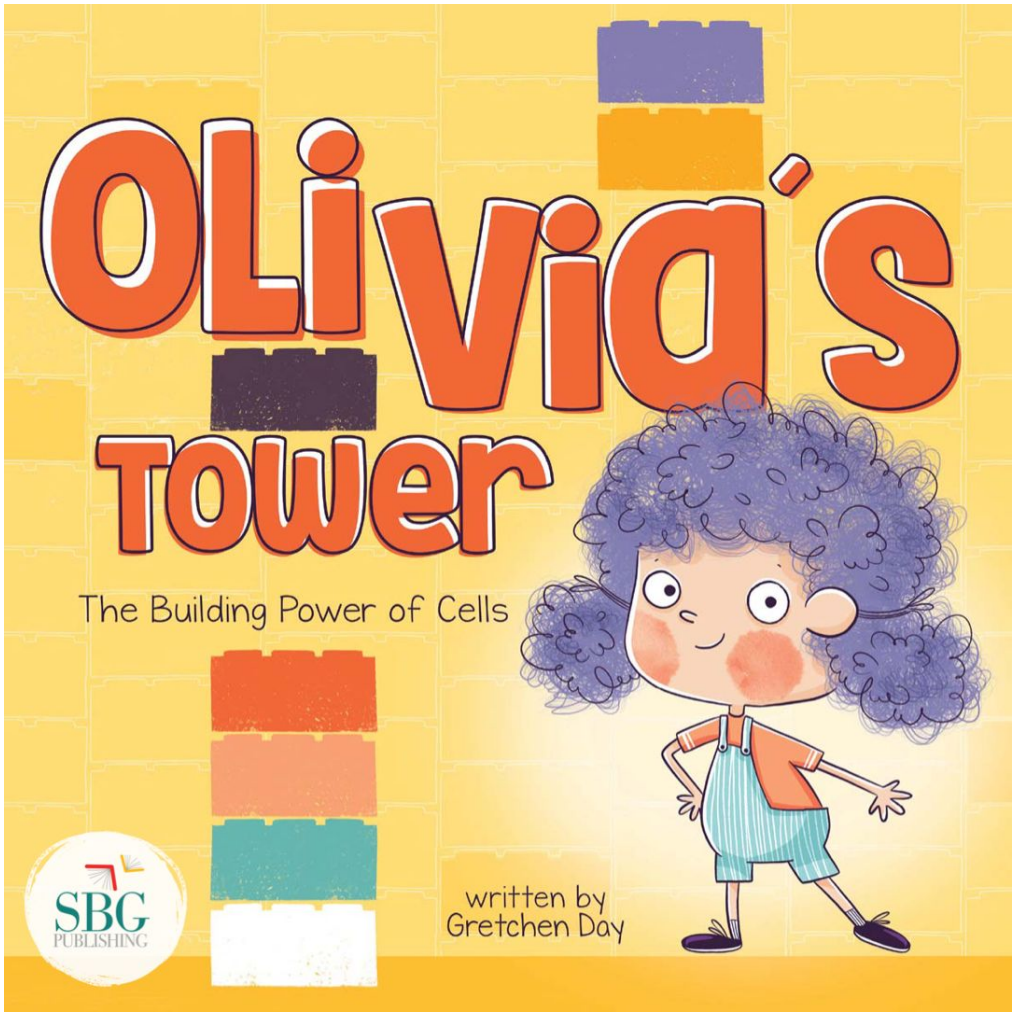



# Olivia's Tower:
## The Building Power of Cells

**Teacher's Guide**

Gretchen Day
AUTHOR

Hello Teachers,

Thank you for supporting my debut children's book, *Olivia's Tower: The Building Power of Cells*. Olivia was created from my own childhood experience. My mom worked in a lab as a molecular biologist. It was a world full of magic to my young mind. Seeing the scientific process unfold was an educational experience.

When you read this book with your students, they may be interested in different aspects of the book. Some kids might notice the lab coats the scientists wear, other kids are drawn to the block creations, another might want to memorize the names of the organelles in a cell. There's no wrong way to discover a book.

One of the wonderful things about books is the opportunity it gives for students and teachers to ask questions and find answers. Maybe you have a budding biologist that loves to ask why things work like they do. As teachers, we can use books to help our students learn about the subjects that interest them.

*Olivia's Tower* is about curiosity, creativity, and the scientific process. An amazing gift of science is researchers learn as much from their mistakes as they do from their success. That is a valuable lesson for kids and adults alike.

Enjoy every page and every illustration. It's made with enthusiasm for learning and exploring the world. I hope you are able to make lasting memories in its pages.

