2023

VIRTUAL ZOO to YOU
Phoenix Zoo

Project Orangutan Teacher Guide

phoenixzoo
ARIZONA CENTER for NATURE CONSERVATION

Grades: 3rd – 6th

Type of Lesson: Adapted for delivery in distance learning settings.

Timeframe: 9-week long research project. Two 30-minute sessions per week with opportunities for extended learning.

Overview: This program will guide participants through research experiences involving how the Phoenix Zoo cares for the complex needs of orangutans. Participants will then be inspired to use the engineering design process to create a model/prototype of a behavioral enrichment item for an orangutan and feel empowered to make responsible consumer choices that limit orangutan habitat loss due to palm oil. This lesson is aligned to state and national science standards.

Key Concepts:

- Define the criteria and constraints for a design problem
- Conduct research about the ecosystem, natural abilities and needs of orangutans
- Appropriately use available technology
- Collaborate with classmates to complete a project
- Create a design and prototype for an invention using the engineering design process and mathematical dimensions
- Evaluate their own work and the design solutions of others
- Develop empathy for animals by considering multiple perspectives
- Discuss how human actions positively and negatively affect animal habitats and populations
- Identify how the Phoenix Zoo addresses the complex needs of the animals
- Identify everyday actions that students can take to conserve and protect wildlife

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

Arizona State Standards Alignment

Science

3rd grade	4th grade	5th grade	6th grade
3.L1U1.5 Develop and use models to explain that plants and animals (including humans) have internal and external structures that serve various functions that aid in growth, survival, behavior, and reproduction. **3.L2U1.6 Plan and carry out investigations** to demonstrate ways plants and animals react to stimuli.	**4.L4U1.11 Analyze and interpret** environmental data to demonstrate that species either adapt and survive or go extinct over time.	**5.L4U3.11** Obtain, evaluate, and communicate evidence about how natural and human-caused changes to habitats or climate can impact population.	**6.L2U3.11** Use evidence to construct an argument regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems.

English Language Arts

3rd grade	4th grade	5th grade	6th grade
3.W.7 Conduct short research projects that build knowledge about a topic. **3.W.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. **3.SL.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace.	**4.W.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic. **4.W.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes, categorize information, and provide a list of sources. **4.SL.4** Report on a topic or text, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. **4.SL.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes.	**5.W.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic and to answer a specific question. **5.W.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work and provide a list of sources. **5.SL.4** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. **5.SL.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes.	**6.W.7** Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate. **6.W.8** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources. **6.SL.4** Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. **6.SL.5** Include multimedia components (e.g., graphics, images, music, and sound) and visual displays in presentations to clarify information.

Arizona State Standards Alignment

Math			
3rd grade	**4th grade**	**5th grade**	**6th grade**
3.MD.C.6 Measure areas by counting unit squares (e.g., square cm, square m, square in, square ft, and improvised units).	**4.MD.A.1** Know relative sizes of measurement units within one system of units which could include km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec.	**5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems.	**6.RP.A.3 d.** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.
Educational Technology			
3rd grade	**4th grade**	**5th grade**	**6th grade**
Strand 2: Communication and Collaboration **Concept 2: Digital Solutions** Contribute to project teams to produce original works or solve problems **PO 1.** Contribute to a cooperative learning project and demonstrate effective group behaviors while using digital collaborative resources.			
Strand 3: Research and Information Literacy **Concept 2: Processing** Locate, organize, analyze, evaluate, synthesize and ethically use information from a variety of sources and media.			
PO 4. Organize information into major topics and create a list of ideas.	PO 4. Use appropriate digital tools to synthesize research information and to develop new ideas.	PO 4. Use appropriate digital tools to synthesize research information and develop new ideas.	PO 4. Use appropriate digital tools to synthesize research information to develop new ideas and/or create new understanding.

NGSS Standards Alignment

3-5-ETS1-2. Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

MS-ETS1-1. Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.

Materials Needed

Provided by the Zoo (digitally)	Provided by the School	Optional Digital Tools

• Teacher guide (lesson plans and rubrics for assessment)
• Student guide (outline of project and student-friendly rubric)
• Welcome video
• Pre/post assessment
• Student research notebook
• Checks for understanding
• Engineering Design Process graphic
• Recommended Research for Orangutans in the Wild
• Recommended research for Orangutan Conservation
• Recommended Research for Orangutan Behavioral Enrichment
• "How do Zoos Help Wild Animals?" handout
• "Palm Oil Challenge" handout
• Pre-recorded video titled "Interview with a Keeper"
• Interview question worksheet
• Orangutan biography
• Pre-recorded video titled "Virtual Field Trip"
• Ethogram worksheet
• Design Idea worksheet
• Safety Considerations Card
• Challenge Cards
	• Access to internet connection
	• Ability to print out digital resources provided by the Zoo
	• Ability to play digital videos for the class
	• Access to Zoom or Google Meets for live conversation with Zoo staff
	• Craft materials to build a 3D prototype of the design solution
	Ex: string, cardboard, tape, paper, craft sticks, model magic, scissors, glue, etc.
	• Posters, butcher paper, or tri-fold boards (1 per group)
	• Other craft materials such as construction paper, markers, colored pencils, etc.
	• Pencils
	
	Optional:
	• Folder for keeping resources together (1 per student)
	• KWL Chart poster
	• Group Roles expectations
	• Post-its or other feedback sheet
		• Access to individual computers (Recommended for at least 30 minutes twice a week)
		• Access to reliable databases for additional research such as:
		• EBSCO Host
		• Encyclopedia Britannica Elementary
		• World Book Kids
		• Access to submit checks for understanding via a digital platform such as:
		  • Kahoot!
		  • Socrative
		  • Microsoft Forms
		  • Tinkercad (create a digital model using digital object design)
		• Access to a digital presentation tool such as:
		  • PowerPoint
		  • Prezi
		  • PowToon
		  • Access to iPads (or similar technology) to have students create a video for their presentation and use an editing app such as iMovie.

Content Outline and Lesson Plans

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Week 1: Introduction

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Pre-Assessment (Approx. 10-15 mins)	Students will take a 10-question assessment either online or using paper/pencil. Remind students that a pre-assessment should include their best guess – it's ok if they don't know the right answers. Please share pre/post assessment data with the Zoo to help us evaluate and improve our program!	Assess student background knowledge		• Pre/post Assessment online access via Microsoft Forms or paper/pencil print out (with answer key)	
Introduction to the project (10 mins)	Play pre-recorded welcome video and review student rubric project expectations and timeline with students. Review the engineering design process.	The students will be able to understand the purpose and expectations of this project.	**MS-ETS1-1.** Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	• Welcome video • Student guide • Student research notebook • (optional) Engineering Design Process poster	Consider creating a folder or lapbook to help students keep all their resources together.
Brainstorm areas for research (10 mins)	Conduct a class discussion to generate questions and topics they want to research related to the project and orangutans. Use a KWL chart to help students keep track of what they already know, what they want to know, and what they learned from the project.	Students will be able to connect what they currently know to what needs to be learned in order to solve an identified problem.	**3.W.7** Conduct short research projects that build knowledge about a topic. **4.W.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic. **5.W.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic and to answer a specific question. **6.W.7** Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.	• KWL chart (in student research notebook) • (optional) Class poster KWL chart	If your students have access to individual computers to do research, review the criteria for a reliable source. Consider using these resources/ lessons from Scholastic website: https://www.scholastic.com/teachers/blog-posts/angela-bunyi/reliable-sources-and-citations/
What is behavioral enrichment? (30 mins)	Show pre-recorded video titled "B.E.-Xamination". Show other videos from Recommended Research for Behavioral Enrichment and discuss as time allows.	Students will be able to define what behavioral enrichment is and why it is important for animals in captivity.		• Pre-recorded video titled "B.E.-Xamination" • Recommended Research for Behavioral Enrichment	

