

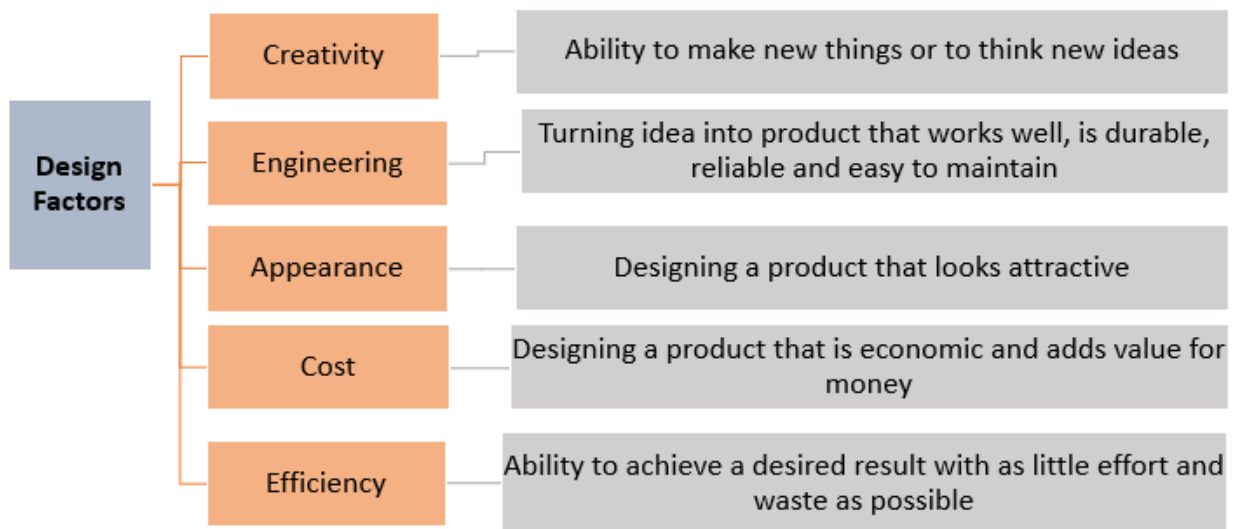
Chapter 2.3: The Design Process - Answers

Vocabulary List!

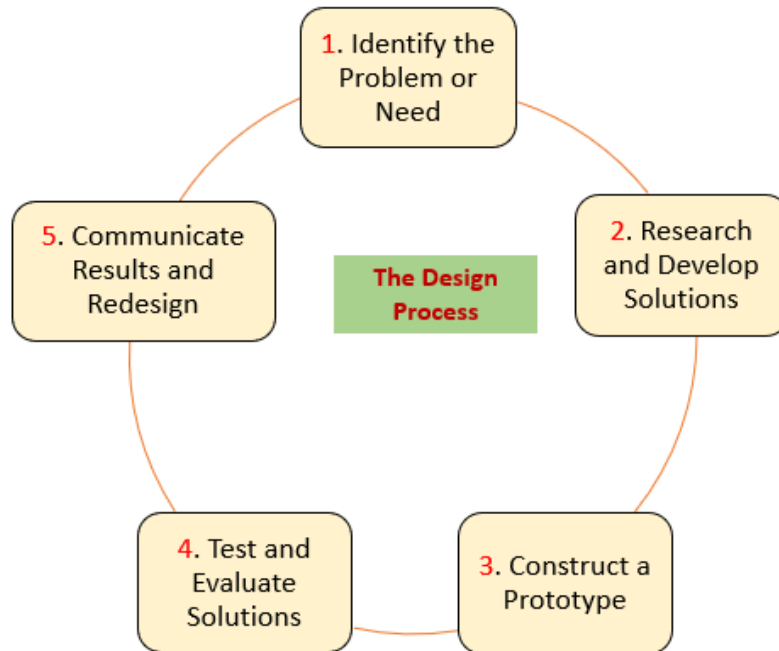
1. **Design Process** – A series of steps used to find solutions to specific problems.
2. **Problem Statement** – A statement that clearly defines a problem to be solved.
3. **Criteria** – are the standards by which the product will be evaluated.
4. **Constraints** – are the limitations put on the design of the product from outside factors such as cost, efficiency, environmental impact or availability of materials.
5. **Brainstorming** – is a problem-solving technique that involves individuals contributing ideas without the fear of being criticized.
6. **Pugh Chart** – is a method used to compare options or solutions.
7. **Prototype** – is a full-scale model that is used to test a new product.

