FaSMEd

Raising Achievement through
Formative Assessment
in Science and Mathematics
Education

Students as Assessors: Using Graphic Organisers

Subject:	Maths/Science
Age of students:	12-13 years
Hardware:	iPads/Surfaces
Software:	*Popplet*
Functionalities:	Sending and displaying
Time:	Two 40 minute classes
FaSMEd partner:	Maynooth University
Short Abstract:	Students develop graphic organisers on a topic and then shared them with the class. These were then peer assessed using success criteria developed by the group.

1. Content

In this example the content was chosen by the students.

2. Activity

2.1   Aims
Learning Outcomes:

Process:
- Students will develop self and peer assessment skills
- Students will develop skills in how to critically analyse the quality of work

Skills:
- Information processing- recording, presenting information.
- Communicating
- Working with others

2.2   Structure / Methodology
Questions during Activity (optional):

- What did you think about this piece of work?
- What did you think of the methods they chose?
- Which method did you like best? Why was this?
- Did you find any mistakes in their work?
- Do you agree with their conclusions?
- What advice would you give to the student to improve their work

Introduction:
This lesson unit is structured in the following way:

Class 1:
- Students will be divided into groups and the teacher will explain the rules of group work.
- Students will work in groups creating a graphic organiser either on their iPad or Surface or on hardcopy
- Students will self assess their role in group work using the template provided
- Teacher will analyse student responses to this task and use it to plan for class 2.

Class 2:
- Students will be divided into their groups once more
- Students will peer assess graphic organisers
- Teacher will analyse student responses to the task.
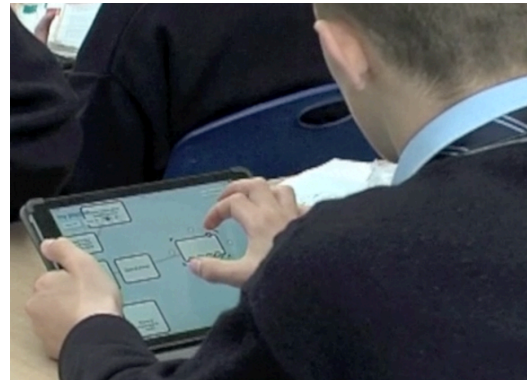- Students will once again self assess their role in group work

Before the Lesson:

- Ensure that you have the apps required for this activity installed on the tablets well in advance to avoid technical difficulties in class (optional).
- Familiarise yourself with the technology before introducing it to the class.
- Print handouts.
- Organise groups so that there is a range of abilities in each group.
- Decide on what topics you want the students to revise.

Class 1 outline:

- Begin the class by explaining to the students that this is a FaSMEd class and they are going to be working as assessors for the next 2 classes.
- Explain to students how graphic organisers work and show examples.
- Explain the criteria for success
- Give students time to ask questions regarding the activity.
- Organise the students into groups and assign a revision topic to each group.

Student working with Popplet

- Students will work on completing their graphic organisers in their groups.
- Teacher will aid this process by asking probing questions while the students are working.
- Student will submit the graphic organisers to the teacher either via *Schoology* or in hard copy.
- Students' will self assess how they worked during the activity.
- Teacher will reflect on this class and plan for the next class using the work the students submitted.

Class 2 outline:

- Begin the class by informing students that this is the second class in the students as assessors task.

Ask students to reflect on what they wrote on their self-assessment handouts and tell them to try to improve on this during today's group work.

- Teacher will hand out graphic organisers for the other science/maths class or from different groups in the class. Teachers reported that they felt it was important to keep the graphic organisers anonymous.
- Students will work on peer assessing this piece of work.

It is important as the teacher here to get the students to critically analyse the work, the questions at the beginning of this lesson plan should help you and the students to carry out peer-assessment effectively.

- Teacher will aid this process by asking probing questions while the students are working.
- A whole group discussion will allow for reflection on the activity.

- Teacher will hand out the self-assessment handouts to the students once more.
- The teacher will collect this set of self-assessment handouts.

After the lesson:

The teacher should analyse the responses to the second self-assessment handouts and make note of what worked well and what did not work well in the FaSMEd classes.

