Mushroom Rain

Teacher's Guide

About the Book:

Without warning, they appear. Mushrooms!

What can smell like bubble gum, glow neon green at night, be poisonous but still eaten by humans, and even help create rain? The answer is mushrooms!

From their hidden networks underground to the fruiting body above, mushrooms can do incredible things. But don't call them plants - mushroom are fungi. They're more closely related to animals like you!

Through lyrical text and colorful, detailed artwork, the wonderful, mysterious, and sometimes bizarre world of mushrooms is explored. Backmatter includes a glossary, additional mushroom facts, and a science activity.

About the Author: Laura K. Zimmermann

Although Laura has seen and eaten many mushrooms, she knew very little about them before she discovered Beatrix Potter's paintings and journal. A mushroom hunter, artist, and researcher, it was Beatrix's passion that led Laura to learn more about the weird and wonderful world of mushrooms. Laura is a college professor by day and children's writer by night. She has published numerous academic articles, as well as nonfiction stories in children's magazines. When she's not writing, Laura can be found teaching and conducting research at Shenandoah University in Virginia or wandering through nature with her goldendoodle, Tivy. Learn more about her at:

laurakzimmermann.com

About the Illustrator: Jamie Green

Jamie is a maker, mushroomer, and curious person living in Greenville, South Carolina. They attended Ringling College of Art and Design for illustration and fell in love with mycology after checking out an illustrated book on mushrooms from the school's library (full circle)! When they are not drawing, they can be found exploring nature, climbing on rocks, foraging, or running on the local trail. You can check out more of their work and adventures at:

@jamiegreen art on Instagram or Twitter

jamiegreenillustration.com

Author: Laura K. Zimmermann ***Illustrator: Jamie Green*** ***Publisher: Sleeping Bear Press***

Content Standards:

Anchor Standards

CCSS: ELA: LITERACY.CCRA: R.1, R.4, W.6, W.7, W.10, SL.1, SL.4, SL.5, L.4, L.5
VA.SOL: Life Science: LS.1, LS.3, LS.8

1st Grade

CCSS: ELA: LITERACY.RI.1.1, RI.1.4, W.1.7, W.1.8, SL.1.1, SL.1.2, SL.1.4, SL.1.5, L.1.4
MATH: CONTENT.1.OA.C.5, 1.G.A.3
NGSS: 1-LS1-2
VA.SOL: ELA: 1.1, 1.2, 1.4, 1.7, 1.10, 1.12, 1.14
Visual Arts: 1.1, 1.2.b, 1.12, 1.13, 1.15, 1.16, 1.17.b
Science: 1.1, 1.4, 1.7
Math: 1.6

2nd Grade

CCSS: ELA: LITERACY.RI.2.1, RI.2.4, W.2.2, W.2.7, SL.2.1, L.2.4
MATH: CONTENT.2.OA.B.2, 2.G.A.3
NGSS: 2-LS4-1, 2-ESS2-3
VA.SOL: ELA: 2.1, 2.2, 2.6, 2.8, 2.10, 2.12
Visual Arts: 2.1, 2.2, 2.5, 2.12, 2.15, 2.16, 2.17
Science: 2.1.e.f, 2.4, 2.5, 2.6.a, 2.7.a
Math: 2.4.a.b.c, 2.5a.b

3rd Grade

CCSS: ELA: LITERACY.RI.3.1, RI.3.3, RI.3.4, RI.3.7, W.3.1, W.3.7, SL.3.1, SL.3.4, L.3.1, L.3.4
MATH: CONTENT.3.OA.C.7, 3.NF.A.1, 3.G.A.2
NGSS: 3-LS1-1, 3-LS3-1
VA.SOL: ELA: 3.1, 3.2, 3.4, 3.6, 3.8, 3.10
Visual Arts: 3.1.b, 3.2.c, 3.3, 3.5, 3.16, 3.17
Science: 3.1.f, 3.4, 3.5, 3.7
Math: 3.4.a

