

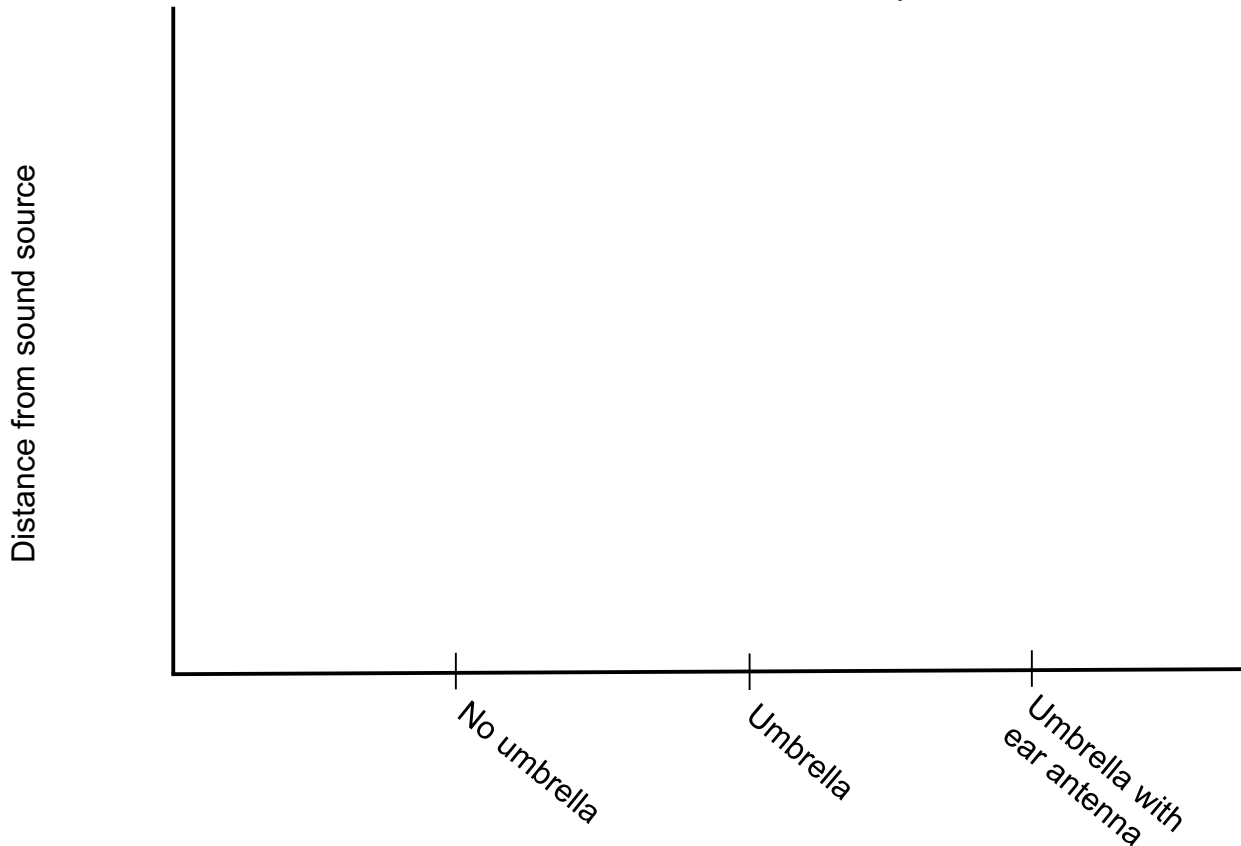


# Catching a Whisper from Space

In the table below, predict how far away you will be able to hear your teacher's beeping mobile device. Conduct three trials and record the farthest distance you are able to hear the beep each time and then average the three distances. Repeat the prediction and experiment when your teacher uses an umbrella with the device. Then, construct an ear antenna and repeat the experiment again.

|                   | Device only, no umbrella, distance (m) | Device with umbrella, distance (m) | Device with umbrella and ear antenna, distance (m) |
|-------------------|--|------------------------------------|--|
| Prediction        |  |                                    |  |
| Trial 1           |  |                                    |  |
| Trial 2           |  |                                    |  |
| Trial 3           |  |                                    |  |
| Average of Trials |  |                                    |  |

Create a scatter plot using the average of your collected data in each scenario (no umbrella, with umbrella, and with umbrella and ear antenna).





**Using a different size umbrella and different ear antennas, conduct more trials.**

Diameter and description of umbrella 1 \_\_\_\_\_

Diameter and description of umbrella 2 \_\_\_\_\_

Diameter and description of ear antenna 1 \_\_\_\_\_

Diameter and description of ear antenna 2 \_\_\_\_\_

|                     | Device with umbrella 1 and ear antenna 1, distance (m) | Device with umbrella 2 and ear antenna 1, distance (m) | Device with umbrella 1 and ear antenna 2, distance (m) | Device with umbrella 2 and ear antenna 2, distance (m) |
|---------------------|--|--|--|--|
| Prediction          |  |  |  |  |
| Trial 1             |  |  |  |  |
| Trial 2             |  |  |  |  |
| Trial 3             |  |  |  |  |
| Average of 3 Trials |  |  |  |  |

Which combinations allowed for the farthest communication?

What mathematical principles are exhibited in this model?

What scientific principles are demonstrated in this model?