# Assessment for learning in STEM teaching

A concrete example (transcript)

*The transcript begins some 40 minutes into the lesson, just as the students have completed a practical where they mixed salt with water and then evaporated the water to retrieve the salt.*

Teacher: So I want you to think about what we just did. Let's just recap so we started with.....?

**Jake:** Salt solution.

Teacher: Salt solution?

**Jake:** Well salt and then salt solution 'cos we put in water.

Teacher: Okay. And what happened when the salt went into the water? Hayley?

**Hayley:** It sort of disappeared.

Teacher points to another student.

**Bijan:** Went invisible in the water but it was still there.

Teacher: How do we know that Bijan?

**Bijan:** The water is salty. So it's there. You just can't see it.

Teacher: Any other evidence? Go on Jake.

**Jake:** Well we got it back when we heated it.

Teacher: Who else found that? That the salt was in the evaporating dish at the end. Most of you. Good. So can you just explain what you think happened in your books. Just a few words to help you get the explanation clear. This one … dissolve. Dissolving. Can you use that please? And this one… evaporate or evaporating. Where did the evaporating come in Bianca?

**Bianca:** With the water.

Teacher: With the water? Which bit as we had water all the way through?

**Bianca:** Last bit. We heated it and that made the salt … made the water evaporate.

Teacher: Okay so you heated the salt solution with your Bunsen and that evaporated the water, leaving the salt from the solution behind. Everyone okay with that? Okay 5 minutes to make notes. Talk to one another first if you aren't sure and talk to me if you are both unsure. Okay. Go.

*Students start task. Teacher circulates reading what the students are writing in their books*
*After 5 minutes, the teacher demonstrates mixing a small beaker of peas into a large beaker of rice.*

Teacher: Let's imagine that this is the water *(holds up beaker of rice)* and this is the salt *(holds up beaker of peas)* and we mix them *(pours peas into rice and stirs it with a spoon)*. What do we have now? Sian?

**Sian:** A mixture.

Teacher: of… ?

**Sian:** Rice and peas.

Teacher: Yep but if the rice is the water and the peas the salt?

**Sian:** Don't get it sir.

Teacher: Who can help Sian? Bianca?

**Bianca:** It's the salt solution.

Teacher: Exactly. In our model, the rice and peas together are the same as the salt solution. So what I want you to discuss in your groups is how can we get the salt – the peas – back out? And also why we can't see the salt – the peas – when they're like this *(holds up the beaker)*.

*Teacher circulates listening to what the students are saying.*

**Samira:** Is it that the peas hide cos they're in the middle and the rice is on the outside?

**Lucy:** Yeah maybe. But water is see-through so it wouldn't work like that with the salt n water.

**Samira:** Maybe it's because rice is a solid. Would it work if we made the rice liquid?

**Jo:** Don't think it goes liquid just soft when you cook it.

Teacher: Think of the rice and peas as particles. So the rice are the water particles and the peas the salt particles. So you mix the particles *(points to the beaker of pea-rice mixture on the front bench)*. Can we get the peas out? Maybe not in the same way we get the salt out but can we separate the peas?

**Samira:** You could tip it all out and pick out the peas.

**Jo:** Or use a sieve thing.

Teacher: Okay. So let's go back to the question. Why can't we see the salt when its in solution?

**Jo:** Because it's mixed in with the water. It's in the solution.

**Samira:** Is it also because there's only a little bit of the peas and so they get spread through.

**Lucy:** Or maybe it's the size. Oh no cos' the peas are bigger. Is the salt bigger sir?

Teacher: It is Lucy but listen again to what Samira just said.

**Samira:** Oh it's spread out. The peas there and the salt here get spread out  so you don't notice them. You only see the liquid.

**Jo:** So if there was more salt would you see it then cos there wouldn't be enough water particles to hide it?

*Teacher nods. And moves away to another group.*

**The lesson ends with a group discussion based on the 2 questions:**

1. How do you separate the peas from the rice/pea mixture?
2. Why can't we see the salt when it's in solution?