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# Technology, Ethics and The Future

# Activity: What Is Technology?

# Technology

***The application of scientific knowledge for practical purposes, especially in industry.***

***Machinery and equipment developed from the application of scientific knowledge.***

***The branch of knowledge dealing with engineering or applied sciences.***

https://en.oxforddictionaries.com/definition/technology

***Technology refers to methods, systems, and devices which are the result of scientific knowledge being used for practical purposes.***

https://www.collinsdictionary.com/dictionary/english/technology

# Ethics

Ethics is about doing the right thing.

When considering if something is ethical we must consider:

- Impact: Who does my decision affect or harm?
- Fairness: Will my decision be considered fair by those affected?

# Activity: Technology, Uses and Effects

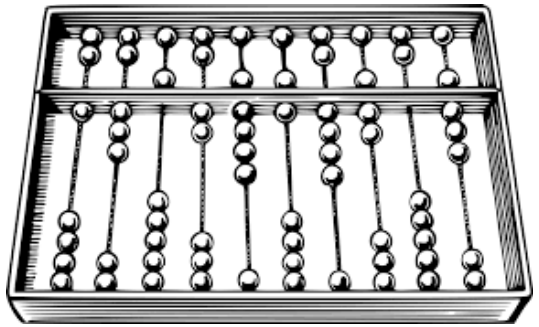
In pairs write a list of the devices you use and answer the following questions about each item.

- What do you use it for? Are these uses good/bad?
- How does it affect you? Does it help you? Is it useful to everyone?

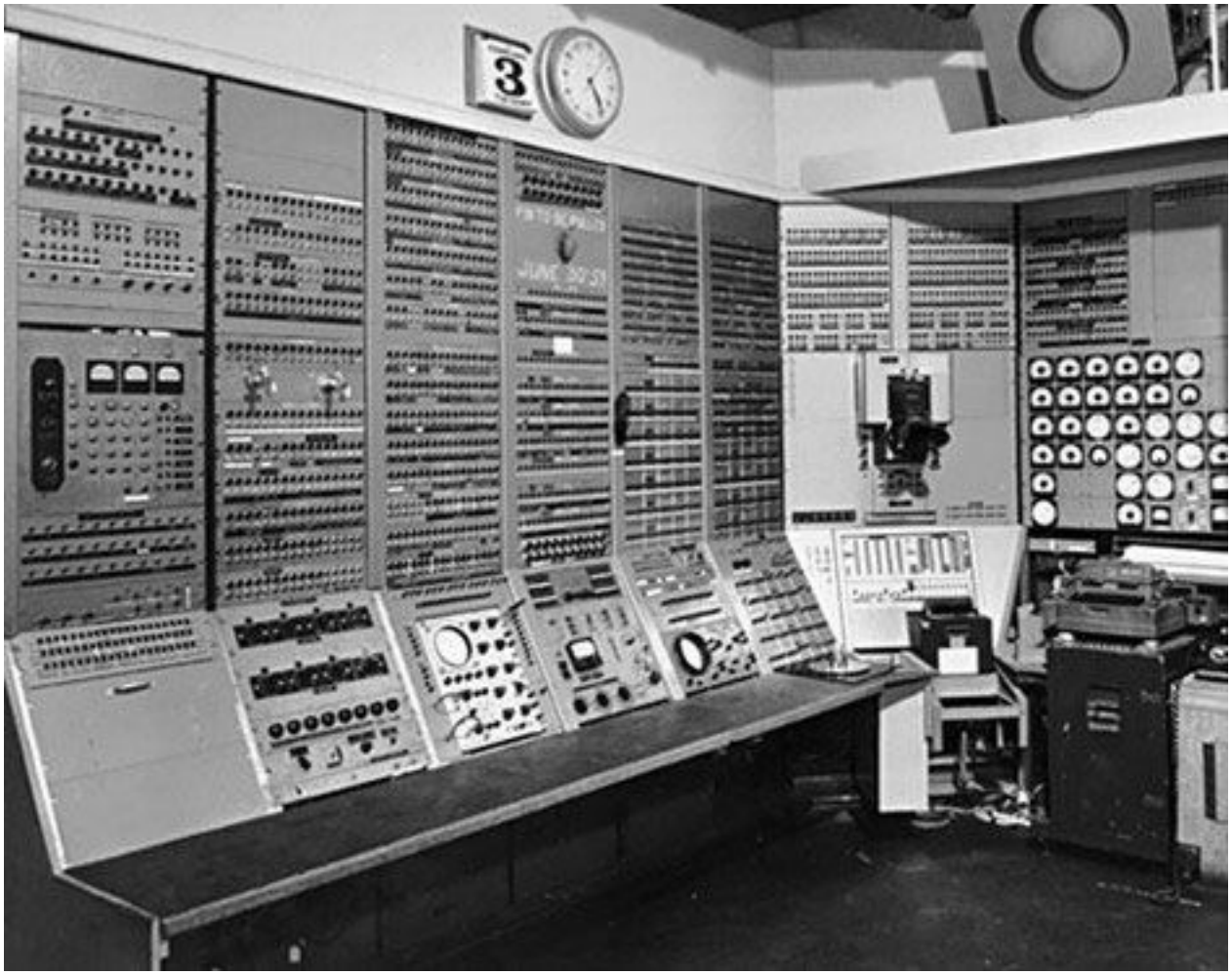
# Technology, Uses and Effects

| Device | Use | Good/Bad |
|---|---|---|
| Computer | Using the Internet to search for homework answers | Both – bad if cheating, good if helping and giving extra information |
| Phone | Socialising via Facebook | Both – good for talking to friends, bad when cyberbullying comes into action |
| TV | Entertainment such as Netflix | Both – can provide good entertainment to all ages, bad when used excessively |
| Computer | Downloading music | Both – good for the listener if it's free, bad if it's copyrighted and actually illegal! |

# What Did We Use Before?

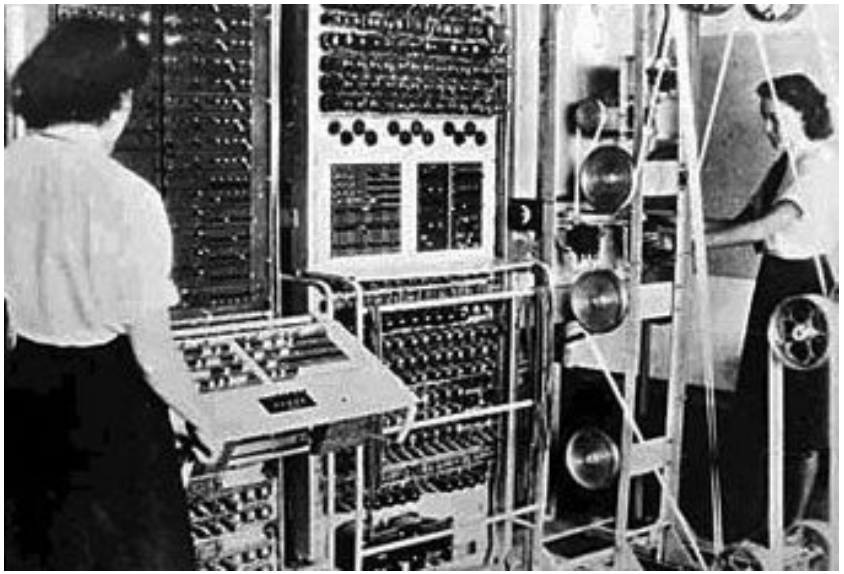


# How Has Technology Evolved?



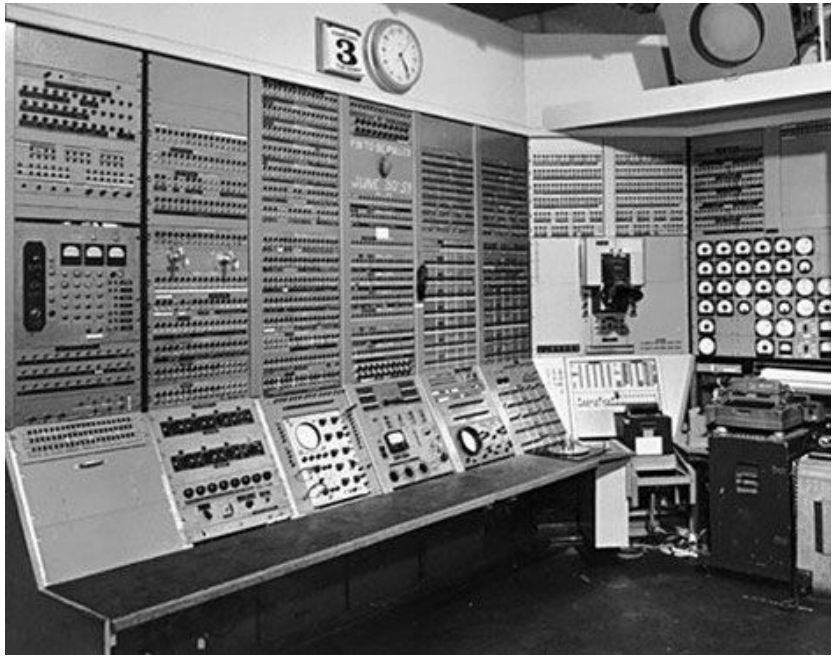
# The First Electric Programmable Computer