4th Grade

CCSS: ELA: LITERACY.RI.4.1, RI.4.3, RI.4.4, RI.4.7, W.4.1, W.4.4, W.4.7, W.4.9, SL.4.1, SL.4.4, SL.4.5, L.4.1, L.4.3, L.4.4, L.4.5
MATH: CONTENT.4.OA.A.1
NGSS: 4-LS1-1
VA.SOL: ELA: 4.1, 4.2, 4.4, 4.6, 4.7, 4.9
Visual Arts: 4.1, 4.2.b, 4.5, 4.16
Science: 4.1.f, 4.2, 4.3, 4.4
Math: 4.3.d

5th Grade

CCSS: ELA: LITERACY.RI.5.4, RI.5.7, RI.5.9, W.5.4, W.5.7, W.5.9, SL.5.1, SL.5.4, L.5.1, L.5.3, L.5.4, L.5.5
NGSS: 5-PS1-1, 5-LS2-1
VA.SOL: ELA: 5.1, 5.2, 5.4, 5.6, 5.7, 5.9
Visual Arts: 5.1, 5.2.a, 5.5, 5.15, 5.16, 5.17

Art by Jamie Green

About This Guide:

This teacher's guide for Mushroom Rain by Laura K. Zimmermann and illustrated by Jamie Green is aligned with Common Core State Standards, Next Generation Science Standards, and Virginia Standards of Learning. Its activities and assignments are geared toward students in 1st -5th grade. It is assumed the teacher will adapt and scaffold the assignments based on their students' needs and level.

This guide can be printed but was created for easy viewing as a digital PDF (pages 1-9). All printables for students are located on pages 10 - 19. It is available for educational use only, free of charge. It is not to be resold or distributed for profit.

This guide was created by DK Ryland - credentialed K-12 teacher and picture book author/illustrator. Visit her at www.DKRyland.com

Table of Contents

English Language Arts

Pre-Reading Questions:

- Who is the author and who is the illustrator?
- What do you think this book will be about?
- Do you think this is a fiction or non-fiction book? Why?
- Do you ever see mushrooms pop up in your yard, park, or at school? Do they look like the mushrooms on the book cover?

Post Reading Discussion:

- There are a variety of mushrooms featured in the illustrations. Which one is your favorite and why?
- Do you and your family ever eat mushrooms? Do you know what kind of mushrooms you eat?
- Look at the spread that starts "Delicate umbrellas open..." Discuss with your students how the author does not call the mushrooms by their name but instead calls them "delicate umbrellas." This is a metaphor (comparison of two unlike things without using like or as).
- Why do you think the author uses a metaphor to describe the mushrooms? Can you find other metaphors on this spread?
- How might mushrooms play a role in an environment's food chain?
- What might happen if mushrooms didn't exist?
- In the text, it says "mushrooms disappear, no longer seen, but not gone." What does the author mean by this?
- Why do you think the author compares scattered spores to a flower's seeds?
- Why do you think this book is called Mushroom Rain?

Writing Prompts:

- Have students use the backmatter in Mushroom Rain to draw a mushroom and label it's anatomy. Make sure to include the Fruiting Body, Gills, Spores, Mycelium, and Hyphae.
- Describe your favorite mushroom from the book. Write about its color and shape, and why you want to learn more about it.
- You are a superhero with the superhero name "Mushroom Kid" - what is your superpower?
- Flip through the pages of Mushroom Rain. Use a metaphor to describe one of the mushrooms from the illustrations.

English Language Arts

Research Report/Presentation:

There are many kinds of mushrooms featured in Mushroom Rain. On cardstock, print the mushroom cards on page 10. You only need to print this page once. Cut out the cards and assign a different type of mushroom to groups of 2-4 students.

Have students work together to conduct online research to find out more about their assigned mushroom. Have them use page 11 to organize their research and page 14 to map out where their mushroom is located across the world.

Speaking
Have students create a physical or digital presentation about their assigned mushroom and present to the class. Keep the presentation possibilities open ended to push creativity. Potential options include: poster, shoebox dioramma, play-doh or clay model of mushroom's anatomy, board game, flip book, powerpoint, etc.

