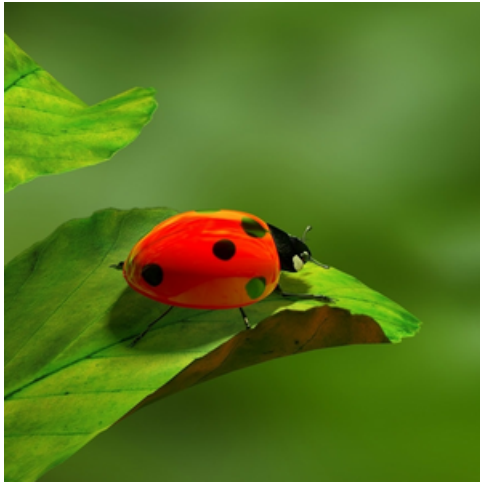


# Ozo-bug Zoo Exhibit

Author: [Kaitlin Chidester](#)



**Grades:** 2—6

**Subject(s):** Science, Math, Engineering/Tech, Computer Science

**Pre-Reader/ESL-Friendly?** No

**Coding Method:** Color Codes

**Compatible Bot(s):** Evo, Bit+/Bit

**Duration:** 300 min

## Quick Summary

Students will be presented with the challenge of creating a Ladybug exhibit at a new zoo including key features of a habitat.

## Objectives & Outcomes

- ① Student will identify the needs of an insect within it's habitat.
- ② Student will create a clear Ozobot path that requires repeated arrival at a final point.
- ③ Student will use ozobot code to describe movement.

## Preparation

### Teacher Materials & Digital Resources

- [Ozobot Habitat.pdf](#)

### Student Materials

- 1 Evo or Bit per group
- 1 Coding markers per group
- 1 Design Brief per student
- 1 Measurement Ticket per student
- 1 Ruler per group
- 1 Coding Sort Sheets per group
- 1 3-dimensional build materials per class
- 1 Ozobot Coding Sheet per group
- 1 Teacher Presentation Document per class

### Background Knowledge

#### Ability to

- draw Ozobot lines
- create Ozobot color codes

- identify the needs of a ladybug in its habitat

## ● Teacher Tips

This unit can be done over 7 days or shortened by removing the supplemental review lessons.

If you do not have enough building materials students can draw on the paper itself to create the habitat.

Students will work bet in groups of 2 to make sure they are engaged. 3-4 students per group is possible but difficult until building starts. Key jobs will need to be given.

## ● Direct Instruction

### ① Day 1: ASK and IMAGINE

Files/Materials Needed: Ozobot Habitat Presentation, design brief for each student

Instruction:

1. Introduce idea of a new zoo exhibit. Create a story about a local zoo that wants to add a ladybug exhibit to their zoo. They need help designing the habitat to make sure the ladybug has everything it needs to survive.
2. Ask the students what they know about ladybugs and what they think it will need.
3. Have them ask questions to get them thinking about what they need to know or figure out.
4. Discuss the kinds of movements they are going to see in a ladybug in terms of prey and predators. This is key to the concept of how will we replicate the movement and what does that look like.
5. Show them the materials and introduce the ozo-bug concept. Show them the constraints that they will need to use while working.
6. They will now go work on Student Step 1 as they imagine by themselves using the design brief.

### ② Day 2: PLAN

Files/Materials Needed: One set of the "Sorting Card" document per group, Ozobot Habitat Presentation, design brief

Instruction:

1. Explain that now that they have ideas on paper it is time to focus in on the constraints related to the Ozobot.. the codes and lines that will be included to replicate the habitat.
2. Show them the code options.
3. Explain that they will work with a partner to cut out the cards and then sort them into 2 groups: will work, will not work
4. Send them off to complete Student Step #2
5. After 15 minutes bring them back together and check on the codes.
6. Explain that they will now plan with their partner to decide on a final path as they will work together on one path.
7. Send them off to complete Student Step #3

**3** Day 3: CREATING an Ozo-bug Path

Files/Materials Needed: ruler per student, one half of the measurement page per student, Ozobot Habitat Presentation, design brief

Instruction:

1. Explain that today they will begin working towards transferring their ideas to their final paper. A key piece of this is making the design accurate and planning ahead. A key part of that will be measuring to allow for movement along the path.
2. Discuss the areas where measurement will be needed: turns, objects on either side of the path to allow for the Ozobot, straight lines, objects that will go over the Ozobot, creating a path that takes up the whole paper.
3. Explain how they will complete the measurement ticket and allow them to go work.
4. Send them off to complete Student Step #3.
5. As they finish collect them and have them work on the planning.
6. Once most are done bring them back together and discuss Page 3 of the design brief and the key steps of creating the path.
7. Send them off to complete the "creating a path" portion.
8. This will need to be approved at various points to be sure students codes work well.

**4** Day 4: CREATING an Ozo-bug Skin

Files/Materials Needed: Ozobot Habitat Presentation, design brief, materials to create skin (for each group)

Instruction:

1. Discuss that students will need to add adaptations to make their Ozo-bug resemble a model of a ladybug.
2. Demonstrate taking a 1 inch strip of paper and wrapping it around the Ozobot or using an egg carton.
3. They will then add materials or a drawing to create their skin.
4. Send students off to complete Student Step #4.
5. Once they have completed their skin they can continue working on the path.

**5** Day 5: Bringing your habitat to life

Files/Materials Needed: Ozobot Habitat Presentation, 3-dimensional consumable materials, glue, tape, scissors, markers, paint, other crafting and building materials, design brief

Instruction:

1. Explain that today the students will be adding character and dimension to their path and bring it to life.
2. They will be adding models of prey, predators, shelter and other components of a ladybug habitat.
3. Discuss how they can use building materials to create 3-dimensional shapes. This would be a good time to show them a video of a lady bug in its habitat as well as examples of other Ozobot paths that have structures added.
4. Talk to them about how the more realistic it looks the more it will all come to life.
5. Show them page 4 in the design brief and how they need to sketch ideas and materials and get them approved before adding.
6. Remind them of the measuring components.
7. Send them off to do Step #5 in the student section.

**6** Day 6: Bringing the Ozobot Habitat to Life

Files/Materials Needed: Same as day 5

Instructions:

1. Students will have the time needed to finish their habitat before completion. This day is not needed if they are all done or can be expanded into more days if needed.

**7** Day 7: TEST AND IMPROVE

Files/Materials Needed: design brief, finished Ozobot presentations, Ozobot Habitat Presentation

Instructions:

\*\*See Supplement section to learn more about assessment.

Students will spend the day testing their mazes and thinking about ways to improve based on feedback from classmates.

## Supplements

### ● Lesson Closure

During the final day students will be presenting their Ozobot Habitats. You can allow them to observe other's habitats and leave feedback on sticky notes as a part of the learning process.

