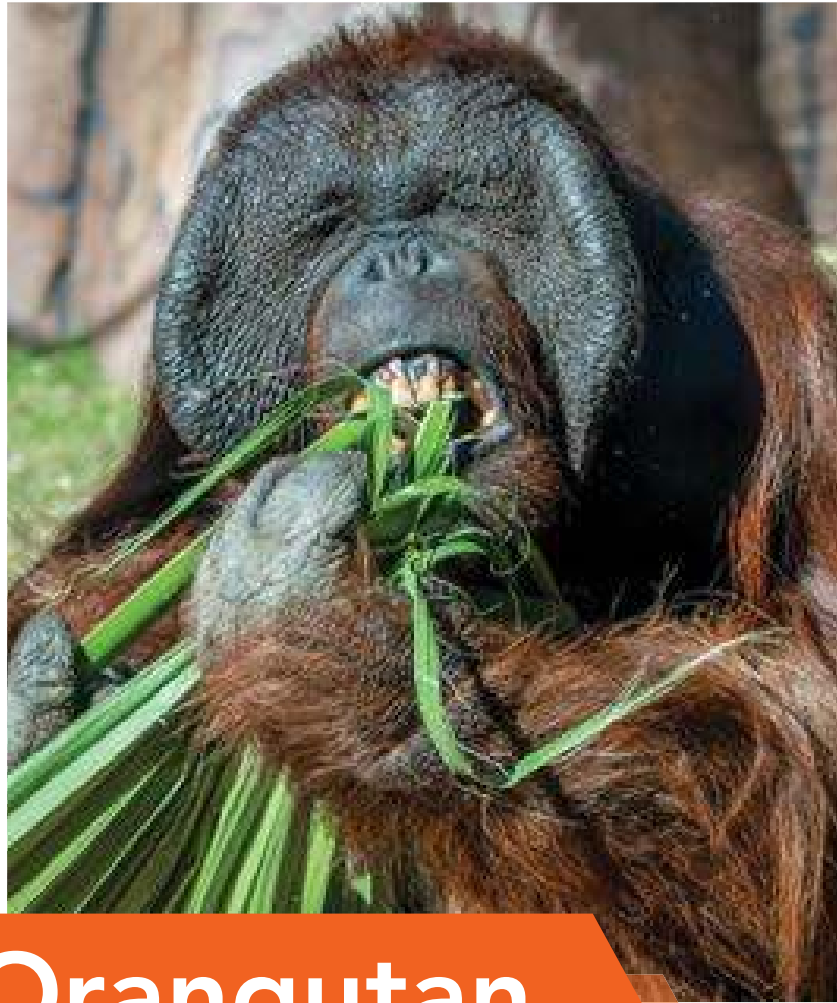


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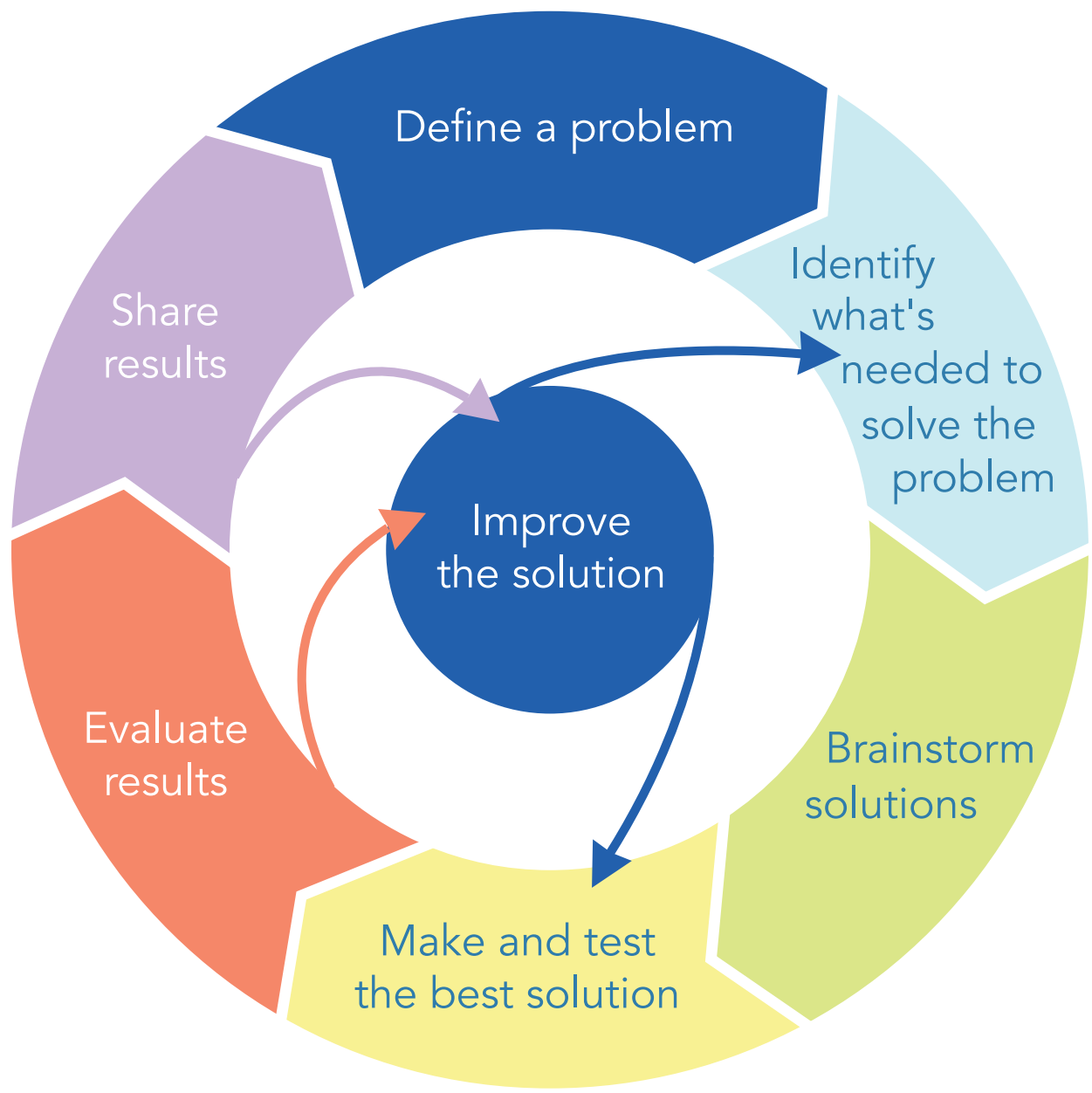


# Project Orangutan Student Guide



This Student Guide Belongs to: \_\_\_\_\_

# The Engineering Design Process



## Design Challenge Criteria:

Design a challenging, creative behavioral enrichment item that matches the abilities, needs, and natural behaviors of an orangutan.



## Design Challenge Constraints:

- Time
- Limited Materials or Resources
- Size/Dimensions
- Safety Concerns
- Easy to Clean for Zookeepers



## By the end of this project, I will have created...

- A research notebook
- A model or prototype of a behavioral enrichment item
- A presentation with visuals to explain my design idea to my class

# Project Timeline

|  | What will I do?  | I will be able to...   |
|--|--|--|
| <b>Week 1:<br/>Introduction<br/>to the Project</b> | <input type="checkbox"/> Watch video: Welcome to the Phoenix Zoo Project-Based Learning program!<br><input type="checkbox"/> Discuss the project as a class<br><input type="checkbox"/> Take a Pre-Assessment Quiz<br><input type="checkbox"/> Brainstorm Ideas for Research<br><input type="checkbox"/> Watch video: What is Behavioral Enrichment? | <input type="checkbox"/> Understand the purpose and expectations of this project.<br><input type="checkbox"/> Take a pre-assessment quiz that includes my best guesses – it’s ok if I don’t know the correct answers right now!