BIRDEE Unit 1 Lesson Plans

1.2.2. Testing the Lotus Effect

Prototypes allow engineers to test a subset of the design requirements. The test results can inform our understanding of the problem, requirements, and prototype development. Students will test their Neverwet prototypes with different liquids.

Teachers will need to apply the second coat of Neverwet to their students' samples if there wasn't time in class the day before.

Teachers will also need to gather materials needed to test the samples:

- **Testing Liquids:** Water, Food-Colored Water/Dirt Water, Chocolate Syrup, coffee, hand sanitizer, packets of ketchup/mustard/soy sauce.

Teacher Note: The hand sanitizer should degrade the Neverwet. Students may notice it sticking. They will apply it in Test 2 and then apply water to see if the hand sanitizer has degraded the Neverwet.

Engage: 5 min

View: 1.2.2. BID Ideation
- How do animals stay dry?
- What products could this inspire?
- **Class Discussion** on what students brainstormed
- **Play video:** Slow Motion Animals video (in ppt)

Explore: 30 min *(Group)*

Test Lotus Effect
- Today we will test the Lotus Effect using the samples prepared from our previous class. Your group will conduct 2 tests and record your results:
- **View:** 1.2.2 Lotus Effect Test Results & Observations
- **Procedure:**
  - **Test 1:** Test your samples with the different liquids available in your class (except the hand sanitizer).
  - Record results on the 1.2.2 Lotus Effect Test Results & Observations worksheet.
  - **Test 2:** Apply the hand sanitizer to one of your samples. Then test with water. Record your results.

Evaluate: 15 min *(Class discussion)*

You will share your results: [Not every group will have tested every material/ liquid combination]:
Class Discussion:

Student Handouts:

1.2.2 Lotus Effect Test Results & Observations

Student Materials:

Mounted samples from 1.2.1, container to catch spills

Testing Liquids: Water, Food-Colored Water/Dirt Water, Chocolate Syrup, coffee, hand sanitizer, packets of ketchup/mustard/soysauce

Instructional PPT's & Materials:

1.2.2. BID Ideation

Teacher Resources:

N/A

Web Resources:

Slow Motion Animals video

Mammals Shake Drying article

Shake Drying video

● Which materials/ liquid combinations were the most impressive as far as repelling dirt and water? ● Which materials/ liquid combinations did not work as well? ● What happened when the hand sanitizer was applied? ○ ***Teacher Note:*** *The hand sanitizer should degrade the Neverwet. When students apply water after applying hand sanitizer to the Neverwet, the water is absorbed into the fabric.* ● Why do you think this happened when the hand sanitizer was applied? ● Which materials would be good for making footwear?Which materials might you include when redesigning footwear to keep it looking clean? ● Which material would you choose to go forward with in your design?	