Once they have all had a chance to make observations and understand the variations of success they should complete page 5 in the design brief. On page 5 they will rate their success with constraints. They will then take time to reflect on the project and put onto paper the ways they would improve their design.

### ● Lesson Extension(s)

- 1 Once you have created your 3-dimensional path can you add details to the objects to make them more life-like? How could you add the interactions of another ladybug within the habitat to your design?

### ● Academic Standards

#### ● CCSS.MATH.CONTENT.1.G.A.2

Compose two-dimensional shapes (rectangles, squares, trapezoids, triangles, half-circles, and quarter-circles) or three-dimensional shapes (cubes, right rectangular prisms, right circular cones, and right circular cylinders) to create a composite shape, and compose new shapes from the composite shape.1

#### ● CCSS.MATH.CONTENT.1.MD.A.2

Express the length of an object as a whole number of length units, by laying multiple copies of a shorter object (the length unit) end to end; understand that the length measurement of an object is the number of same-size length units that span it with no gaps or overlaps. Limit to contexts where the object being measured is spanned by a whole number of length units with no gaps or overlaps.

- NGSS.1-LS1-2  
Read texts and use media to determine patterns in behavior of parents and offspring that help offspring survive.
- CSTA.1A-AP-08  
Model daily processes by creating and following algorithms (sets of step-by-step instructions) to complete tasks.
- CSTA.1A-AP-10  
Develop programs with sequences and simple loops, to express ideas or address a problem.

# NEW ZOO EXHIBIT



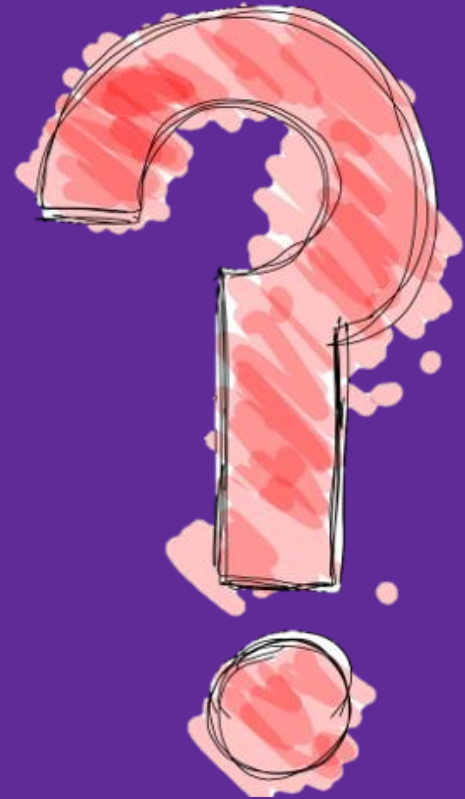
COMING SOON:  
Ladybug Habitat

# ASK

What is the problem?

How have others approached it?

What are your constraints?





# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?





What do  
you need  
to know?

—

DAY 1

# Movement to describe prey interactions



# Movement to describe predator interaction



# Materials



Ozobots



Ozobot Markers



Ozobot Code Sheet

3-dimensional building supplies



# Constraints

## Must include:

\_\_\_ A path for the Ozobot to travel

\_\_\_ Interaction with ladybug prey

Code used:

\_\_\_ Interaction with a ladybug predator

Code used:

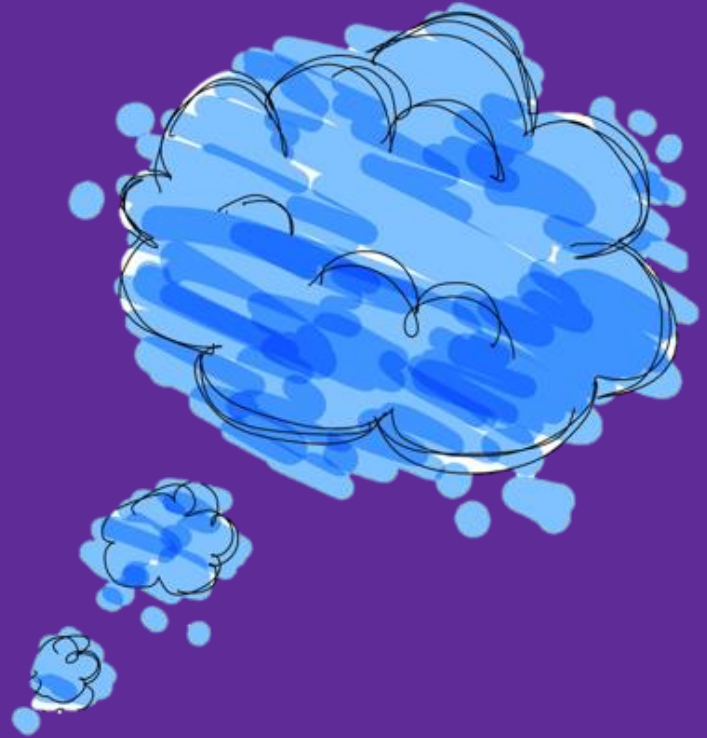
\_\_\_ Shelter or protection

\_\_\_ Finish that it gets to every time

\_\_\_ Use of 3-D shapes to create the Ozobot's habitat

# IMAGINE

What are some solutions?  
Brainstorm ideas.  
Choose the best one.



# What do I see my Ozo-bug habitat looking like?



## Must include:

1. A path for the Ozo-bug to travel
2. Interaction with ladybug prey
3. Interaction with a ladybug predator
4. Shelter or protection
5. Finish that it gets to every time
6. Use of objects to create the Ozo"bug"s habitat

Name: \_\_\_\_\_

### Ozo-bug Habitat

**Driving Question:** How can you, as a bird, build the best nest for your babies?

#### Constraints:

Must include the following:

1. A path for the Ozobot to travel
2. Interaction with ladybug prey
3. Interaction with ladybug predator
4. Shelter
5. A finish that the ozobot arrives at every time

#### IMAGINE

**Directions:** Draw a basic sketch of your ozo-bot habitat in the space below. Be sure to think about all of the above constraints as you imagine your solution.

A large empty rectangular box with a thin black border, intended for drawing a sketch of the Ozo-bot habitat.

