheit and not kelvins? Why do you think kelvins are better for scientists to use?

# After Reading: Measuring a Cozy Hug

**Grades:** K – 3rd Grade

**Materials:** *Talking Science*, meter stick

**Subject:** Measurement

**NGSS:** Practices: Analyzing and Interpreting Data

**Skills:** Critical thinking, making comparisons

**Background:** *Talking Science* introduces kids to various units of measurement, one being meters. The book estimates that a cozy hug is one meter long, but that won't be the case for everyone. Estimation can be a useful tool, but sometimes it's also important to use more exact measurements. This activity will help your students understand estimating and when it's appropriate to do so.

## Activity:

1. Read *Talking Science* aloud to your students.
2. Have your students split off into pairs
3. Have your students put their arms out wide as if they were about to give someone a hug.
4. In pairs, have them measure the length of one another's outstretched arms in meters.
5. Bring all the students back together to compare and contrast the measurements they found.
  - a. If your students are older, have them calculate the class average.

**Discussion:** *Talking Science* shows a mix of estimations and exact measurements. Have your students discuss in what situations estimation is appropriate versus when it's important to have an exact measurement. For instance, if you were to get the same long-sleeve shirt for everyone in the class, an estimate of arm lengths would be fine. But if you wanted to get a shirt for one kid and make sure it fits really well, you would need the exact measurement. Why can estimating be helpful in some situations? Why can exact measurements be helpful in some situations? What tools do we use to measure exact length? Can estimating be useful for measurements other than height or length?

Name: \_\_\_\_\_

# Measurement Matching

Draw a line matching the base unit with the correct measuring tool

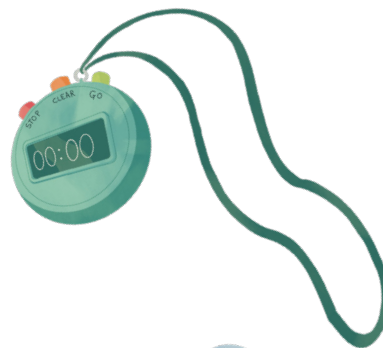
Kelvin



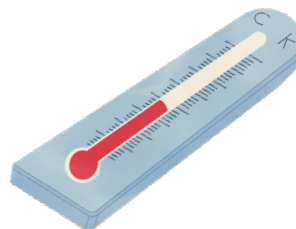
Meter



Second



Kilogram



**BONUS:** Using the table on page 31 of *Talking Science*, write in the symbol for each unit of measurement next to the unit name (for example, Moles use the symbol “mol”).

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**Science, Naturally!**

750 First Street, NE • Suite 700

Washington DC, 20002

202-465-4798

[Info@ScienceNaturally.com](mailto:Info@ScienceNaturally.com)

[www.ScienceNaturally.com](http://www.ScienceNaturally.com)



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