I'd love your help to share Olivia's story. If you enjoyed the book, please rate and review it on Amazon, or share a social media post and tag **@oliviastower**. Thank you!

Happy Reading,

Gretchen Day

**Lesson 1: Asking Questions**

**Purpose:** Explore why asking questions leads to learning. Questions are an important part of the learning process, and often the start of it.

**Introduction:** Ask the class if they've ever been to a new place. They probably had questions while they were there. Ask them to think about a new place they've been. Where did you go? When did you go there? What did you see? How did people behave? Who else was there? New places, and new topics often lead us to asking questions. That's how we figure things out. We use the question words **WHO**, **WHAT**, **WHERE**, **WHEN**, **WHY** and **HOW** when we were thinking about a new place or a new topic.

**Activity:** Prepare 6 sheets of paper. On each paper write one of the six question words: **WHO**, **WHAT**, **WHERE**, **WHEN**, **WHY**, and **HOW**. Ask for six volunteers to hold one paper and come to the front of the class. Tell them to step forward when the word on their paper is being used to ask a question. Now, ask one student to tell the class about the new place you asked them to think about. Students can now take turns asking about the place. When each one of the question words is asked, the student holding that paper should step forward. For example, if they ask "When did you go to Disneyland?" the student holding **WHEN** should step forward. When each of the question words has stepped forward, you can continue to another student. Tell the students that by asking questions, they were able to learn a lot of information about the new places people in their class went. Questions lead to learning!

| | | |
|---|---|---|
| WHO? | WHAT? | WHERE? |
| WHEN? | WHY? | HOW? |

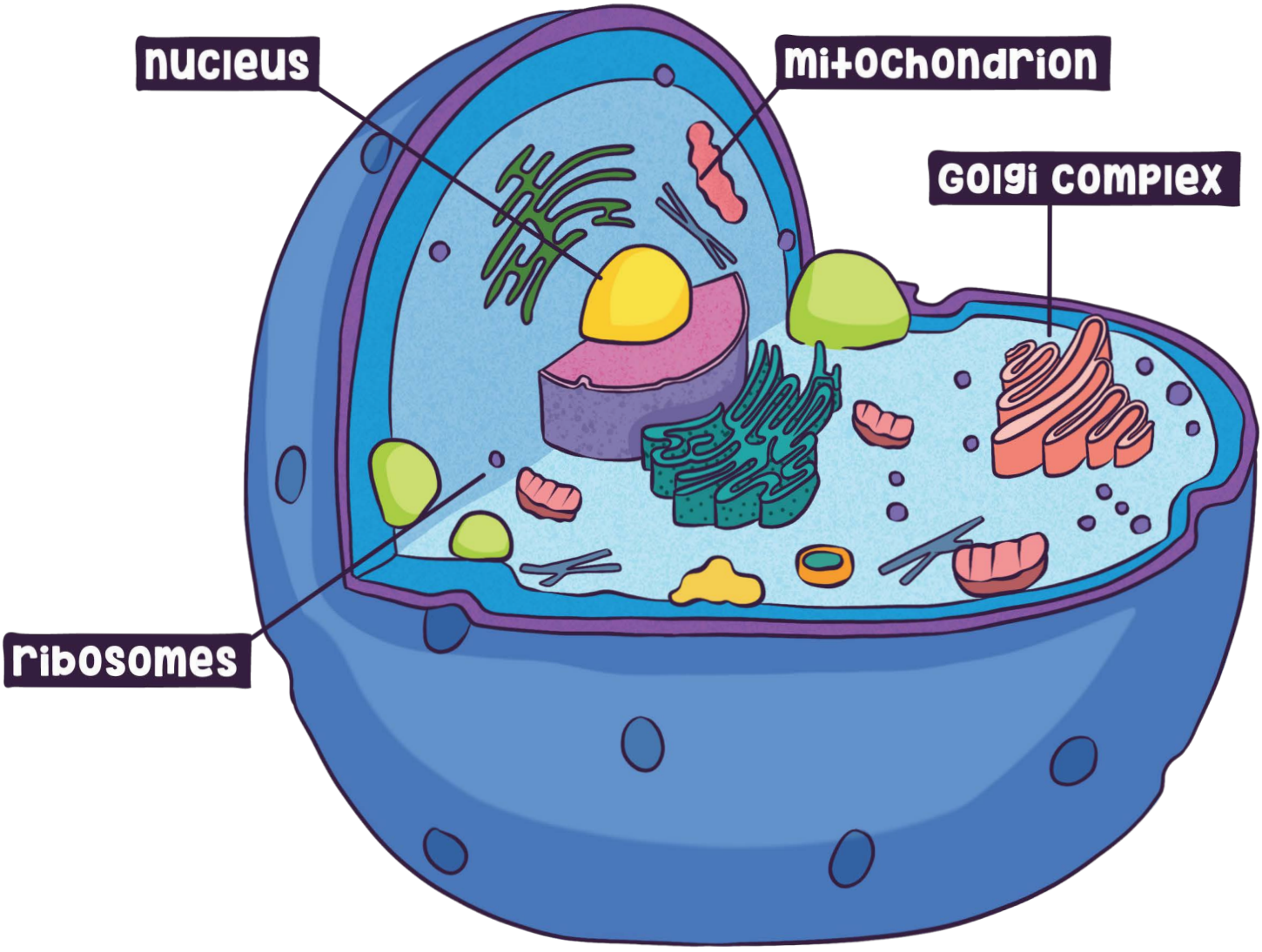
**Tie-In to the Book:** After reading **Olivia's Tower** to your class, ask the students what Olivia's question was in the story. Ask the students what question word she used.

