

Assessment of selected aspects of inquiry during teaching topic Properties of plastics

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Inquiry-based activities: Properties of plastics



Determining density of plastics

Combustibility of plastics

Beilstein's test of halogens

Resistance of plastics to chemicals

Thermal stability of plastics

Verification of teaching Properties of plastics with IBSE using tools of formative assessment

Research was realized with **12 teachers** and with participation of **130 students**.

Task of the teachers: realize teaching inquiry-based activities from topic Properties of plastics.

Verification of teaching: tools of formative assessment

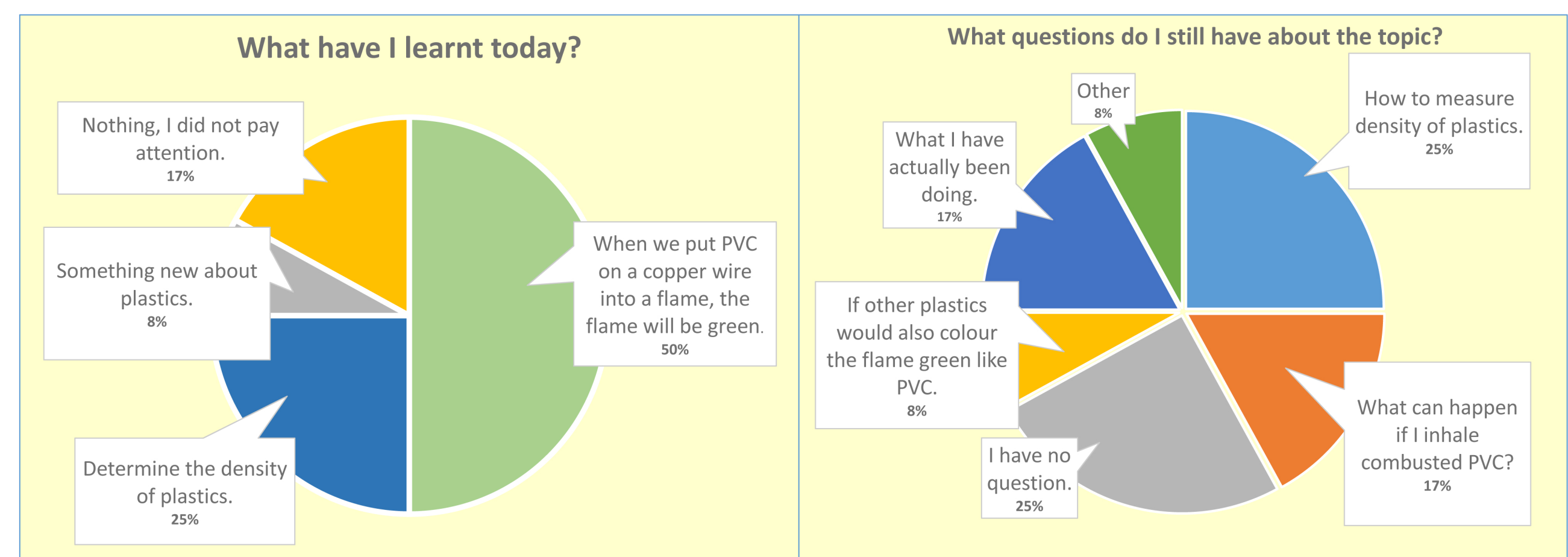
• Selfassessment

Sample n. 1: Assessment of understanding or “What have I learnt about density of plastics with inquiry – based method?” on the basis of metacognition.

Students group: 14-15 years old, 16 students of Elementary school

Activities: Determining density of plastic materials, Combustion of plastics – Beilstein's test for halogens.

Assessment: at the end of the lesson, students are supposed to answer the questions: *What did we do? Why did we do it? What have I learnt today? How can I use it? What questions about the topic do I still have?*



Sample n. 2: Self-assessment table of a student after teaching inquiry-based activities

Students group: 17-18 years old, 22 students of Grammar school

Activities: Determining density of plastic materials, Combustion of plastics – Beilstein's test for halogens.

Assessment: students fill out a short table, which they hand in before leaving the class:

Self-assessment table of a student after teaching inquiry-based activities	
Things I have learnt today:	Properties of particular plastics. What kinds of plastics exist. How to ignite the burner. How plastics are burning. Which plastics smell and drip during burning. How plastics are used.
Things which were interesting:	Behaviour of plastics during combustion. Burning of a Ping-Pong ball. Finding out how many things are made of plastics. The colour of flame during combustion. Smell.
Questions which I still have:	How plastics can be harmful to us. How to avoid problems with excessive amount of plastic waste. Why plastics burn in this way. Why you do not teach in this way more often. 14 students had no question.

• Peer assessment

Sample n. 3: Questionnaire method for peer assessment of group work

Students group: 17-18 years old, 22 students of Grammar school

Activities: Determining density of plastic materials, Combustion of plastics – Beilstein's test for halogens.

Assessment: questionnaire for assessment of student's group work
The questions were divided into three parts: discussion and the design of procedures, the formulation of conclusions, and the creation of answers to questions:

ASSESSMENT OF STUDENTS' GROUP WORK	1 almost never [%]	2 seldom [%]	3 sometimes [%]	4 often [%]	5 always [%]
We discussed procedures for solving out the given tasks together.	0	0	5,3	47,4	47,4
I suggested procedures and the others agreed.	10,5	31,6	42,1	15,8	0
The others suggested procedures and I agreed.	0	0	57,9	36,8	5,3
We formulated conclusions together.	0	0	15,8	42,1	42,1
I explained to the others how to formulate conclusions.	31,6	31,6	26,3	10,5	0
Other classmates explained to me how to formulate conclusions.	10,5	26,3	42,1	21,1	0
We formulated answers to questions together.	0	0	21,1	52,6	26,3
I answered questions and justified them.	10,5	36,8	47,4	5,3	0

Conclusion

Formative assessment – advantages (teachers' opinions)

- Formative assessment **provides feedback**. Teacher can assess better the level of student's knowledge and on this basis, teacher **can plan the next teaching activities**.
- The importance for the students is that they have a possibility to improve their performance, to improve their output, which is then assessed with a grade.
- Students learn how to assess their knowledge objectively and to compare it with their classmates.
- This way of assessment strengthens the teacher – student relationship, which is very important for the confidence of students in their teacher. Teacher gains knowledge about subjective feelings of students, e.g. about work in groups.

Formative assessment – problems (teachers' opinions):

- Pupils are unable to assess objectively– they over-estimate or under-estimate
- Time consuming– preparation of assessment tools, realization
- Weak verbal skills, weak vocabulary, inability to express opinion

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