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Water: from the source to the treatment plan

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As a physics and chemistry teacher, I have worked on water from the source to the treatment plant with 27 pupils between 14 and 15 years old enrolled in the option “Science and laboratory”. The objectives of this option are to interest students in science, to introduce them to practical methods of laboratory analyses, and let them use computer technology. Teaching takes place every two weeks and lasts 1.5 hours. The theme of water is a common project with the biology and geology teacher, Mrs. Virginie Marquet.

Lesson 1:
Introduction: The water in Vienna
The pupils have to consider why the water is so important in Vienna (history, economy etc.) and where tap water comes from.
Activities: Brainstorming about where and why we use water every day and why the water is different in Vienna.
Lesson 2:
Objectives of the session: What are the differences between mineral waters?
Activities: Compare water from different origins (France: Evian, Vittel, Contrex. Austria: Vöslauer, Juvina, Gasteiner and tap water from Vienna) by tasting and finding the main ions they contain.
Testing ions: Calcium, magnesium, sulphate, chloride, sodium, and potassium
Lesson 3:
Objectives of the session: Build a hydrometer
Activities: Producing a range of calibration solutions, build and calibrate the hydrometer with different salt-water solutions. Measure the density of the Dead Sea’s water and other mineral waters.
Lesson 4:
Objectives of the session: How does a fountain work?
Activities: Construction of a fountain as Heron of Alexandria with simple equipment and try to understand the hydrostatic principles.
Lesson 5:
Objectives of the session: Study of the physical processes of water treatment (decantation, filtration, screening)
Activities: Build a natural filter with sand, stone, carbon, and cotton wool. Retrieve the filtered water to test it during lesson 7.
Lesson 6: Visit of the biggest treatment plant of Europe in Vienna.
Lesson 7:
Objectives of the session: Water Quality Monitoring: Biochemical Oxygen Demand (chemical analysis) in common with my colleague.