

Module 1: Staying Dry and Clean

Lesson 3: Application and Design

Class Level: Infants	
Strands: 1. Materials 2. Design and make	Strand Units: 1.2 Materials and Change

Safety: All material should be safe and found in your classroom or at home. Avoid selecting sharp items.

Background

This lesson looks at the question asked at the end of the previous class – would we want to be waterproof like a duck? What about the things that we use?

Scientists look to nature to see what features and properties of natural materials may benefit us and if there is a way to recreate those properties using technology. This is the case for waterproof material. This approach to using nature for technological advances is called biomimicry – mimicking what we find in nature. There are many advances on this technological front, and this is a good way to introduce students to the idea of design thinking and design and make. For infants and junior classes, introducing the concept of biomimicry and having them see how nature can inform technology is a great way for getting them to think about the purpose behind design and make activities.

Here is a good example of creating waterproofing material by changing the structure - just like a leaf or a duck's feather (information for teacher).

<https://www.azom.com/article.aspx?ArticleID=14157>

Key Learning

Scientists look at how animals and plants create waterproof surfaces or coats, and study how we can use them and make them into waterproof materials for us.

Resources

- Material for design and make; leaves and natural waterproof material (materials used in lesson 1), a way to stick leaves and other materials together, wool, glue, sticky tape
- SunPilot Resources:
 - o Powerpoint
 - o Video – technologies to keep things dry and clean.
 - o Design and make template

Key Vocabulary

Encourage students to clap out the syllables in each new vocabulary word and discuss what sound they hear in each word. It will help the children remember the new vocabulary while also developing phonological awareness.

- investigating
- biomimicry

- properties

Learning Objectives/Outcomes

Science

1. Materials 1.1.1 investigate materials for different properties; materials that absorb water and those that are waterproof. 1.1.2 know about some everyday uses of common materials

2. Design and Make
design and make modelled through thinking about a problem and seeing what scientists are doing

Literacy

Oral Language

- express personal opinions, ask and ask and answer questions to get information, develop understanding and to clarify and extend thinking in relation to biomimicry.

-use sophisticated oral vocabulary (subject specific).

-describe events and processes relating to real and imaginary contexts in relation to the duck/cat scenario.

Reading

- recognise and manipulate syllables in new vocabulary words.

Writing

-take part in marking, drawing and writing to communicate with others when designing for the cat

Lesson outline

Introduction: Whole Class Discussion



Recap last lesson – show stick puppets of duck and cat. How did the cat and duck manage to play together? Who was waterproof? [the duck]

How did the duck clean the Lily pad? [splashed it] Why did that work? [the Lily pad is waterproof and when the water is splashed onto it – the dirt rolls off with the water].

Would you like to be waterproof and always clean?

Slide 4

Is there anything you can think of in your life that would be good if it had those properties? What gets dirty that you have to wash and then dry? How about a jumper that was also a raincoat? Would that work?

Waterproof and absorbent are two types of properties – prop'erties

Slide 5

Properties are descriptive words that tell us about a material or object. Knowing the properties of different materials helps us make the right choice for what we need to do – like waterproof for a raincoat. What do you think of these ideas?



Activity 1 whole class. thinking about *technology* and *biomimicry* **Slide 6**

Scientists think about this too. They look at nature and see if there are any **properties**, pro'per'ties, in nature they could use to help us. Properties are words we use to describe something, like being waterproof. Scientists **investigate** if these properties would work to make our lives better. Making man-made things for us that copy nature is called **biomimicry**. Bi'o'mim'i'cry.

Show SunPilot video M1L3 (<https://youtu.be/2UzorxppGJA>)

- Stop at various places within the video and ask for understanding.
- What property were they looking at?
- What animal or plant had that property?
- What are they going to try to make?
- What do you think of that?



Activity 2 Design and make

Set up the situation:

The duck is having fun in the rain.

The cat is his friend and would like to play with him.

The cat gets terribly wet in the rain and it makes her unhappy.

What can you make to help the cat play with the duck in the rain?

Slide 7

Slide 8

Slide 9

Slide 10, 11

Ask the students:

- Could you use *natural material* (like the lily pad) to help the cat play with the duck outside in the rain?
- Think back to the first lesson, was there anything from your nature investigation that you could use so the cat stays dry? What could we make to keep the cat dry?
- Prompts: Could you make a coat for the cat from the lily pad leaf? What would be good about a coat made from plant leaves? What would be bad?
- What could we make instead of a coat?
- Are there any ideas from the video that you think would help?

In teams of two:

Slide 12

- Plan the design, draw and label it. Use the template provided or make your own.
- Once it is designed on paper – have them make it. Give the students time to make their design.
- Once it is made - have the students test it to see if it would keep the cat dry
- Revisit the exploration table (testing is the final steps of design thinking)
- If it is not successful, give the students a chance to change the planning of their design.



Wrap-up (whole class discussion)

Slide 13

Use a learning experience approach to talk about how scientists use nature to make things for us. Include what they learned from the video and from their design and make activities. Write out their experiences on the board.

- What did you do today?
- What properties of animals and plants are people investigating to see if they would make our lives better?
- Key learning: Scientists look at the properties of animals and plants and see how we can use them.

Modification

- The class could develop the design together as a whole group discussion, students would then copy the design and label it.
- The design and make could be stopped at the design phase.

Extension Activities

- Have material available during free play so that the students can play with and make other possible designs.

Assessment

- Teacher observation
- Probing questions do students understand the idea of biomimicry during the plenary
- Label design plans
- Final design product
- Testing and drawing conclusion

Design and Make Template

My Name: _____

We will make a _____

My drawing of our design

A large, empty rectangular box with a thin black border, intended for the student to draw their design. It occupies the lower half of the page.