

## Assessing the Matter Tracing Tool: Matter Movement Inside a Growing Child

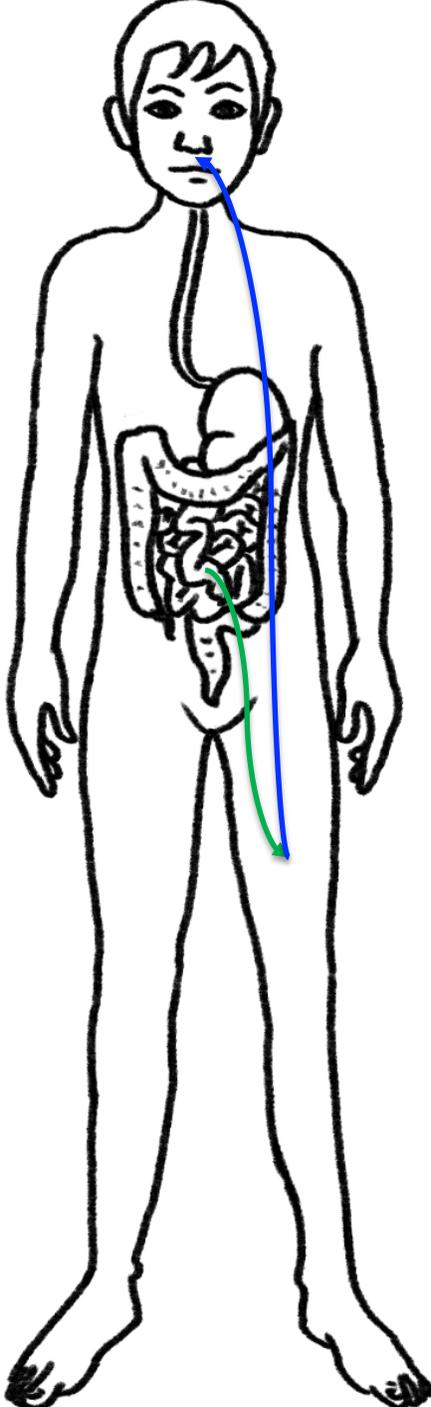
*Note: The Matter Tracing Tool is designed to be used three times during the unit: after completing the Explanation Tools for each process—cellular respiration, digestion, and biosynthesis.*

- *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 child's body.*
- *Each time, students will also complete one of the boxes on the second page, explaining how a specific process in the cells or digestive system 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 through the child's body.*

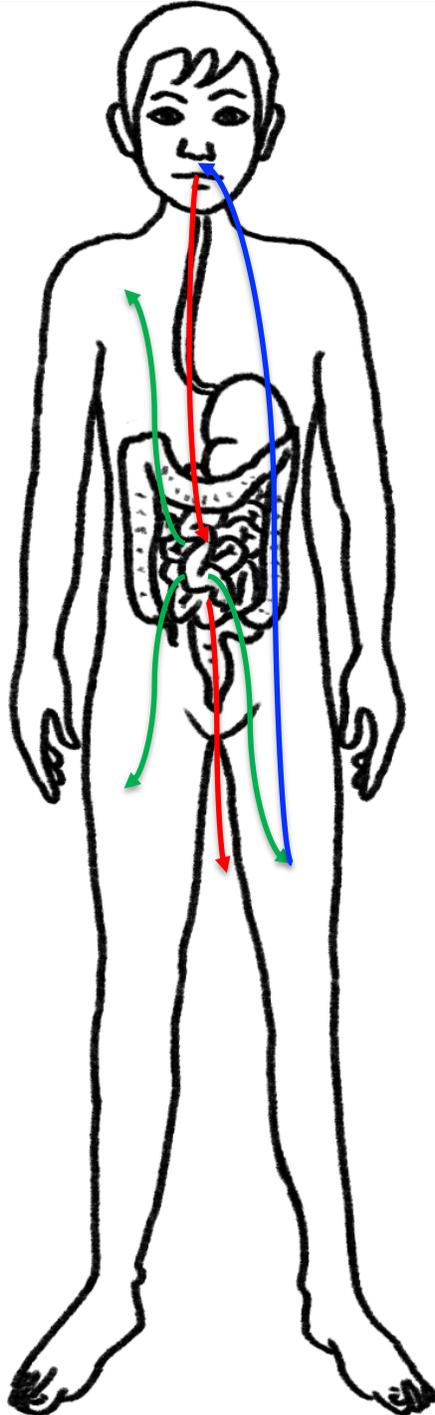
Key points for cellular respiration (choosing a leg cell as an example for all cells in the body):