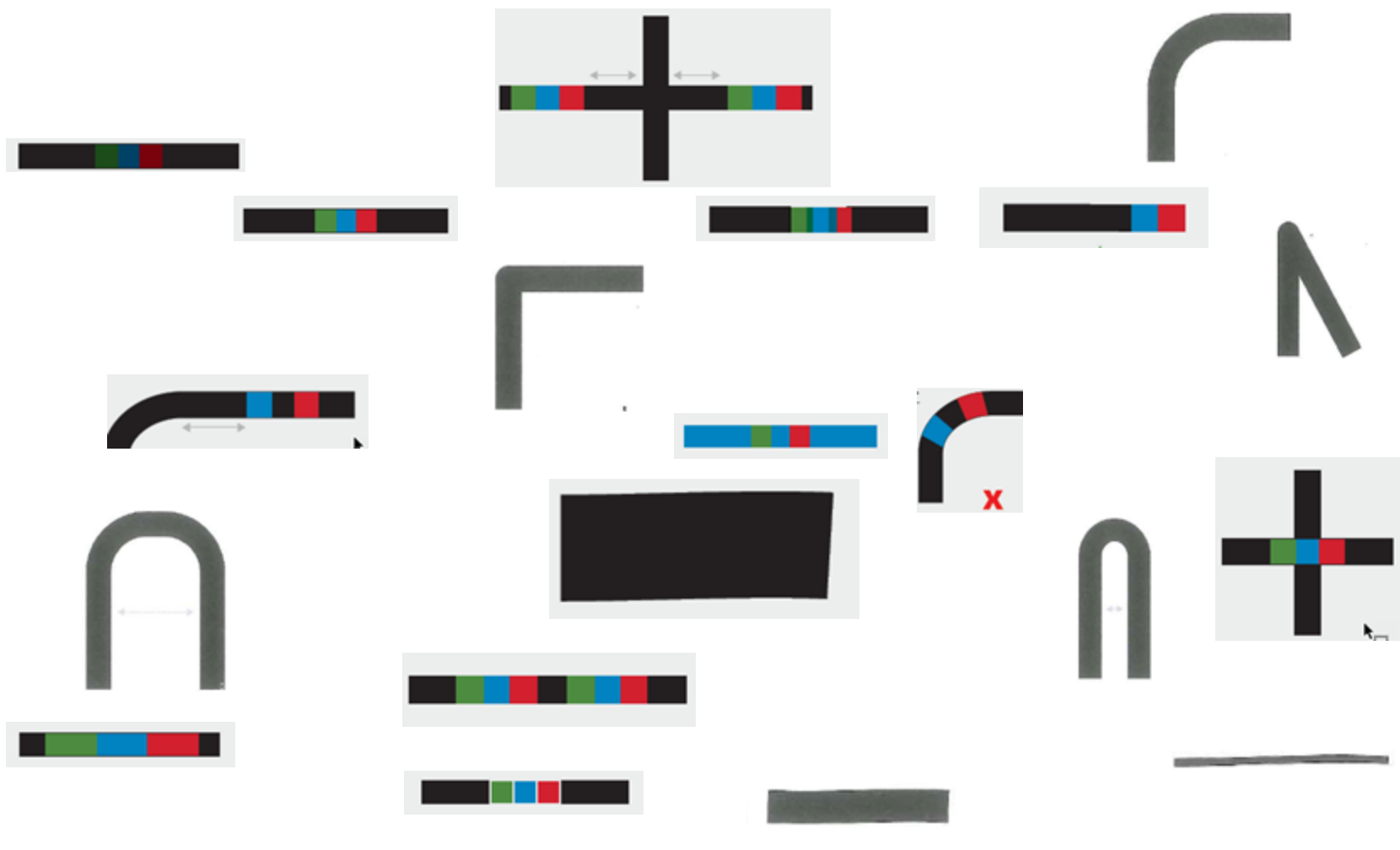


# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?

# Coding so an Ozobot can Read...

Directions: Cut out the lines and codes below. Then work with your group to sort them into two groups: Will work and will not work.









# Color code reference chart

## Ozobots



### SPEED

SNAIL CODE	SLOW	CRUISE
FAST	TURBO	NITRO BOOST

### DIRECTION

GO LEFT	GO STRAIGHT	GO RIGHT
LINE JUMP LEFT	LINE JUMP STRAIGHT	LINE JUMP RIGHT
U TURN	U TURN (LINE END)	

### TIMERS

TIMER ON (30 SEC. TO STOP)	TIMER OFF	PAUSE (3 SEC.)

### COOL MOVES

TORNADO	ZIGZAG	SPIN	BACKWALK

### WIN/EXITS

WIN/EXIT (PLAY AGAIN)
WIN/EXIT (GAME OVER)

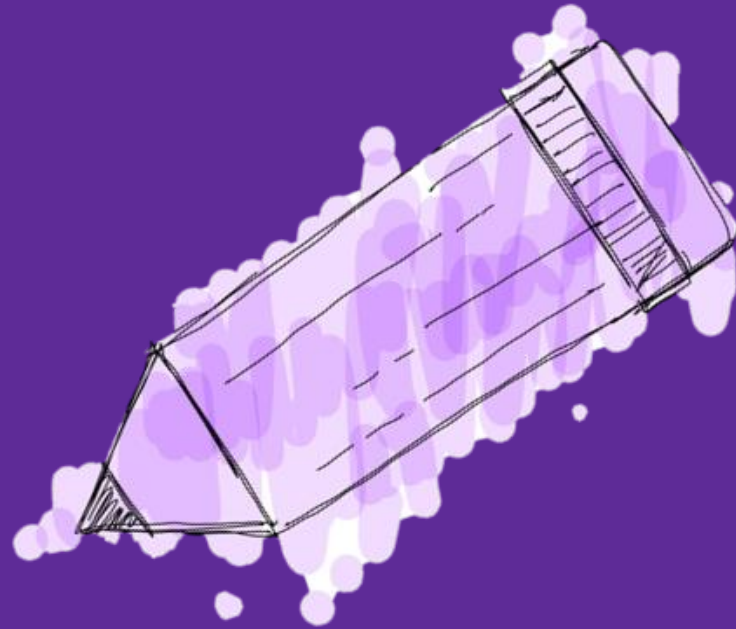
### COUNTERS

FIVE DOWN TO STOP

ENABLE X-ING COUNTER
ENABLE TURN COUNTER
ENABLE PATH COLOR COUNTER
ENABLE POINT COUNTER
POINT +1
POINT -1

# PLAN

Draw a diagram.  
Make a list of materials  
you will need.



# Sharing your ideas.

## How to Pick an IDEA

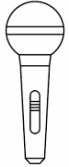
Pick one idea.	Take a part from each.	Decide on a new idea.
		
<p>Still stuck?</p> 		

A shares.

B listens.

B shares.

A listens.



Name: \_\_\_\_\_

**Oso-bug Habitat**

**Driving Question:** How can you, as a bird, build the best nest for your babies?


**Constraints:**

Must include the following:

1. A path for the Oso-bug to travel
2. Interaction with habitat prey
3. Interaction with habitat predator
4. Shelter
5. A food that the osobug arrives at every time

**IMAGINE**

**Directions:** Draw a basic sketch of your oso-bug habitat in the space below. Be sure to think about all of the above constraints as you imagine your solution.



Name: \_\_\_\_\_

**Oso-bug Habitat**

**Driving Question:** How can you, as a bird, build the best nest for your babies?

**Constraints:**

Must include the following:

1. A path for the Oso-bug to travel
2. Interaction with habitat prey
3. Interaction with habitat predator
4. Shelter
5. A food that the osobug arrives at every time

**IMAGINE**

**Directions:** Draw a basic sketch of your oso-bug habitat in the space below. Be sure to think about all of the above constraints as you imagine your solution.

Group Members \_\_\_\_\_

**PLAN**

1. Take turns sharing your habitat ideas.
2. As a group decide on a final plan.
3. Use the space below as to create a draft. Label constraints and code locations along the osobol path.

4. Take the above plan to your teacher for approval.

Teacher Approval: \_\_\_\_\_

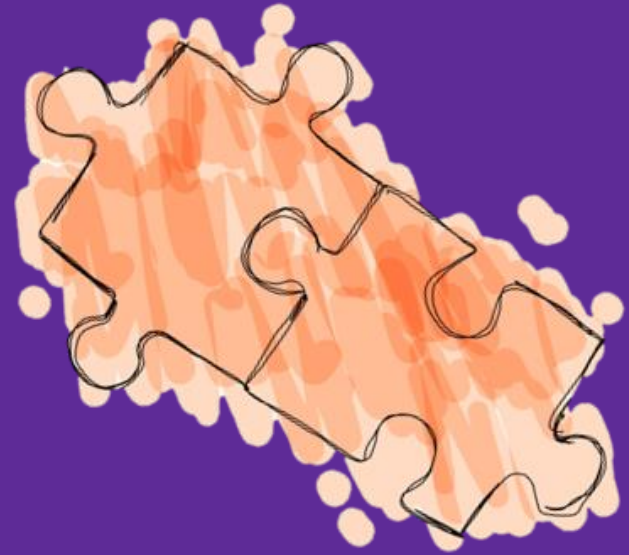


# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?

# CREATE & TEST

Create and build a prototype.  
Test and evaluate.



# Measure it out...

Where in your design are you going to need to use **MEASUREMENT**?



# Measure it out... practice

1. Find 4 items in the classroom.
2. Write the name of your object
3. Draw a sketch.
4. Measure its length to the nearest  $\frac{1}{2}$  inch.
5. Record your measurement.



Name: \_\_\_\_\_

## Measurement Ticket

Find 4 objects around the classroom.

Using the space below: Draw a sketch, write the name of the object and then measure that object to the nearest  $\frac{1}{2}$  inch and record the measurement.

Object Measurement	Object Sketch
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	

# CREATING A PATH



1. Gather your final Ozo-bug habitat paper and rulers.
  2. With a pencil transfer your above plan to paper. Use a ruler to measure important features of your design. Be sure to make your plan take up the larger space of the paper.
  3. Label locations of all codes as well as the following features:
    - Interaction with prey.
    - Interaction with predator.
    - Shelter.
    - Start and finish of ozo-bug path.
  4. Add ozobot codes to path using an Ozobot Code Sheet.
  5. Fill in your 5mm black lines.
  6. Test with an Ozobot and rewrite code where needed.
  7. Get approval from teacher.  
Teacher Approval.
-

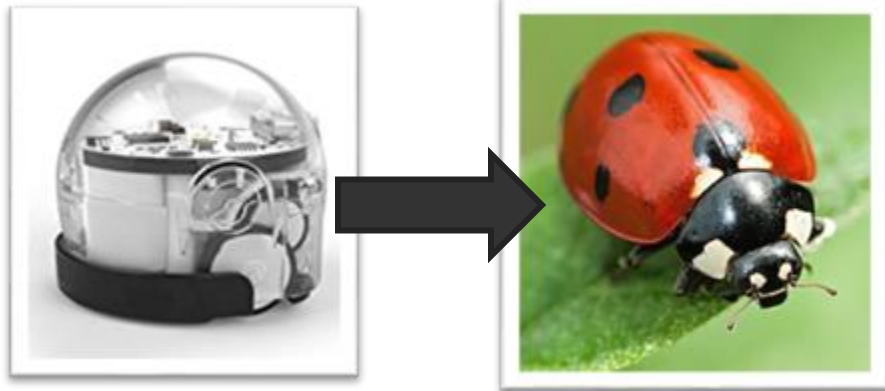




# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?

# CREATING an Ozo-bug Skin



What adaptations can you make the the Ozobot to make it resemble an Ozo-bug?

Create a 1 inch wrap around the outside of the Ozobot.

Attach your ozo-bug adaptations to that strip.

Be sure to keep the wheels clear.

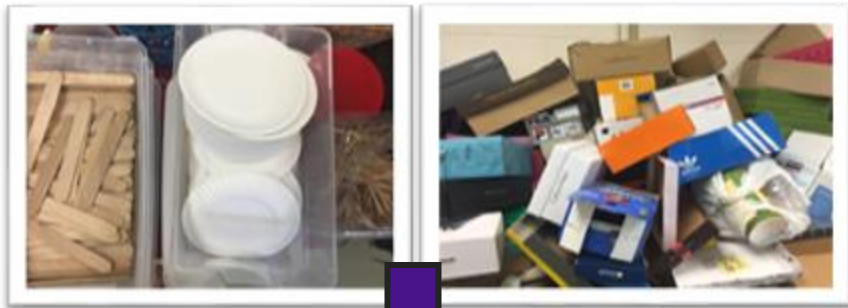
Head	Thorax
Wing	Wing case
Legs	Antenna
Abdomen	



# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?

# BRINGING your habitat to LIFE



What materials can you use to create 3-dimensional models of components of a lady bug's habitat?

- shelter
- prey
- predators
- plant life
- other living creatures

Material ideas:

- boxes
- cardboard
- clay
- legos





# Driving Question

Can you as a zoologist,  
design a ladybug habitat for  
a new exhibit?

# Testing your Habitat

## Must include:

- \_\_\_ A path for the Ozobot to travel
- \_\_\_ Interaction with ladybug prey
  - Code used:
- \_\_\_ Interaction with a ladybug predator
  - Code used:
- \_\_\_ Shelter or protection
- \_\_\_ Finish that it gets to every time
- \_\_\_ Use of 3-D shapes to create the Ozo-bug's habitat

Each group will run their Ozo-bug through their habitat.

Other groups: : Leave feedback for groups on a sticky note. Make sure feedback is information to help them grow:

I like how...

It was interesting that you...

