

Introducing the Design Challenge



Focus: Students become familiar with (or review) the design process. Students are introduced to the design challenge at the end of the unit so that they have a context for learning about objects and materials.

Specific Curriculum Outcomes

Students will be expected to:

- 26.0 observe objects and describe their similarities and differences [GCO 1/3]
- 27.0 compare and describe properties of objects and materials [GCO 1/3]
- 24.0 select and use materials to carry out their own explorations and investigations [GCO 2]
- 7.0 make and record observations and measurements [GCO 2]
- 8.0 communicate while exploring and investigating [GCO2]

Performance Indicators

Students who achieve these outcomes will be able to:

- ask reasonable questions and make accurate observations
- experiment with materials and objects to learn about them

NOTES:

Attitude Outcome Statements

Encourage students to:

- recognize the role and contribution of science in their understanding of the world [GCO 4]
- appreciate the importance of accuracy [GCO 4]

Cross-Curricular Connections

English Language Arts

Students will be expected to:

- speak and listen to explore, extend, clarify, and reflect on their thoughts, ideas, feelings, and experiences [GCO 1]
- interpret, select, and combine information using a variety of strategies, resources, and technologies [GCO 5]
- respond personally to a range of texts [GCO 6]

Getting Organized

Components	Materials	Before You Begin	Vocabulary
• <i>The Magnificent Tree</i> (Read Aloud) • <i>What Is the Design Process?</i> poster • Science Card 6	• students' Science Journals		• design • invent • invention

Science Background

- The Design Process is a sequence of steps used to solve problems.
- The process can be broken down in four steps:
 1. Identify and describe the problem. Then think of a solution and make a plan.
 2. Gather materials and build a prototype.
 3. Test and evaluate your solution/device.
 4. Share your solution/device and what you learned.

ACTIVATE

Read Aloud: *The Magnificent Tree*



Summary

This endearing story illustrates how sometimes the simplest ideas are the best. Bonny and Pop dream of creating a magnificent tree that will make the beautiful birds want to stay. They both use their ideas to create a tree for the birds but which tree will the birds prefer?

Before Reading

Explain to students that you will be reading a book about two people who want to create a magnificent tree for the birds in their neighbourhood. Before you start reading, invite students to close their eyes and visualize what a magnificent tree might look like. Ask:

- **Why might someone want to create a magnificent tree?**

Involve students in a Think-Pair-Share strategy. After providing some time for students to ponder the question, have them turn to the person they are sitting beside and share their thinking. After students have had a chance to share their thinking with a partner, invite a few students to share their ideas with the class.

Ask students to listen as you read to discover why Pop and Bonny created a magnificent tree and whether their ideas were the same or different.

During Reading

As you read the story to students, pause frequently to discuss the text and illustrations (many illustrations have multiple meanings within them). Alternate between asking students to respond in a whole group or with a partner. Prompts for discussion could include:

After reading the first page:

- **What does bursting with ideas mean? Have you ever been bursting with ideas?**

After looking closely at the illustrations on the next two pages:

- **What made Bonny's ideas simple and clever? What does properly made mean?**

After reading about Pop's ideas:

- **What was different about Pop's ideas and Bonny's ideas?**
- **Do you think that one type of idea was better than the other? Why or why not?**

After reading the page, "Bonny and Pop loved the birds and wished they could stay.":

- **Why do you think the birds wouldn't stay?** (e.g., no trees, place to land, easy for predators to get them, lack of food)

On the page where Pop is making notes and drawing pictures:

- **What strategy was Pop using to design his tree?** (planning with diagrams and writing)
- **How can doing this help you when you are designing something?**

After reading about and viewing Bonny's idea:

- **What was Bonny's idea? Why didn't Bonny need to draw diagrams and make notes? What would Bonny have to consider with her idea?** (What does a seed need to grow?)

After the birds flew all around Pop's tree:

- **Why do you think birds only flew around Pop's tree?**

After the birds landed in Bonny's "simple, clever and properly made" tree:

- **Why did the birds prefer Bonny's real tree over Pop's invention?**

After reading the rest of the text:

- **What did Bonny enjoy about Pop's tree? What do you think she watched as she swung on her swing?**
- **In the end, were Bonny and Pop successful in building a magnificent tree?**

After Reading

Prompts for discussion could include:

- **Why do you think the birds were attracted to the real tree?**
- **What might a real tree provide for the birds that an artificial tree might not provide?**

Focus on the Design Process by asking questions, such as:

- **What was the main problem in the story?**
- **How did Pop and Bonny solve this?**
- **What was the same about the two solutions? What was different?**
- **Do you think a problem can be solved in more than one way?**
- **What materials did Bonny use to solve the problem? What materials did Pop use?**



Point out the *What Is the Design Process?* poster. Read the steps with the students. Compare the process and steps Pop and Bonny used with the process and steps on the poster.

CONNECT

Curiosity Centre

Invite students to further explore and learn about more objects and materials at the Curiosity Centre. While they are exploring, encourage students to think



about any questions they may have. These questions can be recorded on sticky notes and attached to the I Wonder Wall.

Model asking questions:

- I wonder how many objects at the centre are made of the same materials?
- Can objects be made of many different types of materials?
- What is the best type of material to use when making baby toys? Why?
- I know glass is made by humans. How is glass made?

CONSOLIDATE



Building a Useful Object

Ask students to look at Science Card 6. Introduce the Design Challenge by explaining to students that they are learning about objects and materials and the design process so that they can design and build a useful object on their own, just like Pop and Bonny did.

Review the problem and solution in *The Magnificent Tree*. Have students look at the materials on Science Card 6 and invite them to start thinking about what useful object they would like to build in order to solve a problem.

EXPLORE MORE



Examining Multi-Part Objects

Students can take a multi-part object apart (e.g., a pen), identify the materials that each individual part is made from, and describe the properties of each material. Ask students to draw a picture of the object in their Science Journals and label the different parts.