Name: **Date:** **Class:**

Design Challenge: **The Artificial Heart Answer Key**

1. Ask: Identify the Needs and Constraints

   Design an artificial heart that can carry out all the functions of a human heart. Size, material, site of attachment, power supply, cost, time.

2. Research the Problem

   Research how the heart pumps, what is the path of blood, what is it made of, what are common malfunctions, etc.

3. Imagine: Develop Possible Solutions

   What does the heart actually do, how does it pump blood (mechanically and in what order), what size is the heart, where would it hook into the body, what could it be made of? Brainstorm possible designs.

4. Plan: Select a Promising Solution

   The teacher will explain that the approach chosen for the Jarvik artifical heart was to function as a normal heart does in the body, pumping blood to various organs. It was not designed as a replacement, but as a way to conduct surgery while keeping the patient alive.

5. Create: Build a Prototype

   Discussion on this step

6. Test and Evaluate Prototype

   Students will list the pros and cons of the Freedom pack that enabled Charles Okeke to leave the hospital.

7. Improve: Redesign as Needed

Students will analyze the pump-less artificial heart recently created by the Texas Heart Institute and tested on Craig Lewis after multiple successful tests on cows.