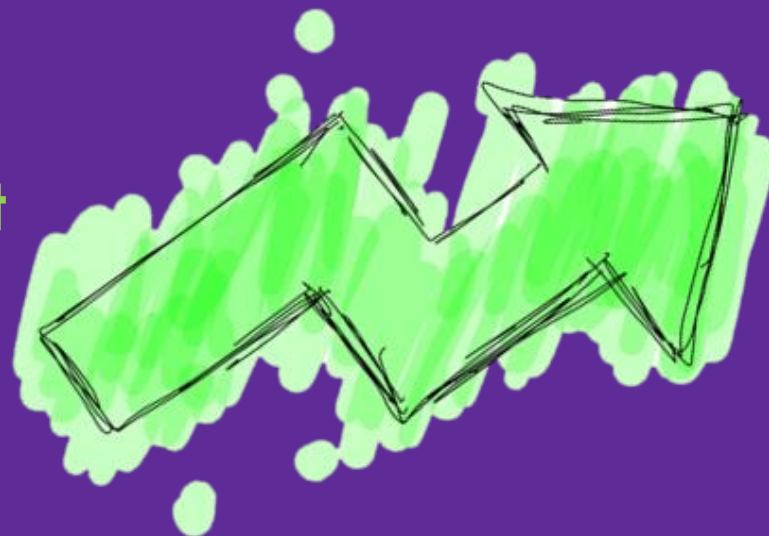
One suggestion I have would be...

---

# IMPROVE

What works? What doesn't?  
Modify your design to make it  
better.

Repeat this step.



**TEST and IMPROVE**

- Did your ozobug go from start to finish?    Yes    No
- Did you include a shelter for your ozo-bog?    Yes    No
- Did your ozobot interact with both predators and prey using two separate codes?    Yes    No
- Did you add 3-dimensional features to bring your habitat to life?    Yes    No

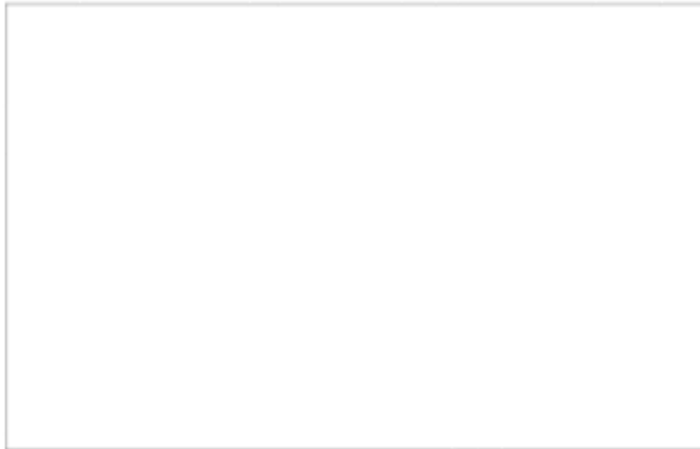
One thing that went well during our test is \_\_\_\_\_

\_\_\_\_\_

A change we will make is \_\_\_\_\_

\_\_\_\_\_

**Draw a sketch of your improved design.**



Reflect on your habitat.... room to grow!



## Ozo-bug Zoo Exhibit

### What We'll Cover:

- ① We'll identify the needs of an insect within it's habitat.
- ② We'll create a clear Ozobot path that requires repeated arrival at a final point.
- ③ We'll use ozobot code to describe movement.

### Materials:

- 1 Evo or Bit per group
- 1 Coding markers per group
- 1 Design Brief per student
- 1 Measurement Ticket per student
- 1 Ruler per group
- 1 Coding Sort Sheets per group
- 1 3-dimensional build materials per class
- 1 Ozobot Coding Sheet per group
- 1 Teacher Presentation Document per class

### Activity Instructions:

#### ① IMAGINE

Using your design brief take 15 minutes to put your ideas on paper for your ozo-bug path. Remember the constraints as you plan. Does your design include all of them? Remember that this is silent, independent work time for you to think of ideas on your own.

**Ozo-bug Habitat Planning Sheets.pdf:** <https://stg-files.ozobot.com/lessons/undefined/Ozo-bug-Habitat-Planning-Sheets.bUcHLhqqRzO65C9TjZOmXgUW.pdf>

#### ② PLAN

Code Card Sort:

You will need to cut out the coding/line sort cards.

Work with your partner to sort the cards into those that the Ozobot will be able to read and those that are incorrect.

You should end up with two piles of cards. We will check your answers once everyone is done. When done you can begin sharing your idea for the path that you imagined.

Plan:

1. Decide who will share their ideas first.

2. The person sharing keeps their paper right side up, the other partner puts their paper upside down.
3. Switch jobs and repeat.
4. Now that you have both shared begin deciding on your plan. Are you going to pick one? Are you going to take parts of each? Do you have a new idea now that you have shared?
5. Complete page 2 in your design brief being sure to include all constraints.
6. Get teacher approval.

**Code Sort.pdf:** <https://stg-files.ozobot.com/lessons/undefined/Code-Sort.SErhK6cUQ8GPgdnfGtH2yAlt.pdf>

### ③ CREATE

Measurement Activity:

1. Write your name on your measurement sheet.
2. Find an object, write the name down, draw a sketch.
3. Using your ruler, measure the object to the nearest 1/2 inch and record.
4. Repeat for 3 more objects.
5. Be sure to put objects back before moving on.

Creating your Path:

1. Once your plan is approved you may move on to page 3 in your design brief.
2. Gather your final Ozo-bug habitat paper and rulers.
3. With a pencil transfer your above plan to paper. Use a ruler to measure important features of your design. Be sure to make your plan take up the larger space of the paper.
4. Label locations of all codes as well as the following features:
  - Interaction with prey.
  - Interaction with predator.
  - Shelter.
  - Start and finish of Ozo-bug path.
5. Add ozobot codes to path using an Ozobot Code Sheet.
6. Fill in your 5mm black lines.
7. Test with an Ozobot and rewrite code where needed.
8. Get approval from teacher.
9. Get teacher approval.

**Ozo-bug Measurement Mini Lesson.pdf:** <https://stg-files.ozobot.com/lessons/undefined/Ozo-bug-Measurement-Mini-Lesson.Nd2gP3eiReWZZTfSvqwITAtf.pdf>

#### ④ CREATE

Ozo-bug Skin:

1. You will move on to the second section of page 3 of your design brief.
2. Think about how you can make your Ozo-bug life-like. What adaptations will you add?
3. Draw a quick sketch of your plan.
4. If you are using the paper method cut a 1 inch tall strip of paper and wrap around the Ozobot and tape. If you are using the egg carton method be sure to cut it so the Ozobot can move.
5. Add a drawing or details to the strip and the egg carton.
6. When done you may return to creating your path.

#### ⑤ CREATE

Bringing your Habitat to Life:

1. You will make a plan for adding 3-dimensional objects to your path to make it resemble a model of a ladybug habitat.
2. Using page 4 of your design brief think about materials you will need and how you can create objects present in the ladybug habitat.
3. Be sure to think about the following: shelter, prey, predators, other components of the habitat.

#### ⑥ CREATE

Today is the last day to work on your Ozobot path.

Check in on the constraints and make sure you have included all of them.

Do all of your codes work?