**Answer:** Olivia wants to know why everything is built like blocks in a tower. Her question word is **WHY**.

**Lesson 2: What are cells?**

**Purpose:** Introduce students to the basic ideas of cells, and some of the parts of a cell. In *Olivia's Tower*, we learn that every living thing is made of cells. We also learn that inside each cell are organelles. These organelles have individual jobs. The nucleus, ribosomes, the golgi apparatus, and mitochondria are the organelles we learn about in the book.

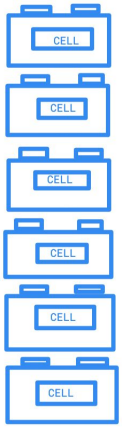
**Activity:** Explain to the class that cells are so small that we can only see them with a microscope. If a microscope is very powerful, we can even see the parts inside of a cell, called organelles. This activity is intended to be a basic introduction to the cell and organelles. Print out the image of the cell from the book. Have the students color it and label the organelles we discussed in the book.


nucleus
mitochondrion
Golgi complex
ribosomes

**Lesson 3: Why do we have cells?**

**Purpose:** Introduce students to the basic idea of cells as the building blocks to all life.

**Activity:** Use a stack of large blocks (like Mega Bloks) to make a tower. Tell your students that each block is needed to complete the tower. Ask the students what else they can make with the blocks. If you have time, allow students to construct with the blocks for a short amount of time. Prepare sticky notes with the word **cell** written on them. Put the **cell** sticky notes on several blocks. Ask the students what they think cells build. Answers can include plants, animals, and people. We are made of cells! Cells are the building blocks of life. Explain to the class that unlike these large blocks, cells are so small that we can only see them with a microscope.




**Tie-In to the Book:** In *Olivia's Tower,* Olivia discovers that some cells look like blocks! And like blocks, when you put cells together, it makes plants, animals, even people! Inside each cell, Olivia learns there are parts that play an important role in life. When people study how life works, it's called biology. Hopefully, students will gain an appreciation for how amazing and important biology is!

**Word Search:** Words may be forward, backward, or diagonal.

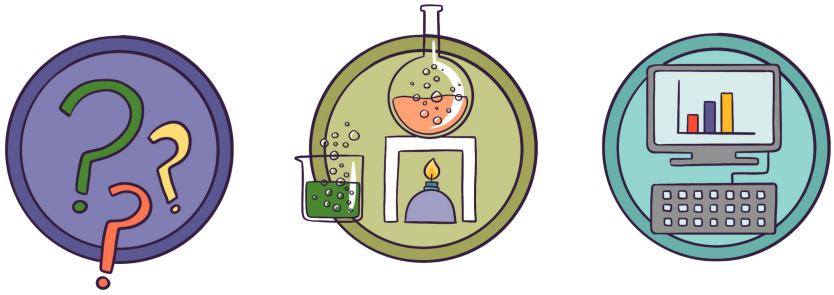
# OLIVIA'S TOWER

| R | R | M | A | P | U | S | P | P | R | W | I | W | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | M | I | C | R | O | S | C | O | P | E | I | O | P |
| S | U | T | A | R | A | P | P | A | I | G | L | O | G |
| H | L | E | I | W | O | H | W | U | N | O | L | G | E |
| O | U | R | P | O | Y | E | U | H | R | S | N | P | I |
| M | T | E | H | P | R | H | N | U | Y | I | U | O | L |
| P | W | H | A | S | A | E | W | A | S | M | C | W | O |
| E | H | W | W | S | H | P | E | W | G | H | S | E | L |
| P | O | H | T | W | S | U | E | L | C | U | N | R | L |
| W | T | P | L | A | N | T | W | H | A | I | R | H | E |
| H | A | S | R | I | B | O | S | O | M | E | P | O | C |
| W | H | E | S | L | A | C | A | R | H | L | W | U | H |
| O | W | I | O | H | U | W | A | H | B | W | L | S | O |
| O | R | C | O | Y | M | L | O | M | O | R | E | E | M |