<br><input type="checkbox"/> Brainstorm what I know about orangutans and what I need to learn in order to complete this project.<br><input type="checkbox"/> Define what behavioral enrichment (BE) is and why it is important for animals in zoos. |
| <b>Week 2:<br/>Research</b>                        | <input type="checkbox"/> Research orangutans’ ecosystem<br><input type="checkbox"/> Research orangutans’ behavior in the wild<br><input type="checkbox"/> Research why orangutans are endangered<br><input type="checkbox"/> Research how I can help orangutans!   | <input type="checkbox"/> Describe at least 3 natural behaviors of orangutans in the wild.<br><input type="checkbox"/> Explain why orangutans are important to their ecosystem.<br><input type="checkbox"/> Explain at least 1 threat to orangutans’ survival in the wild<br><input type="checkbox"/> Identify an action that I can take to help orangutans in the wild   |
| <b>Week 3:<br/>Research</b>                        | <input type="checkbox"/> Read biography of orangutans at the Phoenix Zoo<br><input type="checkbox"/> Watch video: Interview with a Phoenix Zoo Zookeeper!<br><input type="checkbox"/> Virtual field trip: Watch a video to observe and record Phoenix Zoo orangutans’ behavior   | <input type="checkbox"/> Identify individual orangutans at the Phoenix Zoo<br><input type="checkbox"/> Give examples of BE items<br><input type="checkbox"/> Monitor orangutan behavior using an ethogram  |

