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Warm-Up | Technological Design

Lesson Question

Lesson Goals

Explore technological design.

Describe the four _____ of technological design.

Compare the processes of technological design and scientific investigation.

Evaluate a technological design to determine if it meets specific _____.

Words to Know

Fill in this table as you work through the lesson. You may also use the glossary to help you.

criteria	the standards used to make a _____ or decision
prototype	an original _____ from which later versions are developed

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Science and Technology

- Science is a process that involves the collection of information and ideas supported by evidence. Science also:
  - seeks ways to meet the needs of society.
  - influences _____ in technology.
- Technology is the application of new _____ or devices to solve problems. Technology also:
  - influences the progress of science.

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Slide 2

Stages of Technological Design

Technological design involves applying [ ] knowledge to create products that meet specific needs.

Identify a problem or need.	Design a solution.	Implement the solution.	Evaluate the solution.
• Define a need. • [ ] related information.	• Establish [ ]. • Prepare the initial design.	• Build and test a [ ]. • Analyze the results.	• Redesign and [ ]. • Report the solution.

The ATHLETE Robotic Rover

Identify a problem or need.	A [ ] vehicle is needed to unload and transport cargo.
Design a solution.	Create initial designs for prototypes.
Implement the solution.	Test the various prototypes' capabilities.
Evaluate the solution.	Redesign and retest improved prototypes. Develop a full-sized [ ].

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Slide 4

Scientific Investigation

1. Identify a problem or need.
2. Research related information.
3. Design an [ ].
4. Conduct an investigation.
5. Analyze the [ ].
6. Evaluate the conclusions.
7. Communicate the [ ].

Scientific Investigation vs. Technological Design

Scientific Investigation

1. Identify a problem or [ ].
2. Research related information.
3. Design an investigation.
4. Conduct an investigation.
5. Analyze the results.
6. Evaluate the [ ].
7. Communicate the findings.

Technological Design

1. Identify a problem or need.
   - Research related [ ].
2. Design a solution.
3. Implement the solution.
   - Analyze the [ ].
4. Evaluate the solution.
   - Report the solution.

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Slide 7

Cost-Effectiveness

- Cost-effectiveness means maintaining the [ ] cost for production.
  - **Example:** A computer engineering company imports parts from another country. Each part costs $0.35 and shipping costs $10 per case. One case contains 100 parts. A new, domestic company makes the parts for $0.40 each and ships them for $8 per case. Which is more cost-effective if the company needs just one case of parts?

$0.35 \times 100 = \$35 + \$10$

$= $ [ ]

$0.40 \times 100 = \$40 + \$8$

$= $ [ ]

Time-Effectiveness

- Time-effectiveness means minimizing the amount of [ ] it takes to make a product.
  - **Example:** It takes one engineer 10 hours to assemble a product by hand. With a machine, the work can be completed in just five hours. Which is more time-effective?

Cost-Effectiveness vs. Time-Effectiveness

- Trade-offs may be necessary.

	Import	Domestic
Total Cost	$45	$48
Shipping Time	Up to 14 days	Up to 7 days

Time to complete production: 14 days

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Slide 9

Technological Design Criteria

- The product of a technological design should:
  - solve the problem.
  - be available.
  - be _____.
  - be _____.
  - not cause _____ to users.

Benefits and Risks of Using Headphones

The benefits of technological design should always outweigh the risks.

Benefits	Risks
• Allow users to listen to music without disrupting others	• Could damage _____
• Can _____ distractions	• May be a _____
• Are _____	• Can be lost or broken

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Summary | Technological Design

Lesson Question

What is technological design?

Answer

Slide 2

Review: Key concepts

Scientific Investigation

1. Identify a problem.
2. Research related _____.
3. Design an investigation.
4. Conduct an investigation.
5. _____ the results.
6. Evaluate the conclusions.
7. Communicate the findings.

Technological Design

1. Identify a _____ or need.
   - Research related information.
2. Design a solution.
3. Implement a _____.
   - Analyze the results.
4. Evaluate the solution.
   - Report the solution.

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Slide 2

Review: Key concepts

- The process and products that result from technological designs should:
  - solve a problem.
  - be cost-effective and [ ]-effective.
  - be available.
  - be affordable.
  - be durable.
  - not cause harm to [ ].
- The benefits should outweigh the [ ].

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Summary | Technological Design

Use this space to write any questions or thoughts about this lesson.

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