Week 2: Research

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Orangutans in the Wild: Research ecosystem and behavior in the wild (30 mins)	Show prerecorded video titled "Orangutan Adaptations" Students will use accurate, age-appropriate print and/or digital resources to research and take notes on information about orangutans in the wild as time allows.	The students will be able to identify and explain at least 3 natural behaviors/ adaptations of orangutans in the wild.	**4.L4U1.11** Analyze and interpret environmental data to demonstrate that species either adapt and survive or go extinct over time. **5.L4U3.11** Obtain, evaluate, and communicate evidence about how natural and human-caused changes to habitats or climate can impact population **6.L2U3.11** Use evidence to construct an argument regarding the impact of human activities on the environment and how they positively and negatively affect the competition for energy and resources in ecosystems	• Prerecorded video "Orangutan Adaptations" • Student research notebook • Check for Understanding (with answer key)	Check to see if your school has access to reliable databases for additional research such as: • EBSCO Host • Encyclopedia Britannica Elementary • World Book Kids (or Students) Students could submit their answers for the check for understanding via a digital platform such as: • Kahoot! • Socrative • Microsoft Forms
Orangutan Conservation: Research why orangutans are endangered and how students can help! (30 mins)	Students will use accurate, age-appropriate print and/or digital resources to research and take notes on orangutan conservation.	Students will be able to identify and explain at least one factor in the following categories: • Why orangutans are important to their ecosystem • Threats to orangutan species survival • An action that students can take to help orangutans in the wild		• Recommended Research for Orangutan Conservation • "How do Zoos Help Wild Animals?" article • "Palm Oil Challenge" handout • Student research notebook • Check for Understanding (with answer key)	
Optional Video: A Day in the Life of an Orangutan (10 mins)	Students will play a game that teaches about a day in the life of an orangutan, their adaptations, and the ways that humans impact them. This is an interactive video where students will choose an answer for each scenario by moving around the room. You can pause the video to allow them more think time or to explain their answers to the group before proceeding to the part of the video with the "answer".	Students will be able to identify and explain why orangutans are important to their ecosystem		• Prerecorded video "A Day in the Life of an Orangutan"	

Week 3: Research

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
The Phoenix Zoo and orangutans (30 mins)	Have students read the Orangutan Biography handout. Show pre-recorded "Visit Nutritional Services and Interview with a Keeper" video. Provide students with the Interview Question worksheet to follow along and take notes.	The students will be able to give examples of BE items and identify individual orangutans at the Phoenix Zoo.	**3.W.8** Recall information from experiences or gather information from print and digital sources; take brief notes on sources and sort evidence into provided categories. **4.W.8** Recall relevant information from experiences or gather relevant information from print and digital sources; take notes, categorize information, and provide a list of sources. **5.W.8** Recall relevant information from experiences or gather relevant information from print and digital sources; summarize or paraphrase information in notes and finished work, and provide a list of sources. **6.W.8** Gather relevant information from multiple print and digital sources; assess the credibility of each source; and quote or paraphrase the data and conclusions of others while avoiding plagiarism and providing basic bibliographic information for sources.	• Pre-recorded video titled "Visit Nutritional Services and Interview with a Keeper" • Interview question worksheet • Orangutan biography • Student research notebook	
Observe Phoenix Zoo orangutans (30 mins)	Students will take a virtual field trip to the Phoenix Zoo by watching pre-recorded footage of the orangutan exhibit and using an ethogram to monitor orangutan behavior. Play video "Phoenix Zoo Orangutans and Ethogram". This is an interactive video where students will be marking the ethogram chart according to the video's directions. There is a timer that will chime every 15 seconds to indicate when they should mark their chart. You can also pause the video after the narrator asks questions to allow students to discuss as a group.	The students will be able to monitor and interpret orangutan behavior using a common tracking tool for keepers.		• Pre-recorded video titled "Phoenix Zoo Orangutans and Ethogram" • Pre-recorded video titled "Virtual Field Trip 2 – Daniel, Rayma" • Pre-recorded video titled "Virtual Field Trip 3 – Bess, Jiwa, and Michael" • Ethogram worksheet • Check fo understanding (with answer key)	Watch the video multiple times with the students choosing a different orangutan to observe and record on their ethogram each time.

Week 4: Discovery

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Group Roles (15 mins)	Split students into groups of 4. Consider providing group roles so everyone contributes equally: Group Leader, Lead Artist, Lead Writer, Lead Engineer. Emphasize that these roles describe the leader for certain areas of the project, but each person should be contributing equally and helping one another with their role.	The students will be able to collaborate with a team to complete a project.	Strand 2: Communication and Collaboration Concept 2: Digital Solutions Contribute to project teams to produce original works or solve problems PO 1. Contribute to a cooperative learning project and demonstrate effective group behaviors while using digital collaborative resources.		If you are using a fully online model of learning, consider using virtual break-out rooms to allow students to work together virtually. Students can also develop their model individually instead of in groups.
Group Discussion: What additional info do you need to complete the project? (15 mins)	Students will be able to connect what they currently know to what needs to be learned in order to solve an identified problem.	The students will be able to monitor and interpret orangutan behavior using a common tracking tool for keepers.	**3.W.7** Conduct short research projects that build knowledge about a topic. **4.W.7** Conduct short research projects that build knowledge through investigation of different aspects of a topic. **5.W.7** Conduct short research projects that use several sources to build knowledge through investigation of different aspects of a topic and to answer a specific question. **6.W.7** Conduct short research projects to answer a question, drawing on several sources and refocusing the inquiry when appropriate.	• KWL chart (Students should have access to the one created earlier as a reference) • Student research notebooks	*Students can submit additional questions to Zoo staff at this time as part of next week's lesson.*
Create plan for project (30 mins)	Students should brainstorm ideas and use the BE Design Worksheet to help guide their prototype idea. Worksheet information should include detailed sketch (with dimensions) and explanation of their BE model. Students will make changes to their idea once they receive feedback next week.	The students will be able to design a solution to the designated problem based on their research and be able to evaluate and expand on the deas of others to develop the best solution.	**NGSS: 3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• BE Design worksheet • Student research notebook	*Students can submit their design idea worksheets to Zoo staff at this time as part of next week's lesson.*

