

A Common Core State and Next
Generation Science Standards-Aligned
Discussion/Activity Guide
for Grades PK-3

BEATRIX POTTER, SCIENTIST

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Illustrated by Junyi Wu

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Everyone knows Beatrix Potter as the creator of the Peter Rabbit stories. But before that, she was a girl of science. As a child, Beatrix collected nature specimens; as a young adult, she was an amateur mycologist presenting her research on mushrooms and other fungi to England's foremost experts. Like many women of her time, she remained unacknowledged by the scientific community, but her keen eye for observation led her to an acclaimed career as an artist and storyteller. A beloved author is cast in a new light in this inspiring picture book story.

Guide created by
Debbie Gonzales, MFA



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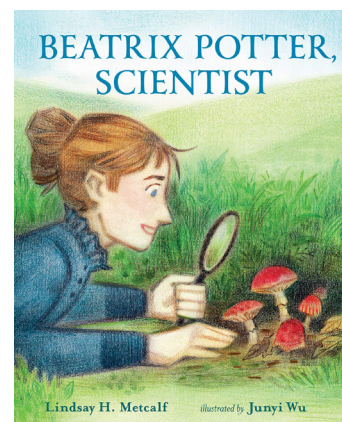
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Pre-Reading Discussion

Consider the illustration on the cover:

- Describe what the woman on the front cover is doing. What is she holding? What is she observing? How does she feel about this activity? How do you know? Identify the clues in the illustration that reveal her emotions.
- Consider the young girl featured on the back cover of the book. Tell what she is doing. How does she feel about her activity? How do you know?
- Compare and contrast details in both illustrations. List similarities and differences in each.
- Predict what this picture book is going to be about.



Meet the author – Lindsay Metcalf:

- On her website, Lindsay says that she developed a love for nature when she was a young child. Consider how her love for nature inspired her to write *BEATRIX POTTER, SCIENTIST*.
- When Lindsay was little, she loved to read. To encourage her to complete her chores, her parents rewarded her with lots and lots of books. Do you think her early love of reading played a role in her desire to write books for children? How so?
- Lindsay lives her life according to a personal mission being “. . . to tell stories that encourage children to appreciate and care for the world and all its creatures. I write both fiction and nonfiction picture books from my home near the farm where I grew up.” Have you defined a mission for your life? If so, what is it?



Meet the illustrator – Junyi Wu:

- On the book flap, Junyi says that she “. . . enjoys exploring the beauty and nuance of nature in her work.” Make a connection between the illustrations on the covers of the book and this statement. Identify how each is an example of exploring the wonders of nature.
- Illustrations are pictures that tell stories. Consider the illustrations on the covers of the book. What are the stories they tell?
- Beatrix Potter was quite famous for writing and illustrating the Peter Rabbit series. In fact, Junyi states that she “. . . grew up admiring Beatrix Potter’s stories and illustrations.” Do you think that the Peter Rabbit stories might have inspired young Junyi to illustrate books for children as an adult? Explain your answer.



See her there, giggling and splashing in the steps of the whistling postman? His dirty boots carry him on mail routes past miles of mushrooms and moss. He can't help but look and learn from the lush landscape edging the Scottish Highlands.

- Tell how drawing her scientific subjects helped Beatrix to better understand the details of her world.
- Why do you think Beatrix studied the skeletal structures of deceased animals? Is it understandable that others felt that Beatrix was somewhat strange? Explain your answer.
- Charles McIntosh, the postman referenced in the story, was also naturalist. Along with delivering the mail, Charles McIntosh studied organisms in the natural world. Describe the importance of Beatrix's relationship with Charles, as a teacher and a friend.

Beatrix and Charles McIntosh discuss how to draw dainty details under the microscope. How to classify each fungus by name. They promise to share their work.

- The Fungus Kingdom is one of the Five Kingdoms of Life. Fungi are decomposers, which means that they survive off broken-down, decayed organisms. Together, Beatrix and Charles produced more than 350 drawings of fungi, mosses, and germinating spores, much like those depicted the photograph. Comment on the patience and attention to detail required to illustrate microscopic spores such as these.
- Fungi spores are extremely small, many of which are so minute they cannot be seen without a microscope. Beatrix Potter spent more than 10 years drawing pictures like this! What does her passion for studying fungi in this way reveal about her determination and dedication as a scientist?
- In 1893, Beatrix discovered a rare species of fungus called "Old Man of the Woods," also known as the Pinecone mushroom. Imagine how remarkable and important that experience must have been.



