

Planning lessons: Secondary Science

English (with Hindi)

Commentary:

In this secondary science class, the teacher explains how she planned a demonstration on states of matter.

It is important to try experiments in advance. Think about what questions to ask to engage your students, how to ensure everyone can see and that the demonstration is safe.

Teacher interview:

I will be teaching states of matter to the students. I thought I would demonstrate four things: evaporation, melting, condensation and sublimation.

This will take some time and requires planning. If I plan before the lesson, it maximises the teaching time. Therefore, advance preparation is necessary.

My first step will be to convert a solid into a liquid. I have a spirit lamp to heat it. This can be dangerous, so I will keep it in a corner and I won't shake it too much. I've decided to take two examples instead of one. So I'm going to convert water from ice and then steam from hot water. I've also remembered that I can use wax. It is a big task for a teacher to keep account of all these little things.

Commentary:

A good demonstration and carefully planned questions will prompt students' thinking.

Teacher: कैसे बदलता है वाष्प - ज़रा देखते हैं। इस glass पे देखो - कुछ... कुछ, पानी की छोटी-छोटी बूँदें हैं!

Students: Yes, ma'am!

Teacher: दिख रही हैं?

Students: Yes, ma'am.

Teacher: सबको दिख रहा है?

Students: Yes, ma'am.

Teacher: हाँ, यहाँ पे भी देख लो। ये, ये जो, जिसमें हमने बर्फ रखी थी, इसमें बाहर की तरफ, छू के देखो, पानी की खूब सारी बूँदें हैं!

Students: Yes, ma'am.

Teacher: है न?

Commentary:

The teacher asks her students to explain how the water had formed on the outside of the container.

Students: Yes, ma'am.

Teacher: छू के देखो! गीला है पूरा। तो अब, ये बताओ कि ये आया कहाँ से? आप बताओ।

Student 1: वायुमण्डल में वाष्प था, जब हमने इसमें, glass में, बर्फ डाली, तो ठंडा हो गया। इसलिए वो पानी आ गया, सतह पर।

Commentary:

In the last part of the lesson, the teacher introduces the concept of sublimation. Notice that the room is well-ventilated and the teacher moves around it to make sure everyone can see.

Teacher interview:

I have ammonium chloride here in my lab. It can be bought from welding shops, or from chemists. And if there is a problem finding ammonium chloride, then camphor can be easily found in every household.

But camphor found in the market is not very pure – it contains some wax. So, when working with students it is better to use ammonium chloride.

Having observed the experiment, it is easier for my students to understand what has happened and they will always remember it.

Students: Yes, ma'am.

Teacher: यहाँ पे देखो ये! ये सफेद-सफेद जम गया है इस में! देखो ये यहाँ जमा हुआ है इस में इसको मैंने, इसका धुँआ बस इसमें डाला ही है। बाहर से न निकले। ये देखो! यहाँ सफेद हो गया!

Students: Yes, ma'am!

Teacher: ये पेन्सिल, इससे अगर हम खुरच के देखें, ये देखो! जम गया है ये। ये नौसादर है। ये देखो!

Teacher interview:

The students spoke enthusiastically and I also think that the outcome is exciting, which is really inspiring.

Commentary:

Effective planning and preparation can make scientific demonstrations possible in lessons, even when resources are limited.

What demonstrations could you plan for your lessons?