Week 5: Application

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Receive feedback on design idea from Phoenix Zoo staff (30 mins)	**Live virtual conversation with Zoo staff** **1 WEEK BEFORE** this lesson, you will be contacted by Zoo staff to determine the following… • Which digital platform do you want to use? Zoom or Google Meets • How would your class like to spend this time? **Option #1:** Q&A session with whole class (pre-submit questions via email the week before) OR **Option #2:** approximately 5 minutes per group with Zoo staff to receive specific feedback (pre-submit design idea worksheets via email the week before)	The students will be able to generate questions and complete research needed for their project. OR The students will be able to receive feedback from Zoo staff on their design idea.	**NGSS: 3-5-ETS1-2.** Generate and compare multiple possible solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.	• Access to Zoom or Google Meets • Pre-submitted questions OR Pre-submitted design idea worksheets	
Receive feedback on design idea from peers (15 mins)	Have students review another group's work and provide constructive feedback. Students should provide written feedback to at least one other group. Provide feedback sentence stems for students such as: • One question I have about your project is… • One suggestion I have for your project is… • One thing I like about your project is…	The students will be able to evaluate and provide feedback about another group's design.		• Design idea worksheets • Paper or post-its for providing written feedback to groups	Consider setting up a "Gallery Walk" where students silently move around the room, reviewing each group's design sheet.
Review feedback and Re-design (15 mins)	Groups will review the feedback they received from Zoo staff and peers, as well as the safety consideration card, to decide what they should improve/change about their design idea.			• Feedback from previous lessons • BE Design Worksheet • Safety Considerations Card • Challenge Cards	Use the **challenge cards** to give groups a specific area to re-design.

Week 6: Application

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Create Model/ Prototype (30 mins)	Show pre-recorded video "Design Your B.E.". Groups will create a model or prototype of their BE idea using the provided materials. Prototype/model should include appropriate and accurate dimensions.	The students will be able to use resources wisely to create a model of their design idea. The students will be able to use appropriate measurement units.	**3.L1U1.5** Develop and use models to explain that plants and animals (including humans) have internal and external structures that serve various functions that aid in growth, survival, behavior, and reproduction. **3.MD.C.6** Measure areas by counting unit squares (e.g., square cm, square m, square in, square ft, and improvised units). **.MD.A.1** Know relative sizes of measurement units within one system of units which could include km, m, cm; kg, g; lb, oz.; l, ml; hr, min, sec **5.MD.A.1** Convert among different-sized standard measurement units within a given measurement system, and use these conversions in solving multi-step, real-world problems. **6.RP.A.3 d.** Use ratio reasoning to convert measurement units; manipulate and transform units appropriately when multiplying or dividing quantities.	• Pre-recorded video titled "Design Your B.E." • Provide craft materials to build a 3D prototype of the design solution *(Ex: string, cardboard, tape, paper, craft sticks, model magic, etc.)*	Have students build a digital model using Tinkercad (digital object design)
Create Visual(s) for Presentation (30 mins)	Groups will create a poster, PowerPoint or other visual(s) that include: • How they came up with their idea based on their research • How it fits the criteria and con straints of the problem • How orangutans would use the design • How they used the challenge card or feedback to re-design	The students will be able to create visual and/or multimedia displays that explain their design solution and enhance their presentation.	**4.SL.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. **5.SL.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. **6.SL.5** Include multimedia components (e.g., graphics, images, music, and sound) and visual displays in presentations to clarify information.	• Provide posters, butcher paper, tri-fold boards • Provide other craft materials such as construction paper, markers, colored pencils, etc. • (optional) Student access to printer to print photos of orangutans, etc.	Have students create a digital presentation tool using: • PowerPoint • Prezi • PowToon If you have access to iPads (or similar technology) have students create a video for their presentation and use an editing app such as iMovie.