|  | <b>What will I do?</b>  | <b>I will be able to...</b>   |
|--|---|---|
| <b>Week 4:<br/>Brainstorm<br/>Design Idea</b>                            | <input type="checkbox"/> Break into small groups if you are able to<br><input type="checkbox"/> Choose group roles<br><input type="checkbox"/> Discuss: What additional info do you need to complete the project?<br><input type="checkbox"/> Brainstorm and create a design for your BE design | <input type="checkbox"/> Work with a team on a project (if possible)<br><input type="checkbox"/> Brainstorm what I know about orangutans and what I need to learn in order to complete this project.<br><input type="checkbox"/> Brainstorm a BE design idea based on my research<br><input type="checkbox"/> Evaluate and add to the ideas of other people to develop a great design |
| <b>Week 5:<br/>Get Feedback<br/>to Improve<br/>Design Idea</b>           | <input type="checkbox"/> Receive feedback on design idea from Phoenix Zoo staff<br><input type="checkbox"/> Give feedback on design ideas to others<br><input type="checkbox"/> Review my feedback and improve the design   | <input type="checkbox"/> Ask questions and complete research<br><input type="checkbox"/> Provide feedback about another group's design<br><input type="checkbox"/> Use the feedback to change and improve the design idea   |
| <b>Week 6:<br/>Create a<br/>Model and<br/>Visual for<br/>Design Idea</b> | <input type="checkbox"/> Create a Model/ Prototype of design idea<br><input type="checkbox"/> Create Visual(s) for presentation   | <input type="checkbox"/> Use resources wisely to create a model of the design idea<br><input type="checkbox"/> Use correct measurement units<br><input type="checkbox"/> Create visual and/or multimedia displays (posters, PowerPoint, etc.) to use during the presentation to help explain the design   |
| <b>Week 7: Finish<br/>Projects and<br/>Practice for<br/>Presentation</b> | <input type="checkbox"/> Review the rubric to make sure the project meets all expectations<br><input type="checkbox"/> Extra time to complete projects<br><input type="checkbox"/> Create a presentation and practice for it  | <input type="checkbox"/> Ask questions to figure out what needs to be added or changed to complete the project<br><input type="checkbox"/> Create a presentation that explains the design idea and design process<br><input type="checkbox"/> Practice the presentation 2-3 times   |

|   | <b>What will I do?</b>   | <b>I will be able to...</b>  |
|---|--|--|
| <b>Week 8:<br/>Presentations</b>        | <input type="checkbox"/> Present Design Ideas to the whole class<br><input type="checkbox"/> Watch other's presentations   | <input type="checkbox"/> Show my public speaking skills!<br><input type="checkbox"/> Show my active listening skills!  |
| <b>Week 9:<br/>Final<br/>Reflection</b> | <input type="checkbox"/> Take a Post-Assessment Quiz<br><input type="checkbox"/> Reflect on my learning<br><input type="checkbox"/> Reflect on assessment and rubric results | <input type="checkbox"/> Take a quiz that shows what I have learned through this project!<br><input type="checkbox"/> Discuss what I liked and disliked about this project<br><input type="checkbox"/> Review my grades for this project |

