Low-cost and easy experiments about the water in the atmosphere

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Introduction

• Atmospheric water and the changes it suffers are essential in the water cycle.
• The concepts related to water are present in the educational curricula of many levels.
• There are many misconceptions from the students related with atmospheric water.
• We present some easy experiments which can help in the learning of these concepts.

Why low-cost?

• Cheap and simple to do: promotes students autonomy.
• It only requires part of the time of a class session.
• It can be adapted to many different levels.
• It can be carried out either in the laboratory or in the classroom.

Ocean of misconceptions

Some examples:

• Clouds are made of water vapor.
• Air humidity and temperature are independent parameters.
• In cloud formation, only the water vapor is needed.

Key concepts

• Key concepts: evaporation, vaporization heat, air humidity.
• Key concepts: evaporation, air humidity and cooling, condensation.
• Key concepts: water vapor, air pressure, temperature, condensation nuclei.
• Key concepts: convection, temperature contrast, air cooling, condensation.
• Key concepts: evaporation, vapor pressure, precipitation, air cooling.

Key questions

• Is water vapor visible?
• What happens when the pressure of moist air decreases?
• What is the initial temperature of all thermometers?
• Why does water evaporate? Why do appear drops in the tray? Why do drops grow and fall?
• Who does water evaporate?
• Why do drops appear in the tray? Why do drops grow and fall?

Didactics

With the aim of a meaningful learning of students we propose:

We show 5 examples of this kind of low-cost experiments. We detail:

• Key concepts: main scientific concepts of the educational curricula which could be approached with each activity.
• Key questions: strategic questions which teachers can propose to students in order to stimulate reflection and understanding about the concepts.

A crazy thermometer?

What are clouds made of?

Let's generate a cloud

The cold drop

Does water follow a cycle?

References