

Programming Activity 3

Temperature conversion program

(Unit 1 Problem solving: pages 12–23)

Learning objectives

- Understand how to create an algorithm to solve a particular problem
- Make use of programming constructs (sequence, selection and iteration) and use appropriate conventions (flowchart, pseudocode, written description, draft program code)

Assessment objectives

AO2, AO3

Spec alignment

Page 12, Sections 2.3.1, 2.3.4, 2.4.1

Task

Write a pseudocode program to convert from degrees Celsius to Fahrenheit. The formula for this conversion is $(C \times 9/5) + 32$, where C is the temperature in Celsius.

Misconceptions/barriers

This task should be used as an introductory task to help students understand the process of writing a pseudocode program. Initially, many students find this difficult, even for simple tasks like this one. One way to help students is to get them to write the stages of solving the problem, ignoring pseudocode initially. So a student may end up with something like:

- 1) get temperature
- 2) use formula
- 3) output result.

You can then get students to use a pseudocode reference guide (from the specification or student book) to figure out what to do one line at a time.

Differentiation

Low ability:

- Work through converting a temperature from Celsius to Kelvin as a class (formula is $C + 273.15$). This should introduce reading from the keyboard, setting a variable to a particular value and outputting that variable to the screen.
- This scaffold should provide enough information for students to attempt the above task unaided.

High ability:

- After writing the pseudocode for the conversion, they should be asked to write a program that will ask whether the user wants to convert from Celsius to Fahrenheit or Fahrenheit to Celsius. This will require the user to enter 1 for one option or 2 for the other option. Using an IF statement they should be able to implement this.

- Ask students to implement their pseudocode solution to the task in the programming language they are doing.
- After completing this, they can discuss with a partner what changes they had to make and why they needed to make them.
- Ask students to expand the range of conversions to include other measures, such as miles to kilometres.