

# DATA *Nugget*

## Springing forward

Featured scientists: Shaun Davis, Mark Hammond, Elizabeth Schultheis, and Jen Lau from Michigan State University

### Research Background:

Every day people burn fossil fuels like oil, natural gas, and coal. This adds more and more greenhouse gasses to our air. Greenhouse gasses trap more of the sun's heat, causing the Earth to heat up!

Plants are very important for almost all life found on Earth. They make the oxygen that we breathe and are food for people and animals. Because plants are so important, we need to find out how climate change will affect them. How will higher temperatures affect the Earth's plants? One good place to start is by looking at *flowering* plants. Many flowering plants produce their flowers when the weather gets warm in spring, and the date that flowers first come out may depend directly on what the spring temperatures are like. It is possible that warmer and earlier springs generated by climate change cause flowers to bloom earlier and earlier. If flowers start blooming earlier each year, this could cause problems for pollinators (like bees and butterflies). They count on plants flowering around the same date each year.



Scientists collecting data in the climate change experiment. They are recording the date that dame's rocket, a leafy plant, makes its first flower of the year.

Scientists Shaun, Mark, Elizabeth, and Jen wanted to know if higher temperatures lead to earlier flowering dates for plants. They chose to look at flowers of dame's rocket, a leafy plant that is related to the plants we use to make mustard! Mark planted dame's rocket in eight plots of land. Half of the plots were left at normal temperature. The other four plots were heated 3°C above normal temperature. Scientists think 3°C is about how much warmer Michigan will be by the year 2100. Mark, Elizabeth, and Jen measured the date that each plant grew its first flower, and the survival of each plant. The scientists predicted that the dame's rocket growing in the heated plots would flower earlier than those in the normal plots.



One of the heated plots shown from above. The silver boxes are electric heaters that raised the temperature inside the ring.



Dame's rocket growing in the field. This species of mustard was introduced to the U.S. from Europe and Asia.

**Scientific Question:** How does temperature affect the flowering time of dame's rocket?

**What is the hypothesis?** Find the hypothesis in the Research Background and underline it. A hypothesis is a proposed explanation for an observation, which can then be tested with experimentation or other types of studies.

**Scientific Data:**

**Use the data below to answer the scientific question:**

<b>Treatment</b>	<b># of plants surviving to flower</b>	<b>calendar date when first flower appeared</b>	<b>average # of days until first flower (since start of experiment)</b>
<b>Normal</b>	28	May 20, 2013	16.11
<b>Heated</b>	25	May 10, 2013	6.08

What data will you graph to answer the question?

Independent variable: \_\_\_\_\_

\_\_\_\_\_

Dependent variable: \_\_\_\_\_

\_\_\_\_\_

Name\_\_\_\_\_

Draw your graph below: Identify any changes, trends, or differences you see in your graph. Draw arrows pointing out what you see, and write one sentence describing what you see next to each arrow.


Interpret the data:

Make a claim that answers the scientific question.

What evidence was used to write your claim? Reference specific parts of the table or graph.

Name\_\_\_\_\_

Explain your reasoning and why the evidence supports your claim. Connect the data back to what you learned about climate change and how this could affect flowering time.

Did the data support the scientists' hypothesis? Use evidence to explain why or why not. If you feel the data did not give a clear answer, explain why.

*Your next steps as a scientist:* Science is an ongoing process. What new question(s) should be investigated to build on Shaun, Mark, Elizabeth, and Jen's research? What future data should be collected to answer your question(s)?