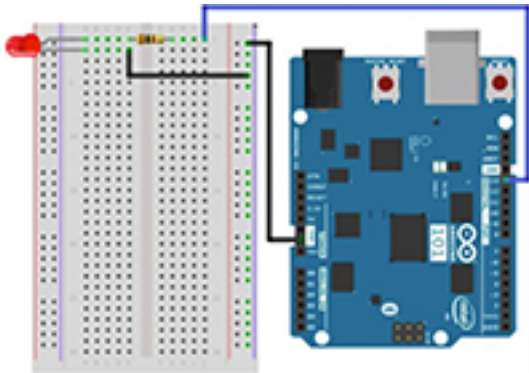


# Blinking LED Light

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## Background/Context

Where do we see LED lights? Students can list where they see them.

What is their purpose? Why do we have them?

Who invented them?

What makes them work?

Can we make one work? How? Using what equipment?

This lesson explores student's understanding of LED technology and how it effects their everyday life. It poses questions and requires students to hypothesis and come to conclusions relating to those questions.

## At a Glance

- **Age Level:** 10-12 years old
- **Subjects:** Digital Technologies, Mathematics, Science, English
- **Time Needed:** 1-2 hours

## Learning Objectives

By the end of this lesson, students should be able to:

- Use coding language
- Write commands for coding LED lights
- Build a circuit
- Understand how a circuit works use a Genuino 101 Board
- Use a bread board
- Understand what an LED light is and where it is used
- Solve problems

## Standards Alignment

Australian Curriculum

### Design and Technologies

#### Knowledge and Understanding

Engineering principles and systems

- Investigate how electrical energy can control movement, sound, or light in a designed product or system (ACTDEK020)

Materials and technologies specialization

- Investigate characteristics and properties of a range of materials, systems, components, tools, and equipment and evaluate the impact of their use (ACTDEK023)

#### Processes and Production Skills

Generating and Designing

- Design, modify, and follow simple algorithms involving sequences of steps, branching, and iteration (repetition) (ACTDIP019)

### Mathematics

Patterns and Algebra

- Describe, continue, and create patterns with fractions, decimals, and whole numbers resulting from addition and subtraction ([ACMNA107](#))
- Explore the use of brackets and [order of operations](#) to write [number](#) sentences ([ACMNA134](#))

### Science

Science as a Human Endeavor

- Scientific knowledge is used to solve problems and inform personal and community decisions ([ACSHE083](#))

Science Inquiry Skills

- Identify, plan, and apply the elements of scientific investigations to answer questions and solve problems using equipment and materials safely and identifying potential risks ([AC SIS086](#))

Science Understanding

- Electrical energy can be transferred and transformed in electrical circuits and can be generated from a range of sources ([ACSSU097](#))

## Inquiry Process

Ask:

- How does a light show illumination (light up)?

## Blinking LED Light

- How does an electrical circuit work?
- What is needed to make an electrical circuit work using a Genuino 101 Board?

### Investigate:

- The process of electricity running through a circuit
- What a light bulb is made up of
- LED lights/equipment to make a circuit
- Codes
- Using Genuino 101

### Create:

- Make one globe light up
- Make more than one globe light up
- Make a blinking light
- Make more than one globe blink
- Make the globes blink in a pattern
- Can you integrate a button/switch?

## Prerequisite Skills

### Students need to know:

- How to use a computer
- Understand that they will be using electricity
- Create a circuit
- That they will be programming a light to blink, why might this be something important?

## Modifications/Accommodations

The main modifications for this activity will be for those who are proficient using a computer and understand the coding language versus those who have trouble utilizing the computer and take longer to understand the coding. Having those that do understand work with those who are having trouble will make it easier for the teacher to get around the classroom. Once more and more students have grasped the key concepts, they can separate and work individually or in smaller groups.