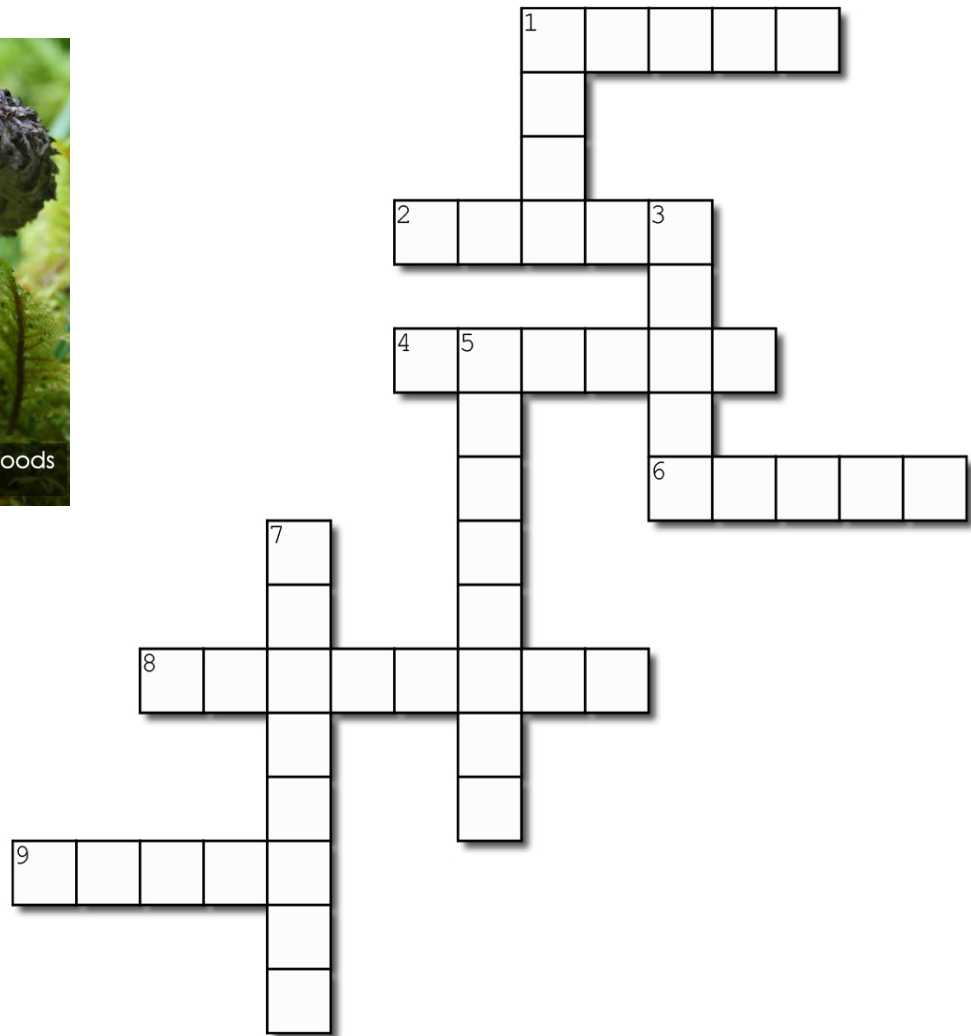
What makes her stop? Does she suspect that she will never be taken seriously as a scientist? Does she begin to doubt herself?

- Beatrix's persistence paid off! Along with making impressive discoveries, she wrote a scientific paper that was presented to prestigious group of scientists and experts in the natural world. And yet, she withdrew her paper for consideration. Discuss reasons why she decided to stop pursuing publication of her life's work.
- The word "inform" means to educate, illuminate, and communicate. Consider the phrase "science informs art." Study the illustrations of Peter Rabbit's world below. Identify ways that her deep understanding of the scientific world informed her art, illustrations that have delighted young readers for many, many years.



Meet the Mushroom: A Crossword Puzzle

"Tiny fungus people singing and bobbing and dancing."



