

Name:

Date:

Class:

Repairing Broken Bones Design Worksheet

Part 1: Identify Criteria and Constraints

In the space below, write out the criteria and constraints for your design.

Part 2: Imagine Design Ideas

Based on your criteria and constraints above, sketch two or three designs of different ways you might be able to repair your bone. Please label the parts and materials that you will use in each design.

Design 1:

Name:

Date:

Class:

Design 2:

Design 3:

Name:

Date:

Class:

Part 3: Evaluate Design Alternatives

For each of your designs in Part 2, answer the following questions in the space provided:

1. How will each design support the weight and movement of the patient?
2. Is it minimally invasive (easy for doctor to implant)? Why or why not?
3. Are the materials biocompatible? Explain.
4. Is it realistic? Explain.
5. What are the strong points and weaknesses of the design?

Design 1:

1.

2.

3.

4.

5.

Design 2:

1.

2.

3.

4.

Name:

Date:

Class:

5.

Design 3:

1.

2.

3.

4.

5.

Part 4: Select a Final Design

Choose one design that you think is best, and explain why you chose it as the one you will build and test. What makes this design better than the others? Redraw your design with any modifications from the original idea.

Name:

Date:

Class:

Part 5: Test the Prototype

How much weight could the original bone withstand? _____

How much weight did your reinforced bone withstand? _____

Where did the reinforced bone break or bend?

Part 6: Evaluate the Device

1. Is it minimally invasive (easy for doctor to implant)? Why or why not?
2. What are the strong points and weaknesses of the design?
3. How did your repair handle the load during testing?
4. Where on the bone did the repair fail? Why do you think it failed there?

Name:

Date:

Class:

Part 7: Improve the Design

How could you have improved your device?