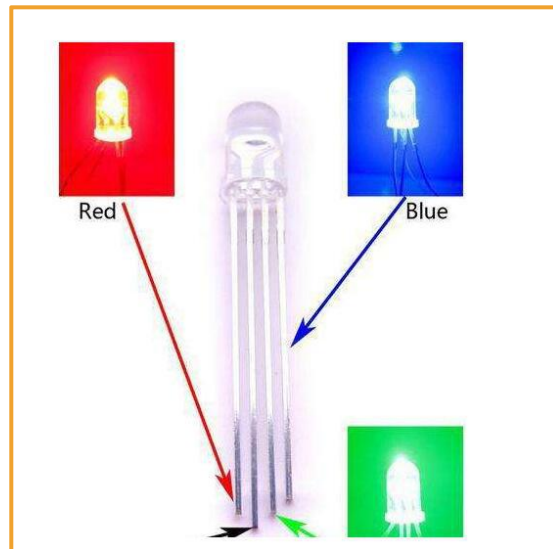# RGB Breathing LED Experiment

Introduction to RGB

In this lesson, you will use PWM to control an RGB LED and make it display different colors.

Component List

◆ Keywish Arduino UNO R3 Mainboard

◆ Breadboard

◆ USB cable

◆ RGB LED*1

◆ Resistor (220Ω) *3

◆ Some wires

Experimental Principle

RGB stands for the red, green, and blue color channels, it is an industry color standard. RGB displays various new colors by changing the three channels and superimposing them, which, according to statistics, can create 16,777,216 different colors. If you say the color displayed doesn't completely match a natural color, then it almost certainly cannot be differentiated with the naked eyes.

Each of the three color channels of red, green, and blue has 255 stages of brightness. When the three primary colors are all 0, "LED light" is the darkest, that is, it turns off. When the three primary colors are all 255, "LED light" is the brightest. When superimposing the

light emitted by the three primary colors, the colors will be mixed. However, the brightness is equal to the sum of all brightness, and the more you mix, the brighter the LED is. This process is known as additive mixing.

In this experiment, we will also use PWM, if you've followed the lessons thus far, you,for sure, already have a basic understanding. Here we input a value between 0 and 255 to the three pins of the RGB LED to make it display different colors.

