# Part 1 Sensors and Introduction to electronics - constructing the sensors

Sensors are used to read information from the world around us and the environment. They are often connected to computers or appliances helping us make more informed decisions.

This lesson introduces simple sensors, through the context of a simple game with toy cars where students are asked to determine which car finishes first.

## Learning objectives

* Students can identify a the purpose of a sensor, what it measures and why
* Students are able to identify and describe the function the following electronic components: transistor, phototransistor, LED, resistor
* Students are able to construct their own sensor circuits from building block components
* Students evaluate accuracy and limiations of certain sensors

## Resources (for demo)

|  |  |
| --- | --- |
| 1 | Ramp |
| 2 | Light sensor |
|  | Raspberry Pi with demo software |

## Resources (for activity, per group)

|  |  |
| --- | --- |
| 1 | Power supply |
| 1 | 2N2222 Transistor |
| 4 | 1K resistor |
| 1 | 100k potentiometer |
| 1 | OFT3301 IR phototransistor |
| 1 | IR LED |
| 1 | LED |

## Lesson Outline

### 30 minutes – Demonstration: use of sensors

* Demonstrate 2 toy cars rolling down ramp and ask students which car reached the bottom first
* Explain that what people see isn’t always accurate and that technology can be used to more accurately measure the world
* Demonstrate contact and light gate sensors to students
* Explain that sensors a simple electronic circuits which can be connected to computers
* Introduce components inside light gate sensor:
  + Phototransistor – detects infrared light
  + Transistor – amplifies output from phototransistor
  + LED – shows output from sensor
  + Potentiometer – used to adjust sensitivity light sensor

### 30 minutes – Activity: introduction to electronic components

* Hand out components and worksheet to small groups of students
* May require step-by-step guidance depending on age/ability of class

# Constructing Simple Sensors