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Low-cost and easy experiments about water in the atmosphere

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Atmospheric water represents only the 0,001% of the total water in the hydrosphere. Despite this tiny percentage, the physical changes water experiences in the atmosphere are essential for the conservation of this substance in our planet. Often, the understanding of the presence of water in the Earth's atmosphere and its physical changes inside this gas layer are difficult for most secondary and primary school students. We present 5 examples of simple practical activities that will facilitate students to think about and understand some important concepts about atmospheric water. Two of the basic principles to bear in mind when designing these activities are the use of cheap and easy to find materials and the simplicity of the construction and development of each activity. This simplicity makes it possible for the students to easily carry the experiments in the classroom or in the laboratory, using only a part of a class session.
We think that the use of these kinds of activities enables us to work some basic concepts about atmospheric water with the students which lead to a more meaningful understanding, not only of these concepts but also of many other processes related to this part of the hydrosphere, such as meteorological phenomena, erosion, floods, etc.

Here we present a brief description of the five experiments we suggest:

1- a crazy thermometer? Using water at the same temperature of the air, a piece of paper and two thermometers, we can easily "build" a dry and a wet bulb thermometer. Making questions about the differences between the temperatures of both thermometers we can understand what the air's humidity is and how we can calculate it.

2- what are clouds made of? Most of people think that clouds are made of water vapour. Observing what happens with the air above a small container filled with warm water when we approach a tray containing ice, we can conduct a Socratic dialogue that allows us to understand that clouds are made of ice or liquid water particles and not of water vapour.

3- Let's generate a cloud. The formation of a cloud needs three ingredients: water vapour, cold air and condensation nuclei. Combining these three ingredients inside a bottle using a small air compressor to generate temperature changes, we can easily visualize and understand the cloud formation process.

4- the cold drop. A blue stained block of ice moving itself inside a container filled with warm water, illustrates the dynamics of this phenomena that is especially relevant in Mediterranean climatology due to the torrential precipitations that the cold drops sometimes generates.

5- Does water follow a cycle? Most students know that water follows a cycle in our planet. Asking them how to design a simulation of this cycle and which laboratory material we need to construct it, we help them to understand all the physical processes which take place in this cycle and its pathways.