

Matter Movement Inside a Growing Fungus

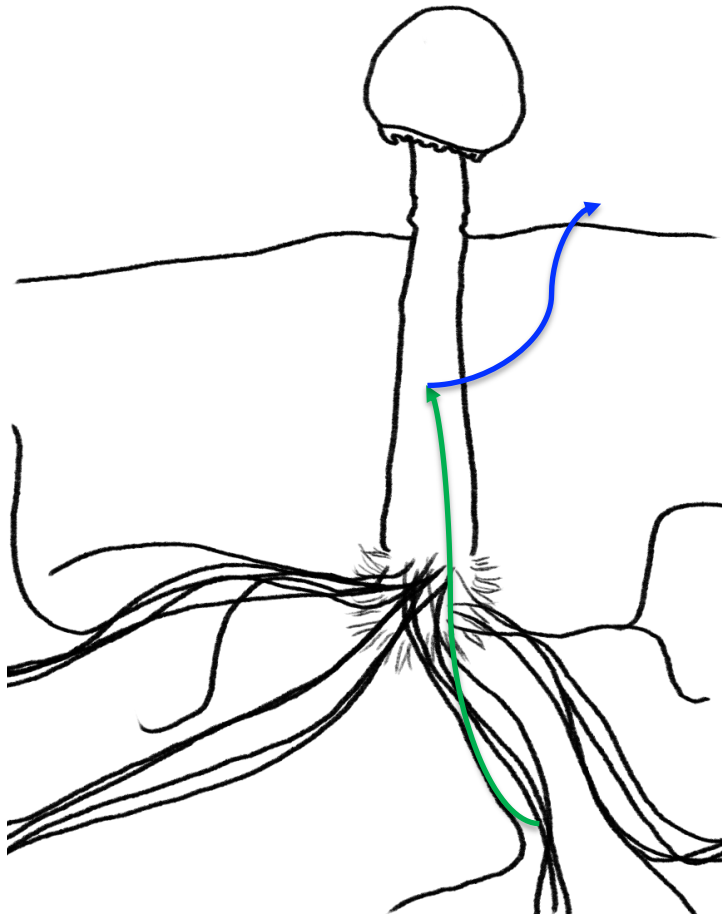
Note: The Matter Tracing Tool is designed to be used three times during the unit: after completing the Explanation Tools for each process—cellular respiration, digestion, and biosynthesis.

- Each time, students will add arrows and notes to the first page, building a more complete picture of how carbon-containing molecules move through the fungus.*
- Each time, students will also complete one of the boxes on the second page, explaining how a specific process in the cells (or outside the fungus in the case of digestion) transforms matter and energy.*

So, this assessing tool repeats the first page three times, showing the steps in building up the picture of how carbon moves into and through the fungus.

Key points for cellular respiration (choosing a fruiting body stem cell as an example for all cells in the body):

- **Small organic molecules travel to the cells through the hyphae**
- **Carbon dioxide leaves the cells and goes into the air (including air in soil)**
- **Oxygen is also a reactant; water is also a product of cellular respiration**



1. Draw colored arrows to show movement of carbon-containing molecules. When the molecules move to or from every cell in the fungus, you can choose one cell as an example.

Key: Color of arrows for:

- Large organic molecules (LOM)

red

- Small organic molecules (SOM)

green

- Carbon dioxide (CO_2)

blue

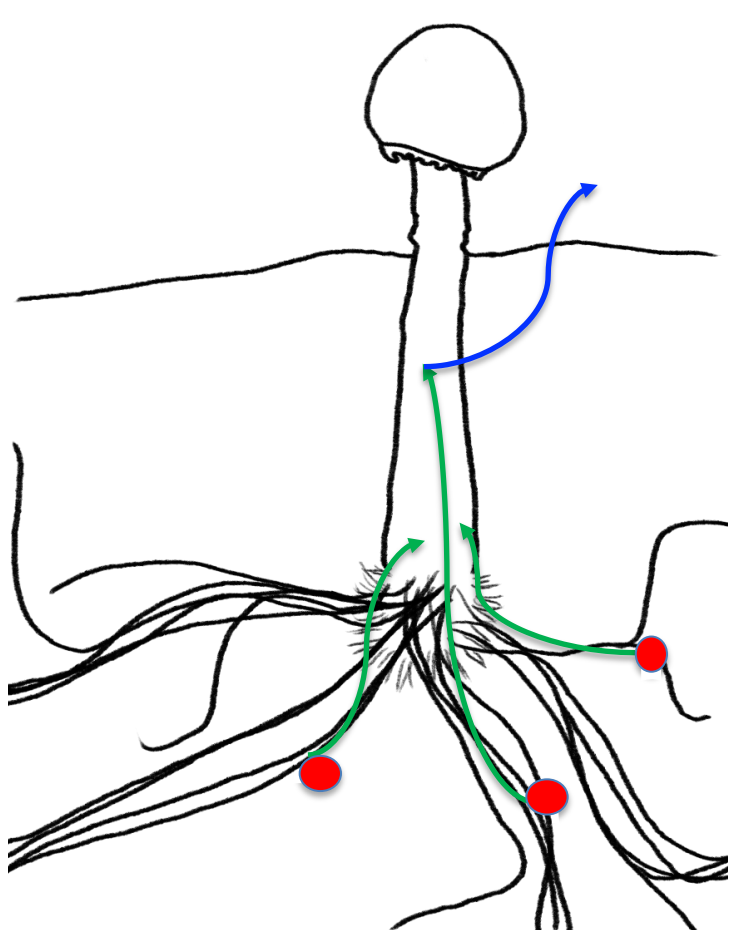
2. Use the space below to list other molecules that also move through the fungus (you don't need to draw arrows).