Mind Map

1. Design Factors – 5 Factors



2. Design Process



Reading Check (pg 52)

1. Why is efficiency important in designing a product?

Answer: Because efficiency leads to little effort and waste in designing product. Efficient products are produced more quickly and at less cost.

Reading Check (pg 53)

2. Why is creativity important design factor?

Answer: Because creativity leads to ideas that are original and imaginative. New products start with an idea from someone.

Reading Check (pg 53)

3. Why do products come in different designs?

Answer: Because consumers have different tastes. Everyone has different ideas about what is attractive.

Visual Check (pg 54)

4. Which step evaluates the strengths and weaknesses of the solution?

Answer: Test and evaluate solutions

Key Concept Check (pg 55)

5. Why is it important to have detailed problem statement?

Answer: Because it provides the necessary information and requirements to design products.

Reading Check (pg 55)

6. Explain the difference between criteria and constraints.

Answer: Criteria – Standards for evaluation for a product.

Example: Weight of a trolley bag

Constraints – Limitation put on design of product from outside factors.

Example: Cost of materials, size of trolley bag.

Key Concept Check (pg 56)

7. What is involved in finding solutions to problems?

Answer: Brainstorming.

Visual Check (pg 56)

8. Which jacket would be the best choice? (refer Table 3 – Pugh Chart on page 56)

Answer: Jacket 1

Key Concept Check (pg 57)

9. Why is it important to test a solution?

Answer: Testing a solution allows the engineer to find out and correct problems with the design.

Key Concept Check (pg 58)

10. What are the steps of design process? (Learn either the answer given below or the Mind Map)

Answer:

1. Defining a problem
2. Collecting information
3. Developing possible solution
4. Building a model
5. Testing solution

6. Evaluating the solution
7. Redesigning the solution
8. Communicating the results

Summarize it! (Page 59)

1. What is a design process?

Answer: Design Process is a series of steps used to find solutions to specific problems.

2. How can different solutions be tested and compared?

Answer: Solutions can be tested using models and evaluated using Pugh charts, graphs, charts and tables.

Use Vocabulary (Page 60)

1. **Define** *brainstorming* in your own words.

Answer: Brainstorming is a problem-solving technique that involves individuals contributing ideas without the fear of being criticized.

2. A method used to compare options and solutions is a Pugh Chart.

3. **Use the term** *prototype* in a sentence.

Answer: Prototype is a model of a new product used for testing.

Understand Key Concepts

4. **Explain** the influence engineering has on a design.

Answer: Engineering makes sure the products work well, is durable, reliable and easy to maintain.

5. Which step in the design process has the engineer building a model for testing?

Answer: C. Construct a prototype.

6. Arrange Solve the problem of a river flooding annually by putting the steps in order.

Answer:

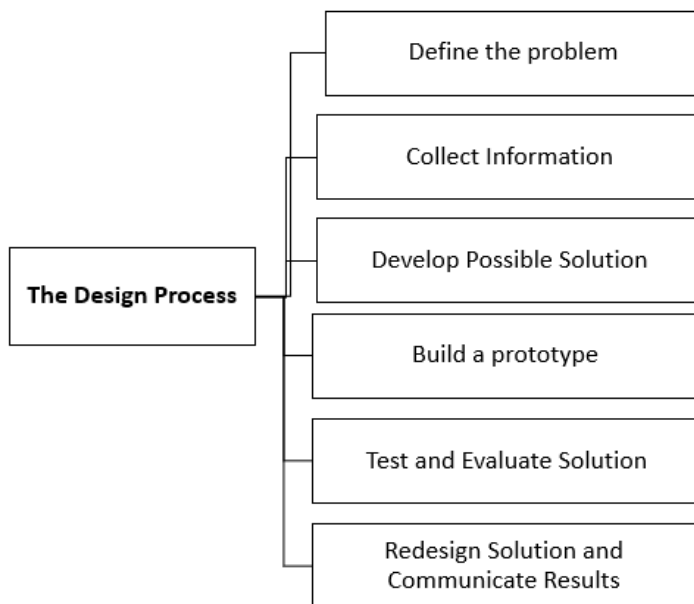
d) Write a problem statement

a) Investigating the river's source and its geography

- c) Create several designs of dams
- f) Select the most promising dam design
- b) Build a model dam
- e) Test the model
- g) Redesign the model

Interpret Graphics

7. **Organize information** Copy and fill in the graphic organizer below to list the steps in design process.



Critical Thinking

8. **Explain** Why does design process have so many steps?

Answer: The design process requires taking a series of steps to get job done. The steps in the process might change depending on the project. Building new product from scratch, for example, would require more steps than improving on an already existing product.