Listening
While students are presenting, have students use the chart on page 12 to record an interesting fact about each mushroom.

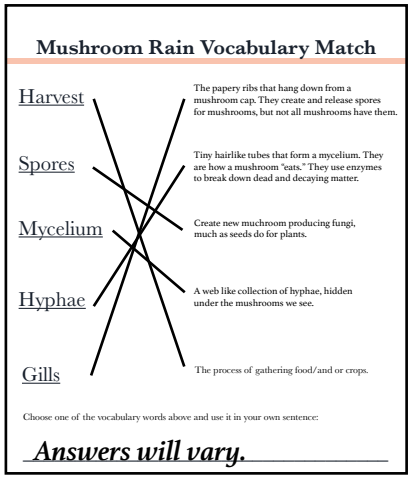
* For younger students, you may want to pick one mushroom as a class and guide them through how to do research. Then assign them to groups to create different types of projects.

Extension: Print another copy of the mushroom cards on page 10 to create a memory game.

Key Vocabulary Words:

Use the printable on page 13 to match the vocabulary word to its definition. Make sure to read the back matter in Mushroom Rain.

Answer Key:



Social Studies

Geography:

As part of their research reports, students will use page 14 to map out where their assigned mushroom is located. They can use simple plot points or draw little mushrooms on the map.

Students can use this map as part of their presentation if they chose.

Beatrix Potter:

Read both the author (Laura K. Zimmermann) and illustrator's (Jamie Green) bios at the beginning of this guide.

Ask your students:
• When did Jamie fall in love with mycology? Does anyone know what mycology is? Can you infer its definition from their bio text?
• What inspired Laura to explore the world of mushrooms? Does anyone know who Beatrix Potter is?

In this lesson, your students will learn more about Beatrix Potter and get out and study nature the way she did.

Beatrix Potter was born in England in 1866 and was a children's book author and illustrator. She is best known for her book The Tale of Peter Rabbit, which was published in 1902 and is still popular today.

Beatrix was also interested in natural sciences, such as botany, archaeology, entomology, and mycology. She observed flora, fauna, and fungi in nature and drew and painted them.

Here is an example of her watercolor paintings of mushrooms:
https://collections.vam.ac.uk/item/O1278341/drawing-beatrix-potter/

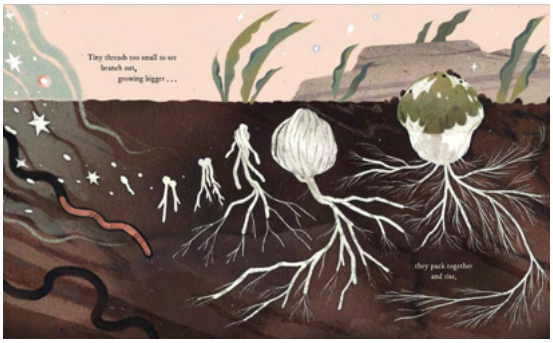
For a more in depth look at Beatrix Potter's life and contributions to the natural science, check out the book:
Beatrix Potter, Scientist by Lindsay H. Metcalf and Junyi Wu

Print page 15 and conduct a nature walk around campus. Have your students observe, draw, and label any plants, bugs, and mushrooms that they see.

Science

Mushroom Life Cycle:

Revisit this spread in Mushroom Rain. Ask your students: What is happening in this illustration?



Art by Jamie Green

1. A mushroom has dropped its **spores** (often located in the gills). The spores then travel by wind, or even by rain.
2. The spores germinate and form **hyphae**.
3. Hyphae fuse together to create a web of **mycelium**.
4. Portions of the mycelium pack together to form a denser, rounded mass, called a **hyphal knot**.
5. The **pinhead** (or baby mushroom) then sprouts from the ground.
6. A new mushroom has formed and will release spores to start a new life cycle all over again.

Use page 16 to record the life cycle of a mushroom. Cut out the key words at the bottom of the page and glue into the correct spots in the life cycle.

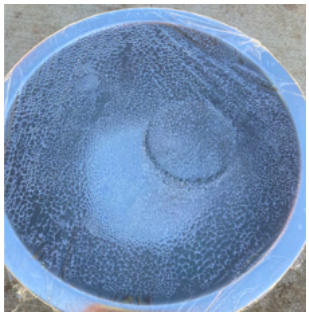
The Water Cycle:

Demonstrate the water cycle to your students:

1. Put a cup in the middle of the bowl and fill the bowl about 1/2 way up with water. Leave the cup empty.
2. Cover the bowl with plastic wrap and secure with a large rubber band.
3. Place in the sun. Revisit the experiment after about an hour.
4. Have your students observe and discuss what they see.

Supplies Needed

- Big Bowl
- Small Cup/Jar
- Plastic Wrap
- Large Rubber Band
- Water

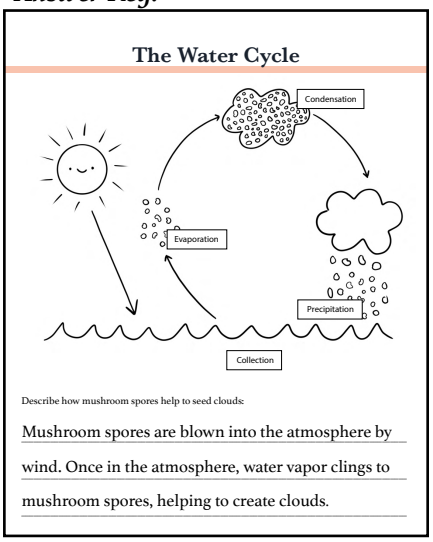


What is happening?

The sun has heated the water, turning it into water vapor and causing it to rise (evaporation), water droplets form on the plastic wrap (condensation - cloud formation), some of the water droplets get too heavy and fall (precipitation - rain), finally they fall back to the bowl or cup, which represents land or ocean (collection).

Reread “Seeding the Clouds” in the back matter of Mushroom Rain and discuss:
• How do mushroom spores travel into the atmosphere? (wind)
• How do mushrooms help to seed clouds? What part of the water cycle does this happen in? (condensation)
• How does seeding the clouds help more mushrooms grow? (helps create rain which mushrooms need to grow)

Answer Key:



Use page 17 to check for understanding of the water cycle. Cut out the key words at the bottom of the page and glue into the correct spots in the water cycle.

For more about mushroom rain, watch this video: https://www.youtube.com/watch?v=gu9UmHbmFfk&t=55s

Math

Mushroom Math:

Use page 18 to have your students create their own math problems.

This worksheet will work with addition, subtraction, multiplication, or division, and is designed to be a flexible resource so it can be used with multiple grade levels.

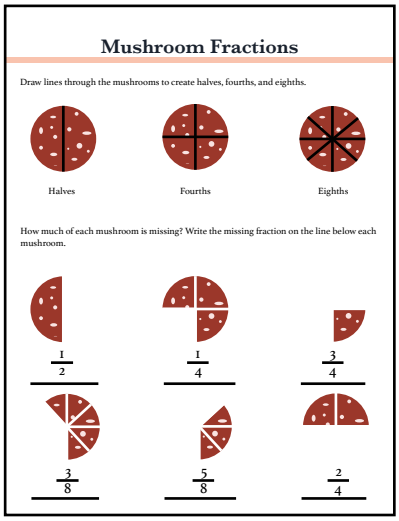
This worksheet can also be used as partner work where students create math problems for each other.

Extension: Have students write their own word problems to go along with the equations they created.

Fractions:

Use page 19 to explore fractions.

Answer Key:



Mushroom Fractions

Draw lines through the mushrooms to create halves, fourths, and eighths.

Halves Fourths Eighths

How much of each mushroom is missing? Write the missing fraction on the line below each mushroom.

$\frac{1}{2}$ $\frac{1}{4}$ $\frac{3}{4}$

$\frac{3}{8}$ $\frac{5}{8}$ $\frac{2}{4}$

Art

Clay Mushroom Forest:

For this class art project, your students will make a clay model of one of the mushrooms they learned about.