# Key Vocabulary

- Engineering design process
- Criteria
- Constraints
- Behavioral enrichment
- Ecosystem
- Keystone species
- Deforestation and palm oil
- Conservation
- Adaptation
- Orangutan growth, survival, behavior
- Dimensions and measurement units

# Expectations for Your Research Notebook

|                     |  |
|---------------------|--|
| <b>ORGANIZATION</b> | My notebook is organized in a way that is: <ul style="list-style-type: none"><li><input type="checkbox"/> Clear and easy to read</li><li><input type="checkbox"/> Has dates, page numbers and an updated table of contents</li><li><input type="checkbox"/> Logical (information is written under headings/topics that make sense)</li><li><input type="checkbox"/> Includes my thoughts about the research</li><li><input type="checkbox"/> Cites my sources (Records where I got my information)</li></ul> |
| <b>CONNECTIONS</b>  | I made many connections throughout my research to: <ul style="list-style-type: none"><li><input type="checkbox"/> The importance of orangutans in their ecosystem</li><li><input type="checkbox"/> Orangutan behavior, abilities and needs</li><li><input type="checkbox"/> Human impact on orangutan survival</li><li><input type="checkbox"/> How behavioral enrichment meets the needs of orangutans at zoos</li></ul>  |
| <b>MECHANICS</b>    | <ul style="list-style-type: none"><li><input type="checkbox"/> I have no misspelled words</li><li><input type="checkbox"/> I used punctuation correctly to make it easy to read my notes</li></ul>   |



# Expectations for Your Model/Prototype Design

|  |  |
|--|--|
| <p><b>BE DESIGN</b></p>                    | <p>My design creatively and effectively meets all criteria:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Is challenging and appropriate for an orangutan</li> <li><input type="checkbox"/> Easy to tell what the BE item is and how it would be used by an orangutan</li> <li><input type="checkbox"/> Accurate and appropriate size and dimensions.</li> </ul>   |
| <p><b>COLLABORATION<br/>(TEAMWORK)</b></p> | <p>My group stayed on task during work time</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> All of my group members did an equal amount of work on this project</li> <li><input type="checkbox"/> My group showed good communication/listening skills and was able to work through any disagreements</li> <li><input type="checkbox"/> I showed respect for other group member's ideas</li> <li><input type="checkbox"/> My group used the feedback we got to change and improve our design</li> </ul> |
| <p><b>USE OF<br/>MATERIALS</b></p>         | <ul style="list-style-type: none"> <li><input type="checkbox"/> My group creatively and efficiently used the materials we were given. We did not waste materials.</li> </ul>   |

# Expectations for Your Presentation

|                                  |   |
|----------------------------------|---|
| <p><b>MASTERY OF CONTENT</b></p> | <p>Our presentation clearly and efficiently addresses all content:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> We explained how we came up with our idea</li> <li><input type="checkbox"/> We explained how our design idea fits the criteria and constraints</li> <li><input type="checkbox"/> We explained how orangutans would use our behavioral enrichment item</li> <li><input type="checkbox"/> We explained how we used the feedback we got (and the challenge card) to improve our design</li> </ul> |
| <p><b>SPEECH</b></p>             | <ul style="list-style-type: none"> <li><input type="checkbox"/> I spoke loudly enough for everyone to hear</li> <li><input type="checkbox"/> I used the right tone of voice and spoke clearly, so everyone can understand what I mean</li> <li><input type="checkbox"/> I spoke respectfully about other students and wildlife</li> <li><input type="checkbox"/> I showed active listening skills when listening to other groups present</li> </ul>   |
| <p><b>LANGUAGE</b></p>           | <ul style="list-style-type: none"> <li><input type="checkbox"/> Our presentation used vocabulary correctly</li> <li><input type="checkbox"/> Our presentation had very few mispronounced words</li> </ul>   |
| <p><b>VISUALS</b></p>            | <p>Our visuals (poster, Powerpoint, etc.) were:</p> <ul style="list-style-type: none"> <li><input type="checkbox"/> Neat</li> <li><input type="checkbox"/> Creative</li> <li><input type="checkbox"/> On topic</li> <li><input type="checkbox"/> Easy to understand</li> <li><input type="checkbox"/> Accurate</li> </ul>   |