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# Teaching English as an Additional Language (EAL) Learners in Science

EAL learners who are New to English and have had a good previous education can sometimes find science lessons less accessible than many other subjects. Much of the language in science is highly abstract and uses complex sentence structures with a lot of new subject vocabulary. On the other hand, practical science lessons offer excellent opportunities for language development because learning activities are usually collaborative and provide a rich context for learners to communicate.

At higher levels in secondary school, learners need to write explanation and justification paragraphs, so a good understanding of how language works in science is essential for success.

EAL learners who have come from other education systems may not have studied the same areas of science that are taught in the UK. For example, in many countries, Primary curricula do not include much science, or only include human biology or environmental science.

## What are the challenges for EAL learners in science lessons?

EAL learners face a range of challenges in terms of the language requirements of science lessons; they may have difficulties at word, sentence and text level.

### Word level

In science, EAL learners are likely to encounter unfamiliar vocabulary items of three different types:

- Subject-specific technical words, e.g. photosynthesis, magnetism, intestine, electro-magnetic. All learners will need help with the technical words of science. Many of them derive from Greek and Latin and have unfamiliar spellings and forms.
- Subject-specialised words, (words that have alternative meanings in everyday language) e.g. function, power, attraction, table. EAL learners may find the specialist meanings of familiar words even more confusing as they have already learnt the word in another context. For example, words like ‘energy’, ‘force’ have specific meanings in science but also different meanings in other areas. Making the different meanings explicit will help all learners, not just those with EAL (Monaghan, 2016).
- General academic words, e.g. accurate, demonstrated, conclusion, substitute. These are words that learners need across all curriculum subjects when they are expected to write in a formal, academic style.

### Sentence level

EAL learners may have problems with difficult or unfamiliar sentence structures in science texts. For example:

- Use of the passive voice, e.g. baking soda and vinegar were mixed…
- Modal verbs are often used to hypothesise and express uncertain conclusions, e.g. 'may be reflected in …. could relate to …'
- Comparative structures, describing relationships between variables, e.g. 'the nearer a planet is to the sun the shorter it's orbit'

### Text level

EAL learners may find the way the text is presented or structured in science texts difficult. Science has created a language that describes its world. It is hard to simplify because the structures of the language express the structures of scientific thought.

*'In formal science writing, information is densely packed: a lot of content is packed into a small amount of text.'* (Driver, 2017)

Scientific English is full of grammatical metaphor. It uses complex noun phrases (known as nominalisations) to represent processes. For example, the phrase, 'premature birth rate.' could mean many different things according to context:

- How many babies are born prematurely
- What proportion of babies are born prematurely
- How prematurely babies are born

## How can I support EAL learners to tackle unfamiliar scientific language?

Teachers can also help EAL learners in science lessons by:

- Using visual, kinaesthetic and concrete activities to model processes
- Using online animations and videos, for example Royal Society of Chemistry resources
- Modelling how to organise and write reports using evidence from reading
- Using science dictionaries and glossaries

It is best practice to give EAL learners plenty of opportunities to move from the concrete to abstract and to provide lots of time to observe and talk about scientific processes before reading or writing about them. Introducing vocabulary-based starter activities is a good idea, see Introducing New Vocabulary.

One idea which supports EAL learners to follow a method while investigating, is to ask pupils to watch a demonstration and listen to the instructions first, then sequence sentences that have been copied onto card and cut up, see DARTs - Directed Activities Related to Text.

> *'A useful approach when having to deal with challenging texts with EAL students is to try and expose the learners to small chunks or parts of the text through some short, highly focused activities, so that they become familiar with its parts.'* (Ahmed and Vazquez, 2016)

An example of a short focused activity that Ahmed and Vazquez give is to summarise the first part of the text in six statements written on cards and ask the learners to work in pairs or groups to sequence the statement cards, then show them the original text and ask them to see if they have got them in the correct order.

To support reading for information from text books, teachers should model how to read the text aloud with the class, talking through scientific vocabulary and showing how cohesion works using pronoun reference in an explanation. For example,

> *When we swallow food, we squeeze it (the food) down through our oesophagus to our stomach. Here (in the stomach) a lot of our digestion is done by the gastric juices, which (the gastric juices) contain hydrochloric acid. This (the hydrochloric acid) breaks down food into things that the stomach wall can begin to absorb.*

## How can I make a fair assessment of EAL learners' prior attainment in science?

When a learner with EAL is new to the school, it is good practice to assess their mathematical/numeracy skills as well as their English and first language skills as this gives a clear idea of the learner's cognitive potential. Primary schools should ask the parents what previous experience of learning science a child has had. Secondary schools may also be able to conduct an informal assessment with the support of a bilingual adult. They should also use the maths rather than the English level for placement in Science groups. In making an assessment of an EAL learner's ability and potential in science, it is important to be clear about what you are assessing. For example,

- Consider what science topics the pupil has covered in their country of origin
- How much they can access the relevant UK science curriculum?
- What existing science skills can easily be transferred e.g. drawing graphs?

# Useful links

### EAL Resources

- Heat loss experiment – helps EAL learners write up a science practical
- Science investigations is a pack to support EAL learners at various levels in planning and writing up a science investigation
- For EAL learners who are new to English, it is useful to have sets of flashcards depicting science practical work. These can be used to show learners what to do, and then to help them to talk and write about what they have done. See, for example, The boiling point of water, Testing acids and alkalis, Does sugar dissolve faster in hot or cold water?
- Unpacking reading - at text and sentence level - with active reading strategies. See DARTs - Directed Activities Related to Text
- Modelling how to write notes and use content from their reading. See Information Exchange

### Other

- Royal Society of Chemistry resources

### References

DfES 2002, Access and engagement in Science.

Driver, C., 2017, What does the language of Science look like? EAL Journal, Autumn 2017.

Ahmed, S. and Vasquez, M., 2016, Developing reading in a Year 10 Science lesson, EAL Journal, Autumn 2016.



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