# MAGNIFICENT MAGNIFICATION


## TEACHER GUIDE

ACCELERATE

# PLANNING

**Here's a suggested schedule for this kit! The activities should be completed in order, but you can choose when the lessons take place over time.**

| ACTIVITY INFORMATION | SECTION (S) | TIME REQUIRED | DAY/ LESSON |
|---|---|---|---|
| **ACTIVITY 1: LOOK CLOSER**<br>View the microscopic world all around you.<br>Total time: 1 h 45 min | ☐ Think Small | 60 minutes | Day 1 |
| | ☐ Going Back in Time | 45 minutes | Day 2 |
| **ACTIVITY 2: WHAT IS A CELL?**<br>Create and compare the types of cells.<br>Total time: 2 h 15 min | ☐ Many Types | 75 minutes | Day 3 |
| | ☐ Sizing Up | 60 minutes | Day 4 |
| **ACTIVITY 3: LIFE OF BOXES**<br>Make a plant cell slide to compare the parts of<br>Total time: 1 h 30 min | | | |



*Full schedule available with purchase*

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## CONTENT

• In this reading section, your student will learn the following vocabulary terms: amyloplast, cell, cell membrane, cell wall, chloroplast, cytoplasm, eukaryotic cell, flagellum, golgi apparatus, lysosome, mitochondria, nucleus, nucleoid, organelle, organism, peroxisome, prokaryotic cell, ribosome, rough endoplasmic reticulum (ER), smooth ER, and vacuole.
• Your student will be given information on size and scope of cells in comparison to an adult female.
• There is an extension titled "Cellular Diffusion" that can demonstrate how cells are impacted by their surroundings.

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# SIZING UP

## CONTENT

• In this reading section, your student will learn about animal cells and plant cells by creating a model of what they think each cell type looks like and then comparing their model to cell diagrams.

## ☑ PREPARATION AND SUPERVISION

■ Students will be using what they learned about the parts of cells to build models. They will use these models throughout the rest of the kit.
■ Your student may notice that there is only one Cell Wall label, one Chloroplast label, and one Amyloplast label. Encourage them to think about why this might be and how plant and animal cells could be different.

## REFLECT

**Question 1: Why did you label each cell model as either a plant or animal cell?**
**Answer:** Plants can photosynthesize, while animals cannot, so chloroplasts are only found in one of the cell models.
**How to Help:**
*• Your student may provide a different reason, which is okay so long as their reason represents their model. For example, they may say that animal cells have amyloplasts because they store starches from foods like potatoes. While this is incorrect, if their animal cell had an amyloplast and their plant cell did not, this is an acceptable answer.*
*• At this point, so long as your student's response matches their models, it is correct because they haven't been told yet which organelles are found in which cell type.*

**Question 2: How difficult was it to tell which was animal and which was plant without knowing in advance?**
**Answer:** Answers will vary.
**How to Help:** *It was likely difficult for your student because they were not yet told which organelles are found in which cell type. However, encourage them to explain "why" it was difficult and if this might be how scientists feel when discovering something new.*

**Question 3: Evaluate how well your model matches the diagrams. What parts of the diagrams would have helped you identify them as being either plant or animal cells?**
**Answer: Answers will vary.**
**How to Help:**
*• Students will begin to recognize that size, shape, and quantity of organelles are difficult to determine without a visual representation.*

activity 4

# AMAZING ANIMAL CELLS

While plants make up 80 % of the mass of living things on Earth, another 5 % of that mass is animals, which are made of animal cells. As your student saw in Activity 1, there is a lot of diversity in the microscopic world.
In this activity, they will use their own body to learn about and compare different types of animal cells.

***LEARNING GOALS:***

- ✓ I can do an investigation to show that living things are made of cells.
- ✓ I can use models to show how cells and cell parts function.
- ✓ I can use microscopes to investigate the cell-level structures of several types of organisms.

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## BECOMING THE TEST SUBJECT

**CONTENT**

• This section will provide your student more information on centrioles and microtubules.

### ☑ PREPARATION AND SUPERVISION

■ Help your student find which end of the hair is the root and cut the other side at the right length.
■ Students can choose to keep their hair or clean it off after the “Comparing Slides” portion.

### MULTIPLE AGES AND ABILITIES:

**If you are working with students with different hair colors or textures, have each stu-dent make their own slide to see what different colors and textures of hair look like under a microscope. You can also have students use hair samples from pets.**

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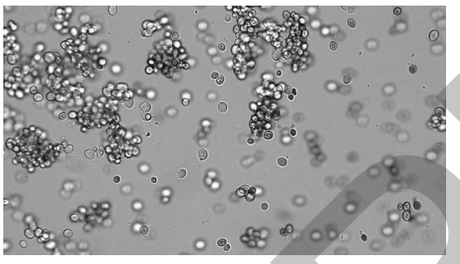
### ☑ PREPARATION AND SUPERVISION

■ Make sure student do not suck or chew on the swab applicator.
■ If your student has eaten recently, encourage them to wash their mouth out with water so that they only pick-up cheek cells, not pieces of leftover food.
■ Students can choose to keep their cheek cell slide or clean it off after the “Comparing Slides” portion.

**How to Help:** *From the image, your student will not be able to see peroxisomes in any of the three types of cells. After completing their chart, encourage your student to use another source of information, a book or the internet are great options, to confirm their chart is correct. Specifically, check whether peroxisomes are in fungus cells.*

## ☑ PREPARATION AND SUPERVISION

- The temperature of the water isn't critical for this experiment. However, if the water is warm, it will activate the yeast. Activated yeast will look different than dormant yeast. You can have your student do the experiment twice – once with warm water and once with cold water – to see how the temperature affects the yeast.
- Your student will need to use the 40X magnification lens to see the yeast properly, but make sure their stage isn't set too high when they switch from the 10X to the 40X lens or you risk damaging the microscope.
- If your student doesn't have a microscope, here is an image of what they would be viewing:



- Students can choose to keep their yeast slide or clean it off after the "Think About It" questions.

## THINK ABOUT IT!

**Question 1: Look in the eyepiece and draw what you see.**
**Answer:** Your student can choose to draw everything they see or a single cell they have focused on well.

**Question 2: Write a description of what the yeast looks like. Look at shape, color, and structure.**
**Answer:** The cells are bunched together and shades of blue. They are all round and have a clear cell wall.
**How to Help:** *Answers will vary, but check that your student's description matches their drawing from Question 1.*

**Question 3: Compare what you viewed under the microscope to the diagram of a fungus cell and the chart you made indicating the organelle found in a fungus cell. Use the diagram and chart to identify parts of the cell.**
**Answer:** Answers will vary.

## 15 CAN YOU SEE THE DIFFERENCES?

**Question 1: Draw and label a plant, an animal, and a fungus cell, including all of the organelles found in each type of cell.**
**Answer:** Answers will vary.
**How to Help:** *Make sure your student's cells contain the correct organelles.*

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|---|---|
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