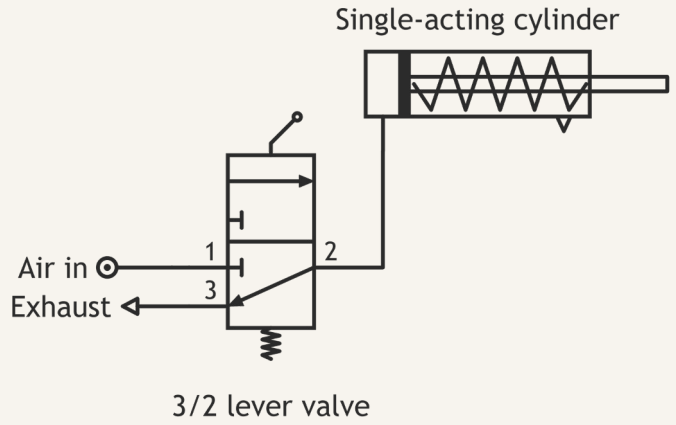
Daily Review

1	**State** what 3/2 means.	3 ports, 2 states
2	**Name** the rod moving out.	Outstroke
3	**State** what pushes a single-acting rod in.	A spring
4	**State** the regulator setting while you build.	0
5	**State** the pressure we test at.	1 to 2 bar

Actuators and Valves

Move the lever. Where does the air go?



3/2 lever valve

S3 Engineering Science

By the end of this lesson…



1. I can **build** and **test** a lever valve circuit
2. I can **name** the parts of a valve **symbol**
3. I can **draw** a circuit full size

