

BIRDEE Unit 1 Lesson Plans

1.6.4. Prototype 2: Build

Students will work in their groups to build their second prototype. They will test it using the Govee sensor to test the insulation performance. They will review the data at the next class.

Before the Lesson: Teachers should use [1.4.3. Thermal Regulation Experiment TEACHER DIRECTIONS PPT](#) to reset the sensors and prepare for the prototype test.

Engage: 5 min

View: [1.6.4. BID Ideation](#)

- You are designing and creating a new umbrella that can be used in heavy downpours. Your umbrella must be water-repellent, of course. What in nature is good at shielding from the rain? What about being water repellent?
- List three things in nature that exhibit water-repellent properties. Your umbrella also needs to be light and strong to be easy to carry yet also able to withstand heavy downpours and gusty winds. List three organisms that are light yet strong.
- **Class Discussion** on what students brainstormed

Explore: 30 min (Group)

- Build your second prototype following your prototype plans.
- **EDPL:**
 - Upload images of prototype 2 to the EDPL.
 - Link prototype 2 to your conceptual design for prototype 2.

Teacher Notes:

- *Teachers need to make sure that students have all the materials they planned to work with.*
- *Teachers need to walk around and check students are aware of what they need to build their prototype. If there are any students struggling with starting to build their prototype, talk and help them to start prototyping.*

Evaluate: 20 min (Group)

Test Setup:

Just like we did for prototype 1, set up a Govee sensor to test the **thermal insulation requirement** of your design.

EDPL:

- Create a test for prototype 2 with the steps of the thermal regulation test.

Teacher Notes:

- *Help students to turn on the sensor and make sure the sensors are recording before wrapping up the class*

Student Handouts:

N/A

Student Materials:

Materials students bring in for their second prototype

Prototype Test Materials:

Jars
Govee sensors
Ice
Double sided tape
Scissors

Instructional PPT's & Materials:

[1.6.4. BID Ideation](#)

Teacher Resources:

[1.4.3. Thermal Regulation Experiment TEACHER DIRECTIONS PPT](#)

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

Web Resources:

N/A

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- *Make sure students put the sensor in a good location so that the temperature will be measured properly.*
- *Students will record the data overnight and review during the next class.*
- *Teachers should make sure the sensors are recording data before wrapping up the class. Teachers will need to download data using [1.4.4 Thermal Regulation Part 2: Analyze Data TEACHER DIRECTIONS](#) as a guide.*

Extend: 5 min (Group)

Teacher Notes: *Clean up and let students know we will export data and conduct data visualization at our next class.*