

Lesson Plan: Solving Problems Through Biomimicry

Stages	Procedure	Materials Requested
<p>Beginning Ideas (3-5 minutes)</p>	<p>Background Information: Students answer a question related to form and function:</p> <ul style="list-style-type: none"> ● How are airplane wings similar to bird wings? <p>OR</p> <ul style="list-style-type: none"> ● Why do pelicans have expandable beaks? 	<p>- projector for facilitating/showing lesson directions</p>
<p>Engage (10 minutes)</p>	<p>Field Observation:</p> <ul style="list-style-type: none"> ● Form groups of 2 or 3 people ● Observe and Record <ul style="list-style-type: none"> ○ Find something that you think is <i>fascinating, amazing, cool, interesting, beautiful, or curious</i> ○ Use your phone or an iPad to take pictures of it ● Discuss: Shape and function <ul style="list-style-type: none"> ○ What parts does your object have? ○ What is the purpose or role of these parts? ○ Is there any part of the object that you see that is similar to things what we use or see in our daily lives? 	<p>iPads or student cell phones (1 device per team of 2-3 students)</p>
<p>Inquiry Exploration (20-25 minutes)</p>	<p>Form & Function Station Labs</p> <ul style="list-style-type: none"> ● Station 1: Pollinator Attraction <ul style="list-style-type: none"> ○ Investigate strategies for attracting pollinators ○ Reverse engineer flowers to identify flower features for attracting pollinators ● Station 2: Beaks and Dinner <ul style="list-style-type: none"> ○ Relationship between shape and function of bird beaks ○ Inquiry challenge: use variety of tools to pick up/catch meal ● Station 3: Flying High <ul style="list-style-type: none"> ○ Investigate engineering of plane wings based on bird wings 	<p>Station 1:</p> <ul style="list-style-type: none"> - 10-12 flowers for dissection (assorted mix?) - toothpicks - plastic knives - magnifying glasses <p>Station 2:</p> <ul style="list-style-type: none"> - 1 tablespoon rice grains - ¼ cup dry beans - chopsticks (1 pair) - pair scissors - garlic press or juice press

	<ul style="list-style-type: none"> ○ Design wings for different situation based on birds with flying abilities that match situation ● Station 4: Structures and Shapes <ul style="list-style-type: none"> ○ Investigate shapes involved in different structural properties in nature and architecture ● Team Jigsaw - Station Debrief <ul style="list-style-type: none"> ○ Share out about your experience & the reflection questions from your station ○ Why should we observe nature in order to help us solve problems? 	<ul style="list-style-type: none"> - nut cracker - tweezers - slotted spoon - collapsible colander - fine-mesh strainer - 2 rectangular plastic bins (wide enough to fit the colander or strainer, and deep enough to add 2-3 inches of water) Station 3: none Station 4: <ul style="list-style-type: none"> - toothpicks - plastic knives - magnifying glasses
<p>Research/ Investigate (20 minutes)</p>	<p>Scientists’ Ideas: Introduction to Biomimicry & Nature-Inspired Design</p> <ul style="list-style-type: none"> ● Mini-lesson on vocabulary and engineering design <p>Biomimicry Videos</p> <ul style="list-style-type: none"> ● 3-4 minute video introducing biomimicry-based innovations <p>Biomimicry Photosort</p> <ul style="list-style-type: none"> ● Match the innovation with the natural object that inspired its design 	
<p>Design Challenge (30 minutes)</p>	<p>“How Could We...?” Board Game</p> <ul style="list-style-type: none"> ● Match species with situational problem <p>Shoot the Moon Design</p> <ul style="list-style-type: none"> ● Select favorite or best match to develop into a product ● Create poster to show design and describe design inspiration & how it works <p>Gallery Walk</p> <ul style="list-style-type: none"> ● Hang posters ● Provide sticky-note celebration and wondering feedback 	<ul style="list-style-type: none"> - 8.5 x 11 blank paper (at least 1 paper per student) - markers or colored pencils (1 set per team or table) -tape or pins to hang up posters