Across:

1. The cup-like structure found at the base of a mushroom
2. Hidden under the cap, _____ contain reproductive spores
4. Tiny, typically one-celled, reproductive units
6. The stem or stalk of a growing mushroom
8. The study of fungi
9. Mushrooms are part of the _____ kingdom

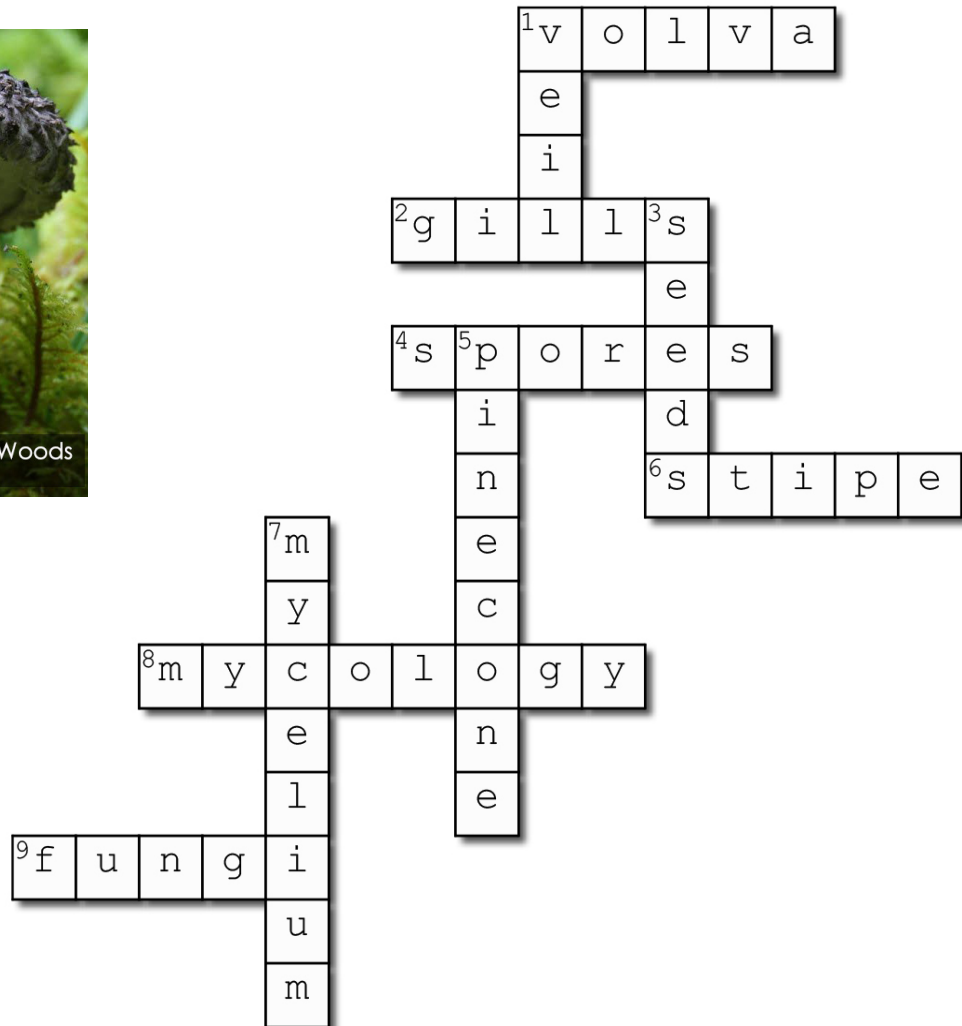
Down:

1. A thin ring around the stipe created when a mushroom matures
3. Fungi reproduce with spores, not _____
5. The Old Man of the Woods mushroom is also called the _____ mushroom
7. Root-like structure that absorbs food for the mushroom



Meet the Mushroom: A Crossword Puzzle Answers

"Tiny fungus people singing and bobbing and dancing."



Across:

1. The cup-like structure found at the base of a mushroom
2. Hidden under the cap, _____ contain reproductive spores
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Down:

1. A thin ring around the stipe created when a mushroom matures
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7. Root-like structure that absorbs food for the mushroom



Parts of the Mushroom: A Labeling Activity

*She peers closer and sees the colors.
She slices... sketches... and scopes... every gill, every scale, every spore.*

Objective: To observe, identify, describe the function of parts of the mushroom.

