

ABOUT THIS ACTIVITY

This lesson sequence is intended to guide students in elementary school (Grades 2 - 6) through a biomimicry science and STEM lesson.

Biomimicry: WebQuest + STEM Lab

Students will complete a hands-on velcro observation giving students the opportunity to look, smell, touch and hear the attributes of velcro. Building from this experience, students will explore key biomimicry concepts through readings, videos, and discussions. Students will then apply this concept of biomimicry to a STEM lab, where teams design their own biomimicry device based on constraint criteria and customer demand.

Key Science Concepts: Nature is good at solving problems. Scientists and engineers look to nature for solutions. We find traits in nature and imitate those traits to solve problems. When scientists and engineers imitate nature to solve a problem, it is called biomimicry.



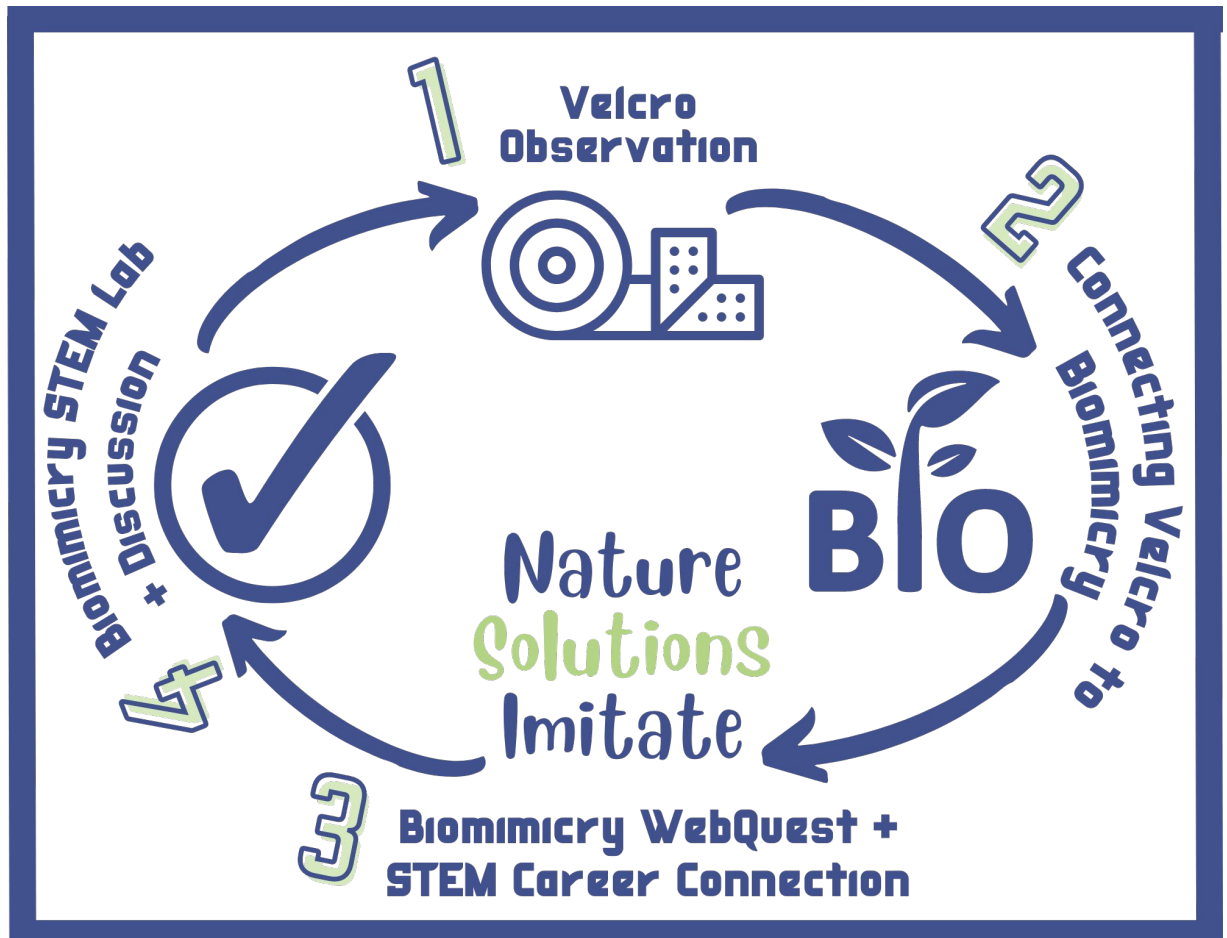
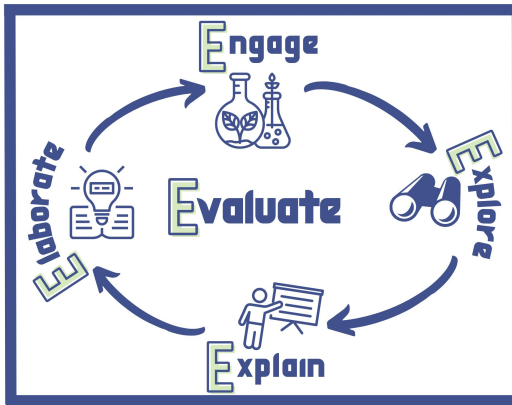
Materials List

- 2 inch pieces of velcro (1 piece per student)
 - Magnifying Lens (1 per student)
 - Scissors, glue & crayons (1 set per group)
- Optional Materials:**
- Poster Board
 - Crayons

Overview of 5E Genetics Unit

Lessons follow the **5E Science Learning Model**. Click to learn more: [NGSS](#) & [Edutopia](#)

1. **ENGAGE:** How many different ways and places have you seen velcro used?
2. **EXPLORE:** Complete Velcro Observation
3. **EXPLAIN:** Connect Velcro Observations to Biomimicry + Webquest
4. **ELABORATE:** Deepen Understanding with Biomimicry STEM Lab
5. **EVALUATE:** Discussion + Exit Ticket



IMPORTANT LINKS

The following are links to student handouts and teacher materials to support implementation of this lesson.



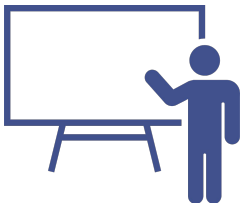
Google Slides

How to use Google Slide Links

These links makes a copy to your Google Drive to edit as needed. To print slides, click FILE and then PRINT. To convert to PDF, click FILE → DOWNLOAD → PDF.

If assigning Google Slides to students, here are some useful resources:

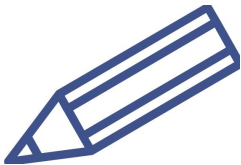
- To prevent students from editing the slides, [watch this](#).
- To send a copy of the file to your students, [watch this](#).



Teacher Instructional Slides

To support your students, we have create editable teacher companion presentation slides and instructional video to guide your students through the lesson. For slides, you will need a Google Account to access the links. This link makes a copy to your Google Drive.

