

# DATA *Nuggets*

## Mowing for Monarchs Data Activity!

Assemble the envelopes: You will need a color printer, 32 paper business sized envelopes, glue or tape, large sticky note paper, small sticky notes, pens and markers. The following instructions will make materials for 4 groups.



1. Print all the materials:
  - a. Single sided for the images showing the treatments. These will be taped onto the front of envelopes.
  - b. Double sided for the monarch egg and caterpillar cards and predator cards. These cards will be handled a lot by students, so you might want to choose a thicker card stock or laminate them.
  - c. Single sided for the graphs for Experiment 1 and 2.
  - d. Copies of the “Mowing for Monarchs” Part 1 and Part 2 Data Nuggets activities (if desired for background reading).
2. Cut out the images showing the treatments and tape or glue onto the fronts of envelopes. There should be 16 envelopes for the control, and 16 for the treatment.
3. Hand-write additional labels on the envelopes. They should be as follows:

Experiment	Treatment	Different Envelope for Each Week			
1	Mowed	Week 1	Week 2	Week 3	Week 4
1	Mowed	Week 1	Week 2	Week 3	Week 4
1	Control	Week 1	Week 2	Week 3	Week 4
1	Control	Week 1	Week 2	Week 3	Week 4
2	Mowed	Week 1	Week 2	Week 3	Week 4
2	Mowed	Week 1	Week 2	Week 3	Week 4
2	Control	Week 1	Week 2	Week 3	Week 4
2	Control	Week 1	Week 2	Week 3	Week 4

4. Fill each envelope with data cards, with ratios as follows:

Experiment 1 Envelopes - Monarch caterpillars and eggs				
	Week 1	Week 2	Week 3	Week 4
Control	2	2	2	1
Treatment	6	8	7	2

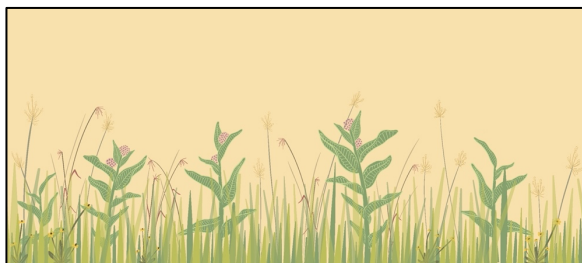
	<b>Experiment 2 Envelopes - Monarch predators</b>			
	Week 1	Week 2	Week 3	Week 4
Control	7	8	8	10
Treatment	0	1	1	8

5. Rubber band the envelopes together by student group. This will make 4 stacks of envelopes for Experiment 1, and 4 stacks of envelopes for Experiment 2.

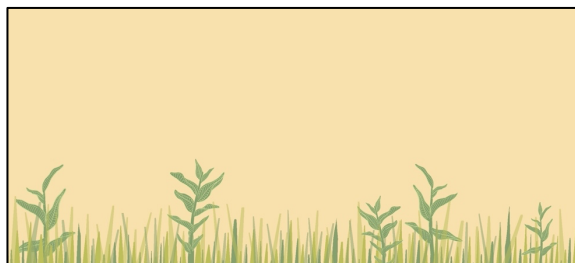
Classroom data activity: Just as the scientists collected their field data one week at a time, so can the students in this activity. We will reveal the data over time, handing out each week in succession to groups of students. Start with Experiment 1 – monarch caterpillar and egg observations, and follow with Experiment 2 – monarch predator observations. The data represents the average number of observations per 10 milkweed plants (note, the data in the Data Nuggets activity represents the average for 100 plants).



1. Break students into 4 groups. Start with the envelopes for experiment 1. Half the groups will get data from the mowed plots first, half the groups will get control plots first. Hand out the weeks one at a time and collect the envelopes between each week to prevent the small cards from getting mixed together.
  - a. Group 1 – Mowed treatment, week 1
  - b. Group 2 – Mowed treatment, week 1
  - c. Group 3 – Control treatment, week 1
  - d. Group 4 – Control treatment, week 1
2. Each group should get an envelope for week 1, a big piece of chart paper, blank graph paper, and two colors of post-its. Each envelope will have 10 cards inside.
  - a. Have students observe the front of the envelope and note whether they got the treatment or control. What do they observe in the picture?



un-mowed control

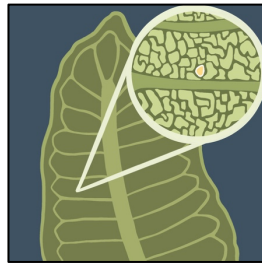


mowed treatment

- b. Take all the cards out of the envelope and organize by whether they have a blank leaf or an egg or a caterpillar.



no data



Monarch egg



Monarch caterpillar

- c. If you see a leaf, that means there was nothing when the scientists made their observations. This would be recorded as a zero. On a graph you plot only the observations where a monarch was seen. This means that students should graph only the number of cards they have showing monarch caterpillars or eggs.
  - d. Count the number of eggs and caterpillars and add that together. These cards all count as observations where the scientists found a monarch on the plant. For example, if there is 1 egg and 1 caterpillar, that is a 2.
  - e. Now take one color of sticky note. Add a legend to the graph to show which color you are using and which treatment (mowed or control) that matches. Now, pull off the # of sticky notes matching the # of monarchs and stick those on the graph paper. Stack the sticky notes to make a "bar" on the graph. Students can also do this by coloring squares onto their graph, or they can line the cards from the envelope up and trace them.
3. Take back envelope week 1, hand out envelope for week 2. Repeat steps 1 b-e.
  4. Repeat for all 4 weeks until students have their sticky note bar graphs for one treatment.
  5. Now swap the groups – the groups who got mowed now get control. Again, hand out one week at a time and collect cards back into envelopes between weeks. Or instead of swapping, have the students stand up and pair with a group that got the opposite treatment from them and have them compare.
  6. Ask the groups to bring their graphs up and stick in the front of the room, or do a gallery walk where the groups get a chance to see the graphs made by the other groups.
  7. Repeat steps 1-7 for experiment 2. BUT with a twist. This time you will have multiple ways to visualize the data.
    - a. Snap cubes
    - b. Printed paper with axes and grid
    - c. Big paper sticky notes with tiny sticky notes