Sample Graphic Organiser (created on *Popplet*):
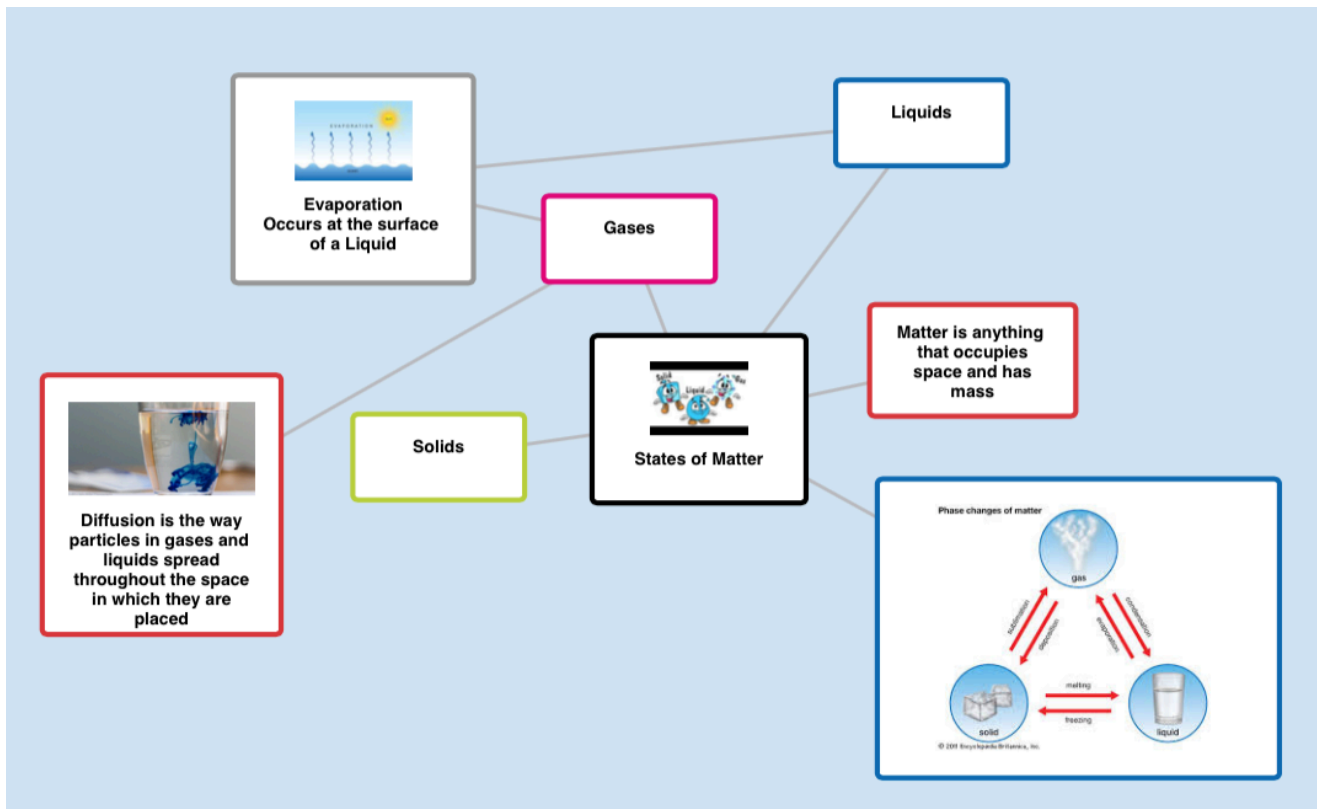
2.3   Technology
- iPads/Surfaces (optional) with *Popplet* application
- Graphic Organisers (hardcopy or PowerPoint)
- *Schoology* for uploading graphic organisers (optional)

Schoology is an online learning environment that allows teachers to create and manage academic courses for their students. It provides teachers with a method of managing lessons, engaging students, sharing content, and connecting with other educators. For more information see the *Beginners Guide to Using Schoology.*

2.4   Aspects of Formative Assessment

Through using co-operative learning techniques in this class, the ability to activate students as instructional resources for one another was heightened. This fits into the FA framework whereby the technology functioned in sending and displaying and providing students with an interactive environment in which to work.

3. Further Information

Two forty-minute classes were required for this lesson. It was important that there was a break between the classes in order for students to have time to reflect on the first class before attempting the second activity. The iPad application Popplet was essential in this activity as it allowed for students to create graphic organisers (or mind maps) on their iPads. This helped them to think and learn visually, all while organising their thoughts and creating relationships between different science topics. This allowed students to represent their learning pictorially. Students could make use of images and videos within this application that would not have been possible with a pen and paper graphic organiser. The popplets created by the students were uploaded to the class *Schoology* page (or when this was not a possibility, emailed to the teacher to upload) where they were to be peer assessed by other students in the class. This demonstrated the sending and displaying functionality of the technology in this activity. Field notes gathered from the lesson directly preceding the activity demonstrate how students were provided with the opportunity to rethink answers that may have been incorrect. The teacher facilitated this by providing the students with thinking time in class and using higher order questioning to probe for understanding. Students made use of *Schoology*, an interactive web based learning environment. This technology provides teachers and students with a safe place to interact and connect both in and out of school. The functionality of this technology was in creating in interactive learning environment for students to work on. Its structure is similar to Facebook whereby those enrolled in a class can post comments and resources on the class wall. There is also the
facility whereby the teacher can upload different resources including marking rubrics, assessments and video links, for the students to make use of. Students had access to their *Schoology* accounts via the class set of iPads.