[Click for Editable Teacher Companion Slides.](#)



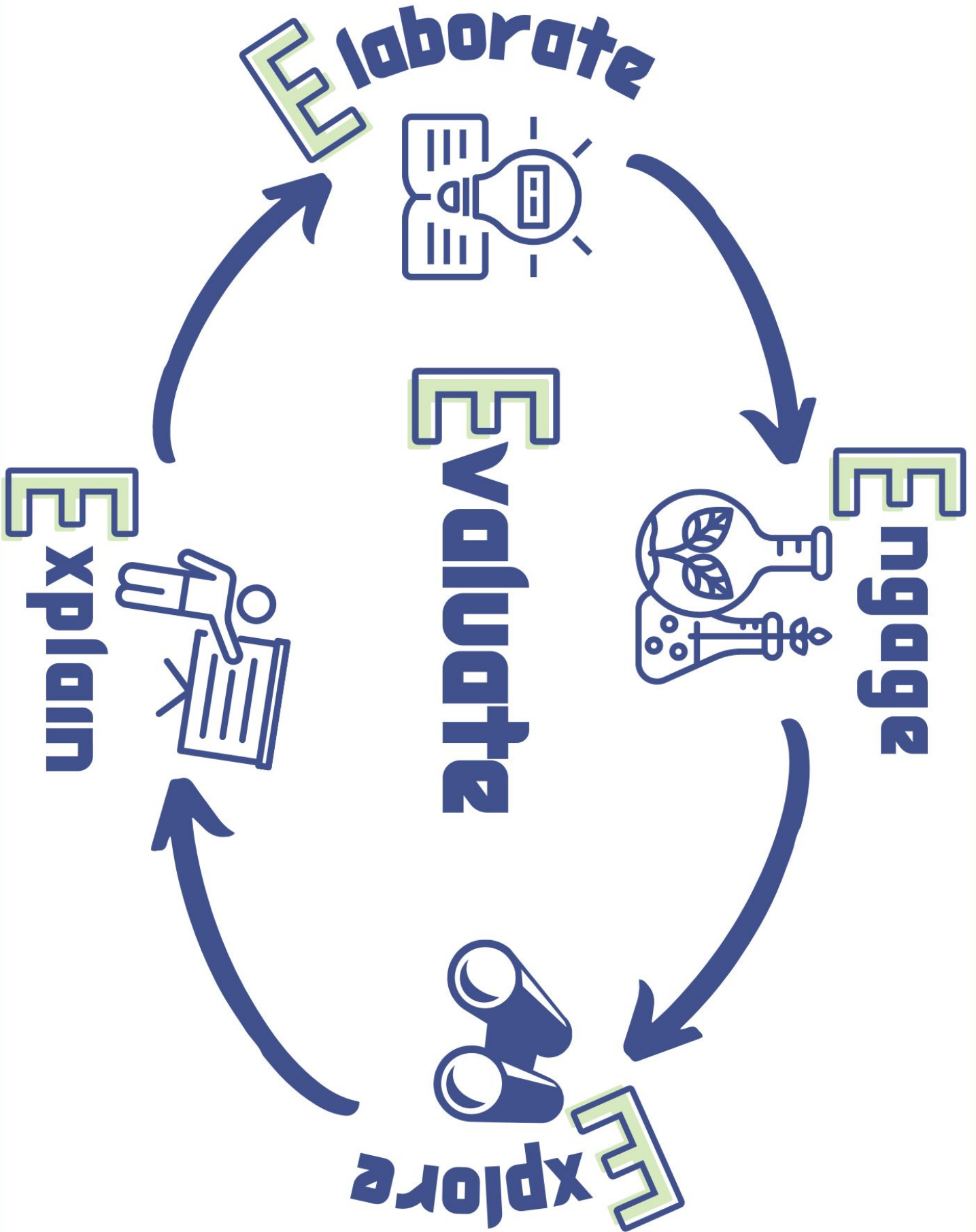
Printable Student Handouts

To allow for teachers to customize worksheets, we are providing a link to the Google Slides version for editing student handouts for this lesson. [Click here to access this editable packet via Google Slides.](#)



Digital Student Handouts

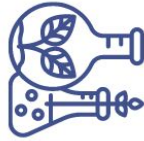
Prefer a digital version of student worksheets or journals? The following can be assigned via Google Classroom. Students will need a Google account. [Click here for Google Slides Journal](#)



Elaborate



Engage



Evaluate

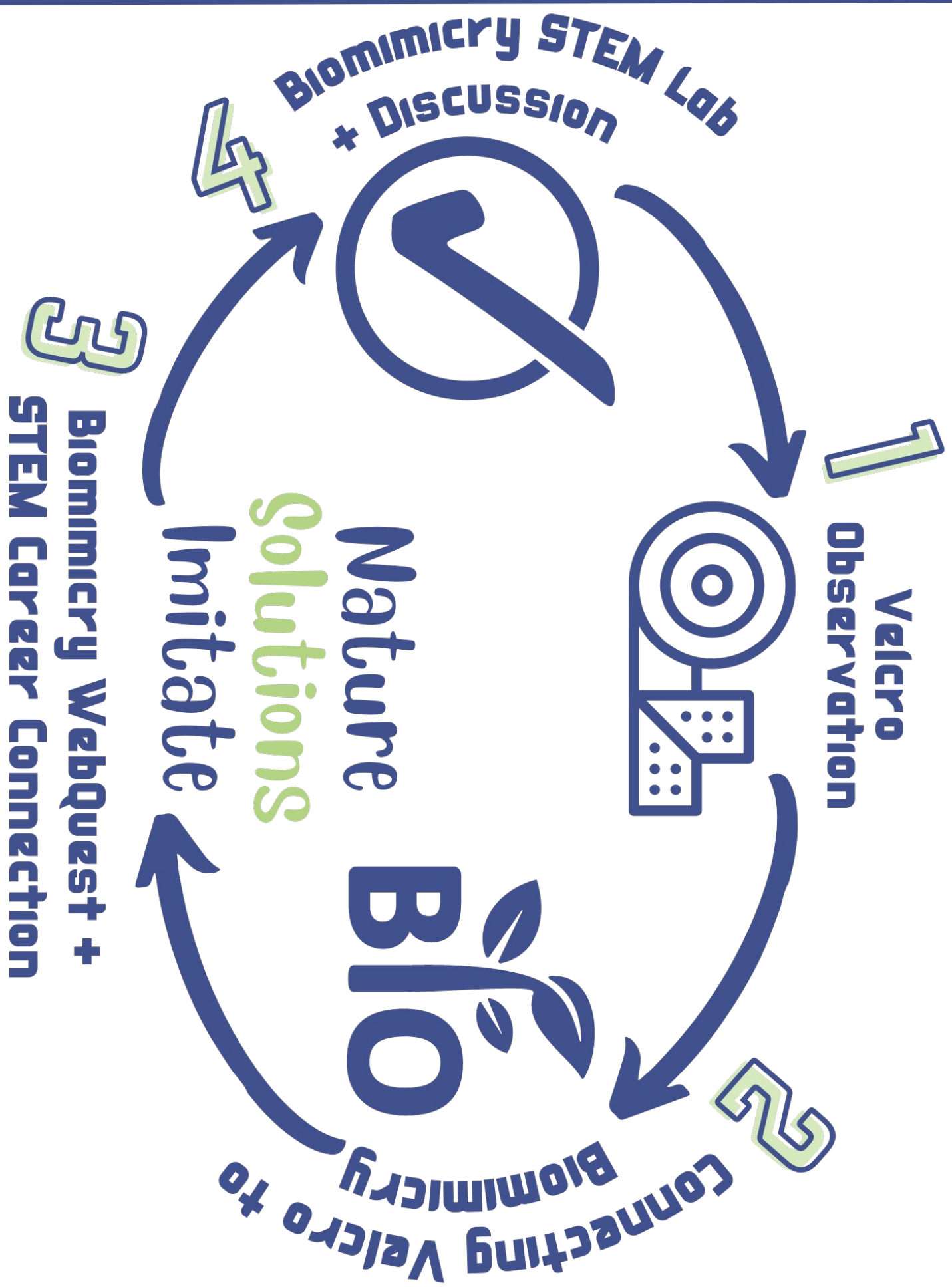


Explore



Explain





LESSON OVERVIEW

Part I: Velcro Observations (Engage + Explore)

- Engage *Where do we use velcro?* brainstorming
- Explore: Complete velcro observation activity

Before introducing science concepts, let students brainstorm all of the places and ways they have seen velcro used in real life. Then students will explore by observing different sides of velcro. During the Velcro Observation activity, students will be given a 2 inch piece of velcro. They will observe and record the appearance, smell, touch and sound of the 2 sides of velcro.