Meet the Parts: the Lever Valve

3/2 valve

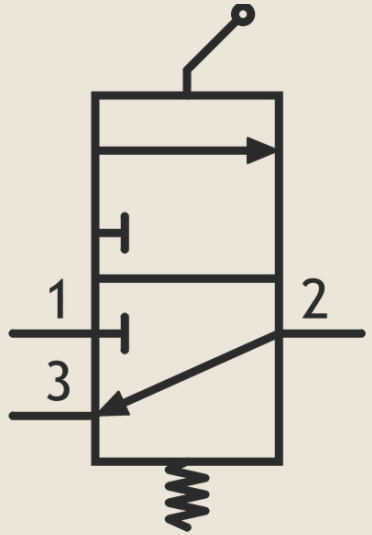
3 ports, 2 states

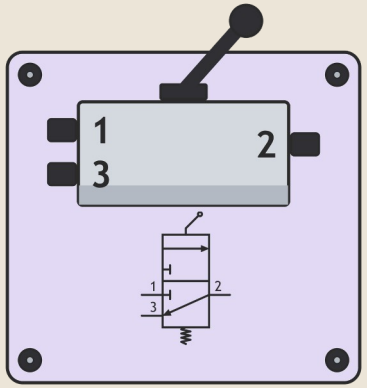
Lever

move it to change **state**

Spring

pushes it **back**





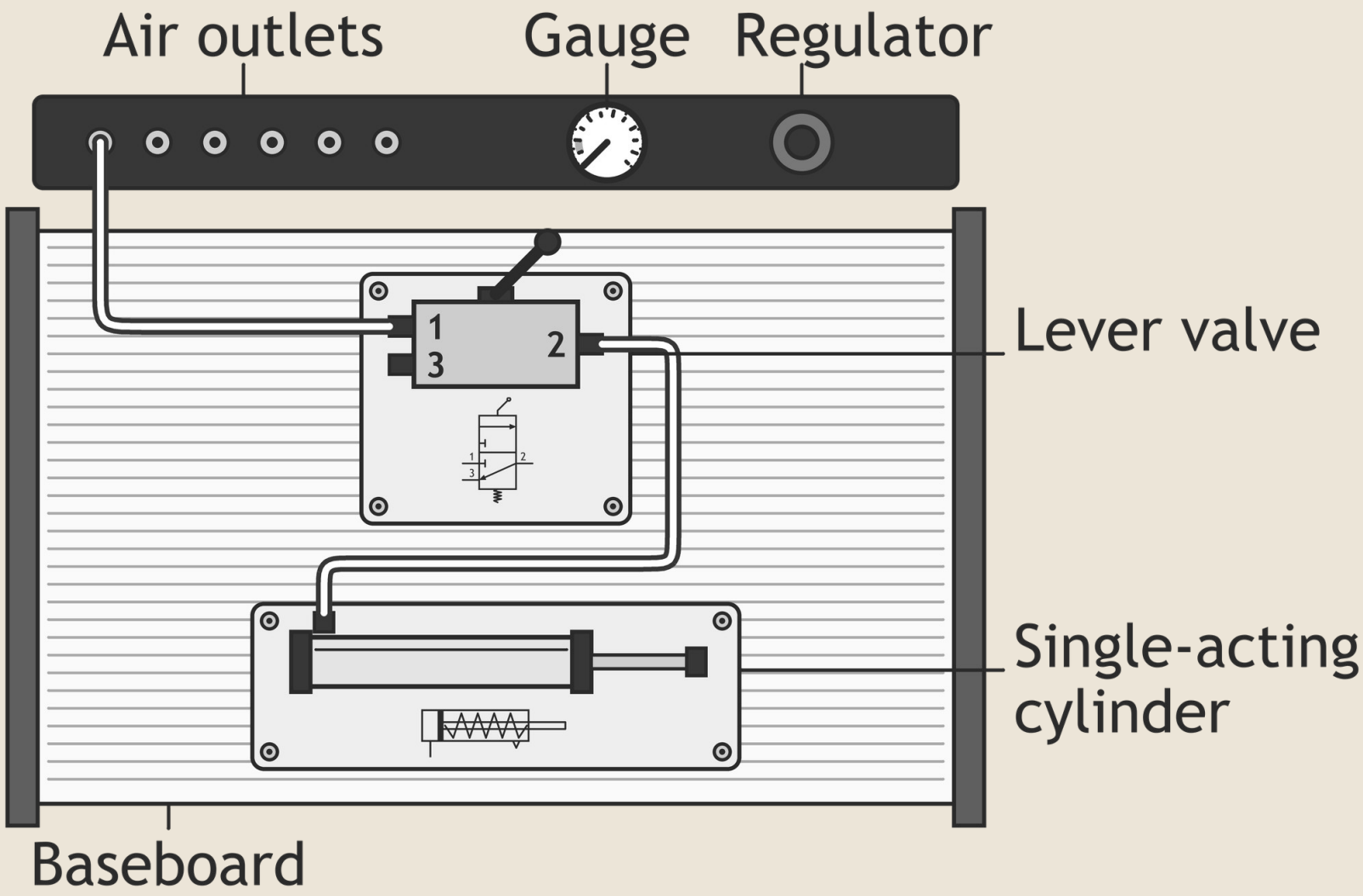
The real lever valve.

Collect, Simulate and Build

Collect the parts on the layout, tubing and goggles.

SAFETY Regulator at 0 to build. 1 to 2 bar to test.

Simulate, **build**, hands up. **Move** the lever, then **let go**.



What Did You Find?

1. **State** what the rod did when you moved the lever.
2. **State** what the rod did when you let go.
3. **State** what moved the lever back.
4. **State** where the air left when you let go.

