

# COVID-19 MASK WITH TEMPERATURE SENSORS AND ALARM LED

Lilliona Benally, Navajo preparatory school, Farmington, New Mexico

Project ID#

## Q1: Research Question/Engineering Goal

Can a respiratory mask be instrumented with temperature sensors and monitored by an Arduino UNO microprocessor, to give an indication of the health of the wearer?

## Q3: Data Analysis & Results

The data taken is shown in Figure 5, below. The exhale air temperature was up to 7.08°C (12.7°F) hotter than the inhale air temperature. Also, the skin temperature was 33.98°C (93.2°F), indicating a healthy wearer. This data indicates that my prototype instrumented Covid-19 mask was successful. Additionally, the red alarm LED would light up whenever the average skin temperature exceeded my threshold. In the Arduino sketch (Appendix A), I selected 38°C as my threshold for a fever.

## Q2: Methodology/Project Design

Download the Arduino IDE program Connect the Arduino UNO to the temperature sensors, alarm LED, and laptop These temperature sensors are mounted in three pairs. Temperature sensors T0 (left filter) and T1 (right filter) measure the temperature of the inhaled air. Temperature sensors T2 and T3 measure the temperature of the exhaled air, at the exhale port of the 3M respirator. Temperature sensors T4 and T5 measure the skin temperature of the wearer near the chin area of the face.

## Q4: Interpretation & Conclusions

My project showed that a Covid-19 mask could be instrumented, thus converting what would normally be a passive mask into an information gathering one. Thus, my hypothesis was accepted by the standards of the results. In the future I would intend to use Bluetooth to relay data and more sensitive sensors for reading more breathing patterns.