Materials:

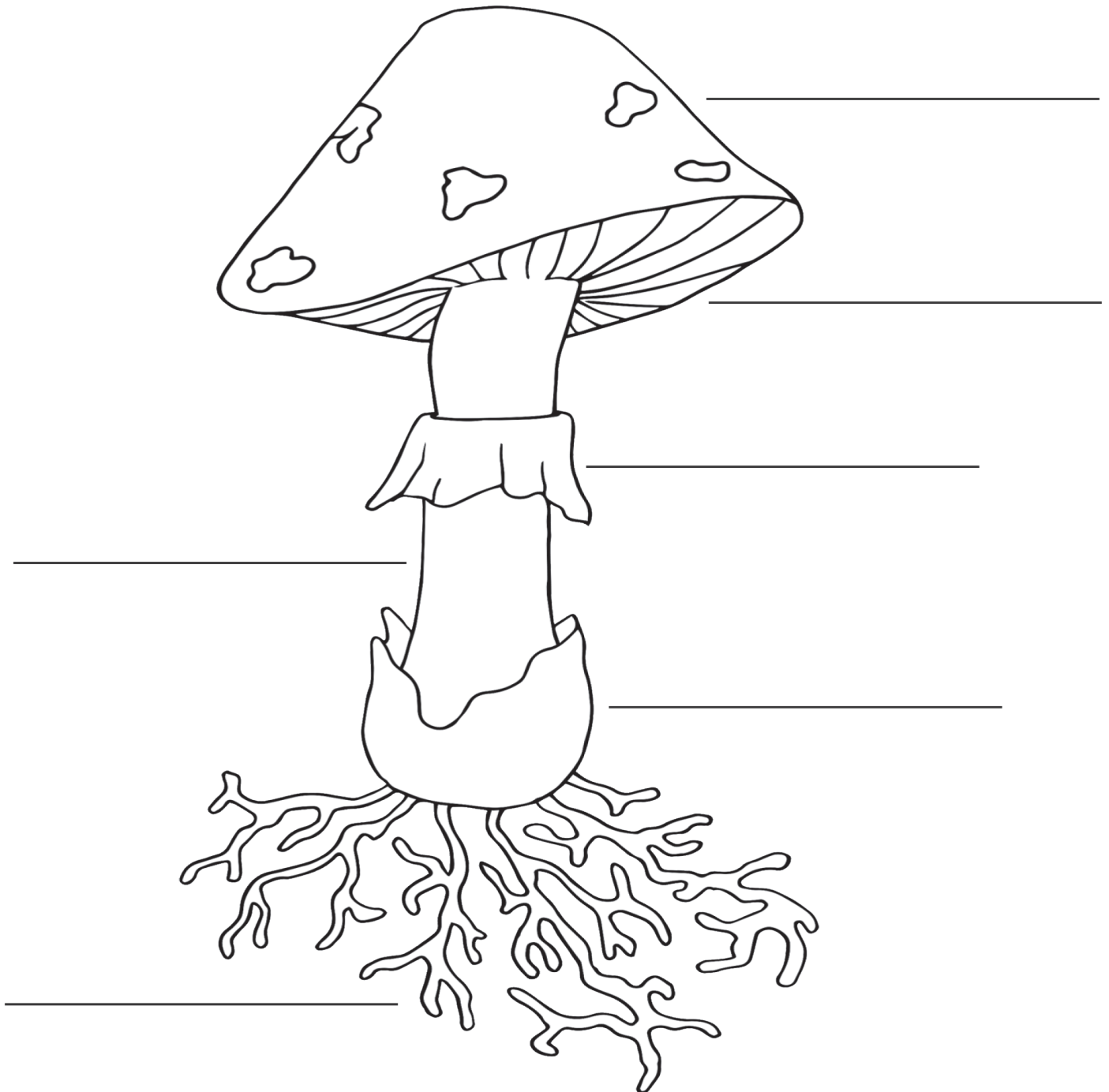
- BEATRIX POTTER, SCIENTIST, the book
- Parts of the Mushroom Template (Guide, pg. 8)
- Parts of the Mushroom Template Answers (Guide, pg. 9)
- Research materials about fungi
- Pencil
- Markers
- Writing supplies