Part II: Connect Velcro to Science Concept

Explain: Build from exploration to conceptual understanding by introducing science connected to their experiences with the velcro.

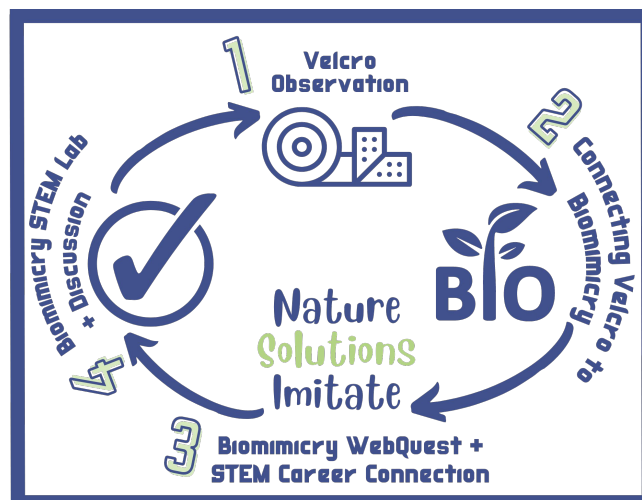
- Read Science Concept Page 1, Page 2, and watch the videos provided in the teacher slides.
- Students play the *Biomimicry Matching Game*.
- Vocabulary: Biomimicry, Nature, Solutions, Imitate

Part III: Deepen Understanding with a Biomimicry WebQuest + Career Connection

- **Biomimicry WebQuest:** Students will gain a deeper understanding for biomimicry by watching a video on the teacher slides and completing **Bullet Train Biomimicry WebQuest Pages 1 & 2**.
- **STEM Career Connection:** Students get an inside look at how biomimicry is applied in a real world STEM Career of a biomimicry engineer using **Career Spotlight activity sheets** and videos on teacher slides.

Part IV: Biomimicry Design Lab + Discussion

- **Biomimicry STEM Design Lab:** Students apply their learned knowledge of biomimicry and biomimicry engineering to create their own biomimicry device that solves a problem. Students have to meet design constraints and maintain customer satisfaction.
- **Discussion:** Students complete **What did you learn? reflection** and discuss as a class.



HOW TO FACILITATE

This 5E unit takes about 5, 90 min sessions to complete. Below is a recommended sequence.

90 minute Sessions

Easily adaptable to 45/50 min. sessions if needed!

Session 1 - Velcro brainstorm + Velcro Observations

- Engage: Show velcro on teacher slides
- Group students together.
- Discuss and model directions for Velcro Observation
- Compare and contrast Velcro Side 1 & Velcro Side 2
- Discuss and model directions for Burdock Plant & Velcro Observation
- Compare and contrast Burdock Plant & Velcro

Session 2 - Connecting Velcro to Science Concept

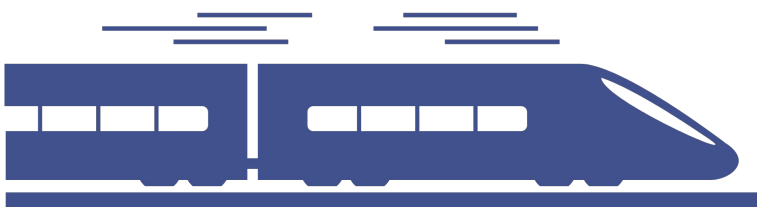
- Read Science Concept Pages 1 & 2.
- Show videos on teacher slides & answer discussion questions.
- Play Biomimicry Matching Game & check answers on teacher slides.
- Show videos on teacher slides & answer discussion questions.

Session 3 - Biomimicry WebQuest + STEM Career Connection

- Science Concept: Biomimicry
- Watch Bullet Train video on teacher slides.
- Complete The Bullet Train of Japan WebQuest Pages 1 & 2 as a whole class or with a partner.
- Refer to video; rewatch and pause as needed.
- STEM Career Connection: Biomimicry Engineer - Reading, videos and activity sheet

Session 4 & 5: Biomimicry STEM lab + Discussion

- Introduce mission, goals and design constraints
- Brainstorm
- Survey Classmate Customers
- Decide on animal trait for biomimicry device design
- Create Prototypes + Generate Names
- Design and Sell
- Peer Feedback
- Exit Ticket: Discussion Questions



Part I: Velcro Observations

Materials Needed	Lesson Objectives
<ul style="list-style-type: none"> • Teacher Slides • Velcro Observations Activity Sheets <p>Materials for Observations (per group):</p> <ul style="list-style-type: none"> • 2 inch piece of velcro • magnifying lens 	<p><i>Students will:</i></p> <ul style="list-style-type: none"> • Apply observation skills to velcro • Analyze results and compare and contrast the 2 sides of velcro. <p>This experience will be used for building science concepts in part 2.</p>

Teacher Instructions:

1. **Engage:** Students brainstorm a list of ways that they have seen velcro used in their lives. Display the question on the teacher slides.
2. **Explore:** Make a copy of the *Velcro Observation* student activity sheets for each student.
 - **Velcro side 1 & side 2:** Students should start with velcro side 1 (hook [hard] side): look, smell, touch and hear. Students record observations for look, smell, touch and hear. Repeat steps for side 2 (loop [soft] side) of velcro. When observations for velcro side 1 & velcro side 2 are complete, students should compare and contrast the two sides of velcro on the Venn Diagram page.
 - **Burdock Plant & Velcro:** Show the pictures of the Burdock Plant on the teacher slides; look and touch. When students have recorded observations for look and touch for burdock plant and velcro, draw the burdock plant and velcro.

Part II: Connecting Velcro to Science Concept

Materials Needed	Lesson Objectives
<ul style="list-style-type: none"> • Teacher Slides • Science Concept Activity Sheets • Biomimicry Matching Game (1 per group) 	<p>Students will understand that:</p> <ul style="list-style-type: none"> • Nature is good at solving problems. • Scientists and engineers look to nature for solutions. • We find traits in nature and imitate those traits to solve problems. • When scientists and engineers imitate nature to solve a problem, it is called biomimicry.

Teacher Instructions:

1. **Biomimicry Concept:** As a class, read **What is biomimicry?** and **Sunflowers + Showerheads** articles on the science concept handouts. Use the biomimicry teacher slides to supplement the information with videos and questions.
 - Answer questions on bottom of Sunflowers + Showerheads activity sheet.
2. **Biomimicry Matching Game:** Read together the game instructions on teacher slide or activity sheets.
 - **Matching Game:** Give each group of students the game activity sheets and scissors. Have students cut out the nature and the items. Then work to match up the item with the nature it imitates.
 - **Check answers:** Use the teacher slides to go over the correct answers for the biomimicry matching game and discuss each nature + item biomimicry pairing.
 - Students can glue down matching pairs on copy paper to display in class or take home.
3. **Biomimicry Concept:** Use the biomimicry teacher slides to supplement the information with videos and questions and gain a deeper understanding of biomimicry.

