

Engineering through Robotics and Automated Patient Care Activity – Guided Research Packet – **Answer Key**

Directions

Define the following words or phrases, and use them in a sentence that shows understanding.

Pressure Ulcer	Definition: Also known as a decubitus ulcer, pressure ulcers are open wounds that form whenever prolonged pressure is applied to skin covering bony outcrops of the body.
	Sentence: My grandfather had a pressure ulcer from spending too much time in bed.
Deep Vein Thrombosis	Definition: A blood clot in a major vein that usually develops in the legs and/or pelvis.
	Sentence: My grandmother was diagnosed with Deep Vein Thrombosis because of her bed rest.
Medical Device	Definition: Any article or healthcare product intended for use in the diagnosis of disease or other condition, or for use in the care, treatment or prevention of disease.
	Sentence: My father's pacemaker is an example of a medical device.
Mechanical Engineering	Definition: The branch of engineering that encompasses the generation and application of heat and mechanical power and the design, production, and use of machines and tools.
	Sentence: Through mechanical engineering many new machines have been created.
Bioengineering	Definition: The application of engineering principles to the fields of biology and medicine.
	Sentence: I am studying bioengineering in order to develop a new prosthetic arm.
Robotics	Definition: The science or study of the technology associated with the design, fabrication, theory, and application of robots.
	Sentence: The robotics department has developed a new robot that will vacuumed the floor.

You will be required to design a medical device to help prevent one of the conditions listed in the chart below. Complete the table below to further your understanding of each of the conditions.

Condition	Description of Condition	Describe the Formation	Current Treatment
Pressure Ulcer	Open sores form from limited blood flow to the skin and nearby tissue	<ul style="list-style-type: none"> Extended time without moving Pressure on bony portions of the body 	<ul style="list-style-type: none"> Stage 1 and 2 heal within 1 -2 months. Stage 3 and 4 may require surgery and extended care
Deep Vein Thrombosis	Blood clots form in the “deep” veins of the body	<ul style="list-style-type: none"> Extended time without moving Clotting occurs in the veins 	<ul style="list-style-type: none"> Pressure stockings Mechanical blood filters Blood thinners

How are robots used in hospitals today?

1. Micro bots are used to scrape plaque from arteries.
2. Delivery robots accurately dispense medicine and medical equipment.
3. Telemedicine robots allow doctors to remotely care for patients.

Identify three pros and three cons for robots’ use in hospitals.

Pros	1. Reduce required hospital staff
	2. Robot surgery has quicker recovery time
	3. Long term cost savings
Cons	1. Loss of jobs
	2. Limited surgeons are trained in robot surgery
	3. Cost

In your opinion, should robots be used in hospitals? Why or why not?

Robots in hospitals can be quite handy. For example some robots are able to navigate around the hospital. So they can help patients to find their way to the needed place, as well as carry some stuff around. Other robots are designed to function as robotic pharmacists. These robots automate medication storage, selection, return and restock functions. Doctor robots are also making their way into modern medicine. With the doctor robot, a doctor can examine a patient from entirely another location. Of course, there are also more serious robots in hospitals too, such as surgical robots which are simply remote control surgical devices.