Week 7: Application

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Rubric Review (15 mins)	Review the rubric for their design and presentation. Review skills for public speaking.	The students will be able to ask clarifying questions to determine what needs to be added or changed to complete their projects.	**3.SL.4** Report on a topic or text, tell a story, or recount an experience with appropriate facts and relevant, descriptive details, speaking clearly at an understandable pace. **4.SL.4** Report on a topic ortext, tell a story, or recount an experience in an organized manner, using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. **5.SL.4** Report on a topic or text or present an opinion, sequencing ideas logically and using appropriate facts and relevant, descriptive details to support main ideas or themes; speak clearly at an understandable pace. **6.SL.4** Present claims and findings, sequencing ideas logically and using pertinent descriptions, facts, and details to accentuate main ideas or themes; use appropriate eye contact, adequate volume, and clear pronunciation. **4.SL.5** Add audio recordings and visual displays to presentations when appropriate to enhance the development of main ideas or themes. **5.SL.5** Include multimedia components (e.g., graphics, sound) and visual displays in presentations when appropriate to enhance the development of main ideas or themes. **6.SL.5** Include multimedia components (e.g., graphics, images, music, and sound) and visual displays in presentations to clarify information	• Student guide	Consider using this four-part framework for public speaking from Edutopia: https://www.edutopia.org/practice/public-speaking-oracy-skills-real-world Search for TED Talks that are appropriate for your class to see/ discuss models of good public speaking.
Complete projects (15 mins)	Provide groups with additional time to complete their model/ prototype and visuals.				
Create and Practice Presentation (30 mins)	Groups will develop a 5-10 minute presentation to explain their model and visuals. Each group member is expected to speak during the presentation. Groups should practice their presentation 2-3 times and time themselves.	The students will be able to develop a presentation that explains their design idea and design process.		• Student research notebooks • Visuals created • (optional) stopwatch or timer	

Week 8: Communication

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Congratulations and Presentations of Design Ideas (1 hour)	Show prerecorded video, "Congratulations!" Groups will present their design to the whole class. The amount of time needed for this lesson may vary depending on number of groups or amount of time given for each presentation.	The students will be able to demonstrate public speaking and active listening skills.	The students will be able to demonstrate public speaking and active listening skills. (see Week 7 standards)	• Prerecorded video "Congratulations!" • Optional for students watching presentations: Paper or post-its for providing written feed back to groups	Consider inviting other classes, parents or principal to see the presentations or hosting an "exhibition" in the classroom where others can visit to see their designs.

Week 9: Assessment and Reflection

Lesson Title (Timeframe)	Description	Objective	Standard	Materials	Extensions/Tech Integration
Post-Assessment (30 mins)	Give students the same test as the pre-assessment to determine how much the students have learned.	Assessment of student learning.		• Pre/post Assessment (online access via Micro soft Forms or paper/ pencil print out)	
Reflection and Feedback (30 mins)	Provide groups with their evaluations based on the rubric provided. Provide groups with any peer feedback from their presentations. Allow groups time to discuss their results. Lead a class discussion to determine how students felt about the project and what they would change. Complete the KWL chart with what students have learned.	The students will be able to reflect on their evaluation results, feedback and overall learning experience.		• Assessment results (Post-assessment, rubrics) • Feedback from peers • KWL chart	Discuss new ideas for future PBL projects. Discuss how students can share what they've learned with others.

Assessment Rubrics

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Rubric for Research Notebook - Individual Research

	4 Exceeds	3 Proficient/Meets	2 Approaching	1 Falls Far Below
ORGANIZATION	Organization is clear, logical, and concise in structure Sequence is effective and logical	Organization is mostly structured dependent on the main idea Sequences logically	Organization is somewhat structured, but may not stick to the main idea the whole time Some parts are sequenced logically	Organization is not structured or there is no main idea Multiple parts are out of order
CONNECTIONS	Multiple connections are made to the importance of orangutans in their ecosystem Multiple connections are made to orangutan behavior and environmental needs Multiple connections are made between the cause and effect of human impact on orangutan survival Multiple connections are made between the needs of orangutans in captivity and Behavioral Enrichments.	One connection is made to the importance of orangutans in their ecosystem One connection is made to orangutan behavior and environmental needs One connection is made between the cause and effect of human impact on orangutan survival One connection is made between the needs of orangutans in captivity and Behavioral Enrichments.	One or two of the connection categories is not present	More than two of the connection categories are not present
MECHANICS	There are no misspelling and/ or grammatical errors. Punctuation is appropriately chosen and placed.	There is only one or two misspelling and/or grammatical error Punctuation is mostly appropriately chosen and placed	There are a few misspellings and grammatical errors but is does not detract from the meaning of the work. There are a few punctuation errors but they do not distract from the meaning of the work	There are many misspellings and/or grammatical errors that distract from the meaning of the work. There are many punctuation errors and/or they distract from the meaning of the work