Out

In

Its spring

At the valve

Second Start

1	**Name** the valve you moved by hand today.	Lever valve
2	**State** what moves the lever back.	A spring
3	**Name** the rod moving in.	Instroke
4	**State** what 3/2 means.	3 ports, 2 states
5	**State** the regulator setting to build.	0

Why: Parts of the Symbol (1 of 2)

Box

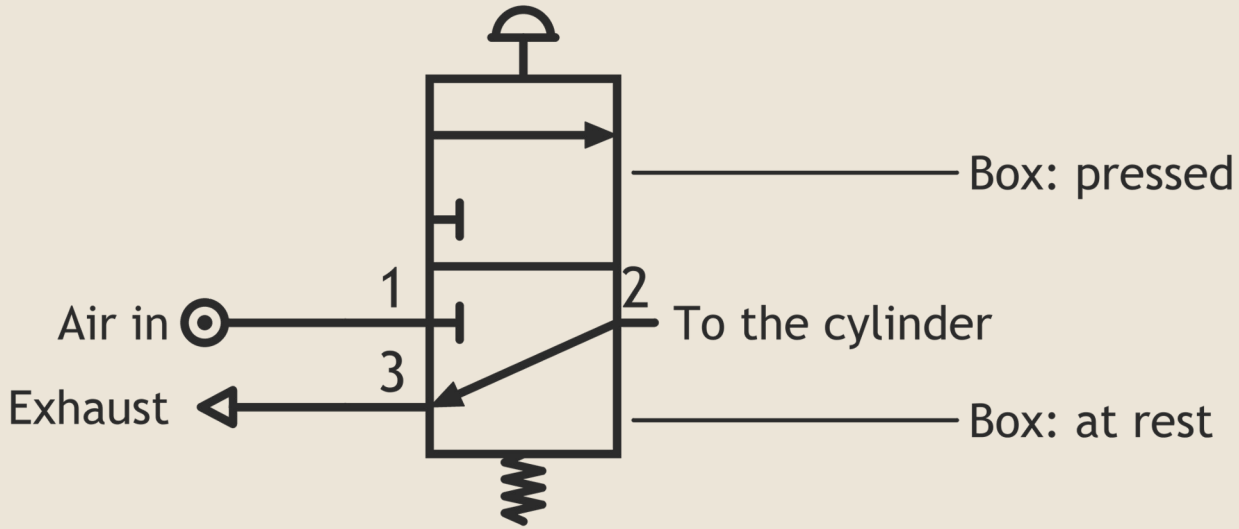
one **state** of the valve

2 boxes

pressed and at **rest**

Ports

1 **in**, 2 **out**, 3 **exhaust**



Why: Parts of the Symbol (2 of 2)

Arrow

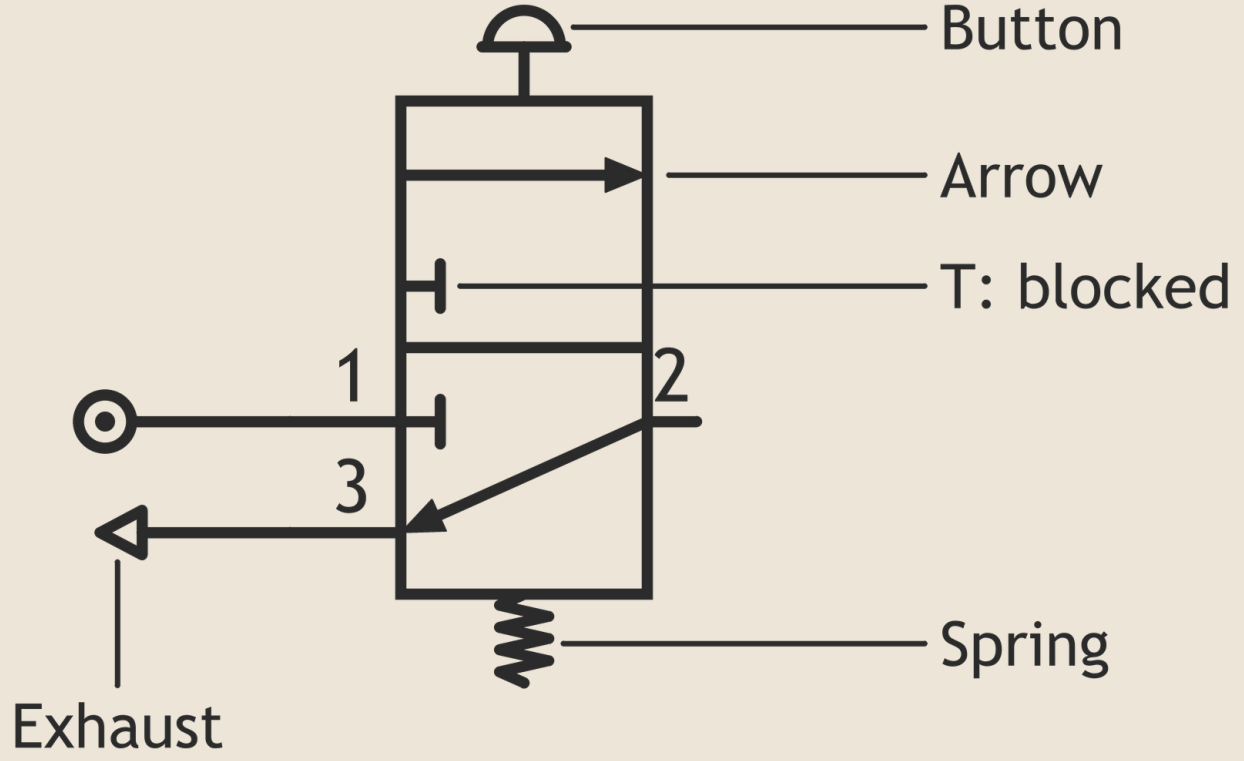
the **path** the air takes

T

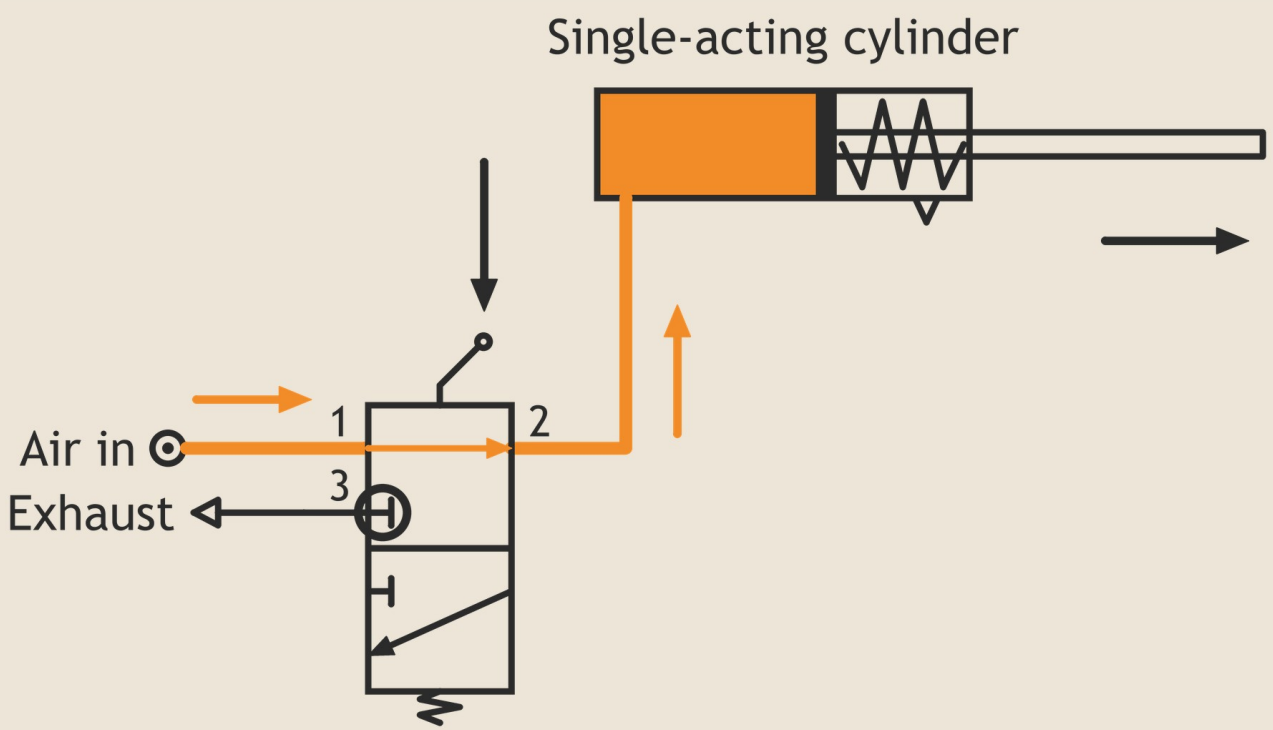
that port is **blocked**

Spring

pushes the valve **back**



Why: Move the Lever



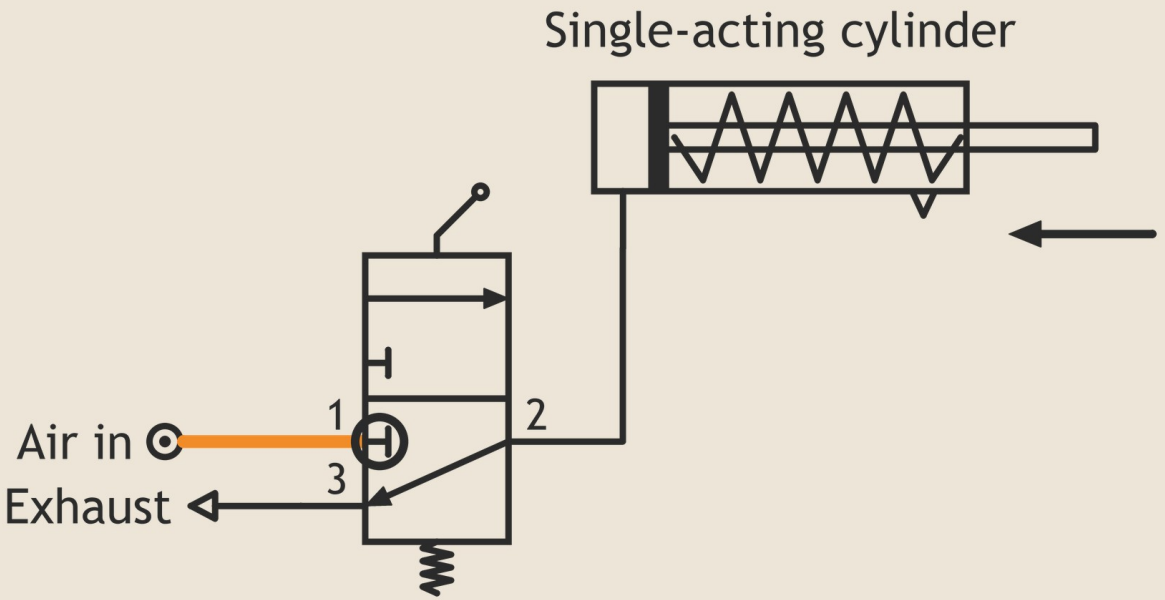
1 Move the lever: both boxes slide **down**.