oxygen (O_2)

water (H_2O)

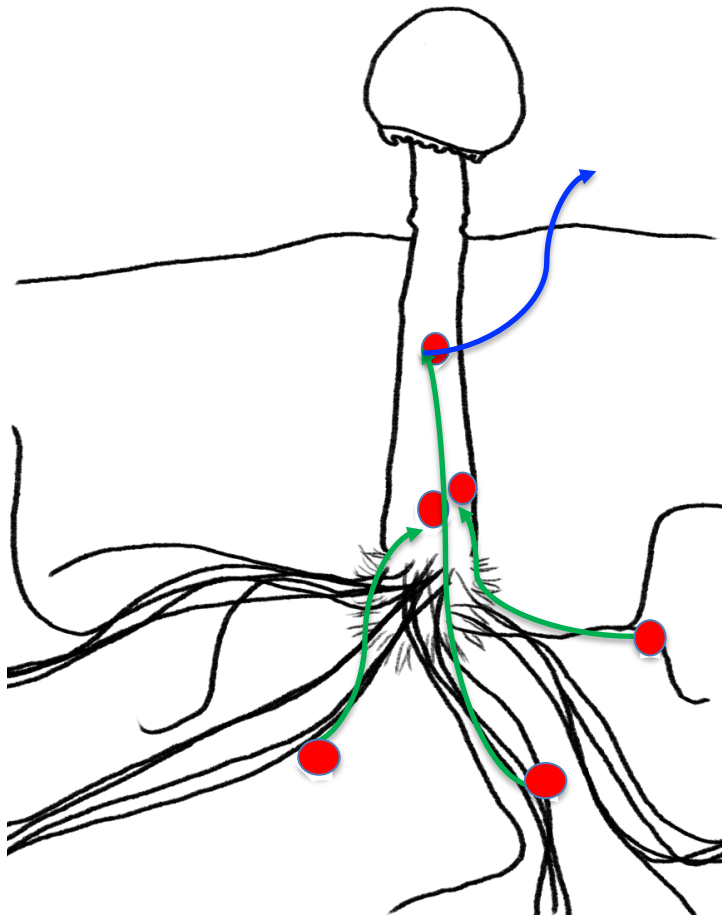
Key points for digestion (taking place outside of the fungus):

- **Large organic molecules (food) are in the soil**
- **Some undigested large organic molecules stay in the soil**
- **Small organic molecules from the soil through the hyphae to all fungus cells**
- **(Optional: Water is also a reactant when large organic molecules are broken down into small organic molecules)**

	<p>1. Draw colored arrows to show movement of carbon-containing molecules. When the molecules move to or from every cell in the fungus, you can choose one cell as an example.</p> <p>Key: Color of arrows for:</p> <ul style="list-style-type: none">• Large organic molecules (LOM) <u>red</u>• Small organic molecules (SOM) <u>green</u>• Carbon dioxide (CO₂) <u>blue</u> <p>2. Use the space below to list other molecules that also move through the fungus (you don't need to draw arrows).</p> <p><u>oxygen (O₂)</u></p> <p><u>water (H₂O)</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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Key points for biosynthesis (taking place in all fungus cells):

- **Small organic molecules move through hyphae to all fungus cells**
- **Cells grow by making large organic molecules from small organic molecules**
- **(Optional: Water is also a product when small organic molecules are bonded together to make large organic molecules)**



1. Draw colored arrows to show movement of carbon-containing molecules. When the molecules move to or from every cell in the fungus, you can choose one cell as an example.

Key: Color of arrows for:

- Large organic molecules (LOM)

red

- Small organic molecules (SOM)

green

- Carbon dioxide (CO_2)

blue

2. Use the space below to list other molecules that also move through the fungus (you don't need to draw arrows).

oxygen (O_2)

water (H_2O)

Matter and Energy Changes in a Growing Fungus

Explain three processes that change matter and energy as a fungus grows and functions by answering the Three Questions for each process.

<p style="text-align: center;">Digestion</p> <p>Matter Movement in: Where molecules are coming from: <u>large organic molecules in the soil</u></p> <p>Matter Change:</p> <p>Reactants: <u>large organic molecules (+ water)</u></p> <p>Products: <u>small organic molecules</u></p> <p>Energy Change:</p> <p>From <u>chemical energy</u></p> <p>To <u>chemical energy</u></p> <p>Matter Movement Out: Where molecules are going to: <u>small organic molecules move through hyphae to cells</u></p>	<p style="text-align: center;">Biosynthesis for growth</p> <p>Matter Movement in: Where molecules are coming from: <u>hyphae</u></p> <p>Matter Change:</p> <p>Reactants: <u>small organic molecules</u></p> <p>Products: <u>large organic molecules (+ water)</u></p> <p>Energy Change:</p> <p>From <u>chemical energy</u></p> <p>To <u>chemical energy</u></p> <p>Matter Movement Out: Where molecules are going to: <u>large organic molecules stay in cells as they grow</u></p>
<p style="text-align: center;">Cellular Respiration for energy</p> <p>Matter Movement in: Where molecules are coming from: <u>hyphae</u></p> <p>Matter Change:</p> <p>Reactants: <u>glucose (small organic molecules), oxygen</u></p> <p>Products: <u>carbon dioxide, water</u></p>	<p>Energy Change:</p> <p>From <u>chemical energy</u></p> <p>To <u>heat, energy for cell functions</u></p> <p>Matter Movement Out: Where molecules are going to: <u>air, including air in soil</u></p>