- Small organic molecules travel to the cells through the blood
- Carbon dioxide travels through the blood to the lungs and is breathed out
- Oxygen is also a reactant; water is also a product of cellular respiration

	<p>1. Draw colored arrows to show movement of carbon-containing molecules. When the molecules move to or from every cell in the child's body, you can choose one cell as an example.</p> <p>Key: Color of arrows for:</p> <ul style="list-style-type: none"><li>• Large organic molecules (LOM) <u>red</u></li><li>• Small organic molecules (SOM) <u>green</u></li><li>• Carbon dioxide (CO<sub>2</sub>) <u>blue</u></li></ul> <p>2. Use the space below to list other molecules that also move through the child's body (you don't need to draw arrows).</p> <p><u>oxygen (O<sub>2</sub>)</u></p> <p><u>water (H<sub>2</sub>O)</u></p> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/> <hr/>
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**Key points for digestion (taking place only in the digestive system):**

- **Large organic molecules (food) go into the digestive system**
- **Some undigested large organic molecules go through the digestive system and leave the body as feces**
- **Blood carries small organic molecules from the digestive system to all body cells**
- **(Optional: Water is also a reactant when large organic molecules are broken down into small organic molecules)**



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Key: Color of arrows for:

- Large organic molecules (LOM)

red

- Small organic molecules (SOM)

green

- Carbon dioxide (CO<sub>2</sub>)

blue

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

oxygen (O<sub>2</sub>)

water (H<sub>2</sub>O)

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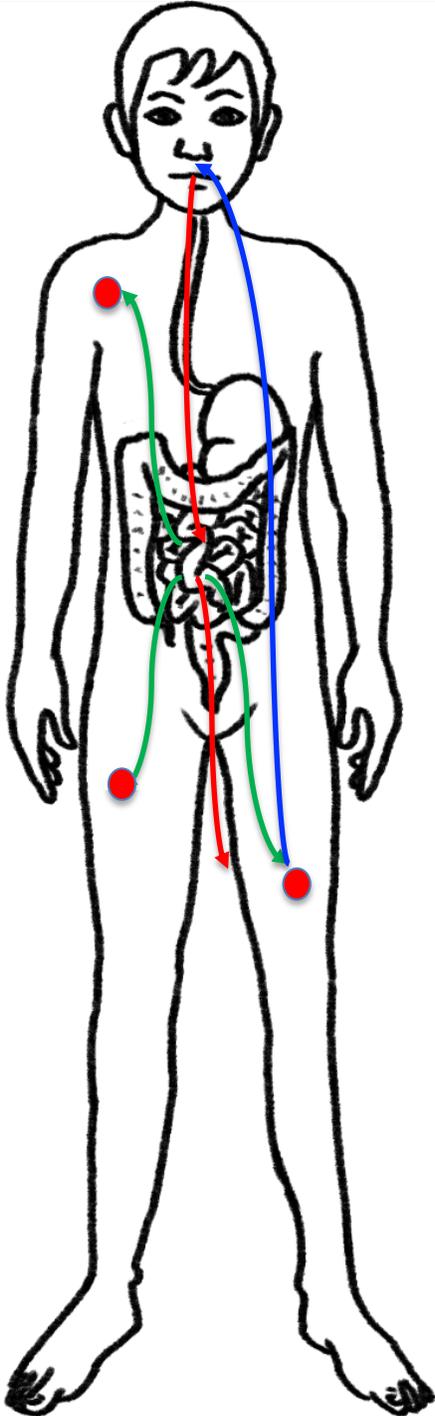
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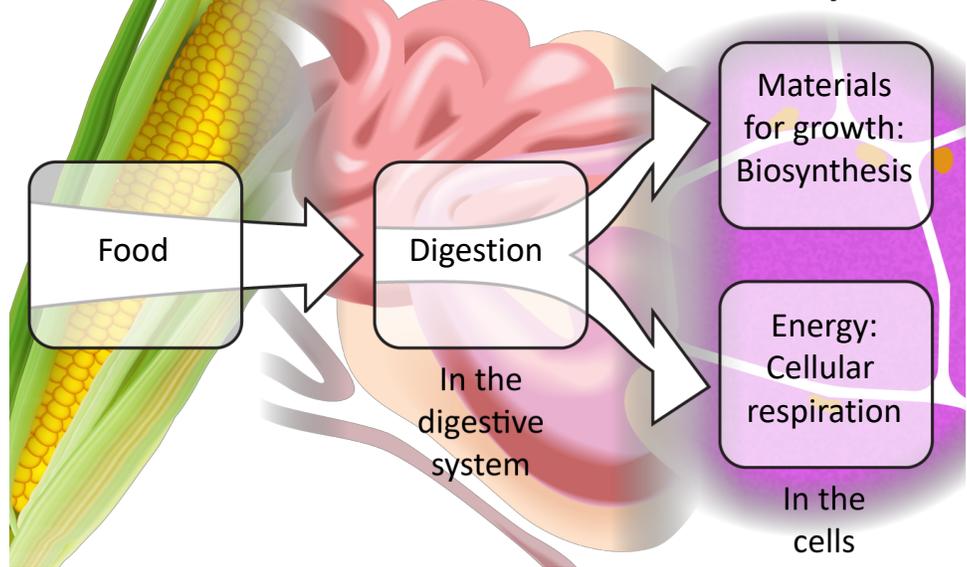
**Key points for biosynthesis (taking place only in all body cells):**