Part III: Biomimicry WebQuest + STEM Career Connection

Materials Needed	Lesson Objectives
<ul style="list-style-type: none"> ● Teacher Slides ● Biomimicry WebQuest Activity Sheets ● Pencils & crayons ● Career Spotlight reading & activity sheet 	<p>Students will get a deeper understanding of biomimicry.</p> <p>Students will:</p> <ul style="list-style-type: none"> ● Understand scientists and engineers look to nature for solutions. ● Understand that when nature provides real world solutions it is called biomimicry. ● Understand that biomimicry engineers are helping to create more sustainable solutions to our modern day problems.

Teacher Instructions

1. **Bullet Train WebQuest activity sheets:** Read the activity sheets that introduce the bullet train and what questions students will be searching for. Watch the videos in the teacher slides and discuss together using the discussion together. Complete the WebQuest activity pages individually, or with partners, rewatching, pausing and using closed captioning to help answer the WebQuest questions.

2. **Animal Picture Teacher Slide:** Show the animals discovered in the WebQuest that the bullet train imitated on the teacher slides. Look at the different traits imitated on each animal to solve a problem and discuss.

3. **STEM Career Connection:** Read about the STEM Career of a *Biomimicry Engineer*. Watch the videos provided in the teacher slides. Students answer the *Career Spotlight* questions. Leave time for pair or classroom discussion of answers.

Part IV: Biomimicry Device STEM lab + Discussion

Materials Needed	Lesson Objectives
<ul style="list-style-type: none"> • Teacher Slides • Biomimicry Device STEM Lab activity sheets • Peer Feedback Worksheet • Crayons, pencils • small poster board (optional) 	<p>Students will</p> <ul style="list-style-type: none"> • Connect their knowledge of biomimicry to the STEM design process. • Design a biomimicry device using design constraints and factoring in classmate customer satisfaction.

Teacher Instructions:

Biomimicry Device STEM Lab: Use the teacher slides and student handout activity sheets to guide students through the mission, mission goals and design constraints.

1. **Introduce the mission with a video:** Watch the video together on the teacher slides and discuss the 3 traits the animal in the video possesses.
2. **Brainstorm:** Students list 5 of their favorite animals. List 1 trait that the animal has.
3. **Survey Classmate Customers:** Students survey 3 other classmates. This can be done by moving around the room. Students ask their classmates what traits they think of when it comes to their animal. The goal is for students to see that likes are different in all classmate customers. Some classmate customers might not like the animal you picked while some might have the same favorite animals. Before designing a new biomimicry device, it's important to have an understanding of what your classmate customer wants.
4. **Choosing an animal trait:** Using the classmate customer results, identify 2 favorite animals from your list.
5. **Identify + Finalize Traits:** Students list the 5 traits for each animal. Circle 1 trait from each animal that could be used in their biomimicry device.
6. **Benefits:** Define the benefits your traits will provide your biomimicry device for optimal classmate customer satisfaction.
7. **Create Prototypes + Generate Names:** Use the chosen animal and trait to create 2 prototypes for a biomimicry device. Then generate names for the new device.
8. **Design and Sell:** Students will design their biomimicry device. This should be in the form of an advertisement. Students should use the traits of their animal and device to sell the product. This can be done on the handout or on small poster board.
9. **Present Device to Classmate Customers:** Students will present their device to the class, groups or partners. Presentation should be in the form of trying to sell their device. After the presentation students can survey their classmates to see how many people would be interested in buying their newly created biomimicry device.
10. **Peer Feedback:** Students should complete the *Peer Feedback* worksheet and discuss with each other.
11. **Exit Ticket:** Students complete **What did you learn?** activity sheet. Go over answers together as a class using teacher slides.

ADDITIONAL RESOURCES

Biomimicry Science Concept Videos:

- The world is poorly designed. But copying nature helps.
<https://www.youtube.com/watch?v=iMtXqTmfta0&t=4s>
- Training Fungi to Turn Waste into Green Building Materials
<https://www.youtube.com/watch?v=1-AWcf9fMr0>
- Biomimicry 101 <https://www.youtube.com/watch?v=V2GvQXvjhLA>
- Biomimicry: Nature Designs
<https://www.youtube.com/watch?v=OdQlaaD77uA>
- 8 Useful Technologies Inspired by Nature
<https://www.youtube.com/watch?v=YT5TZY-emYM>
- Biomimicry - Learning from Nature to heal Nature | Milly Wong | TEDxYouth@CardiffSixthFormCollege
<https://www.youtube.com/watch?v=1DKXe1zoGKk>
- Biomimicry: Murray's Law
<https://www.youtube.com/watch?v=FBUpnG1G4yQ>

Career Connection Videos:

- Biomimicry, Butterflies & Scientists
<https://www.youtube.com/watch?v=QpEsb-fun44>
- Biomimicry: Design Defined
<https://www.youtube.com/watch?v=jSxPWDb7QJU>

Other videos:

- Elements of Print Advertisements
<https://www.youtube.com/watch?v=89wDVZbUIQo>

Part I: Velcro Observation

Student Handouts



Velcro + Magnifying Lens



LOOK What do you observe on side 1 and side 2 of the velcro? Ex: color, shape, design, patterns, etc.

Velcro	
Side 1	
Side 2	

SMELL What do you observe using your sense of smell?

Velcro	
Side 1	
Side 2	

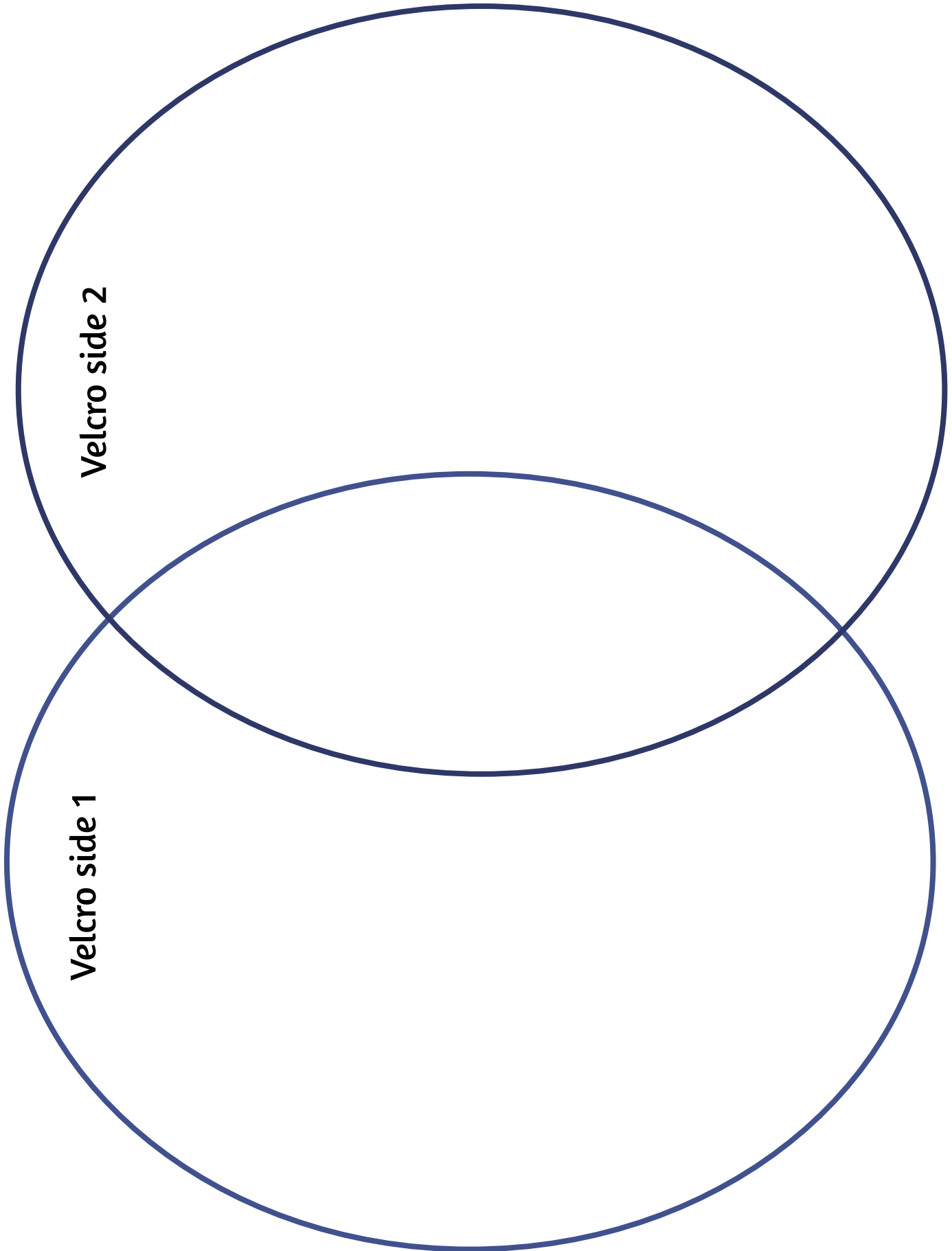
TOUCH What do you observe about the texture of the velcro? Ex: each side, the edges, etc.

