

Design Challenge:

Name: KEY

The Artificial Heart

Date: _____

1. Defining a Problem

Design an artificial heart that can carry out all the functions of a human heart.

2. Brainstorming

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?

3. Researching and Generating Ideas

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

4. Identifying Criteria and Constraints

Size, material, site of attachment, power supply, cost, time

5. Exploring Possibilities

Students will explore older models of the artificial heart as a class discussion with the teacher and record them here. From 1982 to present

6. Selecting an Approach

The teacher will explain that the approach chosen for the Jarvik artificial 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.

7. Developing a Design Proposal

Discussion on this step

8. Making a Prototype

Discussion on this step

9. Testing and Evaluating the Design

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

10. Refining the Design

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.

11. Communicating Results

Students will describe the results of the test on Craig which although he died of unrelated complications, was a success.