TECHNOLOGY in Practice

Applications and Innovations

Chapter Overview, Concepts, and Goals
Chapter 2, Diversity in Technology

Chapter Overview

In Chapter 1, “Consumer Concerns,” students explored criteria and constraints, and how they affect the design of products. In Chapter 2, “Diversity in Technology,” students will focus on how criteria and constraints affect the end product. They will think about why products with the same goal would have similar or different designs. They will think about what causes more or less diversity among the designs for a product.

In the **Engage** activity, *One Problem, Different Designs,* students will look at different products that have the same purpose. They will create a Venn diagram to show what is similar between the products and what is different.

In the **Explore** activity, *Designing with Shapes,* students will look at how different criteria and constraints affect the diversity of their designs for a work of art and a living room of furniture. After their work in the activity, they will reflect on how criteria limited the diversity of their designs.

The **Explain** activity, *Ideas That Fly,* has students create airplane designs based on criteria and constraints. They will read about how criteria and constraints affect the diversity of designs.

In the **Elaborate** activity*, Human Factors as a Design Constraint,* students will focus on human factors as one design constraint. They will role-play young engineers while dividing human factors into physical, mental, and behavioral characteristics.

In the **Evaluate** activity, *Sharing about Design Diversity,* students will create a presentation to share what they have learned about how criteria and constraints affect the diversity of designs.

Chapter Organizer

Engage—One Problem, Different Designs

Key idea:
Different designs can serve the same purpose.
Activity:
Students look at products that have the same purpose, and then create a Venn diagram to show the similarities and differences between the products.
Linking question:
What factors lead to there being different designs for the same purpose?

Explore—Designing with Shapes

Key idea:
Different purposes, ideas, and materials can lead to the diversity of designs.
Activity:
Students use shapes to design different products to see what affects the amount of diversity in their designs.
Linking question:
What affects how similar or different designs are?

Explain—Ideas That Fly

Key idea:
Constraints and criteria play a role in the diversity of designs.
Activity:
Students use criteria and constraints to design airplanes, and then determine the amount of diversity among the designs.
Linking question:
What other factors limit design?

Elaborate—Human Factors as a Design Constraint

Key idea:
Human factors are a constraint that affects the diversity of designs.
Activity:
Students role-play a scenario to determine examples of different kinds of human constraints.
Linking question:
How much diversity is there in designs for the same product?

Evaluate—Sharing about Design Diversity

Key idea:
Diversity changes as criteria and constraints change.
Activity:
Students create a presentation to share what they have learned about how criteria and constraints affect the diversity of designs.

Major Concepts

- Criteria and constraints lead to diversity in designs.
- The purpose of a technology can affect its design.
- Human factors are a constraint that affects designs.
- Diversity changes as criteria and constraints change.

Goals for the Chapter

By the end of this chapter, students should

- understand how criteria and constraints affect the diversity of designs
- be able to explain the role of human factors in the diversity of designs
- be able to describe how the amount of diversity in designs changes as criteria and constraints change.