Name: \_\_\_\_\_

## Ozo-bug Habitat

**Driving Question:** How can you, as a bird, build the best nest for your babies?

### Constraints:

Must include the following:

1. A path for the Ozobot to travel
2. Interaction with ladybug prey
3. Interaction with ladybug predator
4. Shelter
5. A finish that the ozobot arrives at every time

### IMAGINE


**Directions:** Draw a basic sketch of your ozo-bot habitat in the space below. Be sure to think about all of the above constraints as you imagine your solution.



Group Members \_\_\_\_\_

## PLAN

1. Take turns sharing your habitat ideas.
2. As a group decide on a final plan.
3. Use the space below as to create a draft. Label constraints and code locations along the ozobot path.



4. Take the above plan to your teacher for approval.

Teacher Approval; \_\_\_\_\_

## CREATE

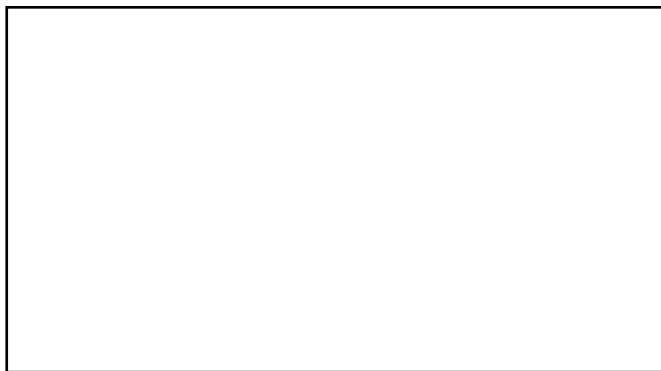
### Creating your ozo-bug habitat:

1. Gather your final Ozo-bug habitat paper and rulers.
2. With a pencil transfer your above plan to paper. Use a ruler to measure important features of your design. Be sure to make your plan take up the larger space of the paper.
3. Label locations of all codes as well as the following features:
  - Interaction with prey.
  - Interaction with predator.
  - Shelter.
  - Start and finish of ozo-bug path.
4. Add ozobot codes to path using an Ozobot Code Sheet.
5. Fill in your 5mm black lines.
6. Test with an Ozobot and rewrite code where needed.
7. Get approval from teacher.

Teacher Approval: \_\_\_\_\_

### Creating your ozo-bug skin:

1. Use the space bellow to draw out a design for the creation of your ozo-bug skin.



2. Cut out a 1 inch strip of paper and wrap it around the ozobot.
3. Draw or create your ozo-bug skin and attach it to the paper on the Ozobot.

## Bringing your Habitat to life:

Now you will create the 3-dimensional, life like components of your exhibit.

Some key reminders:

1. Make all spaces wider than the width of the ozobot.
2. Make all tunnels taller than the height of the ozobot.
3. Keep the ozobot path clear of all building materials.

Use the space below to draw out plans for 3-dimensional components you will add to your maze. Be sure to label all materials

List all necessary materials:

_____	_____	_____
_____	_____	_____
_____	_____	_____
_____	_____	_____

Begin to bring your habitat to life by adding 3-dimensional features to your habitat.

## TEST and IMPROVE

Did your ozobug go from start to finish?      Yes      No

Did you include a shelter for your ozo-bog?      Yes      No

Did your ozobot interact with both predators and prey using two separate codes?      Yes      No

Did you add 3-dimensional features to bring your habitat to life? ?

