



### Adaptations Lesson 3: “The Engineer”

#### Student Handout

#### Your Challenge:

Today you will develop and design a prototype of a product that benefits your human client. Your product is inspired by the adaptation or trait that you researched in “the Make”. Use this organizer to outline your written ideas. If you need space for sketches, complete them on a separate sheet. Your final design will be completed on a separate sheet.



#### Directions:

Your task today is to:

1. Name the trait that you will continue to focus upon.
2. Identify key features of the trait. The key features will be an important part of your product prototype design.
3. Brainstorm ideas and sketch prototype designs based upon the key features. The features in your prototype design should be similar to the key features of the trait.
4. Finalize your prototype design and add labels that describe the function of its key features.
5. On your final design, add:
  - A title with a creative name for your prototype design
  - A description of how the design was inspired by an animal or plant adaptation, and how its form and function benefits your human client.



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### The Engineering Planning Organizer

**What is your focus adaptation or trait ?**



**Describe some key features of the adaptation or trait:**



**Brainstorm some ideas for product designs based upon the key features of the adaptation or trait. Label the parts on any sketches you make.**





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**From your brainstorm ideas, choose one idea that you will develop further. This will become your final product. On your sketch below, label the function of each part of your structural design.**



On poster paper, draw diagrams that show your thinking as you engineered your product, including your final diagram. Use the checklist to design your best poster and presentation.



Extension: Build a 3-D prototype of your product (use chart in Appendix)



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### Assessment: Final Presentation

Let's get ready to present all of your great work! On a separate sheet of poster paper, draw diagrams that show your thinking as you engineered a product that is inspired by an adaptation and designed to benefit a human client. Use the checklist and Science & Engineering Practices rubric to ensure you have addressed all aspects of the "Engineer" with quality work.

The challenge: Design a product for a human based on an animal or plant adaptation.

#### Project Completeness

- The product and presentation meets all requirements and include:
  - A clear and creative title
  - A labeled drawing that identifies the organism and trait that the product is based on
  - A labeled diagram of the product design
  - Details about how the product benefits the human client
  - Well-organized diagrams and captions, arranged in a logical order

#### DCI Standards

- The product and presentation are accurate and includes:
  - A caption that explains the function of the trait
  - An explanation of how the trait helps the organism survive or reproduce
  - A caption that explains how an application of this trait could be helpful to humans

#### Science & Engineering Practices Assessed

	<b>Emerging (1)</b>	<b>Developing (2)</b>	<b>Proficient (3)</b>	<b>Advanced (4)</b>
<b>Designing Solutions</b>	Applies no scientific principles and/or data to design, construct, and/or test a design of an object, tool, process or system.	Applies minimal scientific principles and/or data to design, construct, and/or test a design of an object, tool, process or system.	Applies adequate scientific principles and/or data to design, construct, and/or test a design of an object, tool, process or system.	Applies complete scientific principles and/or data to design, construct, and/or test a design of an object, tool, process or system.
<b>Communicating Findings/Design (Oral Presentation)</b>	Findings/Design are incompletely and inaccurately communicated. Or no evidence of using appropriate eye contact, adequate volume, or clear pronunciation.	Findings/Design are completely communicated with some misconceptions. Or Uses minimal eye contact, inappropriate volume, or inconsistent pronunciation.	Findings are completely communicated but lack depth. Or often uses eye contact and engaging and appropriate volume and pronunciation, but is inconsistent.	Findings/Design are completely communicated with depth and complexity. Or mostly uses eye contact and engaging and appropriate volume and pronunciation.



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### Appendix: Build Your Prototype

1. Identify Materials and explain their representation		Teacher Approval Stamp
<ul style="list-style-type: none"><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li><li>•</li></ul>		
2. Construct: Your teacher will specify the amount of “build time.”		
3. Test Prototype:	Plan your test: <ul style="list-style-type: none"><li>a. What will you test?</li> <li>b. How will you test it? Write a summary of your procedure.</li> <li>c. What do you expect to happen? Make a prediction.</li></ul>	Test your prototype. Record your observations here:
4. Make Modifications	What will you change based on test observations and why? Your teacher will specify the amount of “build time” for modification.	
5. Present your final design	*Use Adaptations Engineer Checklist to meet all requirements	