

Lesson Scenario: Let's investigate on pH

by Maria Stella Bolignano, science teacher

Teacher: Maria Stella Bolignano

School subject: Science

Educational level: 2nd year lower secondary school

School: I. C “ S. Casella”

Topic: pH

Duration: 60 minutes

Aims of the lesson: make a new interactive presentation on pH

Methods: inquiry based learning (IBL), 5E models of Instruction. The 5E Model of Instruction includes five phases: Engage, Explore, Explain, Elaborate, and Evaluate. It provides a carefully planned sequence of instruction that places students at the center of learning.

Forms: Canva

Teaching aids

Key competences (see the European Parliament's and the Council of Europe's Recommendations; 2018) being developed in the course of the lesson:

1 Mathematical competences in science, technology and engineering

2. Digital competence

3. Personal, social and learning to learn competence

I. Preparatory phase

1. Organisational activities: The activities in the Engage phase are designed to help students make connections between past and present learning experiences, expose prior conceptions. The role of the teacher in the Engage phase is to present a situation, identify the instructional task, and set the rules and procedures for the activities. The teacher also structures initial discussions, he raises questions or poses problems and helps students make connections to previous work, he also invites students to express what they think. Students in this phase show interest in the topic through curiosity and expression of wonderings They also demonstrate engagement by expressing ideas, sharing observations, and creating initial models.

Teachers elicits students motivation making some questions:

“What are acid substances?”

“Are every acid substances toxic and unhealthy?”

Students in groups researches information in books and web sites and learn details about pH.

2. Explore

Explore activities are designed so all students have common, concrete experiences which can be used later when formally students plan and conduct investigations in which they observe, describe, and record data. The teacher coaches and guides students as they record and analyze observations or data and begin constructing models or initial explanations.

Acid basic or neutral?

Students prepare some substances (soap, milk, vinegar, bicarbonate of sodium, lemon juice, soft drink, distilled water), then use litmus paper, pH meter or cabbage juice to analyze their color. On the basis of these results students record them in a chart previously planned in three sections : Acid, Basic and neutral.

3 Explain

The Explain phase consists of two parts. First, the teacher asks students to share their initial models and explanations from experiences in the Engage and Explore phases. Second, the teacher provides resources and information to support student learning and introduces scientific or technological concepts. Students use these resources and information, as well as ideas of other students, to construct or revise their evidence-based models and explanations.

Students explain the phenomena using evidences of the investigations

ELABORATE

Once students have constructed explanations of a phenomenon, it is important to involve them in further experiences that apply, extend, the concepts or processes, they are learning. Elaborate activities provide time for students to apply their understanding of concepts and skills. They might apply their understanding to similar phenomena or problems.

Now students are ready to write a lab report on the pH and on the experiments they made in class.

EVALUATE

It is important that students receive feedback on the quality of their explanations. The Evaluate phase encourages students to assess their understanding and abilities and allows teachers to evaluate individual student progress toward achieving learning goals and outcomes.

Students check the outcomes of their lab reports with teachers and classmates in class

. Summing up of the lesson:

The unfinished-sentences/incomplete-sentences method; individual students are to finish/complete the following sentences:

I found of interest.

I found to be the most difficult.

I foundto be the easiest to do.