Yes      No

One thing that went well during our test is \_\_\_\_\_

\_\_\_\_\_

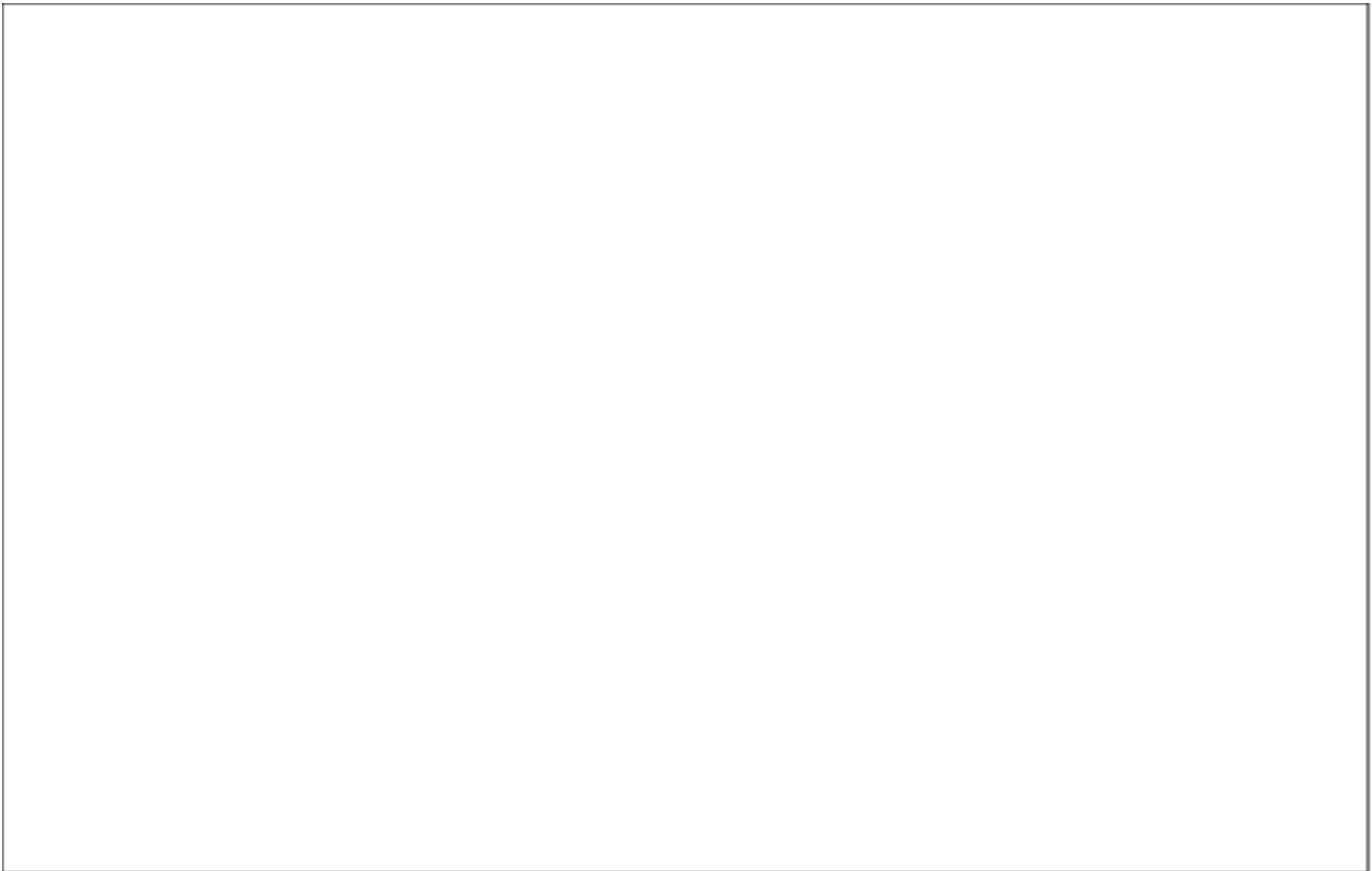
\_\_\_\_\_

A change we will make is \_\_\_\_\_

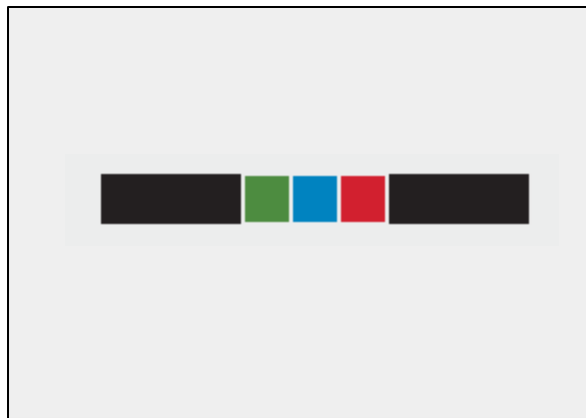
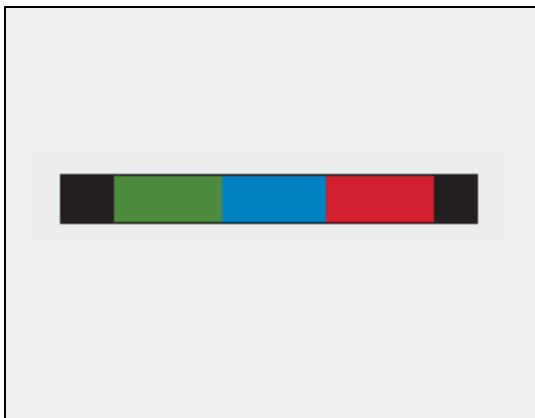
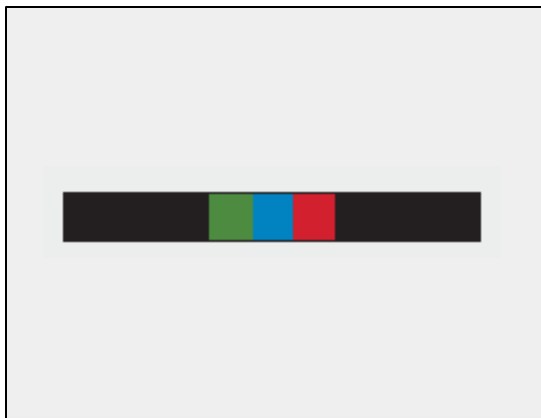
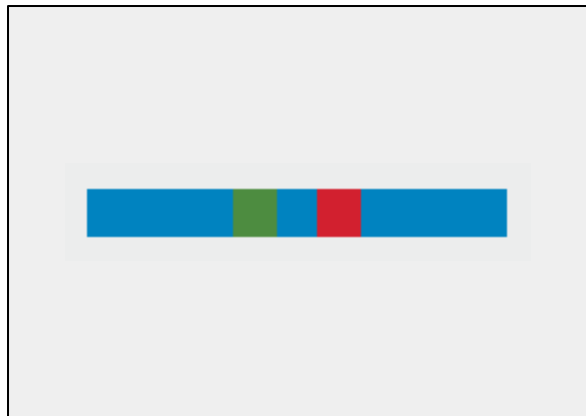
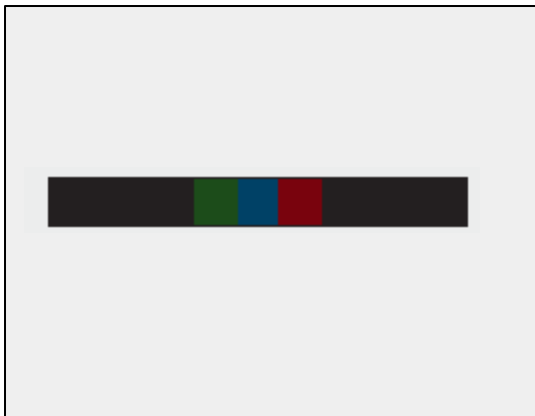
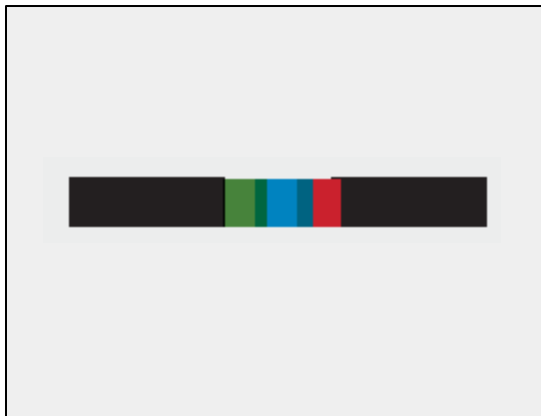
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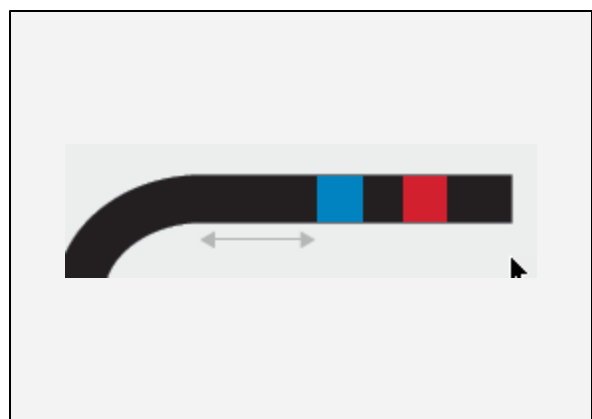
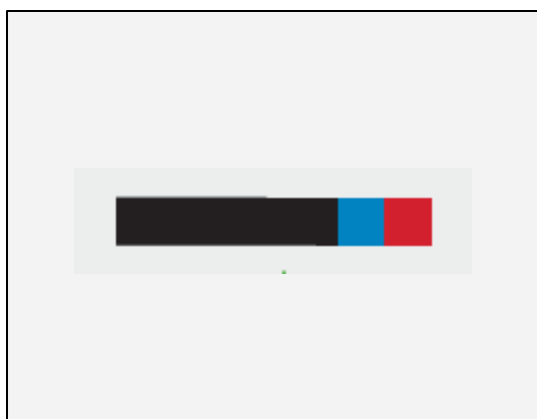
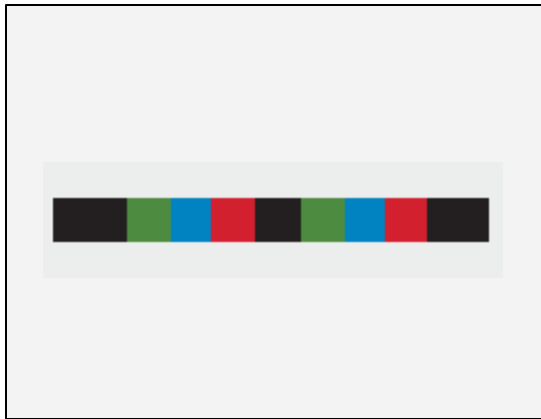
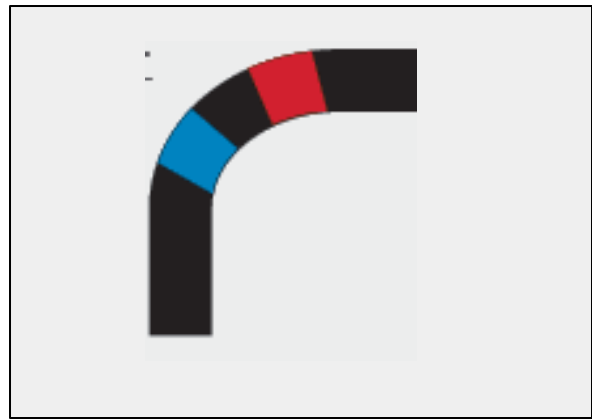
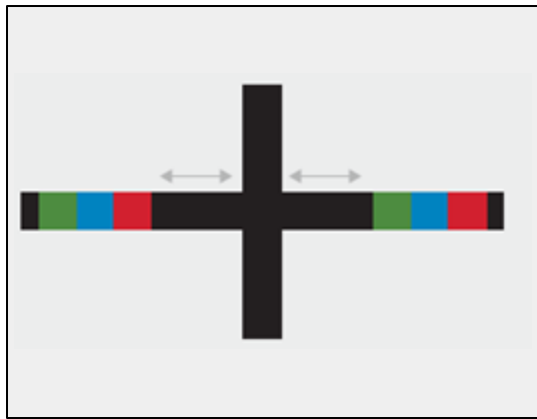
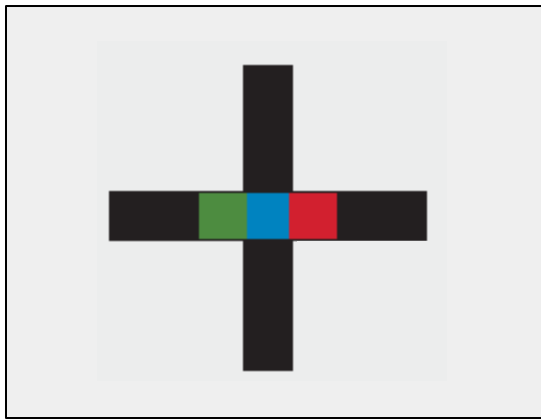
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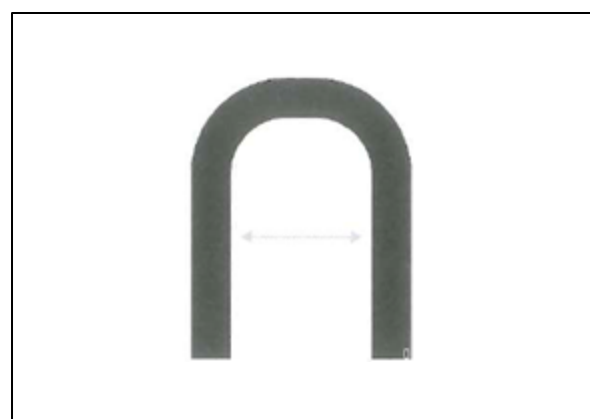
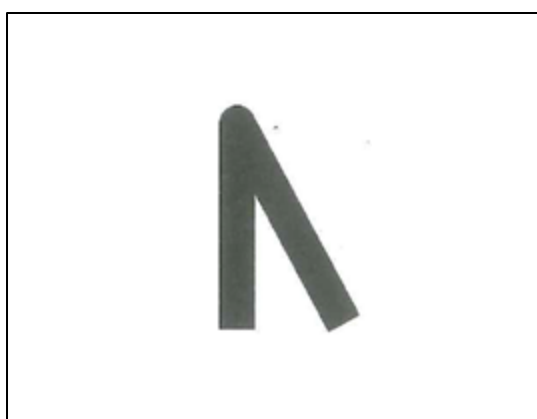
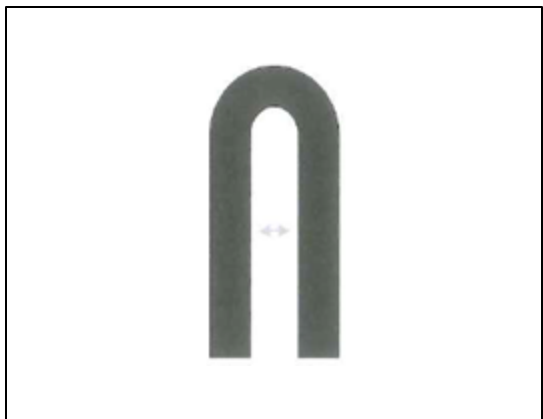
**Draw a sketch of your improved design.**