## Technology and Resources

- Genuino 101 Kit
- Laptop - Arduino 101 Software Version 1.6.9
- Intel® Curie™ Board - must install this into Board Manager

## Activity

### The Code:

```
/*
```

```
BLINKING AN LED
```

Turn an LED on for one second, off for one second, and repeat forever.

```
*/
```

```
//The setup function runs once upon your Genuino 101 being powered or once upload is //complete.
```

```
void setup()
```

```
{
```

```
  //set pin 13 to OUTPUT
```

```
  pinMode(13, OUTPUT);
```

```
}
```

```
//The loop function runs from the top down and repeats itself until you upload new //code or power down  
your Genuino 101
```

```
void loop()
```

```
{
```

```
  //Turn pin 13 HIGH (ON).
```

```
  digitalWrite(13, HIGH);
```

```
  //wait 1000 milliseconds (1 second)
```

```
  delay(1000);
```

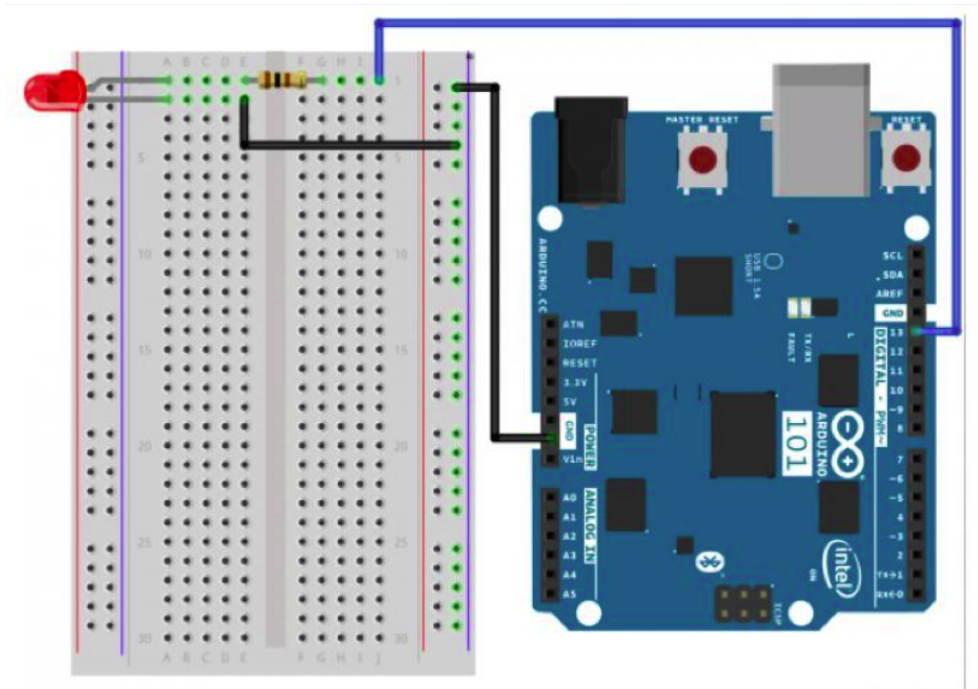
```
  //Turn pin 13, LOW (OFF)
```

```
  digitalWrite(13, LOW);
```

```
  //wait 1000 milliseconds
```

```
  delay(1000);
```

## Blinking LED Light



In order to make this work, students need to build the circuit. As part of the building process, students will need to learn about what each part is and what it does.

It is important for the students to be aware of the parts so that when they try to extend their learning and thinking, they'll have the background knowledge on what the basic parts are and their functions.

## Assessment

Assessment strategies are:

- Screen snip/shot of the code
- Construction of the circuit
- Photos of the light blinking
- Videos of the light blinking
- Notes of progress
- Discussion with individuals
- Demonstrating the program working

## Additional Tips and Information

If the students pick up on the task quickly and show proficiency let them continue to move forward. See if they can make more than one light blink, or blink in time, etc.

## Source

James Colbert and Marcus Saunders

Blinking LED Light

The Geelong College

Newtown, Victoria

This lesson explores student's understanding of LED technology and how it effects their everyday life.