

## **Exploration**

As a hiker changes elevation during a hike, the atmospheric pressure will change. The air pressure at sea level, is vastly different than the air pressure at the top of a mountain. In some regions, it can be even be difficult for people who are not from that region to breathe, because they are not used to the changes in altitude. Using PocketLab, determine the relationship between elevation and air pressure.

## **Materials**

Pocketlab



# **Objective**

In this experiment, students will:

- 1. Measure the change in air pressure during a hike.
- 2. Show how the change in air pressure is related to altitude.
- 3. Use PocketLab to better understand how an altimeter works.

#### Method

- 1. Find an area with elevation change where you would like to take a hike.
- 2. Answer the Prediction questions.
- 3. Turn on PocketLab, pair it with your device, and start hiking.
- 4. Answer the Data Analysis and Observations/Conclusion questions.

#### **Predictions**

- As the elevation increases, how will the air pressure be affected? Explain your prediction.
- Map out your hike's change in elevation. Before your hike, create your own graph that predicts how the pressure will change throughout your hike.

Don't worry so much about the pressure values themselves, instead focus on the shape of the graph. Where will the pressure be the highest and lowest? Where will there be the fastest change in pressure? Etc.

### **Data Analysis and Observations/Conclusions**

- As the elevation increased, how was the air pressure affected? When the elevation decreased, how was the air pressure affected? Explain whether this is a proportional or inversely proportional relationship.
- Analyze the accuracy of your prediction map. Even if the pressure values were not correct, how accurate was the shape of your graph?
- Explain why the pressure changes at different altitudes. What is happening to the oxygen in the atmosphere? Why do you think the air pressure changes at such an even rate at different altitudes?
- When hiking at a higher altitude, people often get tired easily and can sometimes feel light-headed. Explain this in relation to pressure. Why do climbers need oxygen masks when climbing the world's tallest mountains?

#### How to calculate elevation

• Create your own calibration curve. We know the pressure at sea level is ~1013.25 mBar. Look up the elevation where you start your hike. It is safe to assume the relationship between pressure and elevation is linear near sea level.