The Colossus was the first electric programmable computer, developed by Tommy Flowers, and was first demonstrated in December 1943. The Colossus was created to help the British code breakers read encrypted German messages.



https://www.computerhope.com/issues/ch000984.htm

# The First Computer with RAM



MIT introduces the Whirlwind machine on March 8, 1955, a revolutionary computer that was the first digital computer with magnetic core RAM and real-time graphics.

https://www.computerhope.com/issues/ch000984.htm

# The First Laptop

The IBM 5100 is the first portable computer, which was released in September 1975. The computer weighed 55 pounds and had a five inch CRT display, tape drive, 1.9 MHz PALM processor, and 64 KB of RAM. In the picture is an ad of the IBM 5100 taken from a November 1975 issue of Scientific American.

https://www.computerhope.com/issues/ch000984.htm

# The First Apple Computer

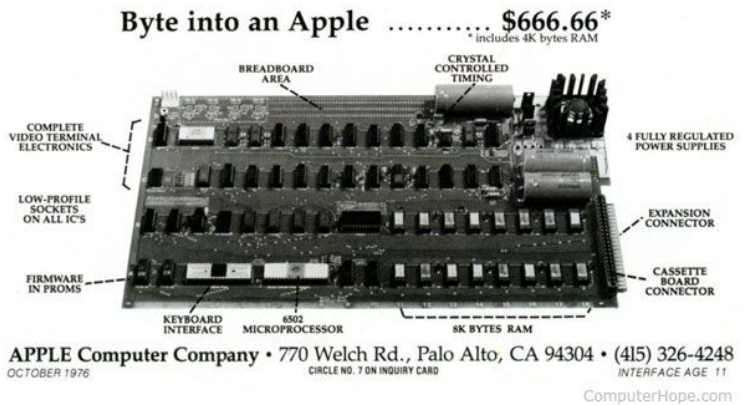
The Apple I (Apple 1) was the first Apple computer

Originally sold for $666.66

Developed by Steve Wozniak in 1976

Contained a 6502 8-bit processor and 4 kb of memory, which was expandable to 8 or 48 kb using expansion cards.

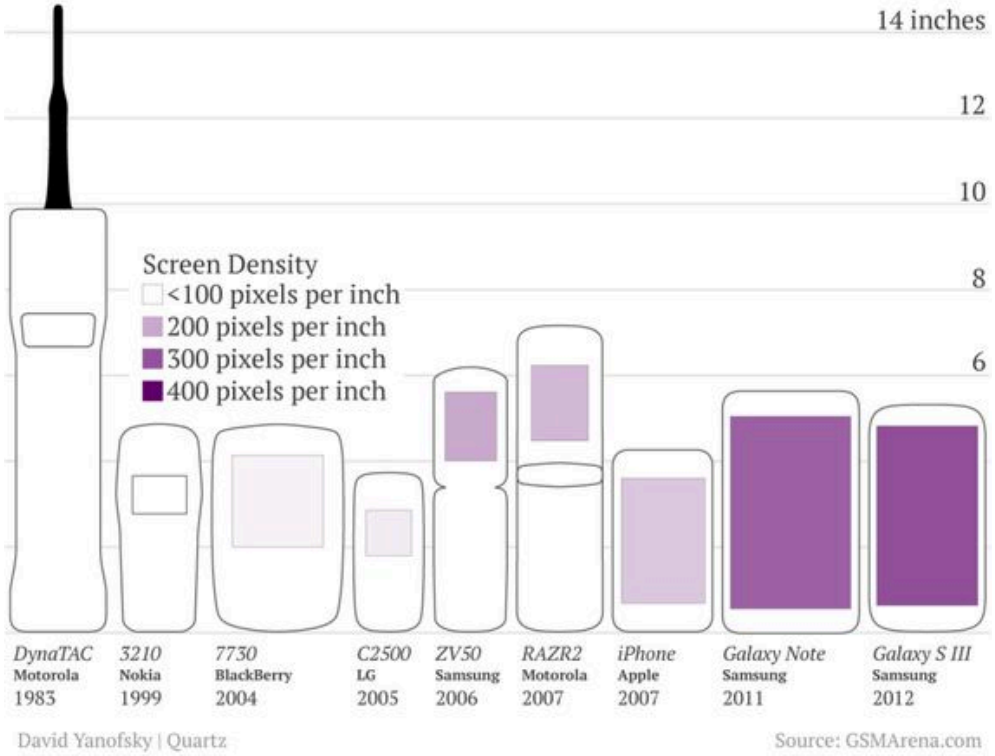
Although the Apple I had a fully assembled circuit board the kit still required a power supply, display, keyboard, and case to be operational.




https://www.computerhope.com/issues/ch000984.htm

# The First Mobile Phone

The first mobile phone call was made on April 3, 1973, by Motorola employee Martin Cooper. Using a prototype of what would become the Motorola DynaTAC 8000x, the world's first commercial cell phone.



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# Present Day Technologies

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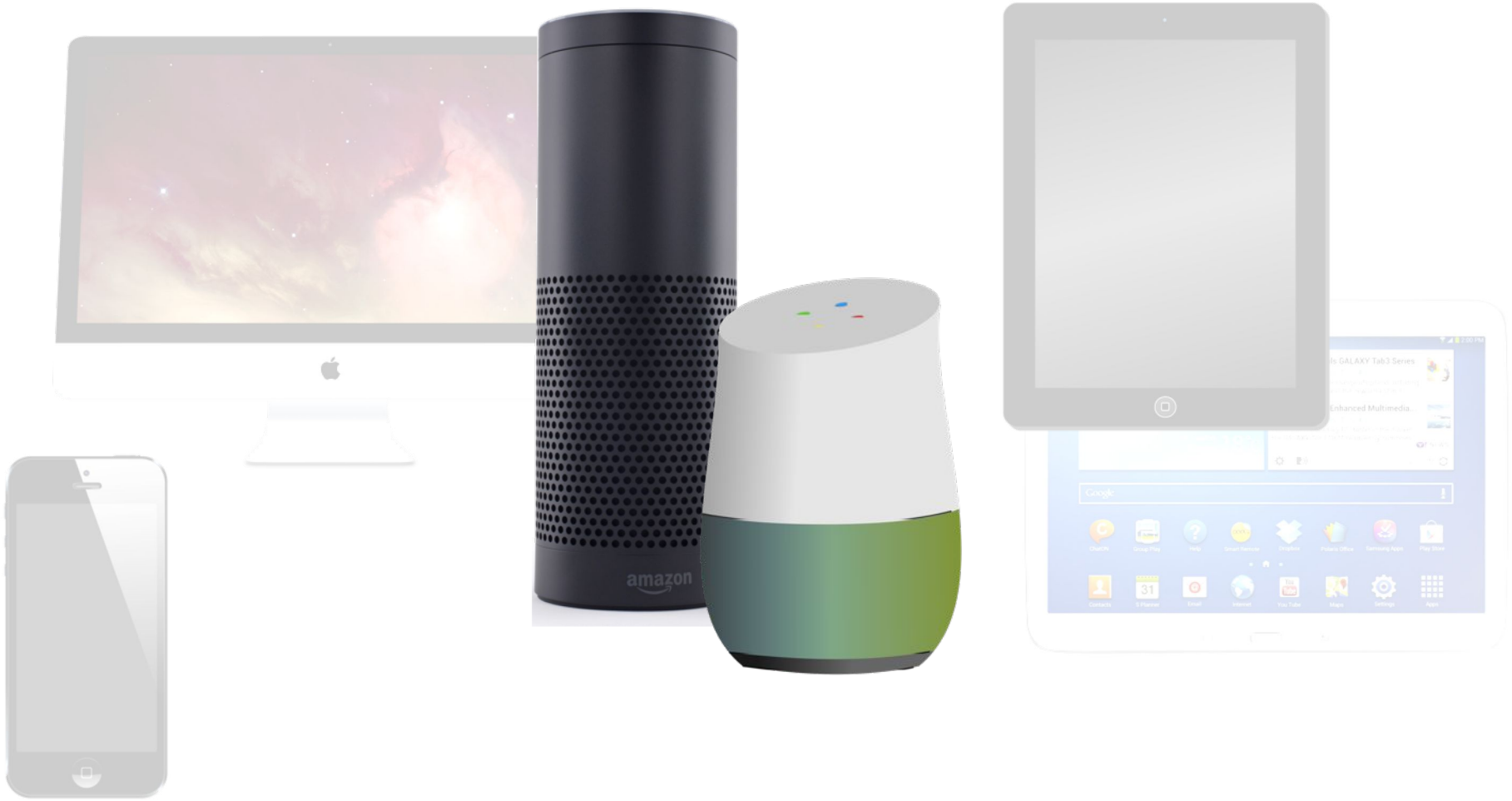
# Present Day Technologies



