

Lesson Plan: Memory Box

Year Group: 7 | **Duration:** 50 minutes | **Topic:** Variables

1. Overview

Core Concept: Variables — named storage boxes that hold values which can change.

Learning Objectives:

- Define what a variable is (name + value)
- Trace variable values through a sequence of events
- Understand assignment (setting a value) and update (changing a value)
- Recognise that the name stays fixed while the value changes

Key Vocabulary:

Term	Definition
Variable	A named storage location that holds a value
Value	The data stored inside a variable
Assign	Set a variable to a value for the first time
Update	Change the value stored in a variable
State	The current set of all variable values at a moment in time
Trace	Follow a program step by step, tracking variable values

2. Before the Lesson

Print:

- [worksheet-variable-trace.md](#) — 1 copy per student
- [resource-variable-labels.md](#) — print and cut, 1 set per pair (laminates if possible)

Gather:

- Sticky notes or small whiteboard sections (for the live demo)
- Markers (so label values are readable from a distance)
- Pencils for tracing worksheet

Room Setup:

- Pairs of desks for the worksheet phase
 - Clear space at front for 3 volunteers in the hook activity
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3. Timed Lesson Flow

0–5 min — Hook: Live Variable Demo

1. Choose 3 volunteers. Give each a large label card from [resource-variable-labels.md](#):
 - o Student 1: **HEALTH** — write **10** on their value box
 - o Student 2: **GOLD** — write **0** on their value box
 - o Student 3: **ITEMS** — write **[]** (empty list) on their value box
2. Read events aloud:
 - o "You find a treasure chest. $GOLD = GOLD + 20$." → Student 2 updates to **20**
 - o "A goblin attacks. $HEALTH = HEALTH - 3$." → Student 1 updates to **7**
 - o "You pick up a sword. $ITEMS = ITEMS + [sword]$." → Student 3 updates
3. Ask the class: "What's staying the same? What's changing?"
4. Key point: **The NAME stays fixed. The VALUE changes.**

5–10 min — Explain Variables

1. A variable is like a labelled box. The label (name) never changes.
2. The contents (value) can change any time you assign a new value.
3. When you write $GOLD = GOLD + 20$, the computer:
 - o Reads the current value of GOLD (0)
 - o Adds 20 (= 20)
 - o Stores the result back in GOLD (now 20)

10–30 min — Worksheet: Text Adventure Trace

1. Distribute [worksheet-variable-trace.md](#).
2. Students read the text adventure story and complete the trace table — filling in the value of each variable after every event.
3. Key discipline: fill in EVERY cell, even if the value didn't change for that variable.

30–40 min — Pair Comparison

1. Pairs compare their completed traces.
2. Discuss any cells where they disagree.
3. Work through the disagreement: which reading of the event is correct?

40–45 min — Teacher Reveals Correct Trace

Walk through the table on the board. Focus on the tricky events (negative gold, removing an item that wasn't there).

45–50 min — Debrief

- Where do variables appear in real life? (Game saves, shopping carts, user accounts, scores)
- What happens if a program forgets to update a variable? (Stale data, wrong results)
- What happens if you try to use a variable before assigning it a value?

4. Teacher Facilitation Notes

What to look for:

- Students who change the VARIABLE NAME instead of the value — the name is fixed!
- Students who forget to carry forward the previous value before adding (e.g., forgetting GOLD was 20 before subtracting 8)
- Students who skip cells — every event must be traced for every variable

How to intervene minimally:

- *"What was the value of GOLD BEFORE this event?"*
- *"The event says $GOLD = GOLD + 20$. What is GOLD right now? What do you add to it? What does GOLD become?"*
- *"Only the VALUE in the box changes. Cross out the old value and write the new one."*

Common misconceptions:

- The variable name changes when the value changes — NO. The name is permanent.
 - You can skip variables that didn't change — NO. Always trace every variable every step.
 - $ITEMS = ITEMS - [sword]$ when ITEMS is empty crashes the program — YES! This is worth discussing.
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5. Extension / Early Finisher Tasks

1. **Write 3 more events** that change the variables. What are the final values?
 2. **Error events:** What should a program do if GOLD goes below 0? Write an IF statement to prevent it.
 3. **Design your own:** Create a different text adventure with different variables (e.g., FUEL, PASSENGERS, DISTANCE for a space game).
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6. Key Takeaway

A variable is a named storage box. The name is fixed — it never changes. The value inside can change at any time. Variables are how programs remember things.