Velcro	
Side 1	
Side 2	

HEAR What sounds do you hear the velcro make?

Velcro	
Side 1	
Side 2	

Compare and Contrast each Velcro Side



Burdock Plant

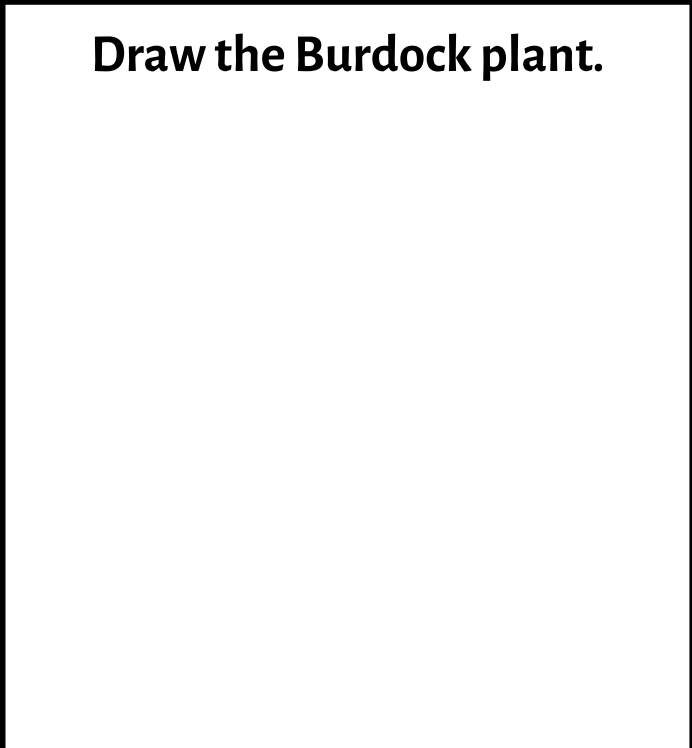
LOOK What do you observe about the look of the burdock plant and the velcro? Ex: color, shape, design, patterns, etc.

Burdock plant	Velcro

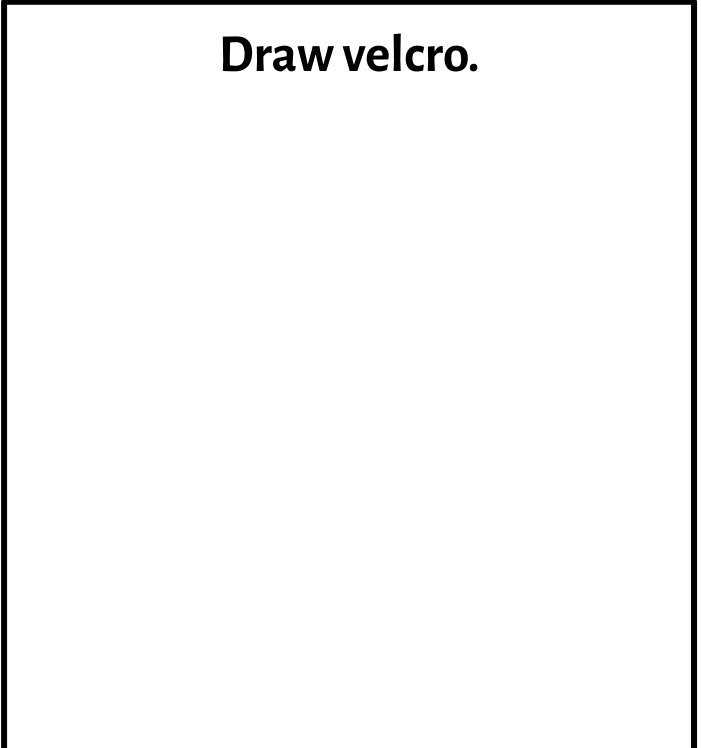
TOUCH What do you observe about the texture of the burdock plant and the velcro?

Burdock plant	Velcro

Draw the Burdock plant.



Draw velcro.



Part II: Science Concept: Biomimicry

Student Handouts



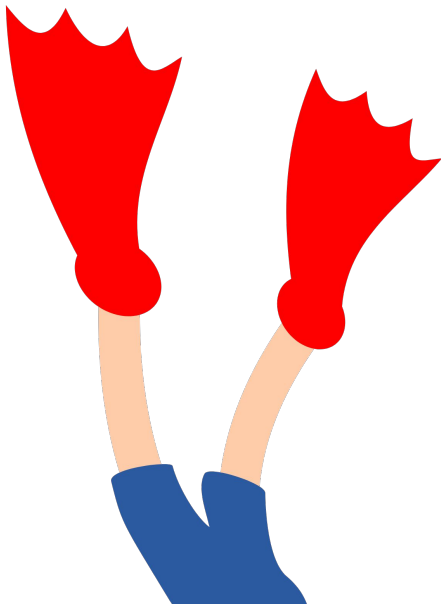
What is biomimicry?

Nature is super amazing. Engineers often look to nature to help solve problems! What is biomimicry? How can biomimicry help engineers?

Biomimicry

The study of living organisms or living things is called biology. Nature and animals are living organisms. Nature is very good at surviving and in order to survive it must use its traits very successfully. Nature has many unique traits. For example, a duck's feet are webbed which allows it to swim more efficiently while a firefly has the ability to light up its tail.

Scientists and engineers look to nature for solutions. Then they imitate the nature trait. This is called biomimicry - mimicking or imitating living (bio) things to solve a problem. Engineers used the duck's webbed feet to create more efficient flippers for divers!



How is biomimicry helping scientist and engineers?