Wiring of Circuit

Arduino Uno	RGB
11	1
10	3
9	4
GND	2
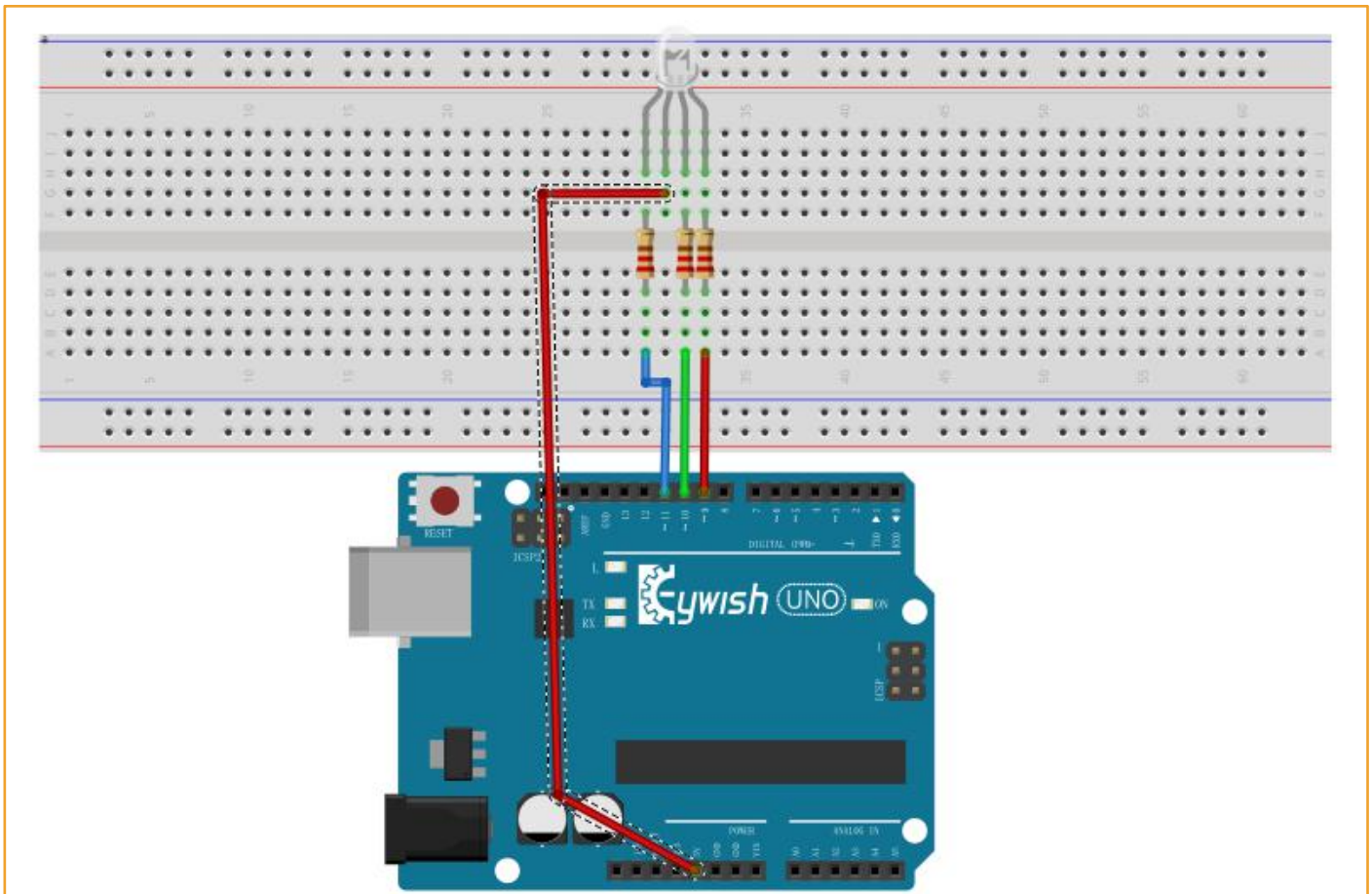
Code

```
#define RGB_RED    11
#define RGB_GREEN  10
#define RGB_BLUE   9

void setup()
{
    pinMode(RGB_RED,OUTPUT);
    pinMode(RGB_GREEN,OUTPUT);
    pinMode(RGB_BLUE,OUTPUT);
}

void setColor(int red,int green,int blue)
{
    analogWrite(RGB_RED,red);
    analogWrite(RGB_GREEN,green);
    analogWrite(RGB_BLUE,blue);
}
void loop()
{
    int i;
    for(i=0,i<256;i++)
    {
        setColor(i,0,0);
        delay(4);
    }
    delay(500);        //turn the RGB LED red smoth
    for(i=0;i<256;i++)
    {
    setColor(0,i,0);
        delay(4);
    }
    delay(500);        //turn the RGB LED green smoth
    for(i=0,i<256;i++)
    {
        setColor(0,0,i);
        delay(4);
    }
    delay(100);        //turn the RGB LED blue smoth
}
```
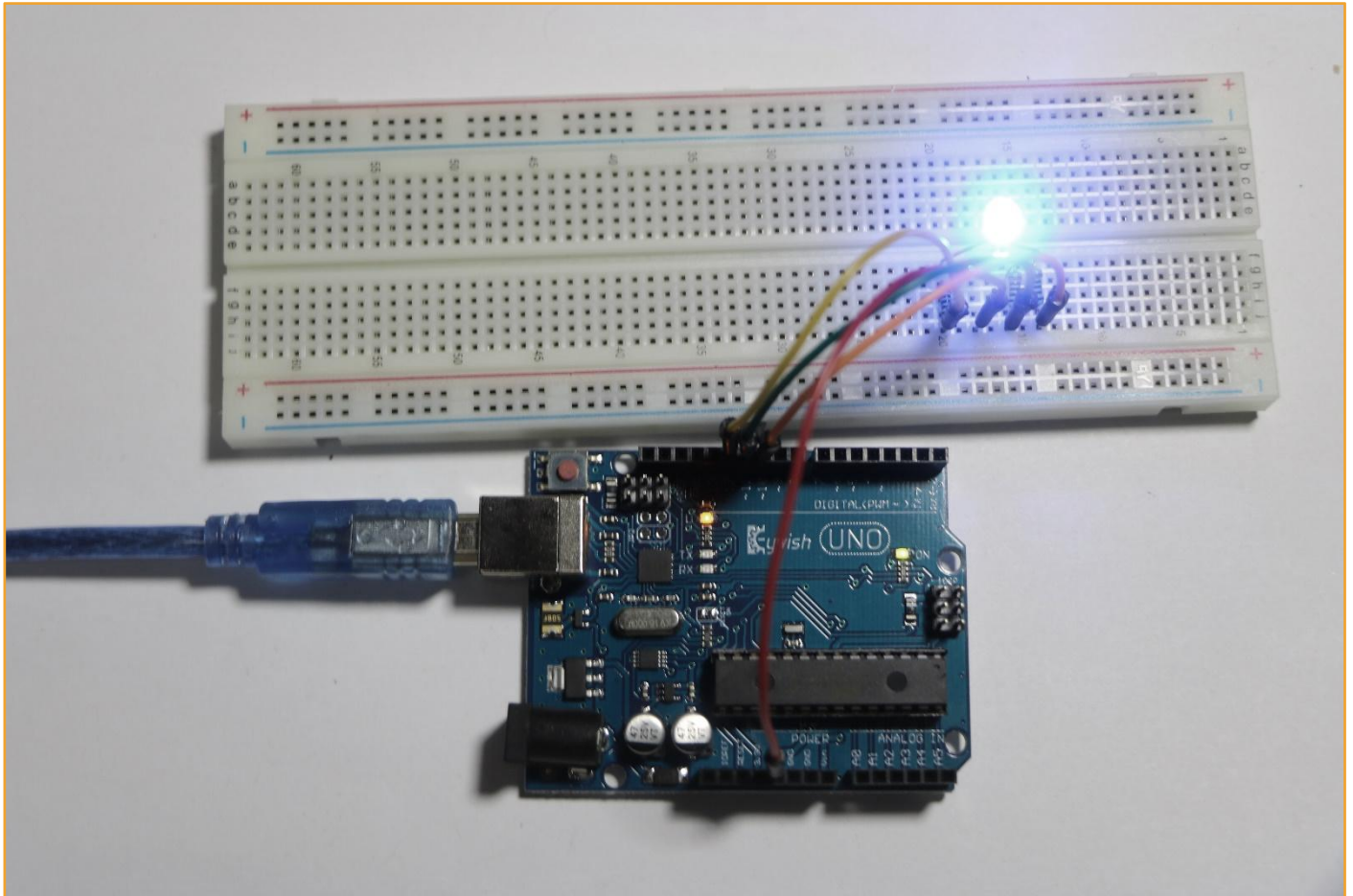
Experiment Result

Here you should see the RGB LED flashes circularly, and blue first, then red, green.

MBlock programming program

The program prepared by mBlock is shown in the figure below: