

# Activity 1 – Build & Test



## Aim:

Build and test a small electronic robot, ready for use in other activities.

## Materials:

- One robot kit per team (ideally three pupils)
- Activity 1 video (approx. 11 mins; takes pupils through the build)
- Step-by-step building guide sheet
- Pupil worksheet (hand out after video)
- Fault-finding chart

## Location:

Build and test can be done on a desk, but driving requires a larger area, such as hall or corridor with wooden or lino floor.

## Background:

- The Robokid project allows pupils to work with a small robot vehicle through a range of challenges and tasks. The first task is to build the robot, make sure it works and practice driving it.
- The electronics in Robokid is very similar to the electronics in mobile phones, MP3 players, cameras, games consoles, cars, computers and plasma screen TVs. For example, the brain of the robot is an electronic chip that is used in many modern cars and household products.
- The robot is a simple example of small robot vehicles that are being developed for many applications, such as planet investigation (e.g. the moon or Mars), underwater exploration (e.g. oil exploration), clearing of dangerous objects (e.g. bombs, radio-active materials), carrying materials in factories and hospitals, and cleaning carpets and floors.

## Running the Activity:

- Form teams (suggest three pupils per team) and show Activity 1 video (approx. 11 mins). The video demonstrates the build process step-by-step; may need to be shown twice.
  - Part 1: <https://www.youtube.com/watch?v=QFCfiEa7dII&>
  - Part 2: <https://www.youtube.com/watch?v=abbJYOfb6-E&>
- Hand out Activity 1 worksheets:
  - A: Activity worksheet guiding pupils through the tasks, inc. testing with supplementary worksheet B.
  - B: Details the running of the initial test sequence to check the robot is fully functioning and has been wired correctly.
- Experiment by driving the robot.

## There are three supporting documents for teachers:

- 1: Diagnosing the problem if robot fails the self-test.
- 2: Photographic build procedure (shouldn't be necessary for pupils).
- 3: More detailed test chart to diagnose the problem if document 1 doesn't solve it.

## Notes on Troubleshooting:

The main issue reported from the build sequence has been incorrect wiring of the motors. The test mode highlights wiring problems, but the following visual check can also be carried out, before switching on:

- BLACK wire for LEFT motor should be connected to LEFT connector clamp 1
- RED wire for LEFT motor should be connected to LEFT connector clamp 2
- BLACK wire for RIGHT motor should be connected to RIGHT connector clamp 1

- RED wire for RIGHT motor should be connected to RIGHT connector clamp 2

On the circuit board the left side is shown by 'L' and the right by 'R'.

The joystick controller for mode 'J0' uses the left switch for the left motor and the right switch for the right motor; the off position is when the switch is in the middle.

The rivet for the pen holder should not be pushed hard until it is located in the hole in the board. There are spare rivets in the class kit if there is a problem. It is also quite easy to remove a rivet by pushing the pin of the rivet with the edge of the screwdriver.