**Off-Road Wheelchair Packet**

***Define the following terms***

Mechanical engineering: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Bioengineering:

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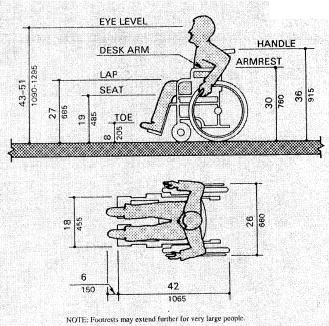
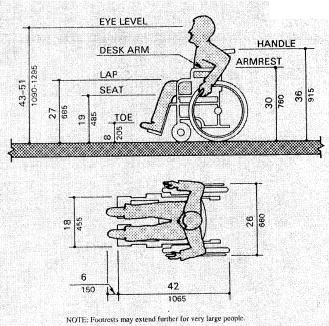
Biomedical engineering:

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***Introduction***

You work for an engineering company that specializes in making outdoor sporting equipment. The company has recognized that many people who are confined to wheelchairs enjoy outdoor activities such as light hiking or even mountain biking. Your role is to develop an off-road wheelchair design that enables this end user to access to formerly inaccessible outdoor activities.

ncbi.nlm.nih.gov

***Client Statement***

Create an off-road wheelchair for recreational purposes. The wheelchair should be easy to transport and operate, and be effective in traversing off-road terrain, such as trails, fields and beaches.

***Problem Statement*** (Define the problem in detail) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Revised Problem Statement:*** (Definition of the problem in detail including client modifications) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Functions*** (what the product does)

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***Objectives*** (What the product is)

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***Constraints*** (The product must or must not)

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***Background Research***

As homework, use the internet to research past and present wheelchair designs, off-road and mountain bikes, why people need wheelchairs, and other related topics. Keep a record of relevant material and source websites.

***Design Solutions*** (Sketch and describe 3 possible solutions)

Design #1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Design #2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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Design #3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Prototype Creation*** (describe why you chose the design you did)

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***Test Design***

1. Attach the scale model wheelchair prototype design to the spring scale.
2. Pull your prototype wheelchair across the three simulated off-road surfaces.
3. Record the highest amount of force needed to move your prototype at any point during each movement simulation.
4. Record your data in the table.

***Test Results*** (Complete the table and record the test results in detail)

|  |  |  |  |
| --- | --- | --- | --- |
| (Force Measured In Newtons) | **Trial 1** | **Trial 2** | **Trial 3** |
| **Beach** |  |  |  |
| **Light Hike** |  |  |  |
| **Field** |  |  |  |

(Description of results) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

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***Evaluation* *of Results*** (Was your design effective? How do you know?)

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***Future Recommendations*** (What you would recommend for future research)

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