

### 4.3 Case study 3 (CS3 Slovakia)

<b>Concept Focus</b>	Properties of plastics (thermal stability and conductivity)
<b>Activities implemented</b>	Activity C
<b>Inquiry skills</b>	Working collaboratively
<b>Scientific reasoning and literacy</b>	Not assessed
<b>Assessment methods</b>	Classroom dialogue Self-assessment
<b>Student group</b>	<b>Grade:</b> lower second level <b>Age:</b> 14-15 years <b>Group composition:</b> mixed ability and gender (22 students) <b>Prior experience with inquiry:</b> No prior experience

One activity from the **Polymers** SAILS inquiry and assessment unit was chosen for implementation in this case study – Activity C: thermal stability and conductivity of plastics. The focus for assessment was on the students’ skill in *working collaboratively*. To assess this skill, a self-assessment questionnaire, with smileys, was used to enable students to evaluate their role and contribution to group work.

#### (i) How was the learning sequence adapted?

Activity C: thermal stability and conductivity of plastics, from the **Polymers** SAILS unit was implemented during two lesson periods. Plastics are materials which students encounter every day; therefore at the beginning of the lesson students discussed properties of plastics and their use in everyday life. This was a whole class discussion about what properties of plastics students are familiar with, and where they encounter them in their everyday lives. The teacher then motivated students by providing samples of gradual decomposition of a plastic bottle (after 20, 40, 60, 80 and 100 years). Students put the samples in the order of time and they tried to guess time intervals between the samples. They realised that the bottle is not decomposed in any of the samples, and formed hypotheses the about time which is necessary for a plastic bottle to decompose. All the students in the class suggested hypotheses and teacher used questions to guide the thinking of students.

Students were divided into two groups of five and two groups of six. The teacher created groups of students based on students’ school results, so students with different ability were in each group. The group chose their leader without the teacher’s intervention. They selected students with lower results to become leaders, so that they can present the results. The students worked in groups and performed inquiry-based Activity C.

#### (ii) Which skills were to be assessed?

This implementation focused on assessment of *working collaboratively*. Students assessed the collaborative teamwork with a scale questionnaire constructed by the teacher (Table 1). The questionnaire was focused on self-assessment of student’s individual contribution to work in the group, on cooperation with other members and on mutual cooperation of the members.

#### (iii) Criteria for judging assessment data

Students evaluated group work using a self-assessment questionnaire with smileys, which focused on their own work in the group, their cooperation with other members and students’ mutual cooperation (Table 1).

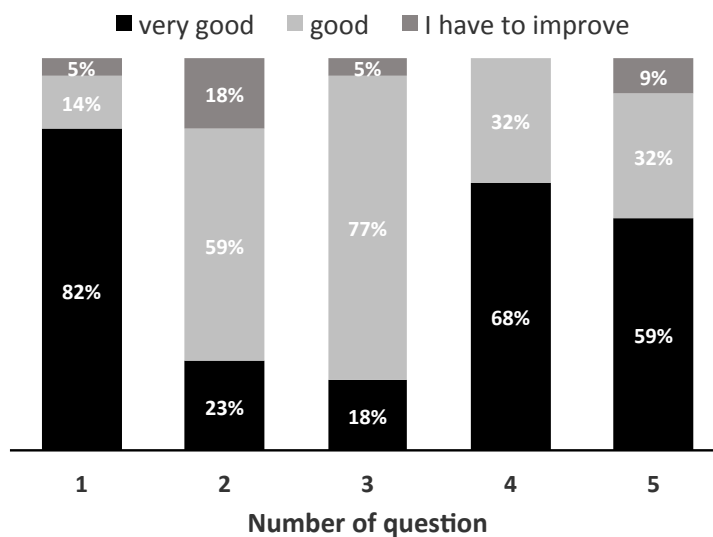
**Table 1: Questionnaire for self-assessment of working collaboratively**

	Very good 	Good 	I have to get better 
1. How did I help during group work?			
2. How did the other members of the group help me?			
3. Did I make group work harder?			
4. How did I manage to fulfil the goal of the lesson?			
5. How did other members of the group manage to fulfil the goal of the lesson?			

**(iv) Evidence collected**

**Teacher opinion**

Students helped each other during group work. At the end, they evaluated the role of classmates and themselves in the group. This assessment does not necessarily have to be objective. Students should understand that it is not the point to assess their friendship, but their real performance. I will carry on using this way of assessment, because it provides both the student and the teacher with information what the student has already mastered and on the contrary what the student needs to improve.



**Figure 1: Summary of student responses to self-assessment questionnaire**

**Observer notes**

Students are not used to this kind of assessment; they need to learn how to assess. The results of the student self-assessment questionnaires are summarised in Figure 1. A high percentage of students (82%) stated that they had certainly helped during the group work and that they certainly had fulfilled the goal of the lesson (68%). Students' answers showed that some problems occurred during the group work. To improve the quality of students' group work, it is necessary to expand the

questionnaire with questions focused on the specification of the problems that occurred during the group work and try to eliminate them in the future.

**(v) Use of assessment data**

The teacher will continue using this method of assessment. Every member of the group wanted to contribute to the best results of the group assessment. During the lesson, the teacher could guide students' work, evaluate them verbally to help them, and find out deficiencies from the lesson. No problems occurred during this way of teaching.