

The Ascent – Week 2

Objectives:

- Differentiate between weather and climate.
- Understand what density and gravity are and how they play a role in the design of the weather balloon.
- Determine what the atmosphere is and how it impacts Earth.
- Explain the main components of air.

Schedule:

- What is weather? (10 mins)
 - Have students write down the answer and discuss.
- Weather vs. Climate (10 mins)
 - Weather is short term and climate is long term; what would you expect the climate to be in Antarctica? Hawaii?
- Dry Ice and Climate change (15 mins)
 - The change in Earth's climate due to natural and human processes. Introduce the effects of climate change (e.g. coral bleaching, droughts, and sea level rise).
 - Dry Ice is solid CO₂, which is a major greenhouse gas. A greenhouse gas is a gas that traps heat in the atmosphere.
- Weight of gases – do gases have weight? (35 mins)
 - Fill three balloons – one with helium (He), one with carbon dioxide (CO₂), and one with breath.
 - Hypothesize what will happen when you let go of each balloon. Then drop two at once and hypothesize what will happen.
 - Why did this occur? Help students calculate the weight of He (2 g/mol) and CO₂ (44 g/mol). C=12 g/mol and O=16 g/mol
 - The balloons with different gases have different densities, which is why they fall at different rates or don't fall at all.
- What's in air? (10)
 - Mixture of different gases
 - 78% Nitrogen, 21% Oxygen, 1% Argon, 1% everything else
 - CO₂ occurs in such tiny amounts, that when you raise the amount even a little, it has big effects.
- Discuss how we should build the weather balloon and what we will need. (10)
 - Which gas should be used?
 - What do students want to measure?
 - How are they going to measure it?

Materials:

- Balloons – One filled with CO₂, one with He, and one with breath.