RIBOSOME
WHY
WHEN
GOLGI APPARATUS
PLANT
POWERHOUSE
WHO
NUCLEUS
WHAT
MICROSCOPE
HOW
CELL
WHERE

**Word Search Answer Key:**

| R | R | M | A | P | U | S | P | P | R | W | I | W | W |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| P | M | I | C | R | O | S | C | O | P | E | I | O | P |
| S | U | T | A | R | A | P | P | A | I | G | L | O | G |
| H | L | E | I | W | O | H | W | U | N | O | L | G | E |
| O | U | R | P | O | Y | E | U | H | R | S | N | P | I |
| M | T | E | H | P | R | H | N | U | Y | I | U | O | L |
| P | W | H | A | S | A | E | W | A | S | M | C | W | O |
| E | H | W | W | S | H | P | E | W | G | H | S | E | L |
| P | O | H | T | W | S | U | E | L | C | U | N | R | L |
| W | T | P | L | A | N | T | W | H | A | I | R | H | E |
| H | A | S | R | I | B | O | S | O | M | E | P | O | C |
| W | H | E | S | L | A | C | A | R | H | L | W | U | H |
| O | W | I | O | H | U | W | A | H | B | W | L | S | O |
| O | R | C | O | Y | M | L | O | M | O | R | E | E | M |



