Good questions

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Aims

• To consider why using good assessment items is important
• To develop some new assessment items that could be used in class to elicit evidence of student learning
• To share these, and to consider how they might be used in teaching
BACKGROUND IDEAS
“The main purposes of assessment are concerned respectively with the support of learning, with certification, i.e. with reporting the achievements of individuals, and with satisfying demands for public accountability.” (p. 4)

A more fundamental role of assessment

• “Many students do not really understand potential difference.”
• “Students have difficulty in understanding Darwin’s theory of evolution by natural selection.”
• “Most of my students don’t really understand the difference between a physical and a chemical change.”

What, exactly, would we want students to be able to do for us to judge that they ‘understood’ things like these?

What would count as good evidence?
A more fundamental role of assessment

Assessment clarifies the intended learning outcomes.

- Unless you can say how you could judge whether a student has achieved a given outcome or not, you don’t really know what that outcome means.
- This enables teaching to be much better focused.
QUESTIONS THAT ASSESS UNDERSTANDING
A three step process

1. **What do we want students to learn?**
   - Learning intentions

2. **What do we want students to do to provide evidence of their learning?**
   - Evidence of Learning Statements

3. **What are the questions and tasks that will provide that evidence of learning?**
   - Evidence of Learning items

Writing **Evidence of Learning Statements** clarifies the **Learning Intentions**

Identifying the **Evidence of Learning Items** also clarifies the **Learning Intentions**
In the dark

Imagine you go into a cupboard under the stairs and close the door. There are no windows and the door is a very tight fit.

You switch off the light.

After sitting there for a while, what will you be able to see?

A  After a while, you will be able to see everything, but very dim.

B  The only thing you will see is the cat’s eyes shining.

C  You will see the mirror shining dimly, but everything else will be dark.

D  You won’t be able to see anything at all, no matter how long you wait.
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"The lack of a correct model of vision is also probably one of the reasons for the difficulty, which pupils traditionally have, of grasping the notion of a virtual image.

......

This model rests on the idea that an object is seen because the light that comes from it and that penetrates our eye after having been propagated in straight line in the intermediate space."

Diagnostic questions

• Not only do they tell you which students have some understanding of the idea, ...........
     ..............they also give you some information about the ideas of those who do not understand.

• Useful at the beginning of a sequence of teaching to find out where learners are in their understanding, or to check on progress during a lesson.
Children’s understanding
Students responses to questions
What did the students say?

Why do the motors run faster in one circuit than the other?
Alom: In circuit A the motor runs slower because they are next to each other.

Ben: In circuit B there is the same voltage across them both.

Fred: In circuit A the current is shared.

Eve: In circuit A the energy is shared.

Di: In circuit B the current is shared.

Callum: Because the there is more energy in circuit B.
Predict-explain-observe-explain

What happens when a second bulb is added?

Predict
What do you think will happen to the reading on the ammeter, and the brightness of bulb $B_1$, when switch $S$ is closed?

Explain
Explain the reasons for your prediction:

Observe
Describe what happens

Explain
If your prediction was not correct, can you now explain what you have observed?
Focused cloze exercises

Cooking a pizza

Complete the sentences below to describe cooking a pizza.

You should only use the words **heat** and **temperature** to fill the gaps.

When you want to cook a pizza, you should turn on the oven and let it get up to the right ________________ . When you put the pizza into the oven, don’t keep the door open for too long or a lot of ________________ will escape. Once the pizza is cooked, take it out and put it on to a plate. Be careful when you take your first bite, as its ________________ may be quite high. If you leave it for a few minutes on your plate, it will lose some ________________ and cool down a little.
Tasks

• Each task will ask you to develop new assessment items that could be used in class to elicit evidence of student learning by using question templates from York Science and applying these to new contexts:
  – Identify the learning for which the item will provide evidence
  – Write the assessment item on the A3 sheets for display around the room
A variety of question types

1. ‘Talking heads’
2. Judging confidence in understanding using a set of statements
3. PEOE (predict-explain-observe-explain) practicals
4. Focused Cloze exercises
Using Evidence of Learning Items

I put some questions together to make a short test. Each student wrote their answers – so I was able to give them personal feedback.

I projected a question on to the whiteboard. A show of hands told me how many were choosing each answer option. It’s a good way to see the range of ideas in the class.

I gave each group the same question to discuss. They had to agree on the answer and everyone in the group had to be able to explain the group’s answer to the class.

Instead of telling students the right answer, I turned the question into a practical activity – so they could find out the right answer for themselves.
Another way of evaluating confidence

- A set of multiple-choice questions
  - Each with four answer options (one correct; three distractors)
- For each question, **your team** have 100 points to allocate.
- You can award these to each of the answer options as you wish.
- You score all the points you place on the correct answer.
“sharing high quality questions may be the most significant thing we can do to improve the quality of student learning.” (p. 104)