Procedure:

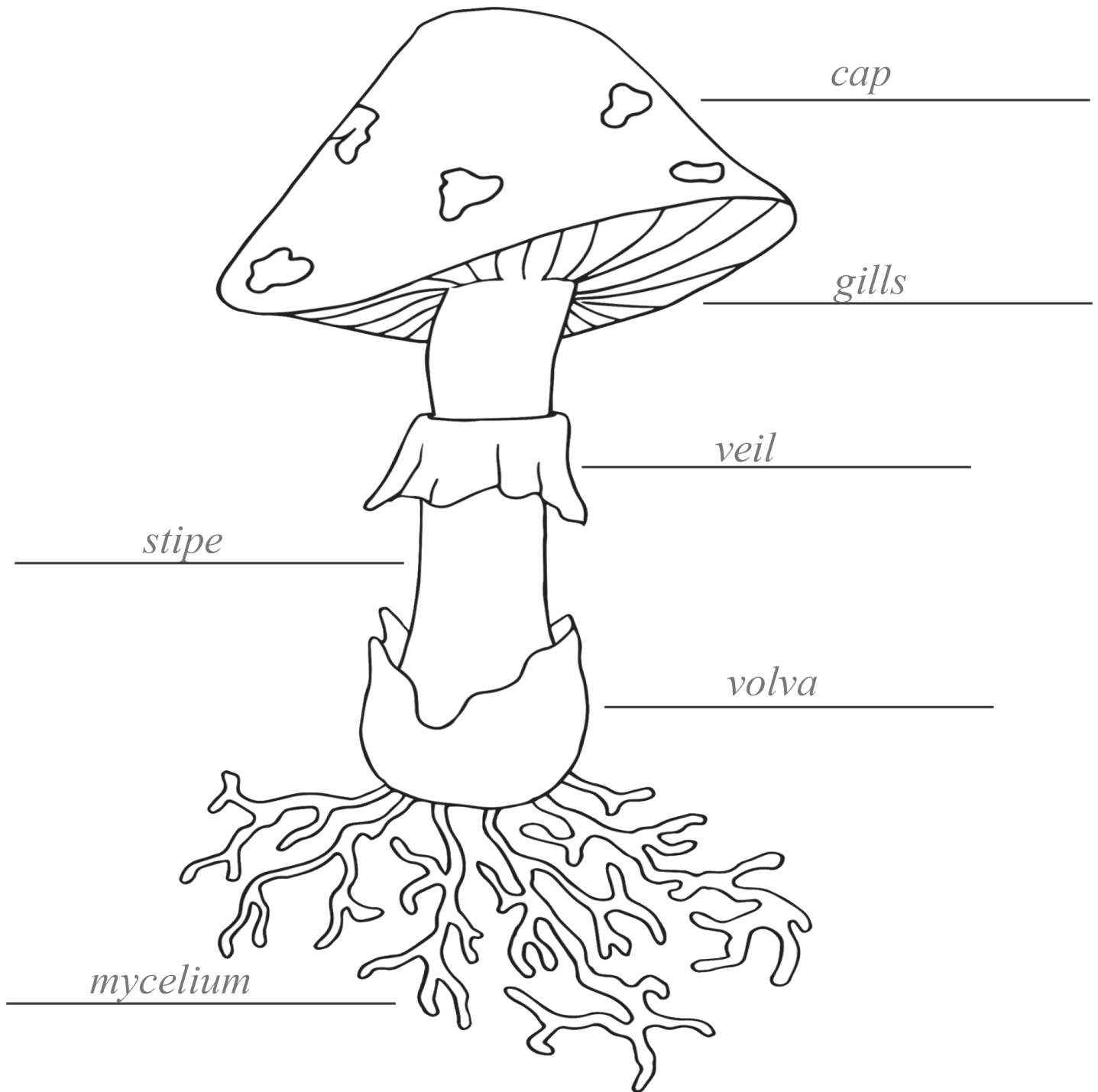
- Lead students in a discussion about Beatrix Potter's passion for the natural world – in particular, the Old Man of the Woods mushroom. Consider how her years of illustrating her discovery of the natural world with precise scientific detail prepared her for her work as both a scientist and a writer.
- Encourage the students to explore the Fungus Kingdom with online or hard copy references.
- Distribute copies of the **Parts of the Mushroom Template**. Instruct students to use research materials to fill in the blanks. Have them color the line drawing to match a mushroom they have found to be interesting in the research.
- Use the **Parts of the Mushroom Template Answers** to check their work.
- Instruct students to write a short essay describing the parts and functionality of the mushroom or a narrative from Beatrix's point of view describing her love for the natural world. Encourage students to share their work with the class.