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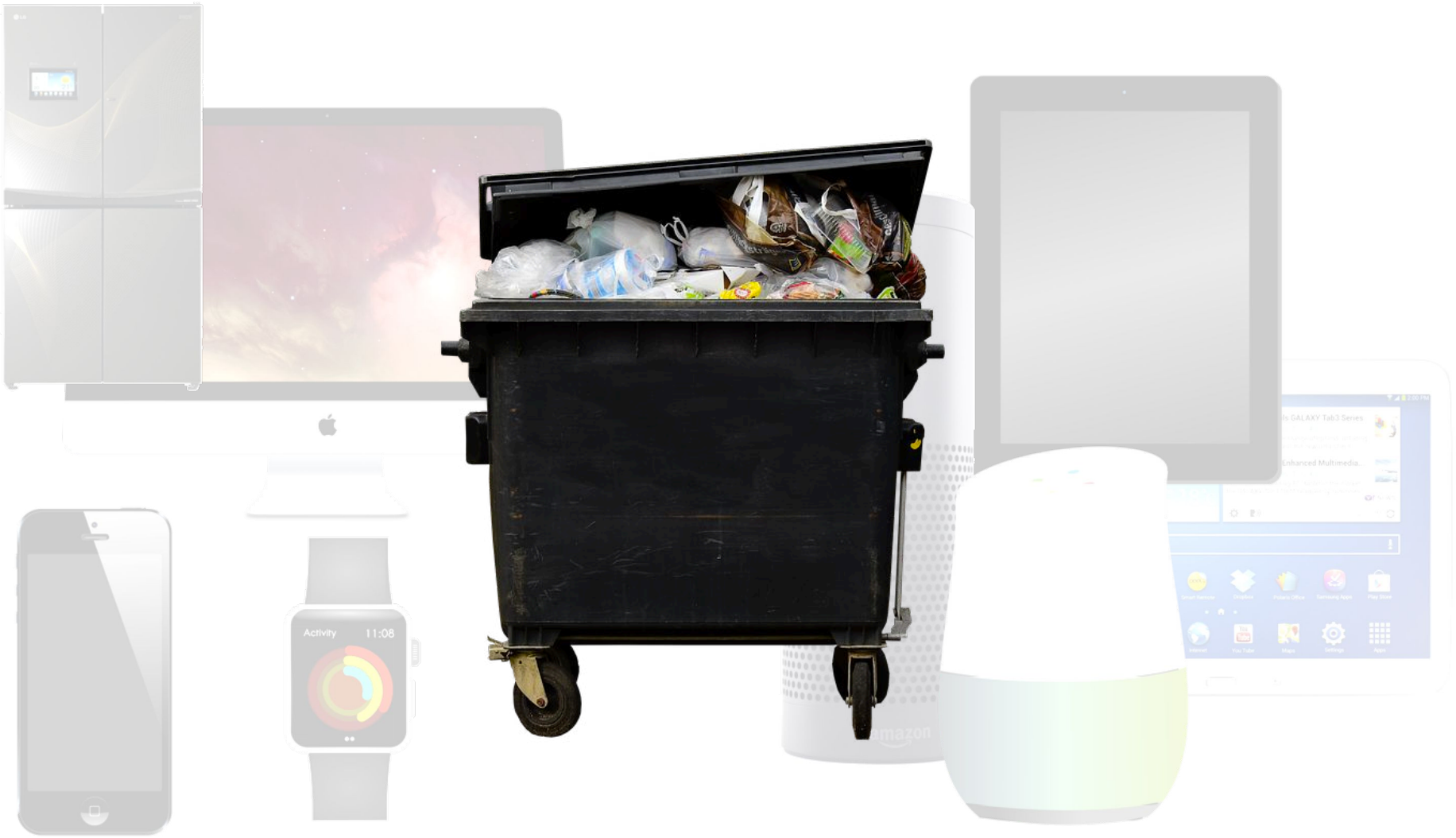


# Activity: Bins - How Do They Use Technology?

# Smart Technology

Can be categorized into three main sectors:

- **Smart devices** have some automation and can be easily programmed through an intuitive user interface. Think of a smart coffeemaker that you program to make coffee at a certain time. Network connectivity is not needed.

# Smart Technology

- **Smart connected devices** are remotely controlled or monitored via Bluetooth, LTE, Wi-Fi, wired or other means of connectivity. Examples would be a smart bulb, smart security camera, smart refrigerator or a smartphone.

# Smart Technology

- **IoT devices** are software-defined products that are a combination of product, application, analytics and the Internet/networking. They add more value to smart or connected devices. That's because they are more scalable, upgradable, automated and future ready. Think of smart cities, smart factories and smart homes.

# Smart Technology

Nowadays technology is evolving and we are seeing more and more people make their homes **smart homes** and more and more of our cities are becoming **smart cities!**

How many of you have smart devices at home?

How many of you use them daily?

What kind of uses do they have?

What do smart homes and cities offer us?

# Smart Homes and Cities: Bins

- Sensing when full
- Sorting recycling/rubbish

# The Great Fire of London

# The Great Fire of London: Fire Alarms

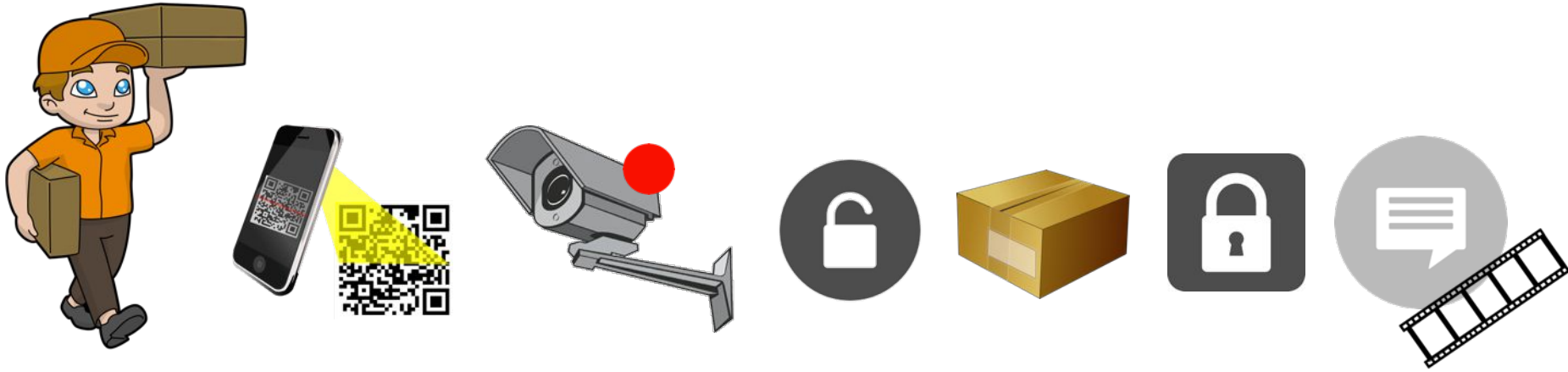
The future is one where smart smoke and fire alarms automatically contact the emergency services and warn neighbours.

This type of preventative maintenance will become increasingly commonplace as smart homes become more entwined with smart cities.

# Smart Homes and Cities: Deliveries

Amazon have started to trial and offer a service called **Amazon Key.**

It relies on a smart camera (cloud cam) and a compatible smart lock. The camera is connected to the Internet in your house and talks to the lock via Zigbee (a wireless protocol).



# Smart Homes and Cities: Deliveries

# Smart Homes and Cities: Issues

- What if someone hacks Amazon?
- Can we imagine all of those doors just swinging open at once?
- What if Amazon was to get hacked and just exploit the camera system – thieves could know when we're home or not!

