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The challenges of teaching Earth Sciences in another language: effectiveness of task-based activities and collaborative learning

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In the French school system, as in many other systems across the world, students have the possibility to be taught a subject in another language, in a setting called Content and Language Integrated Learning (CLIL). For instance, in French high schools, students can have a class of Life and Earth Sciences in English, Spanish, German, etc. The idea is to be learning by doing, using the foreign language in a setting different from the regular language class. Science classes offer an excellent opportunity to develop language skills, especially oral skills. Thanks to an EU-sponsored training period, we have found that tasked-based activities, in authentic situations and based on collaborative work, can be very effective. Let's have two examples linked to Earth Sciences.

The first type of activity is called information gap. Student A and student B have different informations and need to talk to each other to fill out a table or a diagram. For instance, this can be used to learn about the different parts of a petrographic microscope. The teacher provides the scaffolding language (how to formulate questions) and the students, working in pairs, exchange information in a collaborative way. In the end, they have learned the names and function of the parts of the microscope and are able to recognize and name them on a real microscope. This first step can be followed up with a writing activity: each student has to write a "How to" short explanation about using the microscope, which will be later used by another group of student from another class. Again, scaffolding language is provided to help the writing. Finally, students will actually observe slides using all the words they just learned.

The other task-based activity is built like the game called Connect 4. Our example is related to sizes and scales, always challenging for science students. We created a large grid where we wrote, in each box, a size or range, such as 1 cm, >10 micrometers, 1 meter, 1 nanometer, <1000 kilometers, 1-10 millimeters, etc. Students have a stack of cards with drawings and names of various natural objects: molecule, mountain range, Earth, atom, human being, mineral,etc. Each team has to lay a card on a box with the correct size. The team getting 4 cards in a row wins, just like in the game Connect 4. This leads to negotiation within the team, a great setting to use scientific words and concepts. The idea is to communicate in the foreign language AND about sizes of natural objects, the game context providing the incentive and motivation. The activity can work as introduction or as revision activity.

Many other activities of this type can be practiced in CLIL Earth sciences classes, the general idea being that they should be hands-on, fun, engage the students, allows them to practice all four skills of language learning (listening, speaking, reading and writing) while also reaching science-related goals. In this context, tasked-based collaborative activities can be very effective.