Give each student a small ball of clay to mold into the mushroom of their choice. Make sure it can stand on its own. Let dry overnight.

The following day have students paint their mushrooms with acrylic paint. Once dry, seal by painting with white craft glue.

Supplies Needed

- Clay
- Acrylic Paint
- White Craft Glue
- Paintbrushes

Make a classroom display with all of the mushrooms to create a class mushroom forest.

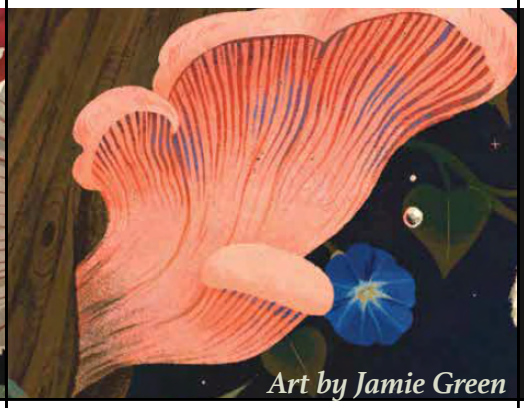
Mushroom Collage:

Shapes are one of the building blocks artists use to create images. Create an assortment of different size rectangles and semi-circles made from colored/patterned/textured paper. Have students use these shapes to create an art collage with mushrooms as its main focus. Leave this assignment open-ended for maximum creativity.

Challenge older students to...
- play with depth by overlapping shapes.
- use size to manipulate perspective.
- use shapes to create 3-dimensionality.

Fly Agaric

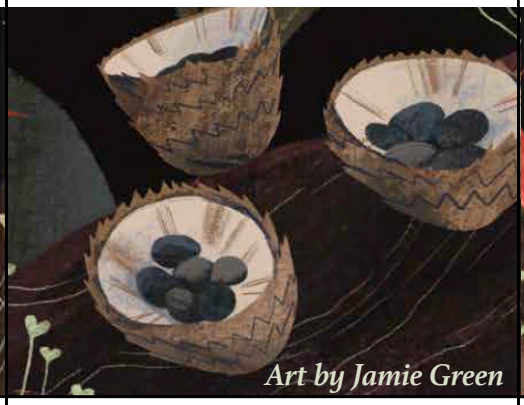
Pink Oyster



Orange Mycena

Green Pepe

Bird's Nest Fungus



Octopus Stinkhorn

Chanterelle

Caesar's Mushroom

Long Net Stinkhorn

Red Cage Fungus

Turkey Tails

Sulfur Tufts

My Mushroom: _____

Drawing of my mushroom:

Other Names: _____

_____

Location: _____

Color: _____

Edible?: _____

More Interesting Facts:

- _____
- _____
- _____

Sources:

- _____
- _____

Mushroom	An Interesting Fact

Mushroom Rain Vocabulary Match

Harvest	The papery ribs that hang down from a mushroom cap. They create and release spores for mushrooms, but not all mushrooms have them.
Spores	Tiny hairlike tubes that form a mycelium. They are how a mushroom “eats.” They use enzymes to break down dead and decaying matter.
Mycelium	Create new mushroom producing fungi, much as seeds do for plants.
Hyphae	A web like collection of hyphae, hidden under the mushrooms we see.
Gills	The process of gathering food/and or crops.

Choose one of the vocabulary words above and use it in your own sentence:

