

<b>Overarching Enduring Understanding</b> <b>How can naturally occurring materials can be used to create healthier, safer, and cleaner products that put less stress on the environment?</b>		
<b>FLOW OF INSTRUCTION</b>		
<p><b>3-LS4-2</b> Use evidence to construct an explanation for how the variations in characteristics among individuals of the same species may provide advantages in surviving, finding mates, and reproducing.</p>	<p><b>3-LS3-1</b> Analyze and interpret data to provide evidence that plants and animals have traits inherited from parents and that variation of these traits exists in a group of similar organisms.</p>	<p><b>3-5-ETS1-1</b> Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time, or cost.</p> <p><b>3-5-ETS1-2</b> Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.</p>
<p><b>Investigation: “Stolen from Nature” (mini research project, occurs during week 1)</b></p> <p>Students <b>gather, analyze, and interpret data</b> to look critically at the similarities and differences of various organisms in nature and start <b>constructing explanations about why similar organisms may be different</b> (3-LS3-1) and <b>what purpose those differences serve</b> (3-LS4-2).</p> <p>For the activity students find something from nature that we use—either directly or modified—and ask the following questions: <i>Which traits make the organism useful to us? Are there traits that might make it less useful? Are there versions of the organism that are less useful? What traits don't matter? Why did some attributes develop and others not?</i> (For example, pine trees—tall, straight; bamboo—tall, straight, grows fast; madrone trees—slow-growing, curvy.)</p> <p><b>Investigation: Hi Fungi! Are You a Friend or Foe? (research activity, occurs during week 3)</b></p> <p>Students do research to gather <b>evidence and data on why different traits/characteristics developed in various fungi species</b>. They will <b>compare</b> similarities and differences that exist between parents and offspring, as well as between types of fungi.</p> <p><b>Investigation: Terrific Traits (summative challenge, occurs during weeks 4, 5, &amp; 6)</b></p> <p>After some practice with looking at species variations and identifying different characteristics and traits, students will pick a plant- or fungi-inspired technology for the summative challenge. In this challenge students must construct an explanation, by <b>providing evidence</b>, of why the plant or fungus has developed the way that it has. This explanation should include both the variations in a given trait and why some versions of those variations are more useful than others.</p>		<p><b>Investigation: Mushroom Packaging (hands-on activity, occurs during weeks 2, 3, and 4)</b></p> <p>In small groups students will mix, grow, mold, and track the creation of mycelium-based products from a dormant material (<i>substrate</i>) over the course of 10 days. In the beginning they will outline <b>design and evaluation criteria</b> as well as the <b>project constraints</b>. Throughout the process they will make <b>observations</b> about any changes in material processing and performance <b>with respect to the initially stated constraints and criteria</b> for their design. At the end students will <b>evaluate their product with respect</b> to their initially stated <b>performance criteria, compare</b> their product with their classmates', and <b>suggest possible improvements</b> for both their own process and for those of the other groups.</p>
<p><b>Investigation: Who Are You Most Closely Related To? (sorting game, occurs during week 2)</b></p> <p>As students practice <b>identifying patterns associated</b> with traits and characteristics of various living organisms, they learn about how (and why) scientists organize and classify different organisms. Areas of focus include connections between parents and offspring and connections between different types of animals.</p>		

<b>Unit</b>	Mushroom Maestros
<b>Grade Level</b>	Grade 3
<b>Price</b>	\$725 – Full Curriculum Unit
	\$15 – Microbe Building Companion

### Parts List

Component Name and Description	Approximate Cost	Source
<b>Printed materials</b>		
Educator Guide (1)		
<i>My STEM Stories™</i> notebooks (30)		Electronic copies available on the unit website.
<i>My STEM Explorer Notes™</i> notebooks (30)	NA	Printed materials available through replacement kit purchase.
Timelines sheets (1 set)		
Introductory investigation data recording sheets (30)		
<i>Who are you more closely related to?</i> comparison cards (6 sets)		
<b>Provided equipment and materials</b>		
Judy Wearing. <i>Fungi: Mushrooms, Toadstools, Molds, Yeasts, and Other Fungi</i>	\$10-15	<a href="#">Click for Amazon link</a>
Carla Billups and Dawn Cusick. <i>It's a Fungus among Us: The Good, the Bad &amp; the Downright Scary</i>	\$10-15	<a href="#">Click for Amazon link</a>
Elle Simms. <i>Read about Fungi: Reading Fun for Kids</i>	\$10-15	<a href="#">Click for Amazon link</a>
<i>Grow-It-Yourself</i> classroom kit* (mycelium, planter forms, nitrile gloves)	NA	Only available through CreositySpace
<b>Common equipment and materials required but not provided</b>		
All-purpose flour	< \$2	Supermarket
Measuring cup	< \$2	Dollar store/supermarket
Teaspoon	< \$2	Dollar store/supermarket
Tape or binder clip	< \$1	General supplies
Tap water	NA	NA
Oven	NA	NA
Cookie sheet (or similar)	NA	NA
Large mixing bowls or tubs (3–6)	NA	NA
Pushpins	NA	NA



Companion pack comes individually bagged for easy distribution.

While not included in the main *Mushroom Maestros* unit, the Microbe Building Companion supports the exploration of traits and characteristics.

#### Parts List – Companion

<b>Microbe Building Companion</b>
Microbe building kit (plastic eggs, pipe cleaners, google eyes, puffballs, glue dots, etc.)
Microbe classification cards
Microbe classification charts
Investigation notebook