- **Blood carries small organic molecules from the digestive system to all body cells**
- **Body 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)**

	<p>1. Draw colored arrows to show movement of carbon-containing molecules. When the molecules move to or from every cell in the child's body, you can choose one cell as an example.</p> <p>Key: Color of arrows for:</p> <ul style="list-style-type: none"><li>• Large organic molecules (LOM) <u>red</u></li><li>• Small organic molecules (SOM) <u>green</u></li><li>• Carbon dioxide (CO<sub>2</sub>) <u>blue</u></li></ul> <p>2. Use the space below to list other molecules that also move through the child's body (you don't need to draw arrows).</p> <p><u>oxygen (O<sub>2</sub>)</u></p> <p><u>water (H<sub>2</sub>O)</u></p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p> <p>_____</p>
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# Matter and Energy Changes in a Growing Child

Explain three processes that change matter and energy as a child eats, moves, grows, and breathes by answering the Three Questions for each process.

<p style="text-align: center;"><b>Digestion</b></p> <p><b>Matter Movement in:</b> Where molecules are coming from: <u>food going through digestive system</u></p> <p><b>Matter Change:</b></p> <p>Reactants: <u>large organic molecules (+ water)</u></p> <p>Products: <u>small organic molecules</u></p> <p><b>Energy Change:</b></p> <p>From <u>chemical energy</u></p> <p>To <u>chemical energy</u></p> <p><b>Matter Movement Out:</b> Where molecules are going to: <u>blood that carries them to cells</u></p>	<p style="text-align: center;"><b>Biosynthesis for growth</b></p> <p><b>Matter Movement in:</b> Where molecules are coming from: <u>blood (from digestive system)</u></p> <p><b>Matter Change:</b></p> <p>Reactants: <u>small organic molecules</u></p> <p>Products: <u>large organic molecules (+ water)</u></p> <p><b>Energy Change:</b></p> <p>From <u>chemical energy</u></p> <p>To <u>chemical energy</u></p> <p><b>Matter Movement Out:</b> Where molecules are going to: <u>large organic molecules stay in cells as they grow</u></p>
 <p>The diagram illustrates the flow of matter and energy. On the left, a corn cob is labeled 'Food'. An arrow points to a stomach-like organ labeled 'Digestion' with the text 'In the digestive system' below it. From 'Digestion', two arrows point to the right. The top arrow points to a box labeled 'Materials for growth: Biosynthesis'. The bottom arrow points to a box labeled 'Energy: Cellular respiration' with 'In the cells' written below it.</p>	
<p style="text-align: center;"><b>Cellular Respiration for energy</b></p> <p><b>Matter Movement in:</b> Where molecules are coming from: <u>blood</u></p> <p><b>Matter Change:</b></p> <p>Reactants: <u>glucose (small organic molecules), oxygen</u></p> <p>Products: <u>carbon dioxide, water</u></p>	<p><b>Energy Change:</b></p> <p>From <u>chemical energy</u></p> <p>To <u>heat, energy for movement and cell functions</u></p> <p><b>Matter Movement Out:</b> Where molecules are going to: <u>blood, then out through lungs</u></p>