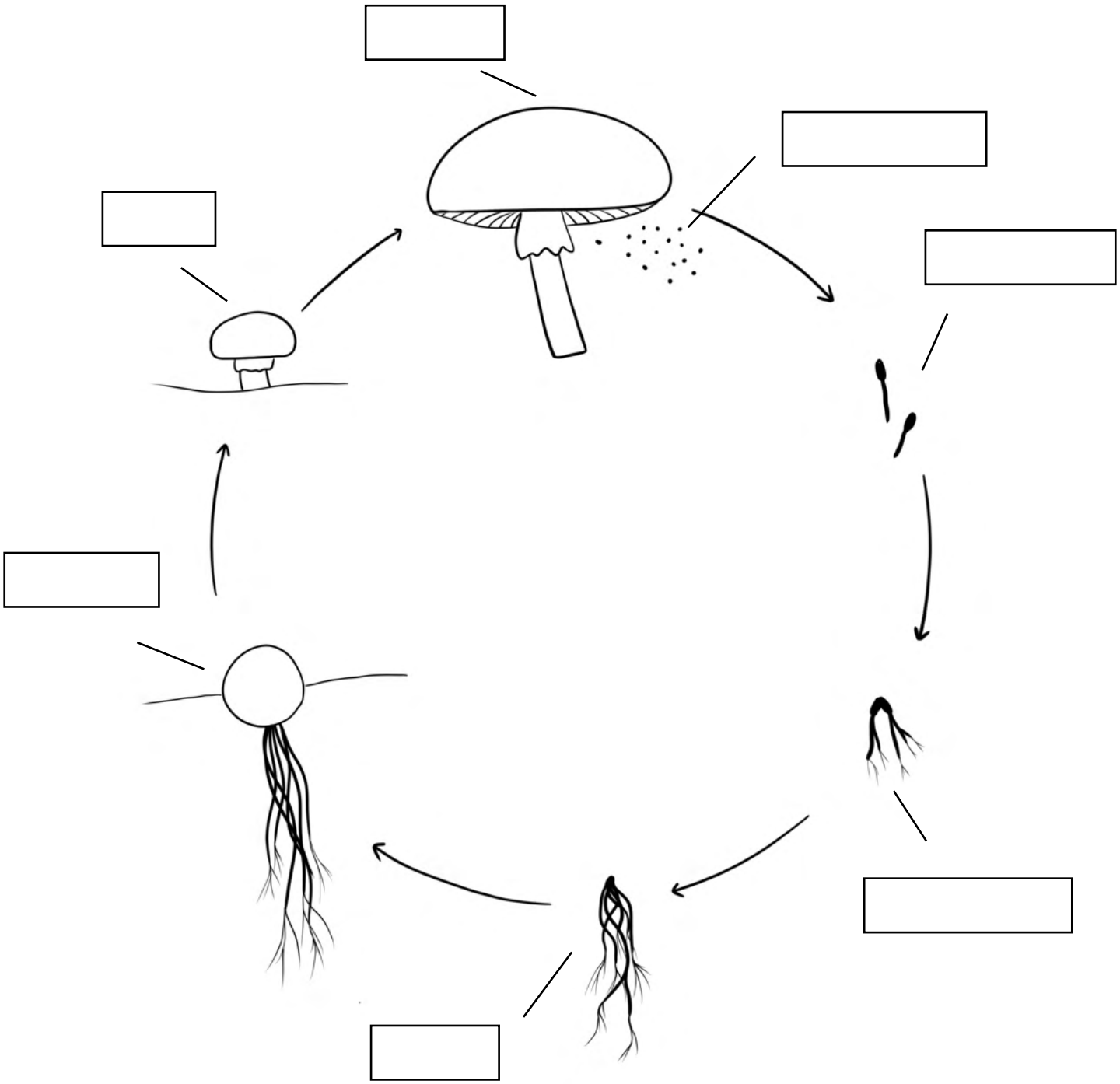
My Mushroom: _____

Nature Observations

Key Terms:

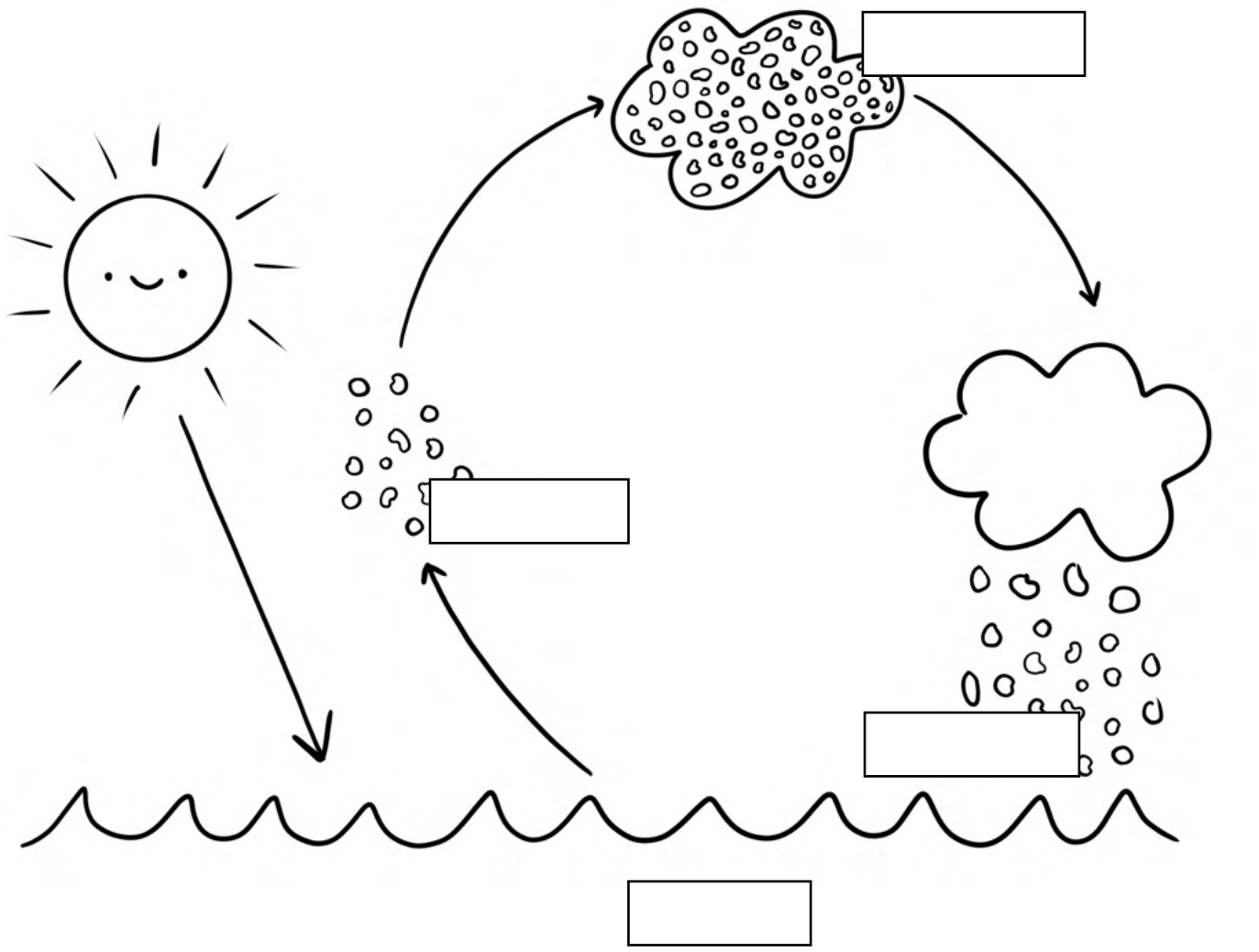
- **Botany** -
  The scientific study of plants.
- **Archaeology** -
  The study of human history and prehistory through material remains.
- **Entomology** -
  The study of insects.
- **Mycology** -
  The study of fungi.

Mushroom Life Cycle



Spores dropped	Mycelium	Hyphae Combine	Hyphal Knot	Mushroom	Pinhead	Spores Germinate/ Hyphae Formed

The Water Cycle



Describe how mushroom spores help to seed clouds:

_____

_____

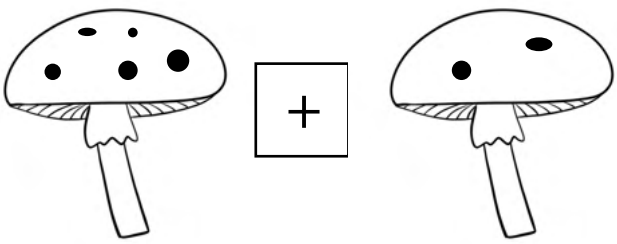
_____

Condensation	Evaporation	Precipitation	Collection

Mushroom Math

Draw circles on the mushroom caps to create your own math equations. You may use addition, subtraction, multiplication, or division.