2 Port **3** is now blocked.

3 Air flows in port **1**, out of port **2**.

4 The rod moves **out**: the outstroke.

We Do: Let Go



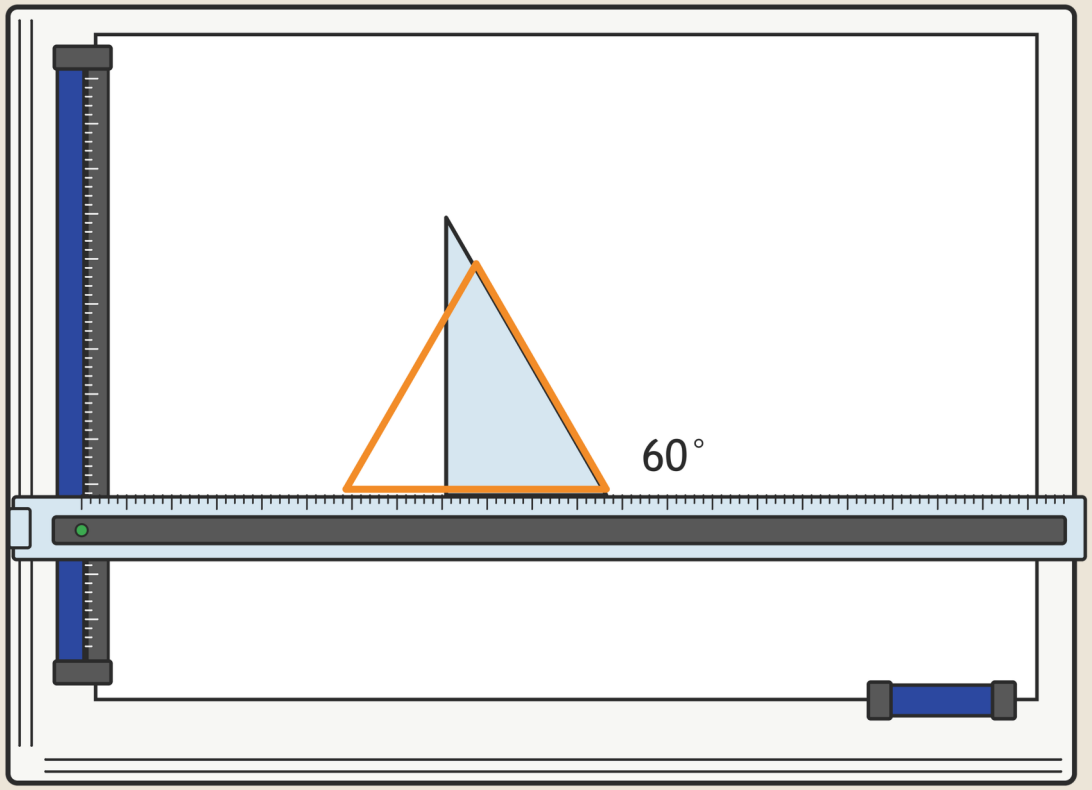
1 Let go: the **spring** pushes the boxes up.

2 Port **1** is now blocked.

3 Air leaves: in port 2, out of port **3**.

4 The rod moves **in**: the instroke.

Draw It: Using the Board



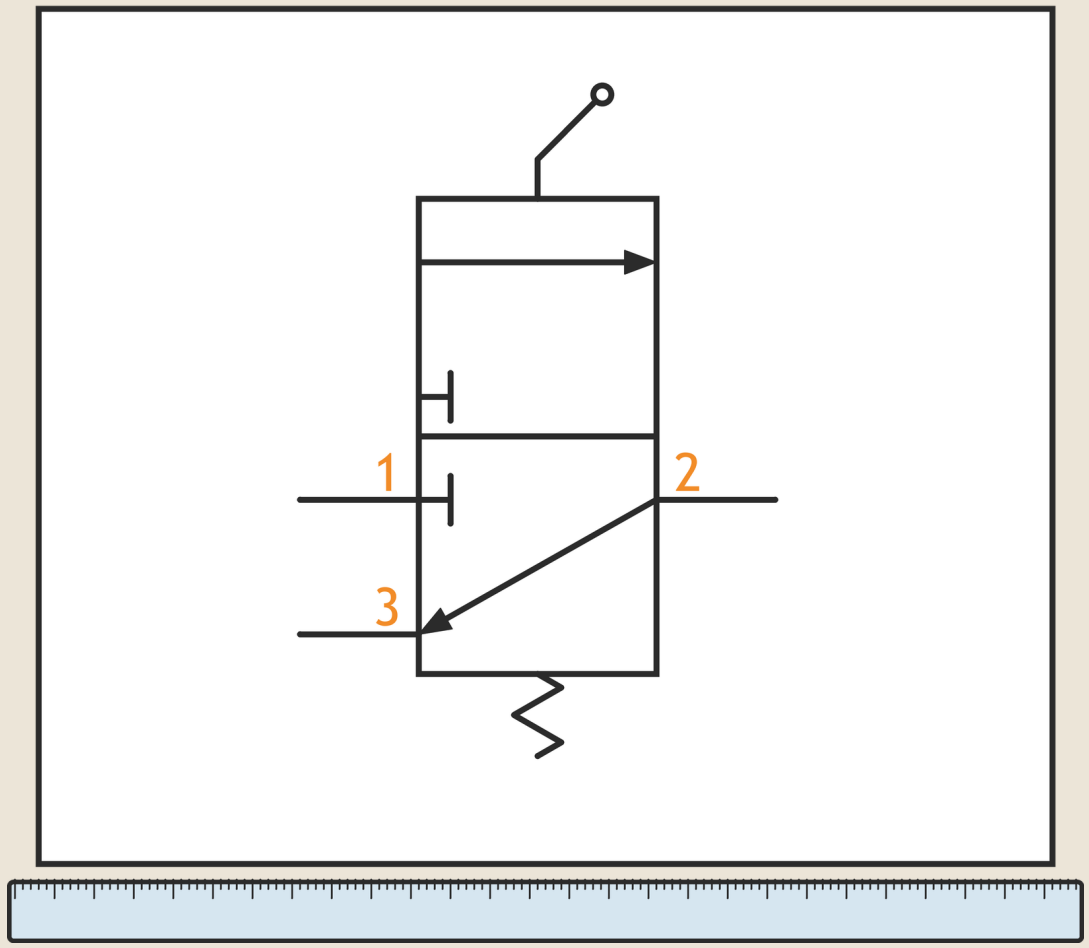
1 Clamp: paper in the bottom left corner.

2 Horizontal: pencil along the top of the rule.

3 Vertical: set square on the rule.

4 Angles: the 60° corner draws the exhaust.

Draw the Valve, Full Size



1 Two 30 mm squares, one on top.

2 Port lines, 15 mm long.

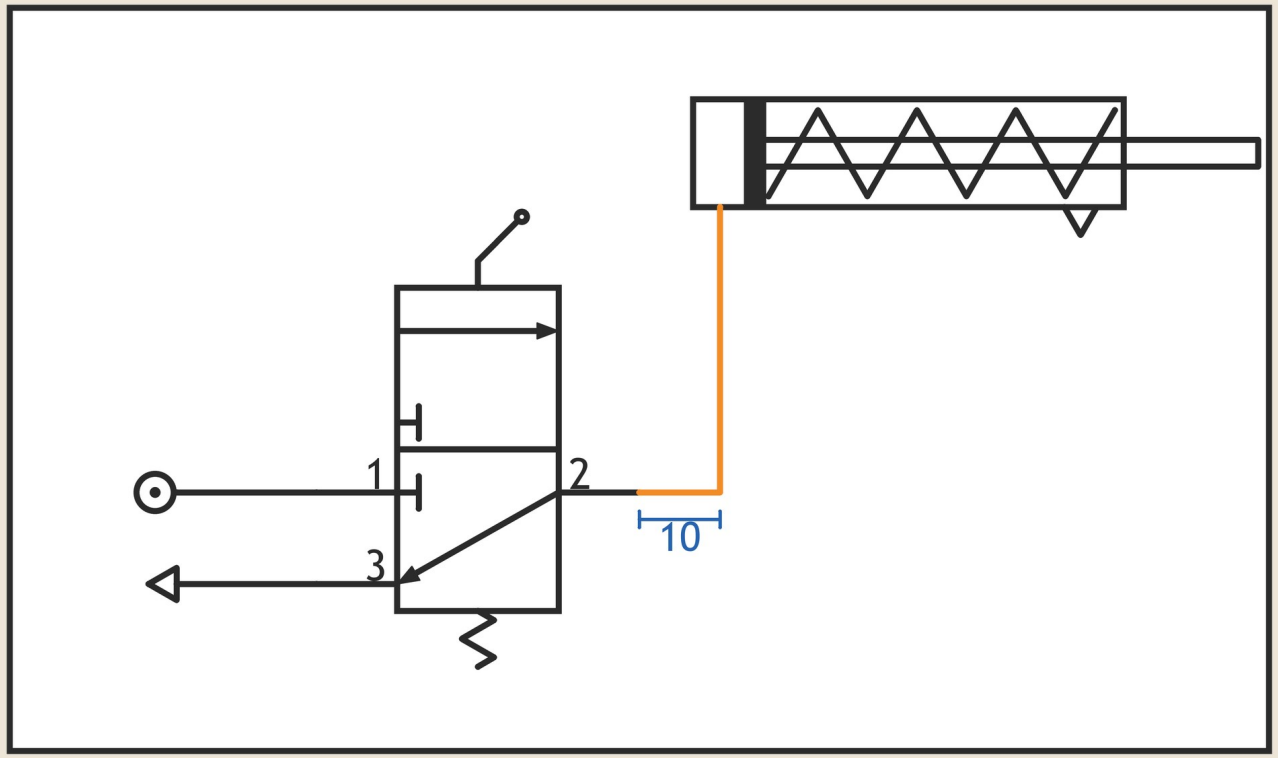
3 Straight arrow and two Ts.

