

Your students' prior knowledge

Where to begin teaching

Prior knowledge

Why are your students' prior knowledge or preconceptions important to your teaching?

Rosalind Driver (Driver, 1983), a constructivist science educator, gives a good answer to the question by describing this simple hypothetical situation. Suppose that a visitor phones you and says:

"I've got lost on my way to your school. Please help me find my way you."

What do you do? Can you direct him to the gates of your school if you do not know where he is calling from? Clearly the best and most useful way you can start to help is by asking:

"Where are you now?"

You must know the visitor's current location in order to give any kind of help. In the same way, a good starting point for your teaching is to find out what your students already know (i.e. their prior knowledge) about the concept or idea that you are going to teach.

From a constructivist standpoint, people learn in a meaningful way when they interpret new experiences in terms of their prior knowledge.

So in your classroom, how can you discover your students prior knowledge about what you are about to teach? This can be done in a variety of ways, but depending on your own teaching context, here are some strategies which you might want to use:

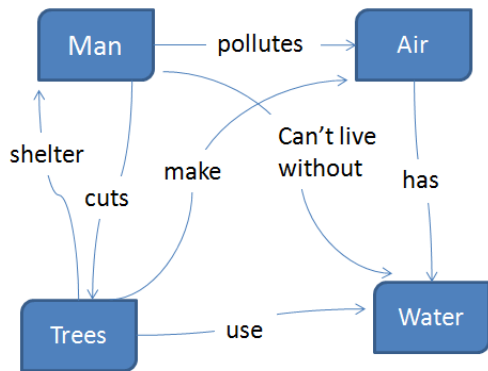
1. Talk to them. Hear them out. Create a situation for your students to discuss prior to the lesson. For example, draw a diagram, take a photograph, or photocopy a paragraph from your local newspaper. Have a list of guiding questions to help draw out your students' current understanding. For example: 1. Which of the two blocks is heavier? Which of the two blocks is denser?



2. Ask your students to write an essay or a short paragraph on the concept which you are about to teach. Read their essays and identify areas of inconsistent understanding. You'll understand more about your students' inconsistent understanding by structuring probing questions based on what they've written.
3. Use *concept mapping*. Ask your students to draw a concept map that represents their current understanding of the concept(s) which you are about to teach.

Concept mapping

A *concept map* is a visual representation of how a person understands a phenomenon or an idea. It consists of different words which are linked by lines. These lines represent the relationships between the words, and each line is labelled with the relationship that it represents.



Martin (2003) believes that a student's concept map provides us, teachers, with a conduit through which we can look into their heads and see how they are constructing information.

For example, the concept map on the left represents a student's prior understanding of the concept Climate change

A concept map shows how different ideas are related to one another. On a concept map, a relationship is represented with a link (which is annotated – described through labelling).

When using concept mapping with your students, it is important that they are encouraged to think of ALL relationships that they could think of (i.e. all possible links are identified and labelled). This way, you have an effective means of looking into how well they understand concepts.

These are some important points to note:

- ▶ There can be more than one link between two terms (i.e. more than one relationship between two words)
- ▶ There can be no (direct) link between two words;
- ▶ There can be more than one correct concept map. If a friend comes up with a slightly different map from yours, based on the same list of words, don't worry! This may simply mean that you and your friend have a slightly different understanding of the same thing.

Misconceptions

Another important function of a concept map is that you can use it to look for (or diagnose) *misconceptions* – that is, knowledge that is in error. These are some indicators of misconceptions in a student’s understanding:

- ▶ The student has not described links correctly.
- ▶ The student has not linked two words that are related (or has erased the link) – indicating that they perceive no relationship between the two words.

When misconceptions are identified, you will need to correct them in your lesson.

POE: Predict, observe, explain

You have learned strategies which you can use to identify your students’ prior knowledge and especially to pinpoint their misconceptions. Now here is a strategy which you could use to change those misconceptions. *Predict–observe–explain* (POE) is a constructivist teaching strategy in which a *discrepant event* (an event that is contrary to a person’s expectation) is used to challenge the misconceptions of students.

Specifically, with POE you can explore and change your pupils’ understanding as they do these three tasks:

1. **Predict.** The students use their current understanding to predict the outcome of some event and justify their prediction.
2. **Observe.** After making predictions, the students then observe the event and describe what actually happens.
3. **Explain.** They must explain or reconcile any conflict between their earlier prediction and what they actually observe.

Constructivist teachers use discrepant events to stimulate students’ natural curiosity. A discrepant event leads pupils to become ‘dissatisfied’ (or in Piagetian terms, *disequibrated*) as the reality of the event makes them question their inaccurate prior knowledge. They become captivated by the experience and are genuinely keen to find an explanation for it.

References

Martin, D.J. (2003). *Elementary science methods: A constructivist approach*, 3rd edition. California: Wadsworth.

For referencing purposes: Should you need to reference this document, please use the following format:

Foliaki, V. (2012). *Your student's prior knowledge: Where to begin teaching*. Unpublished manuscript. Institute of Education, The University of the South Pacific, 'Atele, Tonga.