PHENOMENA, DRIVING QUESTIONS AND STORYLINE

BIOMEDICAL ENGINEERING

How can science, technology, and engineering, be used to solve medical problems?

Phenomenon	Driving Questions	Guiding Questions	Activities	PE	Storyline/Flow (How an activity leads to subsequent activities)
Many people have medical conditions.	How can engineering be used to improve the lives of those living with medical conditions?	What tools and strategies can you design to deal with a broken arm? (Activity 2)	2, 3, 4, 5, 7	MS-LS2-4 MS-LS2-5 MS- ETS1.A MS- ETS1.B	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. One type of engineering, biomedical engineering, focuses on engineering devices or processes to help those with medical conditions. 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). 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.
		How has the development of artificial body parts changed lives? (Activity 3)			
		How can you design a prototype of an artificial bone that is strong yet light and flexible? (Activity 4)			
		How can you design a heart valve prototype out of common materials? (Activity 5)			
		Can you design a snack bar to meet the needs of people with specific medical conditions? (Activity 7)			

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BIOMEDICAL ENGINEERING

How can science, technology, and engineering, be used to solve medical problems?

Phenomenon	Driving Questions	Guiding Questions	Activities	PE	Storyline/Flow (How an activity leads to subsequent activities)
Scientists and engineers use technologies. Technologies are often developed by engineers and scientists.	How do new technologies get developed?	What tools and approaches can be used to solve a problem? (Activity 1)	1, 4, 5, 6, 8, 9	MS-ETS1-1 MS-ETS1-2 MS-ETS1-3 MS-ETS1-4	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. One type of engineering, biomedical engineering, focuses on engineering devices or processes to help those with medical conditions. 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). 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.
		How can you design a prototype of an artificial bone that is strong yet light and flexible? (Activity 4)			
		How can you design a heart valve prototype out of common materials? (Activity 5)			
		How are science, engineering, and technology related? (Activity 6)			
		How does the structure of an arm or wing affect its function? (Activity 8)			
		How can you make a mechanical grabber that can pick up and move an object? (Activity 9)			