Science and Engineering Practice: Analyzing and Interpreting Data
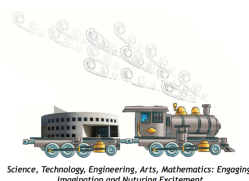
The purpose of this video is to give students experience with the scientific practice of Analyzing and Interpreting Data. It is a resource to expose students to one of the Science and Engineering Practices (SEPs) outlined in the Next Generation Science Standards (NGSS). Reflecting on a novel, authentic example of this SEP applied to scientific research will prepare students for the important role of data analysis in scientific investigations.

This video can be accessed at https://www.youtube.com/watch?v=YVDwaweZ3g4

Expected Outcomes: After working with this video, students should understand the role of analyzing and interpreting data in making conclusions from experiments and sharing scientific discoveries.

Guide:

1. Before watching the video, gather students' initial ideas about data. What is data? How and why do scientists collect data? What tools do we have to understand and learn from the data?

2. Explain that we will watch a video about a scientist who wants to learn more about lifespan and health and uses data to understand it. Explain that you will watch the video all the way through, and then watch again to focus on specific parts.

3. Watch the video all the way through.

4. Lead a brief discussion to clarify the purpose of Todd's research: He is interested in how different compounds affect the health and lifespan of worms. He gathers lots of data about how long worms live when they eat different compounds. Some compounds seem to help the worms live for longer. He shares his results with other scientists doing the same experiments. They can compare their results by sharing and analyzing the data.

5. Start the video again.

6. Pause the video at 2:05. Discuss with students why Todd turns the data from a table into a graph. How does the graph help him interpret his results better? How does he use both visuals and numbers to make sense of his data?

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7. Pause the video again at 3:07. Ask the students which compound they think is causing the biggest change. They should support their claim with evidence from the graph.

8. Debrief the video by leading a conversation with students about how Todd is able to compare his results with other scientists in other places. How does analyzing and interpreting the data help them make sure all the scientists are doing their experiments the same way?

Background Information on Analyzing and Interpreting Data

Analyzing and interpreting data is a crucial step in any scientific investigation. It is important to make meaning out of collected raw data, which may be too great in quantity to be meaningful on its own. Analysis and interpretation can be done graphically and statistically. Graphs are a visual representation of the data, while statistics are numerical; scientists use both tools to make sense of their data.

Analysis and interpretation of data allows scientists to draw conclusions from their experiments. These conclusions can be used as evidence in an argument, or as observations that fuel a further set of experiments. As with any interpretation, not all scientists draw the same conclusions from the same set of data. This can fuel scientific debate, which further advances the field. Because of the importance of data analysis, a strong understanding of analytic methods is an important skill for all scientists.