

**Project-Skeletal System
Bionic Hand- Dexterity (Challenge #1)**

Scenario

You are working with a team of engineers from a biomedical engineering company that specializes in the design and manufacturing of prosthetic devices. Your team's challenge is to design a prosthetic hand that has dexterity of a real hand to help improve the quality of life of the amputee who uses the prosthesis.

Task

Using materials of your choice, you and your partner will design and construct a prosthetic human hand. The prosthetic hand that you design and construct will have the dexterity of an actual human hand.

No instructions have been provided for you. You will document the design and construction of your hand by taking pictures, uploading them to a google presentation, and writing out your procedures for each picture. As an alternative, you may document your progress by taking pictures, narrating them, and creating a video slideshow. **(5 Points)**

****You will need to work on this activity outside of class. You will NOT be given time to start the activity.**

****You will NOT be given time in class to finish the activity. You will only be given class time to present.**

Grading

Students will be graded on dexterity.

Dexterity of Whole Hand

1. Do all parts of the hand work together to grasp objects?

Objects to be picked up using whole hand:

- | | | |
|--------------|----------------|-----------------|
| 1. pvc pipe | 3. tennis ball | 5. water bottle |
| 2. golf ball | 4. stapler | |

Rubric

- 5- Picked all 5 objects.
- 4- Picked up 4 objects.
- 3- Picked up 3 objects.
- 2- Picked up 2 objects.
- 1- Picked up 1 object.

Dexterity of Thumb and Pointer Fingers

2. Does the thumb and pointer finger work together to grasp objects?

Objects to be picked up using at most 3 fingers:

- | | | |
|----------------|----------------------|------------------|
| 1. nut & bolt | 3. animal figure | 5. styrofoam cup |
| 2. highlighter | 4. whiffle golf ball | |

Rubric

- 5- Picked all 5 objects.
- 4- Picked up 4 objects.
- 3- Picked up 3 objects.
- 2- Picked up 2 objects.
- 1- Picked up 1 object.

Questions

Answer each question on a different slide. Place the questions at the end of your presentation.

- | | |
|---|----------------|
| 1. What materials did you use for the different parts of your hand? Why? | 4 points (2/2) |
| 2. As a whole hand, was your hand able to pick up the given objects? Why or Why not? | 3 points (1/2) |
| 3. How would you modify your hand so that it would be able to pick up the given objects? | 4 points (2/2) |
| 4. Using only the thumb and pointer fingers, was your hand able to pick up the given objects? Why or Why not? | 3 points (1/2) |
| 5. How would you modify your fingers so that it would be able to pick up the given objects? | 4 points (2/2) |

Total Points

/ 33
