

Name: _____

Period: _____

A Story: Is Sammy Alive?

Use the characteristics of life to figure out if Sammy is alive. **Underline in a different color pen/highlighter from each passage the supporting information you used for each answer.**

Part 1

Sammy was a normal, healthy boy. There was nothing in his life to indicate that he was anything different from anyone else. When he completed high school, he obtained a job in a factory, operating a machine press. On this job he had an accident and lost his hand. It was replaced with an artificial hand that looked and operated almost like a real one.

Is Sammy Alive? (explain why or why not)

Part 2

Soon afterward, Sammy developed a severe intestinal difficulty, and a large portion of his lower intestine had to be removed. It was replaced with an elastic silicon tube.

Is Sammy Alive? (explain why or why not)

Part 3

Everything looked good for Sammy until he was involved in a serious car accident. Both of his legs and his good arm were crushed and had to be amputated. He also lost an ear. Artificial legs enabled Sammy to walk again, and an artificial arm replaced the real arm. Plastic surgery enabled doctors to rebuild the ear.

Is Sammy Alive? (explain why or why not)

Part 4

Over the next several years, Sammy was plagued with internal disorders. First, he had to have an operation to remove his aorta and replace it with a synthetic vessel. Next, he developed a kidney malfunction, and the only way he could survive was to use a kidney dialysis machine (no donor was found for a kidney transplant). Later, his digestive system became cancerous and was removed. He received nourishment intravenously. Finally, his heart failed. Luckily for Sammy, a donor heart was available, and he had a heart transplant.

Is Sammy Alive? (explain why or why not)

Part 5

It was now obvious that Sammy had become a medical phenomenon. He had artificial limbs, nourishment was supplied to him through his veins; therefore he had no solid wastes. The kidney dialysis machine removed all waste material. The heart that pumped his blood to carry oxygen and food to his cells was not his original heart. But Sammy's transplanted heart began to fail. He was immediately placed on a heart-lung machine. This supplied oxygen and removed carbon dioxide from his blood, and it circulated blood through his body.

Is Sammy Alive? (explain why or why not)

Part 6

The doctors consulted bioengineers about Sammy. Because almost all of his life-sustaining functions were being carried on by machine, it might be possible to compress all of these machines into one mobile unit, which would be controlled by electrical impulses from Sammy's brain. This unit would be equipped with mechanical arms to enable him to perform manipulative tasks. A mechanism to create a flow of air over his vocal cords might enable him to speak. To do all this, they would have to amputate at the neck and attach his head to the machine, which would then supply all nutrients to his brain. Sammy consented, and the operation was successfully performed.

Is Sammy Alive? (explain why or why not)

Part 7

Sammy functioned well for a few years. However, a slow deterioration of his brain cells was observed and was diagnosed as terminal. So the medical team that had developed around Sammy began to program his brain. A miniature computer was developed: it could be housed in a machine that was humanlike in appearance, movement, and mannerisms. As the computer was installed, Sammy's brain cells completely deteriorated. Sammy was once again able to leave the hospital with complete assurance that he would not return with biological illness.

Is Sammy Alive? (explain why or why not)

Label each of the following situations as one of the characteristics of life.

Situation	Characteristic of Life
a. a cell divides	
b. a giraffe eats leaves off of a tree	
c. when using a microscope you see liver cells	
d. you get goose bumps when it's cold	
e. plants capture sunlight to make glucose	
f. a sperm cell and egg cell fuse to make a zygote	
g. a rabbit's fur turns white in the winter	

Characteristics of Life Data Table (in class)

Category	Characteristics of Life	Description of Observed Characteristics
<p>C. elegans (Caenorhabditis elegans)</p> <p>Video: Moving C. elegans</p>		
<p>Sea Urchins (Lytechinus pictus)</p> <p>Video: Sea urchin cell division</p>		
<p>Sea Urchins (Lytechinus pictus)</p> <p>Video: Sea urchin fertilization</p>		
<p>Blood Cells</p> <p>Video: Human white blood cells</p>		
<p>Cellular Structure and Function</p> <p>Video: Elodea leaf cells</p>		
<p>Stem Cells</p> <p>Videos: Compare Mouse embryonic stem cells—movie 1 with Heart cells grown from mouse embryonic stem cells--movie 1</p>		
<p>Cell Motility</p> <p>Video: Crawling Amoeba</p>		
<p>Zebrafish (Danio rerio)</p> <p>Video: Zebrafish development</p>		