Nature is very good at taking care of itself. Nature recycles everything and is very good at cooperating. We as humans aren't so good at recycling, having zero waste or cooperating all the time. Scientist are looking to nature to learn how to create more products that work together and recycle. For example, scientists have created self-healing concrete. Cracks in concrete are formed when water seeps in. In regular concrete the crack just gets larger and larger. In self-healing concrete, the bacteria placed in the concrete mix love water. The bacteria lay dormant or asleep while the concrete is dry. But, when water seeps in to form a crack, the bacteria become alive and begin making their own product which just happens to be limestone. The limestone seals up the crack! That is biomimicry success!

Sunflowers + Showerheads

Our world is full of nature that can help us solve problems!

Biomimicry in our bathrooms

Scientists and engineers looked to nature to help solve a problem in our bathrooms. The problem was wasting water in the shower. The original solution caused low water pressure and made it slow to rinse all of the soap off in the shower. You can see from the first showerhead how it is quite small and controls the water flow well but doesn't give enough surface area for actually rinsing our skin well.



Scientists looked to nature for a solution; specifically the sunflower. They saw all of the seeds the sunflower packs into its disc or center and the pattern that the sunflower seeds are arranged in. Scientists began to create prototypes or sample designs of a showerhead that would imitate the sunflower seeds pattern. They placed many more holes for water to stream out of and arranged the holes in the same pattern that the sunflower uses to display its seeds.

Scientists imitated the sunflower design in the new showerhead. This biomimicry allowed scientists and engineers to design and build a showerhead that saves water and has great water pressure! Biomimicry solved this showerhead problem successfully!



What trait of the sunflower is the showerhead imitating?

Why is this called biomimicry?

Sunflowers + Showerheads

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What trait of the sunflower is the showerhead imitating?

The pattern of the sunflower seeds.

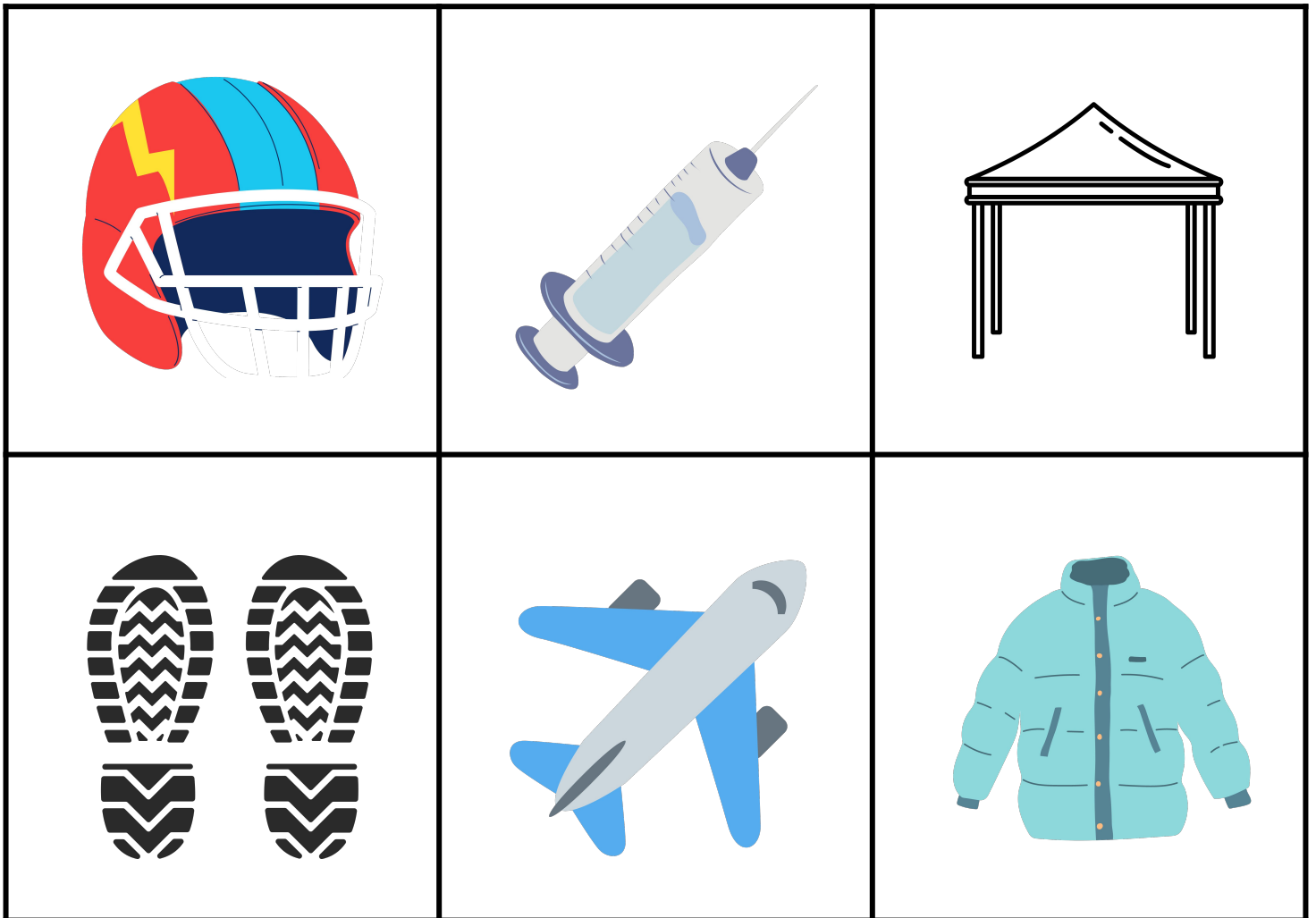
Why is this called biomimicry?

This is biomimicry because the scientist used nature (sunflower seed pattern) and imitated that pattern in the design of the showerhead solution.

Biomimicry Matching Game

Let's play a biomimicry game! Can you match the item with the nature it is imitating? Cut out all of the squares. Then pair them up!