# Smart Homes and Cities: Issues

"Echo woke up due to a word in background conversation sounding like 'Alexa,'" Amazon said in a statement. "Then, the subsequent conversation was heard as a 'send message' request. At which point, Alexa said out loud 'To whom?' At which point, the background conversation was interpreted as a name in the customer's contact list. Alexa then asked out loud, '[contact name], right?' Alexa then interpreted background conversation as 'right'. As unlikely as this string of events is, we are evaluating options to make this case even less likely."

# Smart Homes and Cities: Issues

**New York (CNN Business) –** Not only is Alexa listening when you speak to an Echo smart speaker, an Amazon employee is potentially listening, too.

According to research by Accenture, one in five people are avoiding their voice assistants in their homes. A total of 1,000 adults were surveyed, with 22 per cent reporting they leave the room or lower their voice so the smart speaker can't hear them.

## Is Google Home Listening to me?

The short answer is yes. Google Home is always listening – which may be a surprise, but that's how the device works.

On the hardware level, the speaker locally stores a stream of audio so it can appropriately respond to the wake word when it needs to.

These ambient recordings only upload to Google's cloud servers when the wake word is said. The audio is then processed in the cloud and then returned to the device to deliver a result or response to whatever is asked. According to Google's Data Security and Privacy on Google Home, the device listens for a few seconds at a time, in what it calls snippets, for the hotword – but these Snippets are deleted if it doesn't pick up the hotword.

Around 48 per cent believe the technology is always listening to them.

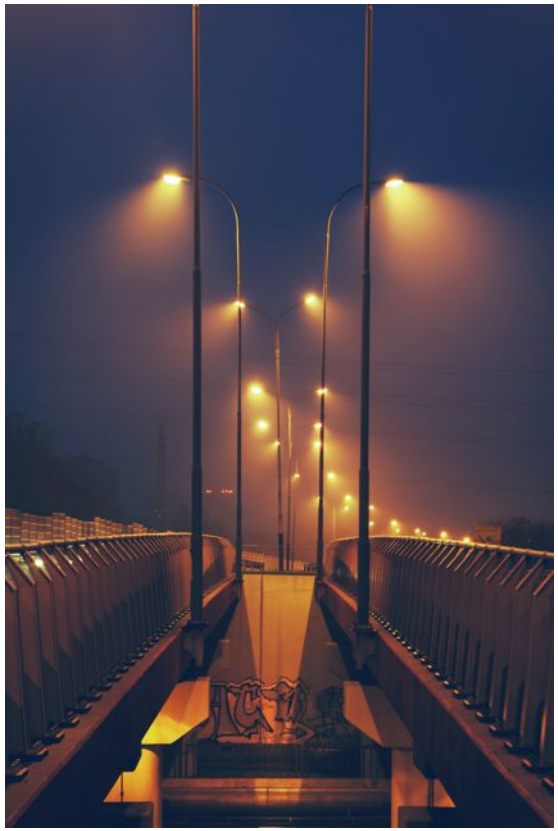
# Activity: Smart Homes/Cities - Benefits and Drawbacks

List in your workbooks some benefits and drawbacks of smart homes and cities. **Think outside the box!**

Consider both the functional benefits to society as well as the ethical issues.

# Smart Technology: Let's Make It!

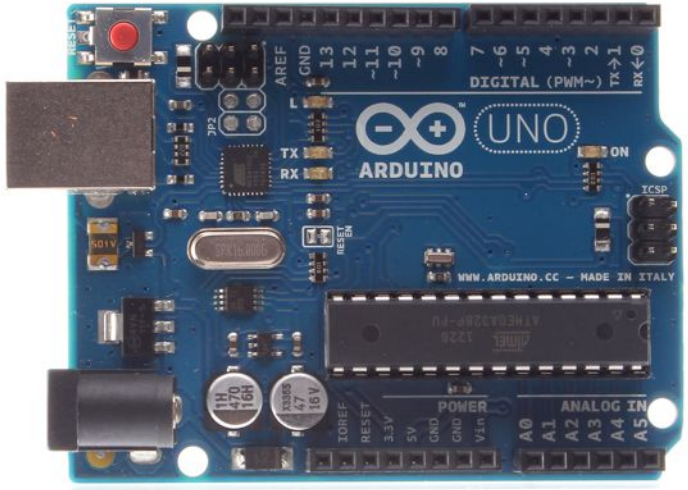
So let's take a really simple example and make it smart!



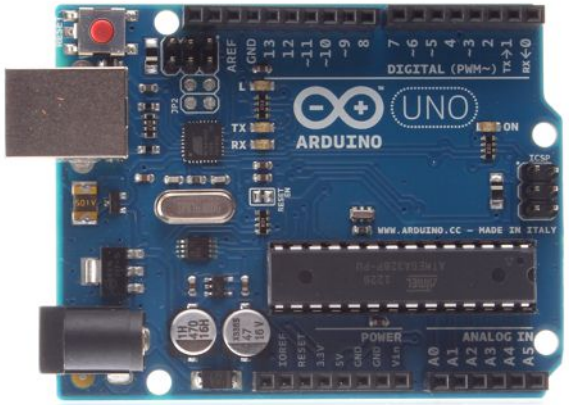
# Arduino

Open-source electronic prototyping platform enabling users to create interactive electronic objects.

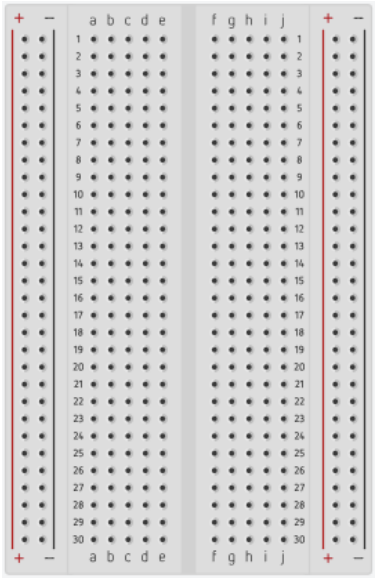
We will be making both the electronic circuit and writing the code to make it work!



# Circuit Components

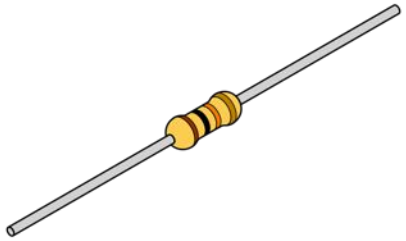



Arduino

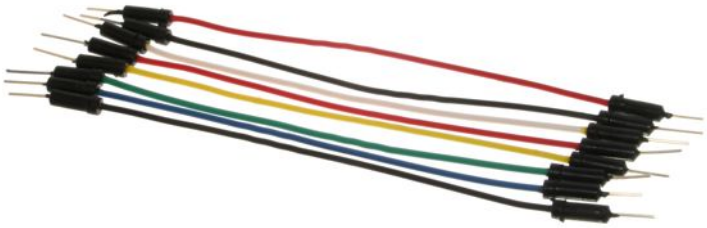


Breadboard

LED



Resistors

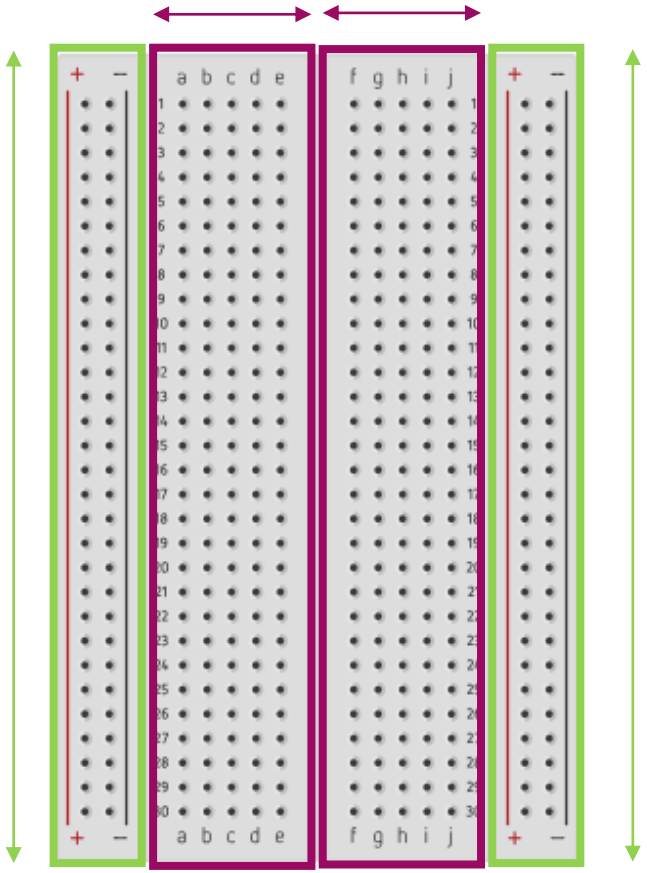


Jumper Wires

LDR (Light Sensor)

