

# TECHNOLOGY in Practice



## Applications and Innovations

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### Chapter Overview, Concepts, and Goals

#### Chapter 3, Testing Your Way to a Solution

#### Chapter Overview

Chapter 3, “Testing Your Way to a Solution,” helps students understand testing. Although they did some testing of products in Chapter 1, “Consumer Concerns,” this chapter helps them focus on why testing is important and how they should conduct fair tests. They will work for a fictitious company to test both boats and rockets and to help the company come up with a rocket design.

In the **Engage** activity, *Propelling You Forward*, students will read a scenario and decide whether they think the tests that were done were fair tests. They will share their current understanding about fair tests.

In the **Explore** activity, *Sails, Propellers, and Fuel*, teams of students will test one way of moving a boat forward. They will focus on the collection of data and the importance of testing parts of a final design, but they will not yet learn about fair tests.

During the **Explain** activity, *To Be Fair ...*, we introduce students to the president of a fictitious company who would like their help selecting a new product line based on reliable results and fair tests. They will learn what *fair test* means as well as the variables that are important in testing. They will also return to the Explore activity to determine what they would have needed to do to make their test a fair one. Because of the students’ good work for the company during the Explain activity, the president would like them to continue working for him.

In the **Elaborate** activity, *Rocketing to the Top*, students will use an interactive simulation to test several parts of a rocket to determine which combination leads to the rocket that will fly the highest and the straightest. They will think about the advantages and disadvantages of using simulations as well as how the testing of parts can help lead to a better final design.

Finally, in the **Evaluate** activity, *Designing the Fuel*, students will build rockets according to the tests they ran during the simulation in the Elaborate activity. They then will continue the rocket design by using fair tests to determine the proper combination of ingredients needed for the rocket fuel.

## Chapter Organizer

### Engage—Propelling You Forward

**Key idea:**

Testing is an important part of designing technology.

**Activity:**

Students read a scenario and share their knowledge about fair tests.

**Linking question:**

How can testing help when someone is designing technology?

### Explore—Sails, Propellers, and Fuel

**Key idea:**

Testing a design can help people make decisions about the final product.

**Activity:**

Students test ways for moving boats forward and describe how testing would help if they were building a real boat.

**Linking question:**

How can I know my tests reveal the best design?

### Explain—To Be Fair ...

**Key idea:**

Conducting a fair test leads to the most reliable results.

**Activity:**

Students are hired by a fictitious company to evaluate tests and choose a new product.

**Linking question:**

What do I need to test when I am designing a solution?

### Elaborate—Rocketing to the Top

**Key idea:**

A functional product results from testing different parts of the design.

**Activity:**

Students use a simulation to test different parts of a rocket design.

**Linking question:**

How do I use the results of different tests?

### Evaluate—Designing the Fuel

**Key idea:**

A successful final product uses results from many different tests.

**Activity:**

Students use the information from both fair testing and the Elaborate activity to design fuel for a rocket.

## Major Concepts

- Testing helps improve final designs.
- A fair test is an important part of investigations.
- Analyzing the data from tests helps people make decisions about their designs.
- The results of different tests lead to a functional final product.

## Goals for the Chapter

By the end of this chapter, students should

- be able to explain the importance of testing
- describe how testing the parts of a product helps the final design
- understand what it means to conduct a fair test
- be able to conduct fair tests to decide on a solution.