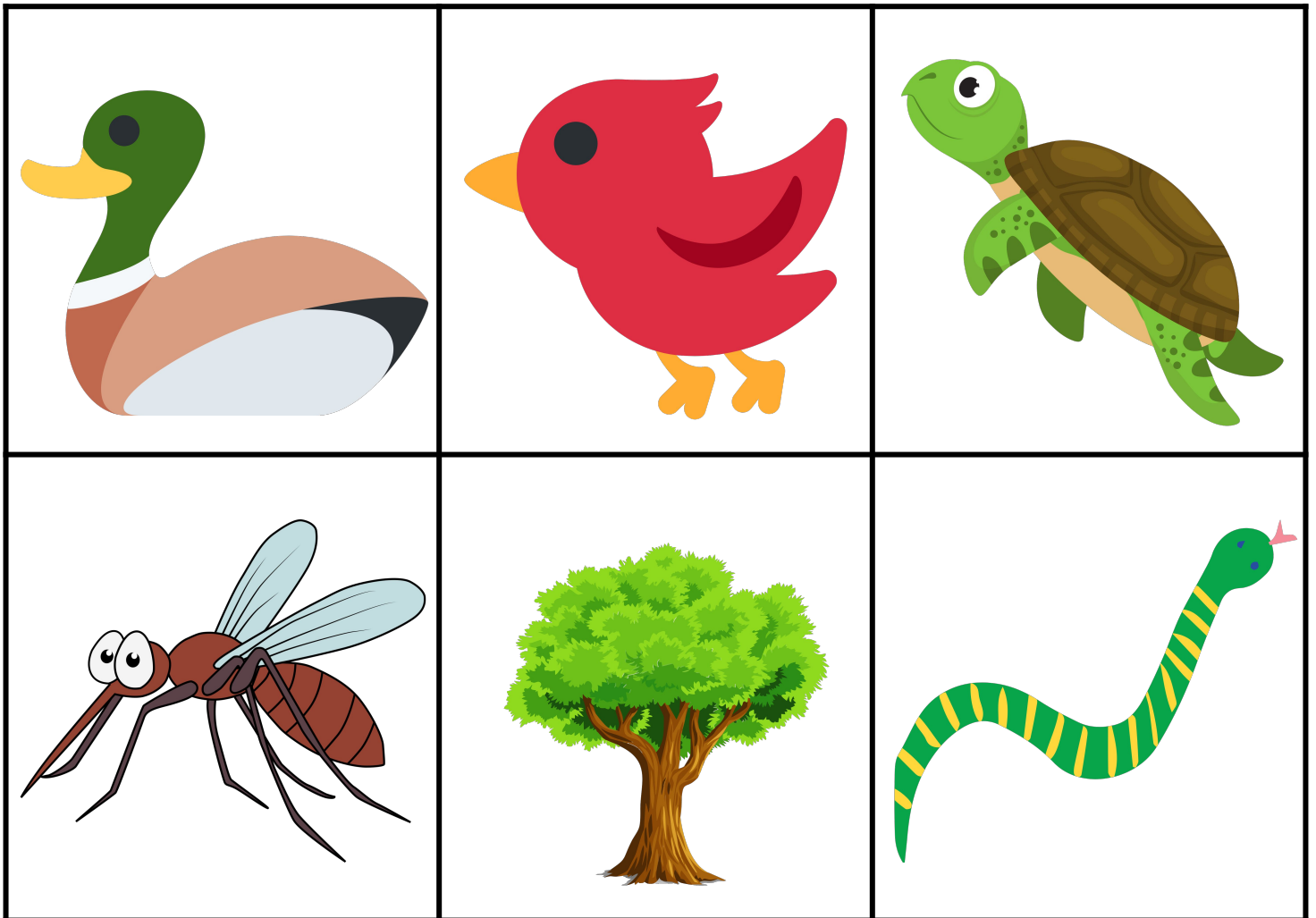
ITEMS



Biomimicry Matching Game

Let's play a biomimicry game! Can you match the item with the nature it is imitating? Cut out all of the squares. Then pair them up!

NATURE



Biomimicry Matching Game

Matching game answers on teacher slides. For discussion tips - student answers will vary but lots of great discussion questions like:

- How do you think the scientists imitated the mosquito to make more effective needles? (Scientists analyzed the mosquito proboscis (mouth part) under a microscope.)
- Why do you think scientists looked to the mosquito to make a gentler needle? (Mosquitos “bite” us all of the time & they are very effective at their job! Sometimes we don’t feel them until they are done sucking. This would be great to imitate in a needle so people don’t feel the prick & blood draw.)

Answers:

- needle tip imitates mosquito proboscis (mouth part) for gentler blood drawing
- helmet imitates turtle shell layers & make up for better, stronger head protection
- shade coverings imitate tree leaves & branching pattern for effective shade & breeze balance
- shoe tread imitates snake skin scales for gripping the ground better
- down jacket imitates duck feathers for insulation
- airplane imitates bird wings for flight efficiency

Biomimicry Matching Game

Let's play a biomimicry game! Can you match the item that is imitating? Cut out all of the squares. Then pair them.

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Let's play a biomimicry game! Can you match the item that is imitating? Cut out all of the squares. Then pair them.

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Biomimicry Game

Nature	Item Imitating Nature

1. How do you think each nature inspired the item?
2. What parts of the nature are the items imitating?
3. How effective is the item compared to the nature it is imitating?

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Part III: Biomimicry WebQuest + STEM Career





The Bullet Train of Japan



1. Predict: What 2 animals do you think parts of the bullet train are imitating?
Why

Animal 1:

Rationale:

Animal 2:

Rationale:

2. Draw the design of the original bullet train.

3. Draw the design of the new bullet train.

4. What problem did the new design solve?

5. Why was this problem important to solve for the bullet train engineers?



The Bullet Train of Japan



6. How did the new design use biomimicry to solve the bullet train's problem?

7. What was animal #1 the bullet train imitated? Draw & label it.

8. What was animal #2 the bullet train imitated? Draw & label it.

9. What was animal #3 the bullet train imitated? Draw & label it.

10. Draw the design of a new train below. What nature imitating features of biomimicry would you add on your train? Draw & label.



The Bullet Train of Japan



1. Predict: What 3 animals do you think parts of the bullet train are imitating?

- Student answers will vary.

-
-

2. What makes you choose these 3 animals?

Student answers will vary.

3. Draw the design of the original bullet train.

A drawing with a more flat-shaped, square nose.

4. Draw the design of the new bullet train.

A drawing with an elongated, triangular-like nose.

5. What problem did the new design solve?

The new design stopped the sonic boom that was occurring when the train exited a tunnel.

6. Why was this problem important to solve for the bullet train engineers?

The problem was important to solve because the tunnels were near residential areas where people lived in homes and the sonic boom occurring when the train exited a tunnel was very, very loud.



The Bullet Train of Japan



7. How did the new design use biomimicry to solve the bullet train's problem?

The engineer used his love of bird watching to see how the kingfisher bird went into the water with a long beak almost silently. He imitated this same beak design on the nose of the train for a much quieter exit from tunnels.

8. What was animal #1 the bullet train imitated? Draw & label it.
nose of a kingfisher bird

9. What was animal #2 the bullet train imitated? Draw & label it.
wings of an owl

10. What was animal #3 the bullet train imitated? Draw & label it.
belly of a penguin

11. Draw the design of a new train below. What nature imitating features of biomimicry would you add on your train? Draw & label.
Student drawings will vary.



Career Spotlight: Biomimicry Engineer



Biomimicry Engineers

Biomimicry engineers create and build designs based on the natural world. They look to plants and animals, the land and the ocean, and the forests and the deserts for design ideas. Biomimicry engineers observe traits in nature. Then they take the trait and see how they could apply it in a new way to solve a problem. Biomimicry engineers work for Eco-Friendly building companies, power companies, transportation companies and in the medical community. They bring ideas that they have found in nature and imitate the ideas to help solve a real-world problem.



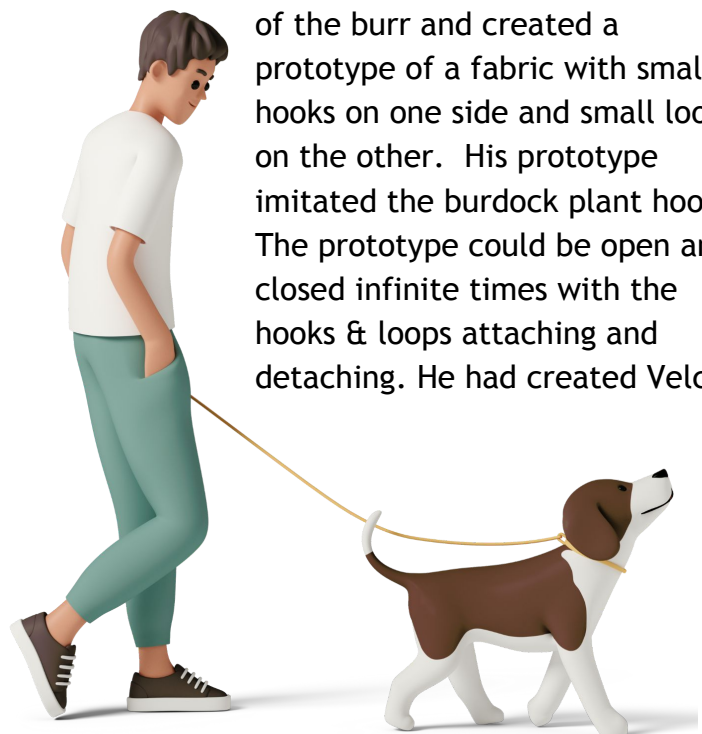
George de Mestral

George de Mestral was the original biomimicry engineer before that job name was even used! It all began on a dog walk. When he got home he pulled off burdock plant burrs from his jacket and his dog's fur.

