

BIRDEE Unit 1 Lesson Plans

1.4.4. Thermal Regulation Experiment Part 2: Analyze Data

Students will analyze data from the Thermal Regulation experiment. They will use Excel or Google Sheets to plot and interpret data.

Prior to the lesson: Teachers should export control jar and student data according to the directions linked here: [1.4.4 Thermal Regulation Part 2: Analyze Data TEACHER DIRECTIONS](#). Teachers should share the individual .csv data files with each student team using the teacher's preferred communication tool. Teachers should also use this link to the [Sample Padlet Link](#), make a copy and share your class link with students.

Engage: 5 min

View: [1.4.4. BID Ideation](#)

- You are trying to design and make a robot that must traverse rough terrain, so it can't have wheels.
- Brainstorm at least three organisms that traverse rough terrain. Choose one organism, describe the type of terrain it traverses, and sketch the structure that allows it to traverse this terrain.
- **Class Discussion** on what students brainstormed

Yesterday, we explored the science behind our problem (thermal regulation) by conducting an experiment using a jar filled with ice and a temperature sensor to record data. Today we will analyze that data and compare it to the "control" jar. Engineers engage in collecting and analyzing data to aid them in making decisions on their projects. In this thermal regulation experiment, we collected data about different materials. We will use this data to understand which material is better at thermal regulation.

Explain: 15 min (Guided Presentation)

Teacher Note: *Prior to the lesson, the Teacher will share the individual .csv data files with each student team using the teacher's LMS. The teacher will pull up the PPT below to guide students in analyzing the data.*

View: [1.4.4. Thermal Regulation Experiment Part 2: Analyze Data PPT](#)

(in ppt) **Steps for analyzing sensor data using either Excel OR Google Slides. The procedure is the same for both methods:**

- Download the Excel file
- Prepare A Scatter Chart
- Review Your Graph
- Narrow Your Data
- Change the Format
- Make Observations based on the data

Student Handouts:

[1.4.4. Thermal Regulation Part 2 Analyze Data](#)

Student Materials:

Microsoft Excel or Google Docs

Instructional PPT's & Materials:

[1.4.4. BID Ideation](#)

[1.4.4. Thermal Regulation Experiment Part 2: Analyze Data PPT](#)

Teacher Resources:

[1.4.4. Thermal Regulation Part 2: Analyze Data TEACHER DIRECTIONS](#)

[1.4.4. Expected Data Visualization Image](#)

[1.4.4. Sample Padlet Image](#)

[Sample Padlet Link](#)

Web Resources:

[1.4.4. Expected Data Visualization Image](#)

[1.4.4. Sample Padlet Image](#)

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Explore: 15 min (Group)

Data visualization

You will now work in your groups to use the [1.4.4. Thermal Regulation Part 2 Analyze Data handout](#) to analyze your results from the experiment.

Extend: 15 min (Group)

Post your data on Padlet

You will now share your data from the experiment on Padlet with your classmates.

- **Teacher Note:** [Sample Padlet Link](#). *Make a copy and share the new link with students.*
- Click on the link to the Padlet to document how their material performed as a thermal insulator compared to the Control Jar.
- Each group will posts their graph, students will compare each result to observe how different materials affect thermal insulation

EDPL: Update Research Notes as needed with information learned in the thermal regulation experiment.