4 Diagonal: 60/30 set square.

5 Lever at 45°. Spring at 30°.

6 Number the ports 1, 2, 3.

Draw the Rest, Full Size



1 Cylinder 80 × 20 mm; rod 25 mm out.

2 Spring at 60°; small triangle below.

3 Air in: 8 mm circle. Exhaust: 6 mm triangle.

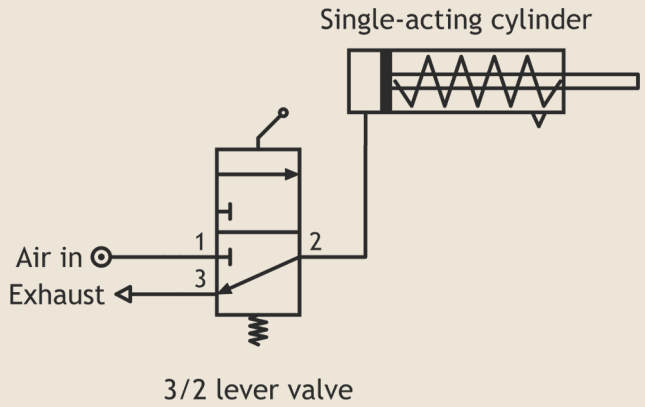
4 Pipe: 10 mm across, then up.

Review Questions

Booklet page 5

Answer Questions 1 to 5 on your own.

Finished? Try the Challenge.



3/2 lever valve

Answers: Review Questions



Question	Answer
1	state; 1; 2; 3
2	path; blocked
3	out; spring
4	lever; push-button
5	3/2
Challenge	Two boxes, ports 1 2 3, arrow and Ts, lever, spring

Look back — by the end of this lesson…



1. I can **build** and **test** a lever valve circuit
2. I can **name** the parts of a valve **symbol**
3. I can **draw** a circuit full size

Credits

Real part drawings: Sources: kit drawings by R Stewart, from the Matrix CP2080 kit.

Kit layout: The Lesson 2 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Valve symbol: The Lesson 2 circuit adapted from the Matrix CP2080 Pneumatics Essentials worksheets (© Matrix Technology Solutions Limited). Drawings by R Stewart.

Drawing boards: Sources: drawing board pictures drawn by R Stewart from photos of the class boards.

R Stewart - October 2026