Parts of the Mushroom Template



Parts of the Mushroom Template: Template Answers



Spore Study

The microscope reveals a new world. Beatrix can't stop drawing.

Objective: To use observations to describe patterns in the natural world.

Materials:

- The Spore Study Template (Guide, pg. 11)
- Colored pencils
- Writing materials

Procedure:

- Lead a discussion about fungi spores. Explain that, in mushrooms, spores can be found inside the gills. All forms of fungi reproduce with spores. Encourage students to imagine what it was like for Beatrix to devote herself to studying and illustrating as a naturalist.
- Print a copy of the Spore Study Template for each student.
- Instruct them to use colored pencils to do their best to draw the image of microscopic spores featured in the photo at the top of the page.
- Have students write a short essay describing the experience of drawing an illustration of living things that are so very small. Encourage them make a connection between their experience and the fact that Beatrix Potter spent over ten years illustrating tiny spores such as these.
- Have students share their work with the class.



Spore Study Template



My Study of Spores



A Recipe for Nature

She observes... questions... collects... records.

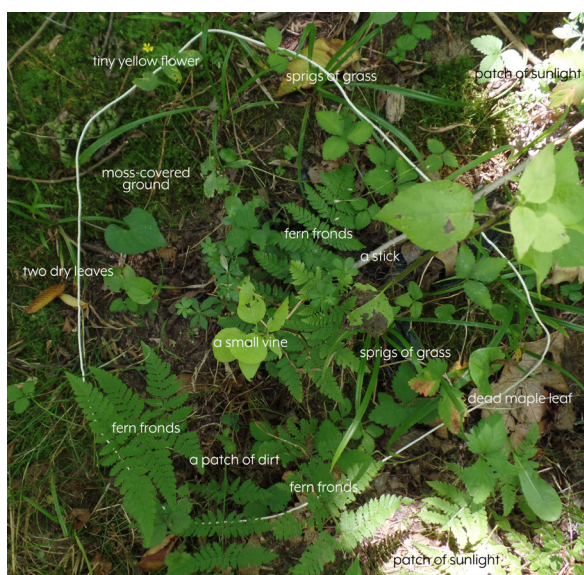
Objective: To plan for and participate in a close observation of a small ecosystem.

Materials:

- A 3 ft. long piece of string (or longer) tied in a loop
- Lined paper & pencil
- Drawing paper
- Colored pencils
- Camera (optional)
- A quiet spot in nature

Procedure:

- Instruct students to place loop around a chosen spot in nature. Encourage students to arrange the loop to surround as many interesting bits of nature as possible.
- Using lined paper, encourage students to list every bit of nature found inside the loop.
- Ask students to consider other environmental factors surrounding them – air, weather, animals, insects, etc. Instruct students to add these elements to their list.
- Using the drawing paper and colored pencils, instruct students to illustrate their space. (Note: While students may photograph their space, it is preferable that they connect through quiet, concentrated observation and illustration as Beatrix Potter did.)
- Encourage students to write and illustrate a recipe for their tiny ecosystem by listing the organisms found on their selected space. (Use the sample below as inspiration.)
- Once complete, have children share their work with the class. Encourage them to make a connection with the recipe-making experience and Beatrix Potter's passion for the natural world.



A Recipe for Nature

Ingredients:

- One small vine
- A collection of fern fronds
- Sprigs of grass
- Two dry leaves
- One tiny yellow flower
- One dead maple leaf
- A small stick
- Two patches of sunlight
- Moss-covered ground
- A dry patch of dirt

Mix well with:

- Birds singing
- Bugs buzzing
- A slight breeze blowing

Serve with a smile!