Rubric for Presentation - Communication

	4 Exceeds	3 Proficient/Meets	2 Approaching	1 Falls Far Below
MASTERY OF CONTENT	Presentation clearly and efficiently addresses all requirements: Students explain how they came up with their idea Students explain how it fits the criteria and constraints of the problem Students explain how orangutans would use the design Students explain how they used the challenge card or feedback to re-design	Presentation addresses all requirements: Students explain how they came up with their idea Students explain how it fits the criteria and constraints of the problem Students explain how orangutans would use the design Students explain how they used the challenge card or feedback to re-design	Presentation is missing one requirement: Students explain how they came up with their idea Students explain how it fits the criteria and constraints of the problem Students explain how orangutans would use the design	Presentation is missing multiple requirements
SPEECH	Student uses appropriate inflection and tone to engage their audience Student speaks loudly enough for all students to hear Student speaks clearly for all students to understand Student speaks respectfully about other students and wildlife Student shows active listening skills	Student speaks loudly enough for all students to hear Student speaks clearly for all students to understand Student speaks respectfully about other students and wildlife Student shows active listening skills	Student speaks so that most students can hear Student speaks so that most students can understand Student speaks disrespectfully or interrupts once Student shows interest in listening to other students	Most students cannot hear student speak Most students cannot understand the student speak Student speaks disrespectfully or interrupts more than once Student shows no interest in listening to other students
LANGUAGE	Uses vocabulary appropriately Response contains few and minor language errors	Uses vocabulary appropriately Response contains some language errors, but errors do not interfere with the listener's understanding	Uses some vocabulary inappropriately Response contains multiple language errors that creates some interference with listener's understanding of writing	Uses most vocabulary inappropriately or no vocabulary used Response contains errors that make their point impossible to understand
VISUALS	Visuals used are neat, creative, relevant, and easy to understand	Visuals used are relevant and easy to understand	Visuals may contain some irrelevant or hard to understand information	Visuals are irrelevant, incomplete, or too messy to understand

Rubric for Prototype/Model - Engineering

	4 Exceeds	3 Proficient/Meets	2 Approaching	1 Falls Far Below
BE DESIGN	The design creatively and effectively meets **all** criteria by being challenging and appropriate for an orangutan Easy to tell what the BE item is and how it would be used by an orangutan Accurate and appropriate size/ dimensions.	The design meets **all** criteria by being challenging and appropriate for an orangutan Needs very little additional explanation of what the BE item is and how it would be used by an orangutan Accurate and appropriate size/ dimensions	The design is **missing** some criteria, but is still appropriate for an orangutan Design is slightly messy and needs substantial additional explanation for viewer to understand what the BE item is and how it would be used by an orangutan Size/dimensions show some error	The design is **not** appropriate for an orangutan The design is messy or incomplete. Size/dimensions show major errors
COLLABORATION	Students demonstrate good use of their group work time by consistently remaining on task Students demonstrate equal involvement in the project for all group members Students demonstrate good communication and conflict resolution throughout the project Students show respect for one another's ideas Students incorporate feedback from others into their design	Students demonstrate good use of their group work time by remaining on task most of the time Students demonstrate mostly equal involvement in the project for all group members Students demonstrate good communication throughout most of the project Students show respect for one another's ideas Students incorporate feedback from others into their design	Students need consistent reminders to stay on task but complete the project on time Students demonstrate unequal involvement in the project for group members Students have some difficulties with communication throughout the project Students mostly show respect for one another's ideas	Students are consistently not on task and their project is turned in late or incomplete One or two students did most of the work for the group Students consistently have difficulties with communication and conflict throughout the project Students have difficulty showing respect for one another's ideas
USE OF MATERIALS	Creative and efficient use of supplied materials.	Efficient use of supplied materials.	Some wasteful use of supplied materials.	Wasteful use of supplied materials.