Technology in the classroom (new course content)

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Examples of possible uses of sensors in the four strands of new syllabus

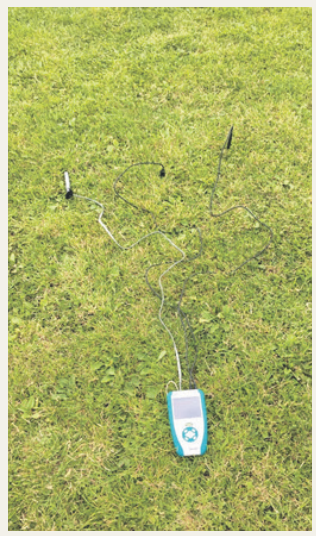
With the introduction of new Agricultural Science syllabus, it is now more important than ever that we, as teachers, develop engaging and scientific class material for our students. I will be describing some data collection technology that we can use inside and outside the classroom and link this to the new learning outcomes in each of the four strands of the new course.

Sensors, irrespective of brand, are a very useful tool for both student and teacher. The use of these sensors in the classroom can greatly improve how students collect, analyse and interpret data. Therefore, reducing the margin of error when conducting classroom experiments and encouraging hands-on scientific exploration.

Such equipment can be shared among class subjects within the school, including all senior science subjects, junior cycle science, geography and technology – somewhat justifying the investment.

Strand 1: Scientific practices

LO 1.2 (a, b, d, g), 1.3 (c, d), 1.4 (a).
This can be linked to LO 3.3.1(c, d).



The picture shows three variables that can be measured – soil moisture, soil temperature and light intensity. For higher level students, other variables such as pH, nitrate level, calcium level and potassium level can also be collected.

The collection of data from the variables above can then be interpreted LO 1.3 (d) and communicated by the class LO 1.4(a, b).

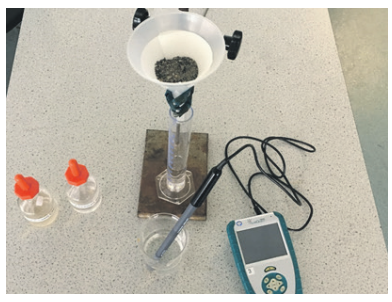
Strand 2: Soils

Soil temperature.
Many learning outcomes can be covered here, LO 2.2.2 (a) and LO 3.3.1(b, c). Collection of data can take place in the school garden, polytunnel or farm visits.

Soil moisture
LO 2.2.2 (a, e) and LO 3.3.1 (a, b, c)
The experiment on calculating the percentage water content of a soil sample; this can be calculated various times during the year.

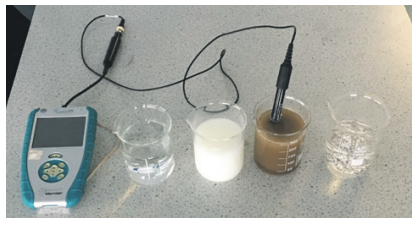
Soil p H
LO (2.1c), LO 2.2.1 (a, b), LO 3.3.1 (b, e) and LO 4.1 (a)
This sensor allows students to compare many soil samples collected on farm visits and communicate their findings LO (1.4 (a, c).

Cation exchange
LO 2.2.1 (a,b) LO 3.3.2(g) LO 4.3.2(a)



The picture shows the calcium electrode sensor, this can be used along with ammonium oxalate to measure calcium ions in mg/l in the soil filtrate. Potassium ions can be analysed by using a potassium sensor. Students will now be able to table and graph their results. Leaching of soil and the quantity of Nitrate ions can also be measured in filtrate from different soil samples collected by students.

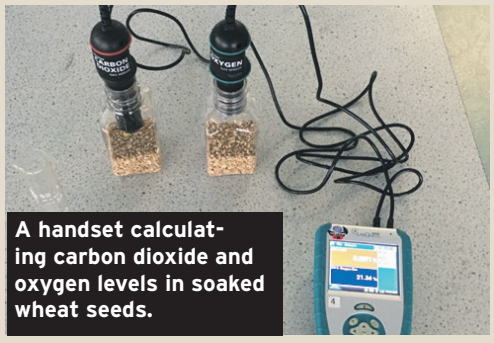
Biological Oxygen Demand
LO 2.3 (a, b, c)



The picture shows the BOD level of river water, dairy washings, animal slurry and fertiliser in river water. These results can be linked to environmental pollution.

Strand 3: Crops and Strand 4: Animals

Respiration and photosynthesis of plants
LO 3.1(a), LO 2.3(a, b, c), LO 4.3.2(a) and LO 4.3.3 (b)



A handset calculating carbon dioxide and oxygen levels in soaked wheat seeds.

How to set up sensors in the classroom
Purchase and load software on to available school devices. This allows the teacher to bring most sensors into the classroom and display results on the whiteboard.

The sensors can be used in three ways:
1. USB adapter (GoLink): this allows sensors to be connected to computers and laptops.
2. Handset: this allows the collection of data in and outside the classroom.
3. Wireless sensors (new).

Advantages of using sensors
- Collected data can be stored, printed and displayed for students.
- There are many learning outcomes in the four strands that will be covered by students using sensors. It makes it easier for them to collect data and remember experiments.
- Allows for accurate measurements to be obtained by students. Reliable results and conclusions are debated in the classroom.
- Students could borrow equipment to collect accurate data for their project work if required.
- Links technology to agriculture and the environment.
- Promotes student participation and development of practical scientific skills.

Sensors can be considered a costly purchase but, as you can see, the benefits of this equipment far outweigh the cost. The implementation of such technology alongside the new Agricultural Science syllabus should inspire a practical and discussion-based approach to scientific learning.

IASTA news

➲ Cork/Kerry Branch meeting in the Abbey Hotel Ballyvourney, Sunday 6 October at 6.30pm. Reminder to attendees to please bring booklet relating to New Specification. All welcome.

NEXT WEEK
Milk production, factors affecting content and quality