PHYSICS YEAR 11 - MODULE 3 - LESSON 17

Thermal Energy, Temperature and Specific Heat Capacity

Use this worksheet after reading the lesson to practise the key ideas and prove you can meet the success criteria.

Name _____

Date _____

Class _____

1. Key Ideas

Thermodynamics starts with a vocabulary trap: temperature, thermal energy, and heat are not the same thing. Once those ideas are separated properly, specific heat capacity and thermal equilibrium become much easier to reason about.

- The difference between temperature, thermal energy, and heat
- How kinetic theory links temperature to average particle kinetic energy

2. Success Criteria

By the end, you should be able to:

- The difference between temperature, thermal energy, and heat
- The meaning of specific heat capacity
- The equation $Q = mc\Delta T$

3. Key Terms

Work
The product of force and displacement in the direction of the force; W = Fd.

Energy
The capacity to do work, measured in joules (J).

Kinetic Energy
The energy of motion; KE = ½mv^2.

Potential Energy
Stored energy due to position or configuration.

Power
The rate at which work is done or energy is transferred; P = W/t.

Conservation of Energy
The principle that energy cannot be created or destroyed, only transformed.

4. Activity: Build the Lesson Map

Use the lesson to complete the table. Keep answers brief but specific.

Prompt	Your answer
Main concept	
Important example	
Common mistake to avoid	
How this links to the next lesson	

5. Short Answer Questions

1. 7. Distinguish between temperature, thermal energy, and heat.

BAND 3 3 MARKS

2. 8. Calculate the energy needed to heat 1.5 kg of water by 10°C. Use $c = 4180\ \text{J/kg·K}$.

BAND 4 3 MARKS

3. 9. Explain why a hot metal object and cooler water reach a common final temperature when placed together.

BAND 5 4 MARKS

6. Extend: Apply the Idea

BAND 5/6 5 MARKS

A student gives a memorised answer about Thermal Energy, Temperature and Specific Heat Capacity but does not use evidence or reasoning.

Improve the answer by writing a stronger response that uses accurate terminology, a relevant example and a clear explanation.

7. Multiple Choice

1. What is the best first step when answering a question about Thermal Energy, Temperature and Specific Heat Capacity?

- [ ] A. Identify the key concept being tested
- [ ] B. Write every fact from memory
- [ ] C. Ignore the command word
- [ ] D. Skip examples and evidence

2. Which answer would show stronger understanding of Thermal Energy, Temperature and Specific Heat Capacity?

- [ ] A. An answer with accurate terms and reasoning
- [ ] B. A copied definition only
- [ ] C. A single-word response
- [ ] D. An answer with no example

3. What should you do if a question asks you to explain?

- [ ] A. Link the idea to a reason or cause
- [ ] B. List unrelated facts
- [ ] C. Only draw a diagram
- [ ] D. Write the shortest possible answer

8. Success Criteria Proof

Finish with evidence that you can do each success criterion.

SUCCESS CRITERION 1

Prove that you can: The difference between temperature, thermal energy, and heat

BAND 3 2 MARKS

SUCCESS CRITERION 2

Prove that you can: The meaning of specific heat capacity

BAND 4 3 MARKS

SUCCESS CRITERION 3

Prove that you can: The equation $Q = mc\Delta T$

BAND 5 4 MARKS

One thing I still need help with: