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CONNECTING CLASSROOMS

Teaching topic:
Acid and Base

Focused core skill:
Creativity and Imagination

Teacher:
Ashok Kumar Rai

School:
Shree Amar Jyoti Model Secondary School

Subject: Science and Environment	**Class:** 8	**No. of Students:** 42-45	**Time:** 45 mins

Teaching topic
Acid and Base

Focused core skill
Creativity and Imagination

(Expected) Learning outcomes
By the end of this lesson the students will be able to:
- Use Litmus and Phenolphthalin to predict if common household substances like lime juice, vinegar, baking soda and washing powder are acids or bases.
- Be able to talk about the usage of these substances in real life.

Required materials
1. Computer/laptop
2. Indicators: litmus paper (Red and blue) and phenolphthalein
3. Test tubes (to hold the materials to be tested), Dropper
4. Specimens: lemon juice, vinegar, baking soda and washing powder

Teaching learning activities

Time division

Warm Up — 6 mins

Before the warm up activity, the teacher divides students into seven groups of six members and gives each member a clear and distinct role as follows:

1. **Group Leader:** Take a quick decision when the group can't reach an agreement.
2. **Facilitator:** Support group members as required. To ensure that each member of the group is carrying out their roles as required.
3. **Recorder:** To record the work done by the group.
4. **Materials manager:** Manages the resources/materials. Responsible for putting the materials or resources that aren't required in the proper location.
5. **Group Reporter (2 people):** Presents the findings of the group.

8 mins

The teacher then asks "What do you know about acid and base?' and 'what would you like to learn more about acid and base today?'. He gets students to discuss in groups and fill out the K and W columns of the KWL chart. Students write what they already know about acid and base in the K column and write about what they want to know about acid and base in the W column. Students then share feedback.

Each group is given four test tubes containing 10 ml of lemon juice, vinegar, baking soda solution, washing powder solution as well as red and blue litmus.

Each group first predicts whether the substances are acid or base, reasons for their predictions and also predict what will happen when they dip the red litmus paper into each of the test tubes and also what will happen if they dip blue litmus in the solution. The students are then instructed to use four clean test tubes with 10 ml of lime juice, vinegar, baking soda and washing powder. They then predict what would happen when they put phenolphthalein in each test tube giving reasons for their prediction. They'll be asked to dip the litmus strips in the test tubes. The students then compare the change in colour with the colour scale provided to them, decide whether each is acid or base and record their observation on the observation table. They repeat the earlier task with phenolphthalein using a dropper to put 3 drops each in every test tube. They record their observations on the observation table.	16 mins
Groups discussion, sharing the predictions After each group completes the experiments, the teacher facilitates a whole class sharing of their findings.	5 mins
Students summarize for themselves what they have learned. The students are then asked to summarize what they've learnt by filling out the L column in the KWL chart. The teacher asks the students how they could use this knowledge in their everyday lives such as at home or in food production and asks them to represent this through a picture	10 mins

Student evaluation

The teacher evaluates the learning through what the students have put down on the L column of the chart at the end of the lesson.

Teacher review

Teaching is a constant cycle of planning, teaching, reflecting and revising. One of the most important professional habits we can cultivate is reflective practice. It is by looking back on lessons that we have taught and assessing them objectively that we develop as teachers. Here Ashok Kumar Rai reflects on what went well and how he might amend things were he to teach this lesson to another class in the future.

I am happy and satisfied with today's lesson and with the activities of the students. I had set two objectives and I think both of them were met. The activities were testing the samples as either acid or base. This was practical as well as we explored how this related to its use at home or in business. This was then communicated through creating a poster that was shared with the class.

While it went well, the biggest challenge was management of time as the experiment took longer time than expected. If I did this again, I might have taught this lesson over a period of two lessons.

Student review

As teachers it benefits us to understand the students' perspectives. The more aware we are of their perceived needs and of how they are experiencing the lessons we teach, the better able we will be to modify and improve our approach. Here Ashok Kumar Rai's students provide their input on the session:

Today's lesson was very good as we did two interesting activities. We both did an experiment and made a poster based on this experience. In particular, we enjoyed using the tools, doing the experiment, and comparing the colours. We tested acid and base in groups and found the PH values of lemon and soda. It was helpful for home use, as you use lemon in tea and drinking water for health reasons.

To improve, we would have liked to test more samples.

The teacher trainer's review on the lesson and how it might be further developed

Ashok's session is a nice example of multiple pedagogical tools that can incorporate skills in the classroom. We look at a few approaches that introduce routines and roles as ways of creating a more coherent experience around the session plan.

The session begins using a KWL Chart. KWL Charts ask:

- K: What do the students know
- W: What do they want to learn about the topic
- L: Closing by asking what the students have learned as part of the process

This is a routine that allows the teacher to understand the level of existing understanding that students have, determine what types of questions they have based on a topic, and formatively assess what students comprehended from the lesson. By beginning with this, students are prompted to think critically and creativity about why the topic of acids and bases.

Ashok uses group work to manage a large group of students with limited laboratory equipment. To make this productive, he provides clear roles for each student and this provides them a perspective and a job to be done related to the science experiment. Whereas other less formal group work approaches rely on students being able to manage their own processes, roles ensure that students remain productive and engaged in the lesson even when they are not directly involved in the primary activity.

Finally, the session uses a poster presentation as a mechanism of providing feedback for the laboratory experiment. Communication is a core skill and needs to be cultivated. While general communication skills need to be supported through things like poster presentations, it is also important that communication is also subject specific. By requiring the students to feedback in this way, we see students becoming more confident in speaking both generally but also about science.

Wrap Around and Reflection Activity

From this session, we see the importance of different pedagogical approaches to building out core skills. While there are some lessons and subjects that seem more suited to improving different skills than others, it is possible to incorporate core skills development across all lessons just by how you plan your lesson and the ways that you solicit input and discussion with the students in your class.

If you decide to do a similar lesson, consider the following points:

1. Think about the ways to critically engage your students with the lesson subject.
2. Think about the simple routines or activities in your teaching that could be used more frequently that might solicit this learning
3. Select approaches to classroom management that are able to both increase skills and make class time more efficient.