He asked himself questions like: Why do the burrs stick to my dog's fur? Why do the burrs stick to my jacket? What is the plant trying to do?

He then put the burdock plant burr under a microscope and noticed that each end of the burr had a tiny hook on the end. He discovered that the tiny hook was linking into the tiny loops in the fabric of his jacket and the texture of his dog's fur!

Mestral used this new knowledge of the burr and created a prototype of a fabric with small hooks on one side and small loops on the other. His prototype imitated the burdock plant hooks! The prototype could be open and closed infinite times with the hooks & loops attaching and detaching. He had created Velcro!





Career Spotlight: _____

What is a biomimicry engineer?

How was George de Mestral like a biomimicry engineer?

Why is this career important?

If you were a biomimicry engineer, what types of nature would you be most interested in? Why?

Rate this Career:



Why did you give this rating?



Career Spotlight: _____

What is a biomimicry engineer?

An engineer that looks to nature to solve a problem where they imitate a nature trait in their design solution.

How was George de Mestral like a biomimicry engineer?

He got his velcro idea from a plant in nature and then imitated that plant design to create velcro.

Why is this career important?

Nature has great design ideas that we can learn lots from and we need biomimicry engineers to find and apply these sustainable solutions from nature to our real-world problems.

If you were a biomimicry engineer, what types of nature would you be most interested in? Why?

Student answers will vary.

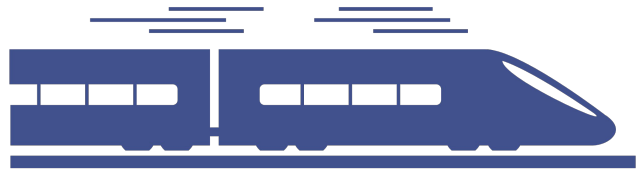
Rate this Career:



Why did you give this rating?

Part IV: STEM Lab + Discussion

Student Handouts



Biomimicry STEM Lab



Your Mission: You have been selected by a team of biomimicry engineers to help develop a new device that solves a problem by using nature for its inspiration.

Mission Goals:

1. Design a new biomimicry device
2. Advertise your device

Design Constraints:

- Device must use a nature trait in its design
- Device must solve a problem
- Others must want to purchase and use the device



Biomimicry STEM Lab



Gathering Information:

- Brainstorm:** In the table below, list 5 of your favorite animals. Describe 1 trait that makes the animal special. Think about why those 5 are your favorite. What is special about them that makes you like them most? Think about the special traits the animal has.
- Survey customers:** Survey 3 classmates. Record what traits they think of when they hear your animal. Remind them to think about the special traits that animal has.

Your Favorite Animals	My Favorite Traits	Customer #1 Favorite Traits	Customer #2 Favorite Traits	Customer #3 Favorite Traits
<i>Duck</i>	<i>good swimmer</i>	<i>can quack</i>	<i>waterproof feathers</i>	<i>male & female look different</i>
1.				
2.				
3.				
4.				
5.				

Analyze Results: *Compare and contrast your results to your classmates.*

Did your classmates have any of the same favorite traits as you did? Explain.

Did they list any different traits that you did not? Explain.



Biomimicry STEM Lab



Animal Traits: Pick 2 animals from your previous list.

1

2

Identifying Traits:

Identify 5 traits of each from your survey.

Animal #1:	Animal #2:
1.	1.
2.	2.
3.	3.
4.	4.
5.	5.

Finalize: Circle 1 trait from each animal that the biomimicry device will use in its design.

Why did you pick the trait for animal #1?

Why did you pick the trait for animal #2?

Benefit of traits: Why would others want to purchase and use your device?



Biomimicry STEM Lab



Create Prototypes: Draw 2 designs for your new biomimicry device. Remember to think about its nature trait, appearance, shape and color and the problem it will solve.

Design 1:

Design 2:

Generate Names: Brainstorm 3-5 names for your new device.

Final name of device: _____

Why did you choose that name?

Design and Sell: Create an advertisement for your new biomimicry device. Draw and color a picture of the new biomimicry device. Label and advertise what makes it unique and what problem it is solving. Don't forget to put the name of your new device.

Peer Feedback



One of the best ways to improve your design is to get feedback from others! Check out the designs of your classmates and provide constructive feedback to help them improve their ideas.

As you provide feedback to others, remember to:

- Ask a question or share something you noticed that you liked.
- Share feedback that is both helpful and kind.
- Try to help the designers think about their work in a new way.

Reviewer's Name: _____

Name of device being reviewed: _____

Does the device meet all the design constraints? If no, describe why it does not.

1. Biomimicry device must use a nature trait in its design.
2. Biomimicry device must solve a problem.
3. Others must want to purchase and use the device.

What is the best feature of this biomimicry device design?

What do you recommend for improvement?

What did you learn?



<p>1. How does nature help us solve problems?</p>	<p>2. What does biomimicry mean?</p>
<p>3. Name 2 ways you learned that biomimicry is used to solve a problem in our world.</p>	<p>4. What benefits does biomimicry provide for scientists and engineers?</p>
<p>5. Reflect on the Velcro Observation. Would you have seen this biomimicry solution in the burdock plant?</p>	<p>6. Reflect on the Biomimicry Device STEM Lab. Explain why you created your device.</p>
<p>7. What STEM Career is related to biomimicry?</p>	<p>8. Why is this STEM Career important?</p>

Rate your level of understanding of biomimicry.



What questions do you still have?

What did you learn?



<p>1. How does nature help us solve problems? Nature has great design ideas that we can learn lots from and we need biomimicry engineers to find and apply these sustainable solutions from nature to our current day problems.</p>	<p>2. What does biomimicry mean? Looking to nature for a solution. Imitating that solution to solve a real world human problem.</p>
<p>3. Name 2 ways you learned that biomimicry is used to solve a problem in our world. Bullet train imitated the kingfisher bird in the shape of its nose to solve the booming tunnel exit problem.</p>	<p>4. What benefits does biomimicry provide for scientists and engineers? Biomimicry provides scientists and engineers with solutions that already exist to help solve problems faster, better and more efficiently.</p>
<p>5. Reflect on the Velcro Observation. Would you have seen this biomimicry solution in the burdock plant? Student answers will vary.</p>	<p>6. Reflect on the Biomimicry Device STEM Lab. Explain why you created your device. Student answers will vary.</p>
<p>7. What STEM Career is related to biomimicry? Biomimicry Engineer</p>	<p>8. Why is this STEM Career important? Nature has great design ideas that we can learn lots from and we need biomimicry engineers to find and apply these sustainable solutions from nature to our real-world problems.</p>

Rate your level of understanding of biomimicry.



What questions do you still have?