

**CAREER
PATHS**

Engineering

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Express Publishing

Table of Contents

Book

1

Unit 1 - What is engineering?	4
Unit 2 - Shapes	6
Unit 3 - Materials	8
Unit 4 - Tools	10
Unit 5 - Energy	12
Unit 6 - Simple Machines	14
Unit 7 - Working with numbers	16
Unit 8 - Types of measurement	18
Unit 9 - The scientific method	20
Unit 10 - Safety precautions	22
Unit 11 - Civil engineering	24
Unit 12 - Chemical engineering	26
Unit 13 - Mechanical engineering	28
Unit 14 - Electrical engineering	30
Unit 15 - Aerospace engineering	32
Glossary	34

Book

2

Unit 1 - History of engineering	4
Unit 2 - Traits of an engineer	6
Unit 3 - An engineer's education	8
Unit 4 - Presenting information	10
Unit 5 - Problem solving	12
Unit 6 - Creativity	14
Unit 7 - Tables and graphs	16
Unit 8 - Dimensions and drawings	18
Unit 9 - Materials and properties	20
Unit 10 - Working with numbers	22
Unit 11 - Sales engineering	24
Unit 12 - Agricultural engineering	26
Unit 13 - Industrial engineering	28
Unit 14 - Software engineering	30
Unit 15 - Genetic engineering	32
Glossary	34

Book

3

Unit 1 - Newton's laws	4
Unit 2 - Laws of thermodynamics	6
Unit 3 - Rate processes	8
Unit 4 - Statics and dynamics	10
Unit 5 - Electricity	12
Unit 6 - SI System of Units	14
Unit 7 - Engineering design method	16
Unit 8 - Models	18
Unit 9 - Accounting	20
Unit 10 - Statistics	22
Unit 11 - Computer engineering	24
Unit 12 - Materials engineering	26
Unit 13 - Environmental engineering	28
Unit 14 - Nuclear engineering	30
Unit 15 - Biomedical engineering	32
Glossary	34

9 The scientific method



problem



variables



experiment

PROJECT PROPOSAL FORM

Observation: Some computer cases **dissipate**, or lose, heat better than others.

Problem: Why do they dissipate heat better?

Hypothesis: The cases contain different materials. Some of these materials hold heat in longer than others.

Experiment: We are checking how well different materials dissipate heat.

Methodology: We are testing glass and metal cups. They are our **variables**. A plastic cup serves as the **control**.

Procedure: Pour water into each cup. Heat the water to 60 degrees Celsius. Wait five minutes. Check the temperature of the water again and record the **data**. Analyze the data and present the **results**.



observation

Get ready!

1 Before you read the passage, talk about these questions.

- 1 When do people use the scientific method?
- 2 Why is the scientific method important?

Reading

2 Read this proposal form from an engineer. Then, complete the table using information from the proposal.

Step	Details
Observation	Some computer cases _____
Hypothesis	Some computer case materials _____
Methodology	Variables: _____ Control: _____

Vocabulary

3 Match the words (1-6) with the definitions (A-F).

- | | |
|-------------------|-----------------|
| 1 ___ observation | 4 ___ analyze |
| 2 ___ data | 5 ___ control |
| 3 ___ variable | 6 ___ dissipate |

- A something that changes during an experiment
- B a particular event or behavior that you witness
- C to study something closely to learn more about it
- D something that does not change in an experiment
- E something that you collect and study
- F to slowly become less strong or disappear

4 Choose the word that is closest in meaning to the underlined part.

- 1 Rob is performing a(n) scientific study.
A problem B experiment C control
- 2 Please explain your process.
A methodology B problem C hypothesis
- 3 What is your attempt to explain this observation?
A hypothesis B variable C experiment
- 4 Present the findings of your experiment.
A observations B hypotheses C results
- 5 All experiments begin with a question to answer.
A control B problem C methodology

5 Listen and read the proposal. What data will be recorded?

Listening

6 Listen to a conversation between an engineer and his manager. Mark the following statements as true (T) or false (F).

- 1 ___ The manager doesn't understand the problem.
- 2 ___ The manager suggests adding extra materials.
- 3 ___ The engineer agrees to test rubber as a variable.

7 Listen again and complete the conversation.

Engineer: Hi Ms. Smith. Did you get a chance to review my 1 _____?

Manager: Uh, yes. You want to study how different materials dissipate heat, right?

Engineer: Yes. It could really help us design better computer cases.

Manager: The problem and 2 _____ are clear. But I have a suggestion.

Engineer: Sure. What is it?

Manager: How 3 _____ other materials as 4 _____? Maybe foam and rubber?

Engineer: Well, we know that rubber retains a lot of 5 _____.

Manager: 6 _____. But try to think of some other materials to test.

Speaking

8 With a partner, act out the roles below, based on task 7. Then switch roles.

USE LANGUAGE SUCH AS:

Did you get a chance to ...?

It could really help ...

I have a suggestion.

Student A: You are submitting a proposal for an experiment. Talk to Student B about:

- the proposal form
- suggestions
- variables

Make up a name for your manager.

Student B: You are Student A's manager. Answer his or her questions.

Writing

9 Use the conversation from Task 8 to complete the manager's evaluation form.

PROJECT PROPOSAL EVALUATION FORM

Is problem clear? Y / N

Is hypothesis clear? Y / N

Suggestion for experiment:
