**NewPing Instructions and Code**

Teacher Directions:

Set up a class account on Arduino Create. In this way you can manage what sketches students are using. More than one device may be open with the same account.

Directions:
Read this notes section prior to copying and pasting the code. Make sure to save it in your account to make it easier to modify if necessary.

Calibration:
The highlighted value may need to change depending on calibration. For purposes of student understanding of integer values, the following calibration was given by Sunfounder. This is a rounded value.

The more accurate calibration for the sensor is listed below:
Distance = sonar ping (uS) * 1e6 (to change to m/s) * 340/2 (speed of sound/2) * 1e2 (converting from m to cm)

Extension: You could have students use the more accurate calibration in the code instead, and possibly suggest adjusting the 340 m/s (optimal measure of the speed of sound in air) for slight disturbances.

Copy the following code below and paste into Arduino Create—make sure to title it for your students

```cpp
#include <NewPing.h>

#define TRIGGER_PIN  12  // Arduino pin tied to trigger pin on the ultrasonic sensor.
#define ECHO_PIN      11  // Arduino pin tied to echo pin on the ultrasonic sensor.
#define MAX_DISTANCE 400 // Maximum distance we want to ping for (in centimeters).

NewPing sonar(TRIGGER_PIN, ECHO_PIN, MAX_DISTANCE); // NewPing setup of pins and maximum distance.

void setup() {
  Serial.begin(115200); // Open serial monitor at 115200 baud to see ping results.
}
```

```cpp```
Designing and Packaging a Distance Sensing Product—NewPing Instructions and Code

```cpp
void loop() {
    delay(50);                      // Wait 50ms between pings (about 20 pings/sec). 29ms should be the shortest delay between pings.
    unsigned int uS = sonar.ping(); // Send ping, get ping time in microseconds (uS).
    Serial.print("Ping: ");
    Serial.print(uS/58); // Convert ping time to distance in cm and print result (0 = outside set distance range)
    Serial.println("cm");
}
```