# Circuit Components: Sensors

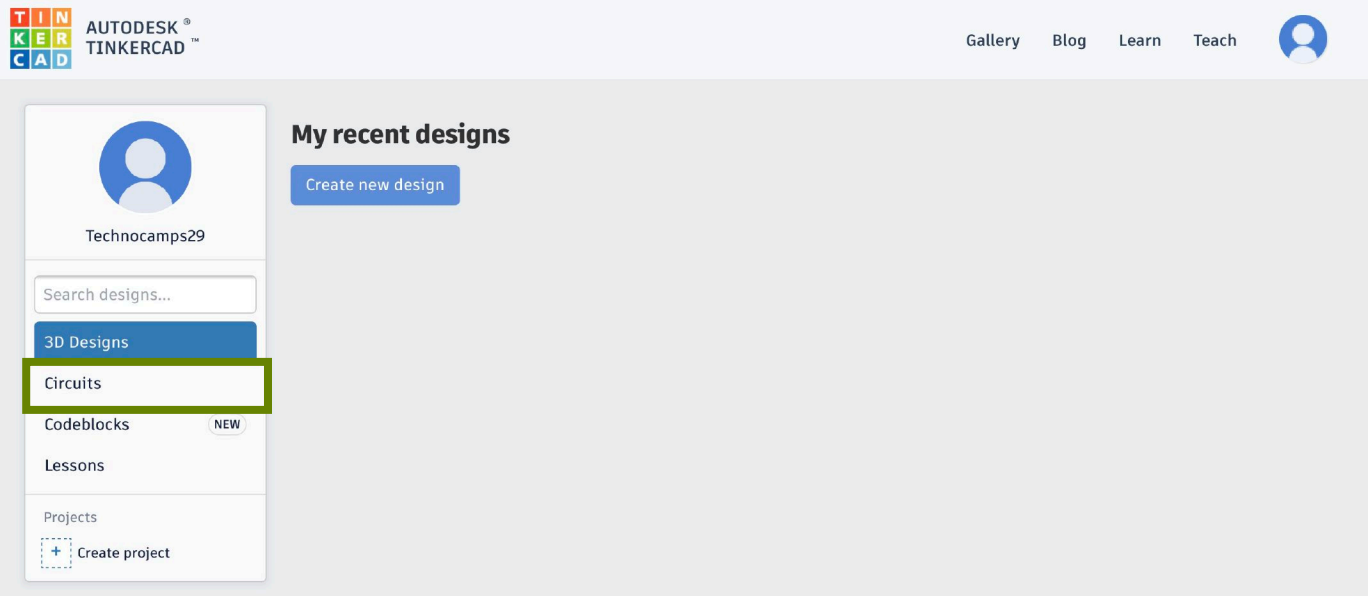
# Circuit Components: Breadboard



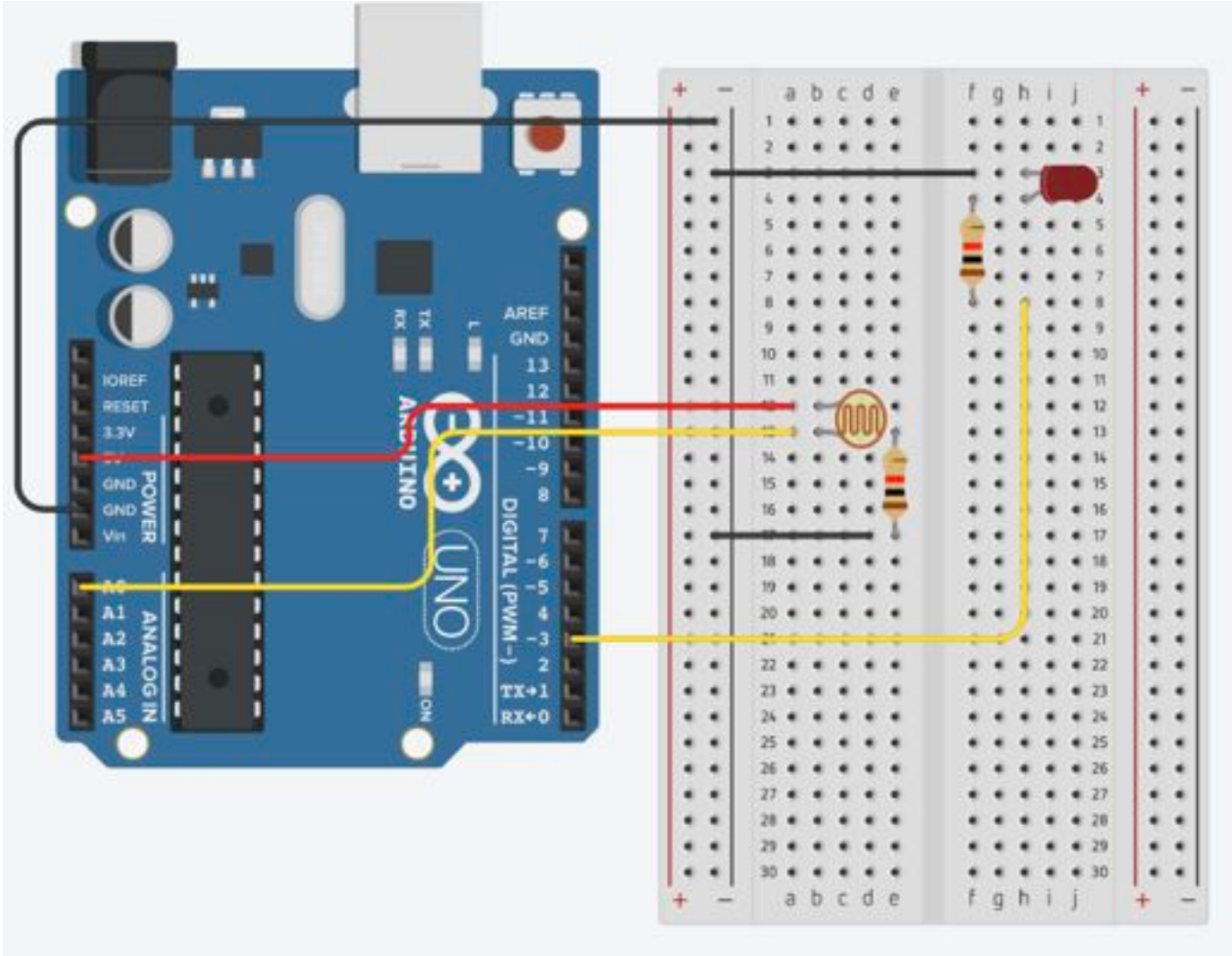
# Activity: Tinkercad

1. Navigate to www.tinkercad.com/joinclass
2. Enter classroom code
3. For your nickname enter technocamps1
4. Now click circuits and create a new one

You will each be allocated an individual number

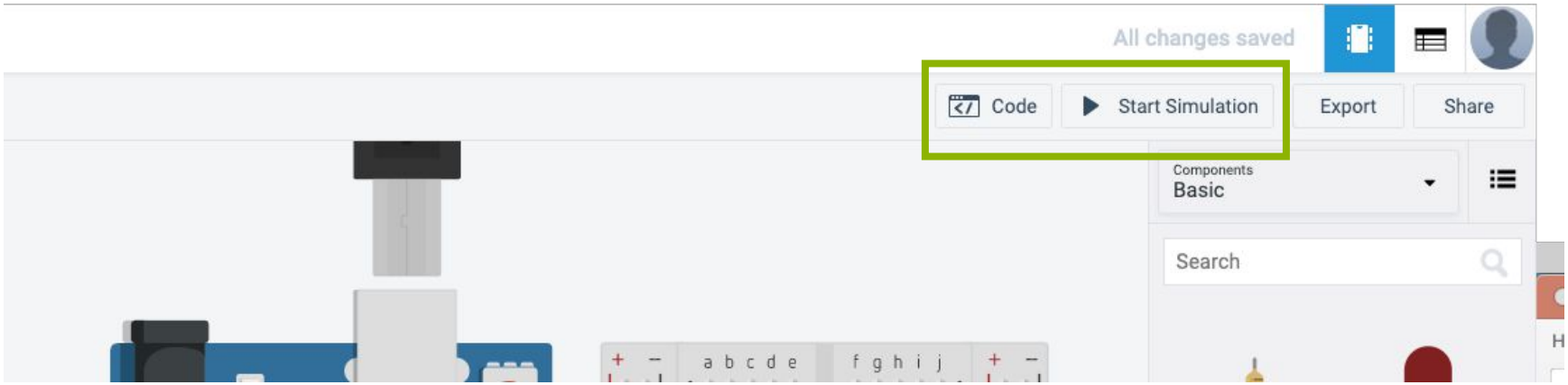


# Activity: Tinkercad Arduino Circuit



# Tinkercad Code

Tinkercad also allows users to write code and simulate the circuit.



# Activity: The Code - Variables

We can use variables in our code to assign names to values.

# Activity: The Code - Variables

Match the correct variable name to the type.

| Text | Number |
| --- | --- |

Name

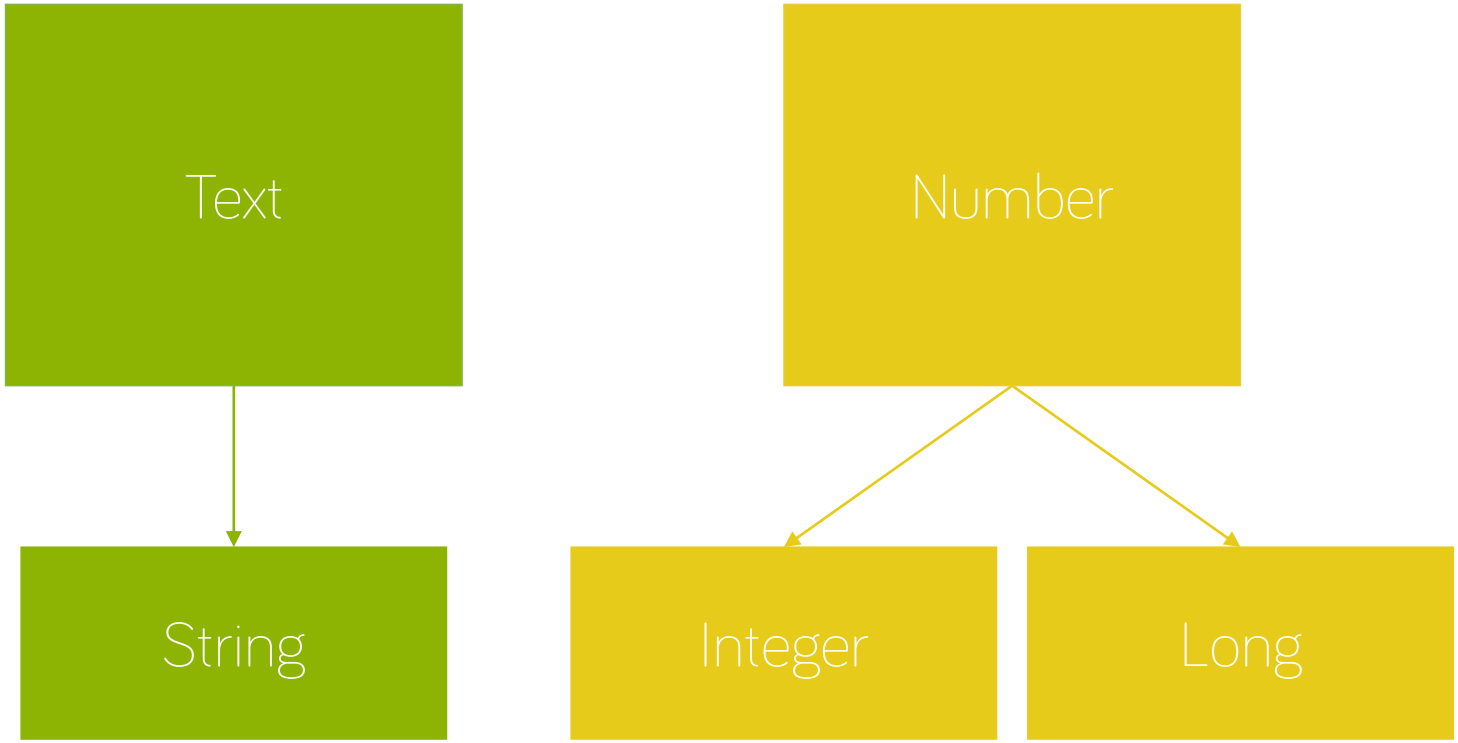
Age

Address

Marks

# Activity: The Code - Variables

There are different subtypes of each main type.



# The Code – if statement

If you are wearing a jumper stand up. – **if statement**

If you have blue eyes clap you hands. – **if statement**

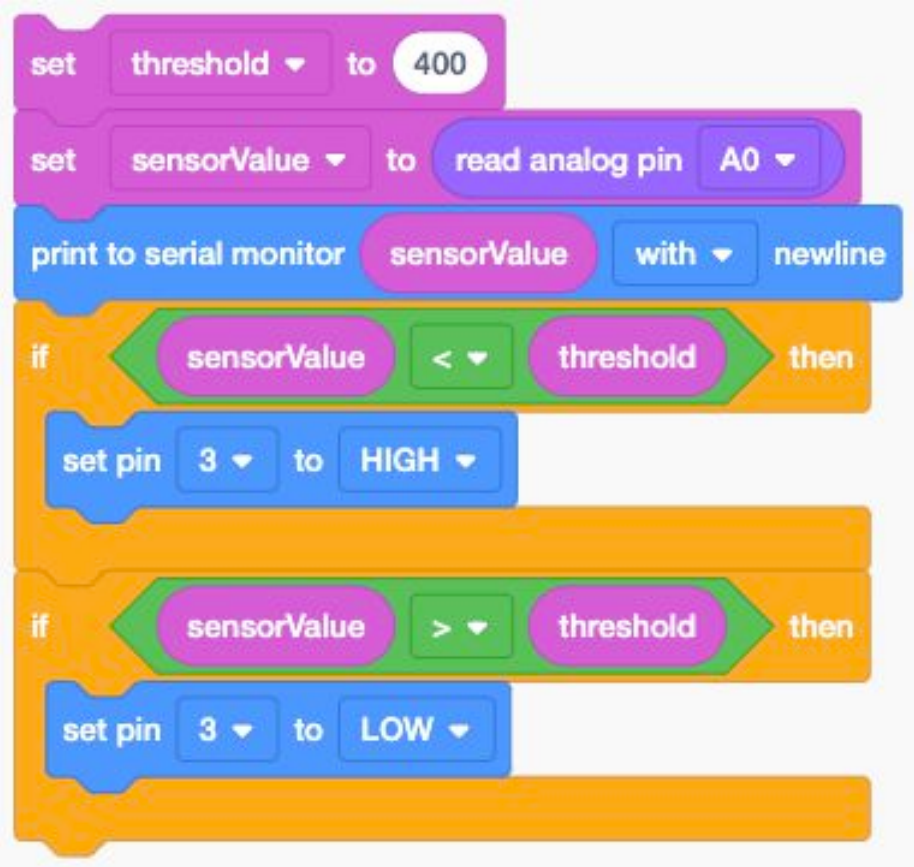
If you have green eyes act like a chicken, otherwise act like a cow. – **if, else statement**

# Activity: Tinkercad Code

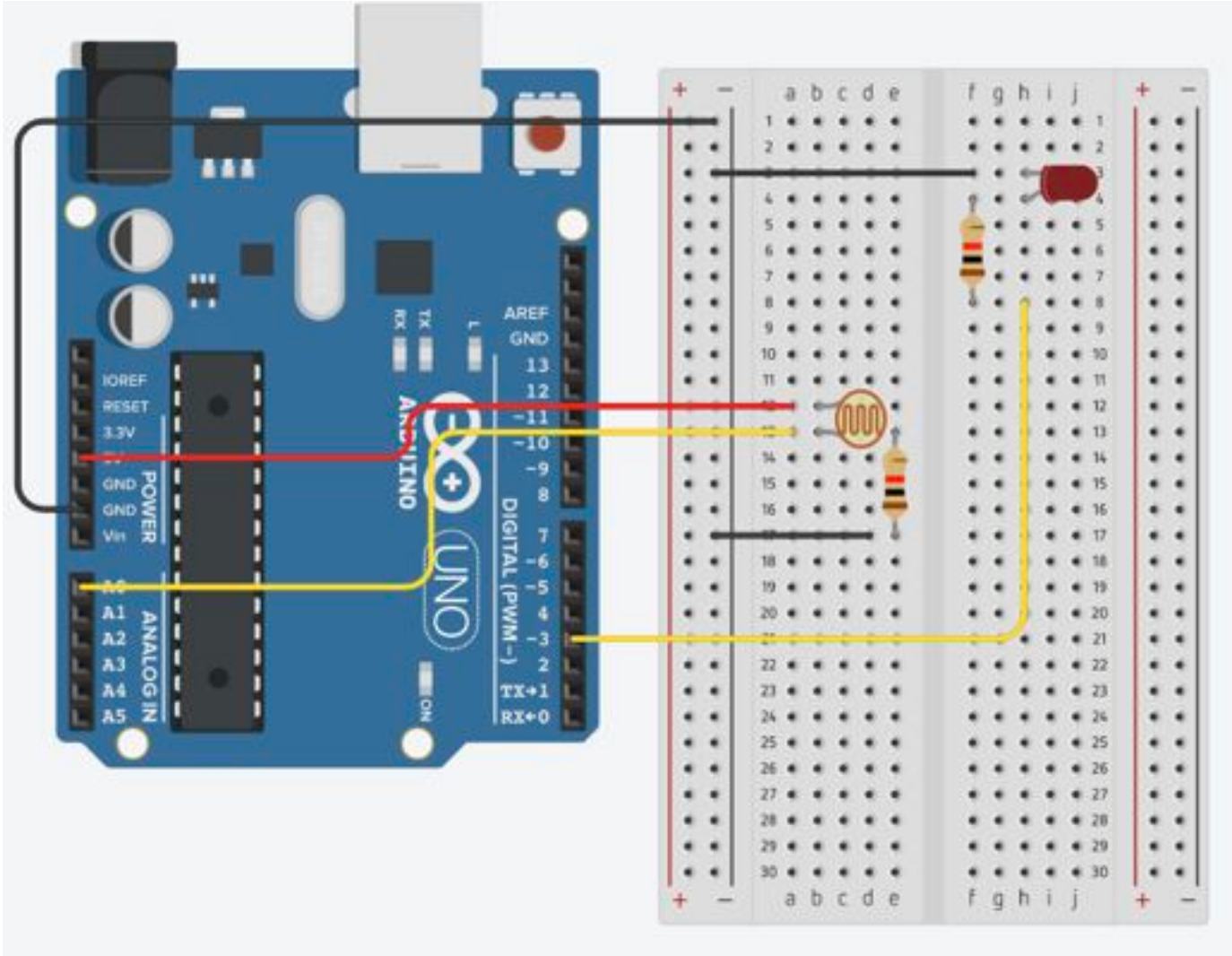
Using the blocks write code to do the following:

1. Create a threshold variable
2. Create a sensorValue variable
3. Set the threshold to 400
4. Set the sensorValue to read from analog pin A0
5. Print to the serial monitor the sensorValue
6. if sensorValue < threshold then:
    - set pin 3 to high
7. if sensorValye > threshold then:
    - set pin 3 to low

# Activity Solution: Tinkercad Code



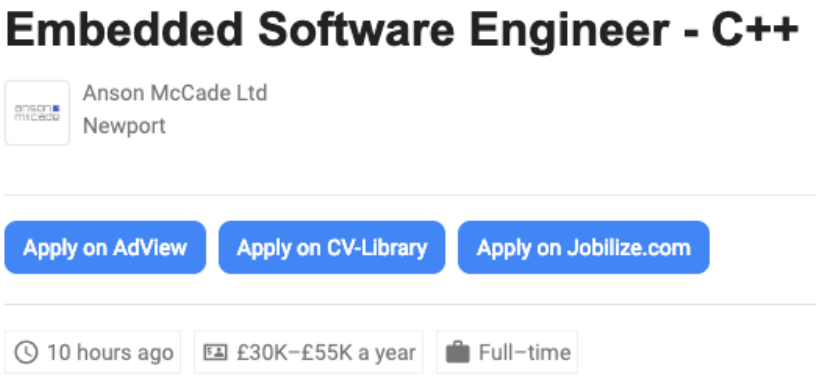
# Activity: Arduino Circuit

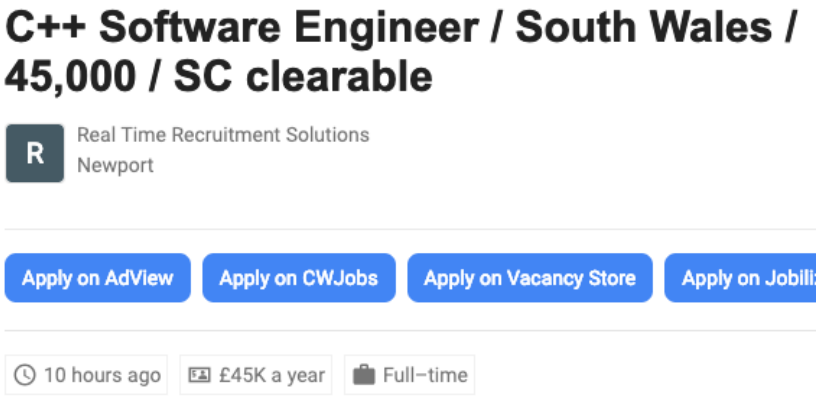


# The Code

The Arduino language is C/C++

We can use a variety of variables, methods and code to make our circuit produce different outputs.



# Activity: The Code - Variables

We can use variables in our code to assign names to values.

green = comments

For example:

```
// Pins
int sensorPin = 0; // This says our sensorPin is connected to 0
int lightPin = 3; // This says our lightPin/LED is connected to 3


// Variables
int threshold = 400;
```

# Activity: The Code - setup

This is where we set up the Arduino ready to interact with our circuit.

```
void setup() {
  // Start Serial & set pin to output
  Serial.begin(9600);
  pinMode(lightPin,OUTPUT);
}
```

Serial provides us with a way to transfer data between the Arduino and our computers.

pinMode(lightPin,OUTPUT) sets the lightPin (2) to be an OUTPUT for our code.

# The Code - loop

Any code inside this method continuously loops **forever** until the Arduino loses power.

We will use this method to analyse the sensor data and react as necessary.

```
void loop() {
}
```

# Activity: The Code - loop

Firstly we will read the data from the sensor pin and print it out. This allows us to debug the amount of light in the room and alter our threshold later on.

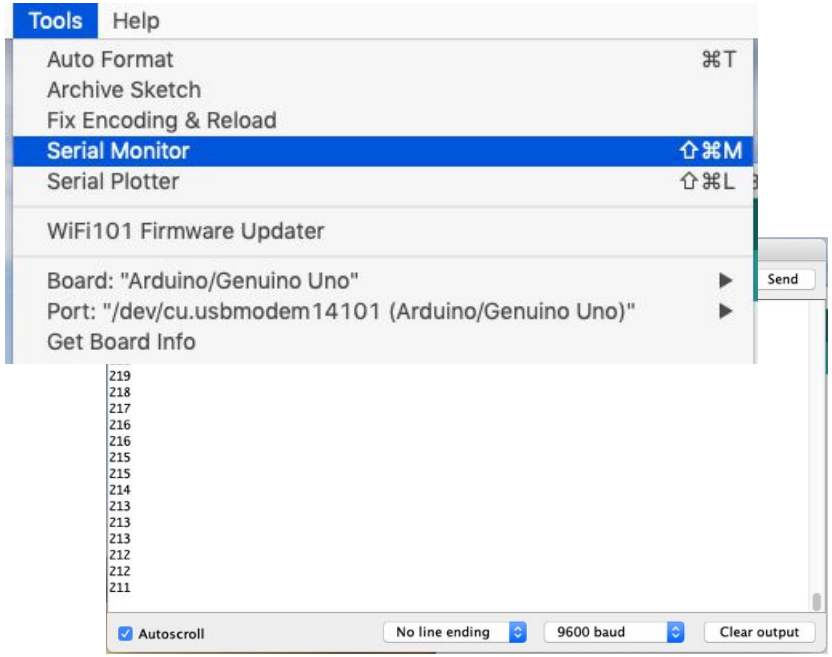
analogRead is a built in Arduino function that we can use to retrieve this data.

`Serial.println(sensorValue,DEC)` prints the sensorValue to the monitor on our PCs.

```
void loop() {
  // Read the sensor pin
  int sensorValue = analogRead(sensorPin);
  Serial.println(sensorValue,DEC);
}
```

# Activity: The Code - loop

Using the code so far, test your sensor works by seeing the values printed to the monitor.


```
int sensorPin = 0;
int lightPin = 2;

int threshold = 400;

void setup() {
  Serial.begin(9600);
  pinMode(lightPin,OUTPUT);
}

void loop() {
  int sensorValue =
analogRead(sensorPin);
  Serial.println(sensorValue,DEC);
}
```

# The Code – if statement

We now need to use an "if statement".

```
void loop() {

  // Read the sensor pin
  int sensorValue = analogRead(sensorPin);
  Serial.println(sensorValue,DEC);

  // If low light level is detected, switch light on
}
```

# The Code – if statement

In code we write an if statement like this:

```
if (condition){
    // perform this action
}
```

# Activity: The Code – if statement

```
void loop() {

  // Read the sensor pin
  int sensorValue = analogRead(sensorPin);

  // If low light level is detected, switch light on
  if (sensorValue < threshold){
    digitalWrite(lightPin, HIGH);
  }
}
```

# Activity: The Code – if statement

```
void loop() {
  // Read the sensor pin
  int sensorValue = analogRead(sensorPin);
  Serial.println(sensorValue,DEC);

  // If light level is low is detected, switch light on
  if (sensorValue < threshold){
    digitalWrite(lightPin, HIGH);
  }
  // If light level goes up again, switch the lights off
  if (sensorValue > threshold){
    digitalWrite(lightPin, LOW);
  }
}
```

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# Activity: The Code – if statement

```
int sensorPin = 0;
int lightPin = 3;
int threshold = 400;

void setup() {
  Serial.begin(9600);
  pinMode(lightPin,OUTPUT);
}
```

```
void loop() {
   int sensorValue = analogRead(sensorPin);
   Serial.println(sensorValue,DEC);

  if(sensorValue< threshold){
    digitalWrite(lightPin, HIGH);
  }

  if (sensorValue > threshold){
    digitalWrite(lightPin, LOW);
  }
}
```

**You may have to change the threshold based on the light in the room!**
**Use the monitor to see the sensorValue outcome and think of what your threshold should be!**

# Activity: Other Arduino Circuits

Choose one of the following to try next:

- LED Dimmer with Sensor
- Two LEDs

- Create your own using Tinkercad! There's lots of additional sensors to try out!

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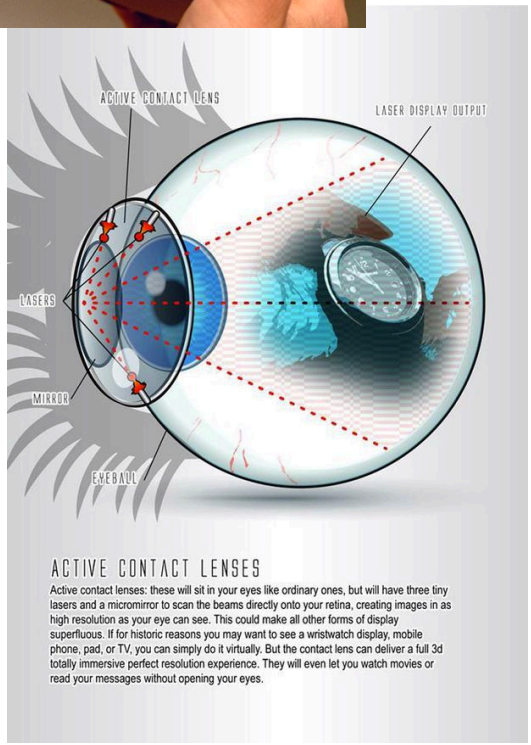
# The Future of Tech



10 **Breathalyser cars**

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# The Future of Tech

# Driverless Cars

- https://www.youtube.com/watch?v=P1tfOeChenQ
- https://www.youtube.com/watch?v=hthyTh_fopo

# Activity: Driverless Cars – What Do They Do?

Write down all of the things that a developer of a driverless car has to consider.

- What should the car be able to do without any assistance?
- What type of sensors could they use?
- What should the car do in emergencies?

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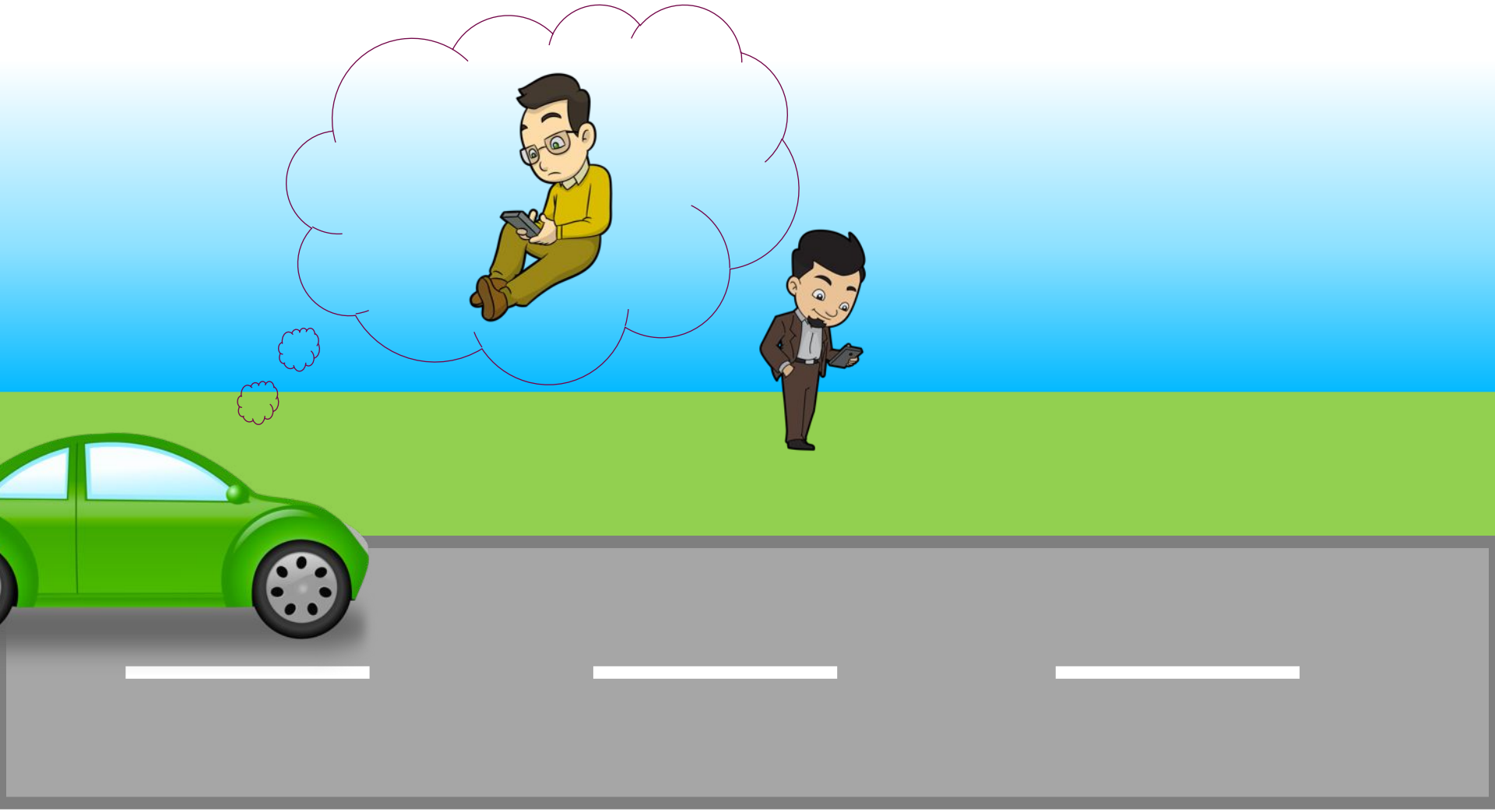
# Driverless Cars - Issues



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# Driverless Cars - Issues

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# Driverless Cars - Issues

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# Driverless Cars - Issues

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# Driverless Cars - Issues

# Activity: Driverless Cars - Issues

What issues do you think there are with driverless cars? Think about accidents, making decisions and responsibilities.

# Driverless Cars – Issues: Who Is Responsible?

If the car was to continue driving and hit the pedestrian – who would be responsible?

- The car owner?
- The car manufacturer?
- The car developer?
- The person crossing the road?

Should there be laws in force to stop these kind of issues arising when driverless cars are made available to the mass market?

# Driverless Cars – Issues: Decisions

Decisions – What if there was an unavoidable collision – who should the car collide with?

- The car in front?
- The car behind?
- The people on the pavement?