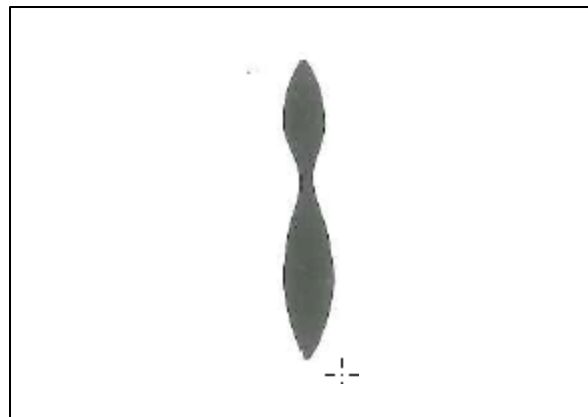












Name: \_\_\_\_\_

# Measurement Ticket

Find 4 objects around the classroom.

Using the space below: Draw a sketch, write the name of the object and then measure that object to the nearest  $\frac{1}{2}$  inch and record the measurement.

Object Measurement	Object Sketch
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	

Name: \_\_\_\_\_

# Measurement Ticket

Find 4 objects around the classroom.

Using the space below: Draw a sketch, write the name of the object and then measure that object to the nearest  $\frac{1}{2}$  inch and record the measurement.

Object Measurement	Object Sketch
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	
Object Name: _____ Measurement: _____ inches	