Common Core State Standards Alignment

		Discussion	Crossword Puzzle	Parts of the Mushroom	Spore Study	Nature Recipe
English Language Arts Standards » Reading: Informational Text						
CCSS.ELA-LITERACY.RI.K.1	With prompting and support, ask and answer questions about key details in a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.K.2	With prompting and support, identify the main topic and retell key details of a text.	•		•		
CCSS.ELA-LITERACY.RI.K.4	With prompting and support, ask and answer questions about unknown words in a text.	•	•	•		
CCSS.ELA-LITERACY.RI.K.5	Identify the front cover, back cover, and title page of a book.	•				
CCSS.ELA-LITERACY.RI.K.6	Name the author and illustrator of a text and define the role of each in presenting the ideas or information in a text.	•				
CCSS.ELA-LITERACY.RI.K.7	With prompting and support, describe the relationship between illustrations and the text in which they appear (e.g., what person, place, thing, or idea in the text an illustration depicts).	•				
CCSS.ELA-LITERACY.RI.K.10	Actively engage in group reading activities with purpose and understanding.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.1.1	Ask and answer questions about key details in a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.1.2	Identify the main topic and retell key details of a text.	•			•	
CCSS.ELA-LITERACY.RI.1.3	Describe the connection between two individuals, events, ideas, or pieces of information in a text.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.1.4	Ask and answer questions to help determine or clarify the meaning of words and phrases in a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.1.6	Distinguish between information provided by pictures or other illustrations and information provided by the words in a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.1.7	Use the illustrations and details in a text to describe its key ideas.	•				
CCSS.ELA-LITERACY.RI.1.10	With prompting and support, read informational texts appropriately complex for grade 1.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.2.1	Ask and answer such questions as <i>who</i> , <i>what</i> , <i>where</i> , <i>when</i> , <i>why</i> , and <i>how</i> to demonstrate understanding of key details in a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.2.3	Describe the connection between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.2.4	Determine the meaning of words and phrases in a text relevant to a <i>grade 2 topic or subject area</i> .	•	•	•	•	
CCSS.ELA-LITERACY.RI.2.7	Explain how specific images (e.g., a diagram showing how a machine works) contribute to and clarify a text.	•	•	•	•	
CCSS.ELA-LITERACY.RI.3.1	Ask and answer questions to demonstrate understanding of a text, referring explicitly to the text as the basis for the answers.	•	•	•	•	
CCSS.ELA-LITERACY.RI.3.2	Determine the main idea of a text; recount the key details and explain how they support the main idea.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.3.3	Describe the relationship between a series of historical events, scientific ideas or concepts, or steps in technical procedures in a text, using language that pertains to time, sequence, and cause/effect.	•	•	•	•	•
CCSS.ELA-LITERACY.RI.3.7	Use information gained from illustrations (e.g., maps, photographs) and the words in a text to demonstrate understanding of the text (e.g., where, when, why, and how key events occur).	•	•	•	•	•

		Discussion	Crossword Puzzle	Parts of the Mushroom	Spore Study	Nature Recipe
English Language Arts Standards » Writing						
CCSS.ELA-LITERACY.W.K.2	Use a combination of drawing, dictating, and writing to compose informative/explanatory texts in which they name what they are writing about and supply some information about the topic.			•	•	•
CCSS.ELA-LITERACY.W.K.3	Use a combination of drawing, dictating, and writing to narrate a single event or several loosely linked events, tell about the events in the order in which they occurred, and provide a reaction to what happened.			•	•	•
CCSS.ELA-LITERACY.W.K.7	Participate in shared research and writing projects (e.g., explore a number of books by a favorite author and express opinions about them).			•	•	•
CCSS.ELA-LITERACY.W.K.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.			•	•	•
CCSS.ELA-LITERACY.W.1.2	Write informative/explanatory texts in which they name a topic, supply some facts about the topic, and provide some sense of closure.			•	•	•
CCSS.ELA-LITERACY.W.1.3	Write narratives in which they recount two or more appropriately sequenced events, include some details regarding what happened, use temporal words to signal event order, and provide some sense of closure.			•	•	•
CCSS.ELA-LITERACY.W.1.7	Participate in shared research and writing projects (e.g., explore a number of "how-to" books on a given topic and use them to write a sequence of instructions).			•	•	•
CCSS.ELA-LITERACY.W.1.8	With guidance and support from adults, recall information from experiences or gather information from provided sources to answer a question.			•	•	•
CCSS.ELA-LITERACY.W.2.2	Write informative/explanatory texts in which they introduce a topic, use facts and definitions to develop points, and provide a concluding statement or section.			•	•	•
CCSS.ELA-LITERACY.W.2.3	Write narratives in which they recount a well-elaborated event or short sequence of events, include details to describe actions, thoughts, and feelings, use temporal words to signal event order, and provide a sense of closure.			•	•	•
CCSS.ELA-LITERACY.W.2.7	Participate in shared research and writing projects (e.g., read a number of books on a single topic to produce a report; record science observations).			•	•	•
CCSS.ELA-LITERACY.W.3.2	Write informative/explanatory texts to examine a topic and convey ideas and information clearly.			•	•	•
CCSS.ELA-LITERACY.W.3.3	Write narratives to develop real or imagined experiences or events using effective technique, descriptive details, and clear event sequences.			•	•	•
CCSS.ELA-LITERACY.W.3.7	Conduct short research projects that build knowledge about a topic.			•	•	•
CCSS.ELA-LITERACY.W.3.8	Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories.			•	•	•