Example:



= 7 (5+2=7)

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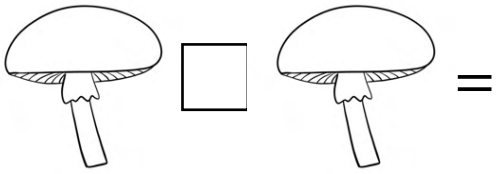

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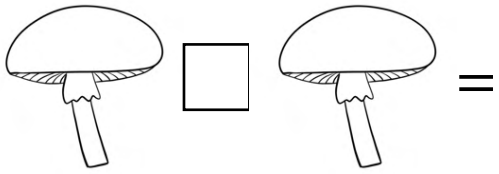

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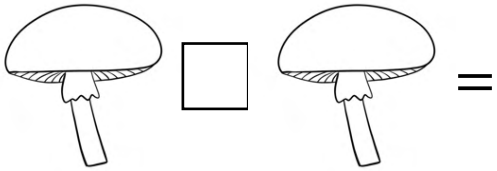

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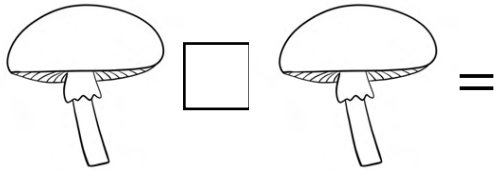

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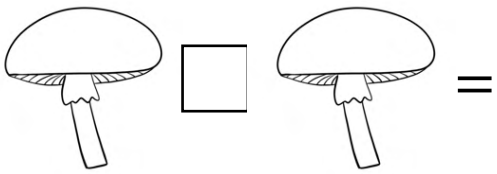

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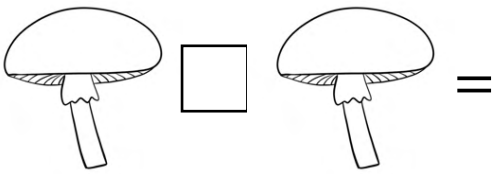

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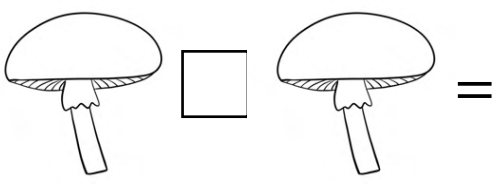

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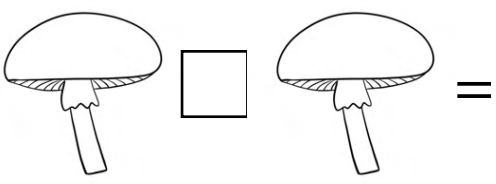
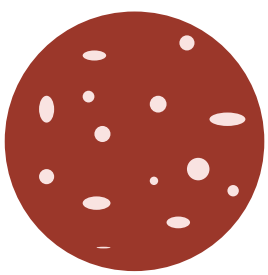
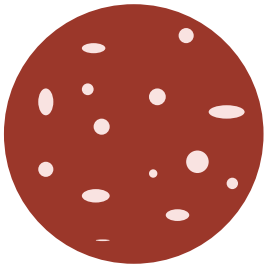


Mushroom Fractions

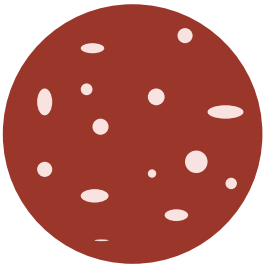
Draw lines through the mushrooms to create halves, fourths, and eighths.



Halves



Fourths



Eighths

How much of each mushroom is missing? Write the missing fraction on the line below each mushroom.