**Worksheet:** Complete the following crossword to learn more about lab equipment in “Olivia’s Tower.”

**Word options:**

Microscope

Flask

Bunsen burner

Graduated cylinder

Beaker

Test tube

Scale

Petri dish

**Answer Key:**

**Across:**

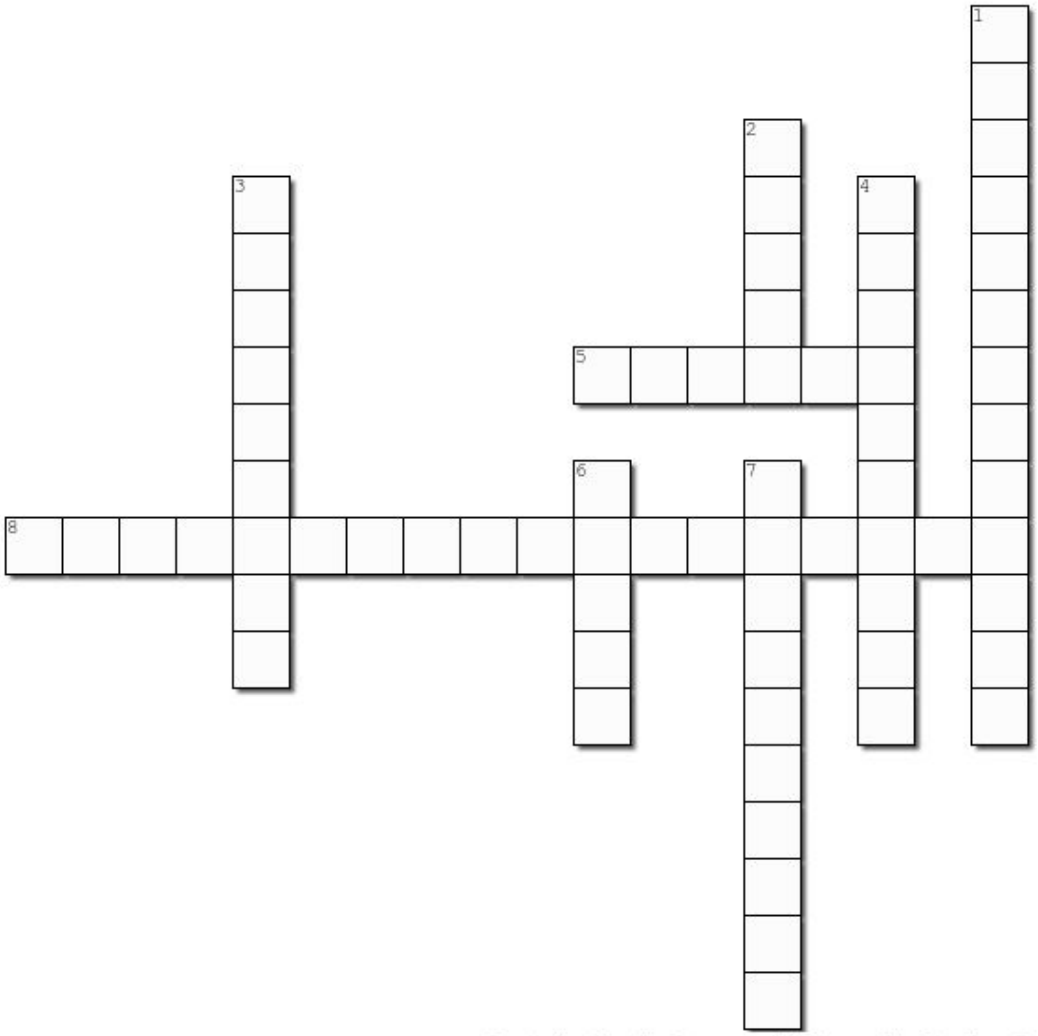
5. Beaker
8. Graduated cylinder

**Down:**

1. Bunsen Burner
2. Flask
3. Test tube
4. Petri dish
6. Scale
7. Microscope

Name:_____

Complete the crossword puzzle below



Created using the Crossword Maker on TheTeachersCorner.net

## Across

**5.** A glass container with a flat bottom that scientists use to hold liquids

**8.** A piece of laboratory equipment used to measure the volume of a liquid

## Down

**1.** A laboratory instrument that can be used to provide a single, continuous flame by mixing gas with air in a controlled fashion

**2.** A narrow-necked glass container, typically conical or spherical, used in a laboratory to hold samples

**3.** A common piece of laboratory glassware consisting of a finger-like length of glass or clear plastic tubing, open at the top

**4.** A shallow dish with a flat lid

**6.** Used for determining the weight or mass of a sample

**7.** An instrument for viewing very small objects

**Lesson 4: The scientific process**

**Purpose:** The scientific process is a way to learn and discover. As students get older, they will most likely go in depth about the steps of the scientific process. As an introduction to the scientific method, it's important to recognize the aspects of asking a question, finding information, applying that information, and using what was learned to formulate new questions. Another important part of the scientific process is that failures ARE part of the process. Failures help us learn. We apply the knowledge gained from a "failed" experiment to improve.

**Activity:** Now that your students know the importance of asking questions, they can apply the scientific process. For this activity, pose a question the class can find an answer to together. For example, you could pose the question "What is the average height of the students in this class?" Asking a question is the first part of the scientific process. Allow students to guess, or come up with a hypothesis of the average height. Next, students should use any tools they have to do an experiment, to test their hypothesis. In this example, tape measures can be handed out and shared around the class. Or, tape a large growth chart ruler to the wall. Have each student write down their height in inches on a piece of paper. The teacher should collect each paper and take an average by totaling the heights and dividing by the number of students. This part of the process is finding and analyzing the data. Were the students correct in their hypothesis? Were measurements accurate? Sometimes, an experiment needs to be done many times to get the most accurate results. Point out to the students that using the scientific process provides a plan - ask a question, use tools to do an experiment or find information, and then see if you've found an answer to your question. Were the students incorrect in their hypothesis? That's valuable too! Answering a question incorrectly is a great way to learn. When we go through the process of finding an answer, we learn a lot!

**Tie-In to the Book:** In *Olivia's Tower*, Olivia says sometimes an experiment doesn't work in the way it was expected. When that happens, they still gather information that is used for the next experiment. Just like taking measurements, sometimes we have to try things more than once. We can use that data to make our next experiment more accurate. There are times that we might fail at things we try to do. That's okay, because it helps us improve when we try again.

**Reader Response & Writing Activity:** Now that your students have learned about asking questions, cells, scientific tools, and the scientific process, they're ready to write their own response to *Olivia's Tower*. Use the following prompts:

- Write about and/or draw a science lab. What can you find in a lab? What tools would you like to use?
- Write about and/or draw an experiment that you would like to perform. What question is the experiment trying to answer?
- Write about and/or draw a STEM job that you think would be fun. What type of job is it? What would you do in that job?
- Write about and/or draw a time you failed at something, but you kept trying. What did you learn? Did you improve?
- Write about and/or draw your favorite part of "Olivia's Tower." Why was it your favorite part?

Thank you for using *Olivia's Tower: The Building Power of Cells* in your classroom. If you have questions, please send them to oliviastowerbook@gmail.com.