		Discussion	Crossword Puzzle	Parts of the Mushroom	Spore Study	Nature Recipe
English Language Arts Standards » Speaking & Listening						
CCSS.ELA-LITERACY.SL.K.1	Participate in collaborative conversations with diverse partners about <i>kindergarten topics and texts</i> with peers and adults in small and larger groups.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.K.2	Confirm understanding of a text read aloud or information presented orally or through other media by asking and answering questions about key details and requesting clarification if something is not understood.	•				
CCSS.ELA-LITERACY.SL.K.3	Ask and answer questions in order to seek help, get information, or clarify something that is not understood.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.K.4	Describe familiar people, places, things, and events and, with prompting and support, provide additional detail.	•				•
CCSS.ELA-LITERACY.SL.K.5	Add drawings or other visual displays to descriptions as desired to provide additional detail.			•	•	•
CCSS.ELA-LITERACY.SL.K.6	Speak audibly and express thoughts, feelings, and ideas clearly.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.1.1	Participate in collaborative conversations with diverse partners about <i>grade 1 topics and texts</i> with peers and adults in small and larger groups.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.1.4	Describe people, places, things, and events with relevant details, expressing ideas and feelings clearly.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.1.5	Add drawings or other visual displays to descriptions when appropriate to clarify ideas, thoughts, and feelings				•	•
CCSS.ELA-LITERACY.SL.2.1	Participate in collaborative conversations with diverse partners about <i>grade 2 topics and texts</i> with peers and adults in small and larger groups.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.2.2	Recount or describe key ideas or details from a text read aloud or information presented orally or through other media.	•	•	•	•	
CCSS.ELA-LITERACY.SL.2.4	Tell a story or recount an experience with appropriate facts and relevant, descriptive details, speaking audibly in coherent sentences.	•			•	•
CCSS.ELA-LITERACY.SL.3.1	Engage effectively in a range of collaborative discussions (one-on-one, in groups, and teacher-led) with diverse partners on <i>grade 3 topics and texts</i> , building on others' ideas and expressing their own clearly.	•	•	•	•	•
CCSS.ELA-LITERACY.SL.3.2	Determine the main ideas and supporting details of a text read aloud or information presented in diverse media and formats, including visually, quantitatively, and orally.	•				
CCSS.ELA-LITERACY.SL.3.4	Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.			•	•	•



Next Generation Science Standards Alignment

		Discussion	Crossword Puzzle	Parts of the Mushroom	Spore Study	Nature Recipe
K-LS1-1 From Molecules to Organisms: Structures and Processes						
K-LS1-1	Use observations to describe patterns of what plants and animals (including humans) need to survive.		•	•	•	•
Analyzing and Interpreting Data						
	Analyzing data in K–2 builds on prior experiences and progresses to collecting, recording, and sharing observations.				•	•
	Use observations (firsthand or from media) to describe patterns in the natural world in order to answer scientific questions.		•	•	•	•
Scientific Knowledge is Based on Empirical Evidence						
	Scientists look for patterns and order when making observations about the world.		•		•	•
Cross Cutting Patterns						
	Patterns in the natural and human designed world can be observed and used as evidence.		•	•	•	•

