

PHENOMENA, DRIVING QUESTIONS AND SEPUP STORYLINE

BIOMEDICAL ENGINEERING

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Unit Issue: How science, technology, and engineering can be used to design solutions to improve the health and wellness of others.

Anchoring Phenomenon: Engineered solutions can improve people’s health and functioning. Examples explored include artificial bones, artificial hands, and artificial heart valves. Students generate and answer questions such as: How can science, technology, and engineering be used to improve people’s health and wellness? How are medical devices designed, tested, and improved?

Investigative Phenomena	Driving Questions	Guiding Questions	Activities	Storyline
<p>Many people have medical conditions.</p>	<p>How can engineering be used to improve the lives of those living with medical conditions?</p>	<p>What tools and strategies can you design to deal with a broken arm? (Activity 2)</p>	<p>2, 3, 4, 5, 7</p>	<p>Solving problems is something that we do every day. One of the most common processes used to find solutions to problems is known as engineering.</p>
		<p>How has the development of artificial body parts changed lives? (Activity 3)</p>		<p>One type of engineering, biomedical engineering, focuses on engineering devices or processes to help those with medical conditions.</p>
		<p>How can you design a prototype of an artificial bone that is strong yet light and flexible? (Activity 4)</p>		<p>Biomedical engineers engage in a multi- step non-linear iterative process that makes use of scientific knowledge and technology in order to find solutions that meet the needs (criteria) of the medically afflicted within certain limits (constraints).</p>
		<p>How can you design a heart valve prototype out of common materials? (Activity 5)</p>		<p>Once solutions to biomedical problems are engineered, engineers often look for ways to optimize their solutions. Common examples of optimization are: making a device cheaper, stronger, or better at specific functions.</p>
<p>Can you design an energy bar to meet the needs of people with specific medical conditions? (Activity 7)</p>				

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BIOMEDICAL ENGINEERING (continued)

Investigative Phenomena	Driving Questions	Guiding Questions	Activities	Storyline
<p>Scientists and engineers use technologies. Technologies are often developed by engineers and scientists.</p>	<p>How do new technologies get developed?</p>	<p>What approaches can be used to solve a problem? (Activity 1)</p> <p>How can you design a prototype of an artificial bone that is strong yet light and flexible? (Activity 4)</p> <p>How can you design a heart valve prototype out of common materials? (Activity 5)</p> <p>How are science, engineering, and technology related? (Activity 6)</p> <p>How does the structure of an arm or wing affect its function? (Activity 8)</p> <p>How can you make a mechanical grabber that can pick up and move an object? (Activity 9)</p>	<p>1, 4, 5, 6, 8, 9</p>	<p>Solving problems is something that we do every day. One of the most common processes used to find solutions to problems is known as engineering.</p> <p>One type of engineering, biomedical engineering, focuses on engineering devices or processes to help those with medical conditions.</p> <p>Biomedical engineers engage in a multi-step non-linear iterative process that makes use of scientific knowledge and technology in order to find solutions that meet the needs (criteria) of the medically afflicted within certain limits (constraints).</p> <p>Once solutions to biomedical problems are engineered, engineers often look for ways to optimize their solutions. Common examples of optimization are: making a device cheaper, stronger, or better at specific functions.</p>