In this lesson where students were using graphic organisers to assess both themselves and each other, field notes illustrated that the teacher was making use of questioning repeatedly to give feedback on answers and to scaffold students to problem solve and find the solution. Scaffolding is especially important for low achievers as it allows for them to build on their previous knowledge and not become overwhelmed by problem solving. Through using co-operative learning techniques in this class, the ability to activate students as instructional resources for one another was heightened. This fits into the FA framework whereby the technology functioned in sending and displaying and providing students with an interactive environment in which to work.

During the project the teacher improved her co-operative learning practices and not only accomplished the students working as teams, but used this group work to promote peer assessment within class. During lessons where the teacher was working on promoting students as assessors, the teacher made use of technologically enhanced co-operative learning to develop student's teamwork and peer assessment skills. The teacher made use of the iPad application Popplet to incorporate technology in the lesson, the completed popplets were shared and displayed among students so that they could peer assess each other's work on *Schoology*.

Prior to the lesson, the teacher had organised the students into mixed ability groups. At the beginning of the class the students were assigned group roles, however the teacher did not tell them what these roles were and they had to assign themselves a letter, A, B, C or D. This tackled the issue of students choosing roles based on their ability levels, for example, stronger students being the reporter and weaker students being the timekeeper. This method of group design had not been explored during sessions with teachers and demonstrates the

teacher taking the initiative to push her co-operative learning planning to a higher level and being particularly mindful of low-achieving students.

Video analysis of this class illustrated student engagement in the activity throughout the lesson. This engagement was supported by the teacher who was seen to be constantly monitoring group work, probing students for understanding through questioning and engaging in discussions with students about their work. The teacher was seen to keep the students on task during group work by providing them with the criteria for success for the graphic orgaiser at the beginning of the lesson. During the co-operative learning activity it was oserved that the teacher repeatedly referred back to the success criteria for making the graphic oganisers. It was noticeable that this helped to keep the students focused on their group task and to self apply success criteria to it.

Once students had completed their graphic organisers in groups, they were to upload them to the class *Schoology* page for them to be peer assessed in the next lesson. This allowed for the sending and displaying functionality of the technology whereby the graphic organisers could be shared among all the students in the following lesson. During the subsequent lesson the class made use of the success criteria uploaded on *Schoology* for peer assessment of their graphic organisers. Teacher reflections gathered after the lesson explained how the students enjoyed this lesson. In particular thy enjoyed both giving advice to and receiving feedback from their peers. The teacher also noted how the technology had an impact on the lesson as the students communicated to her that they wished to use the application in other subjects in school.
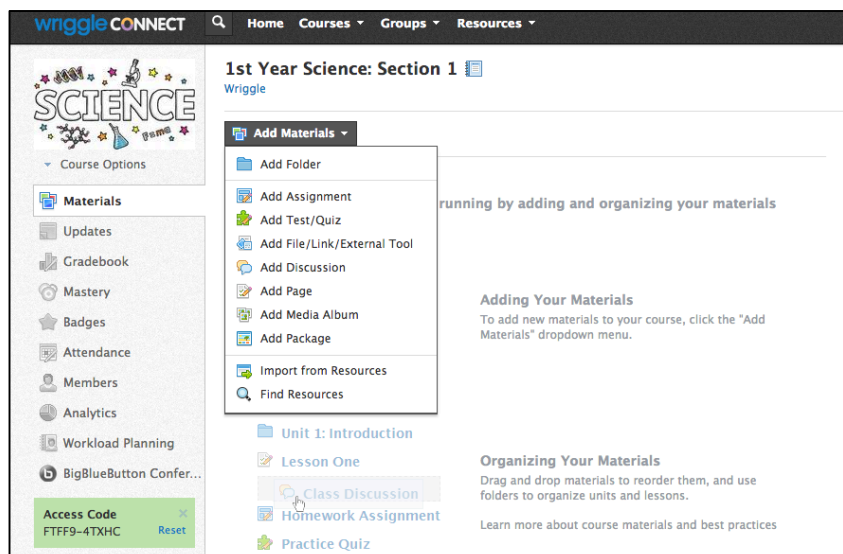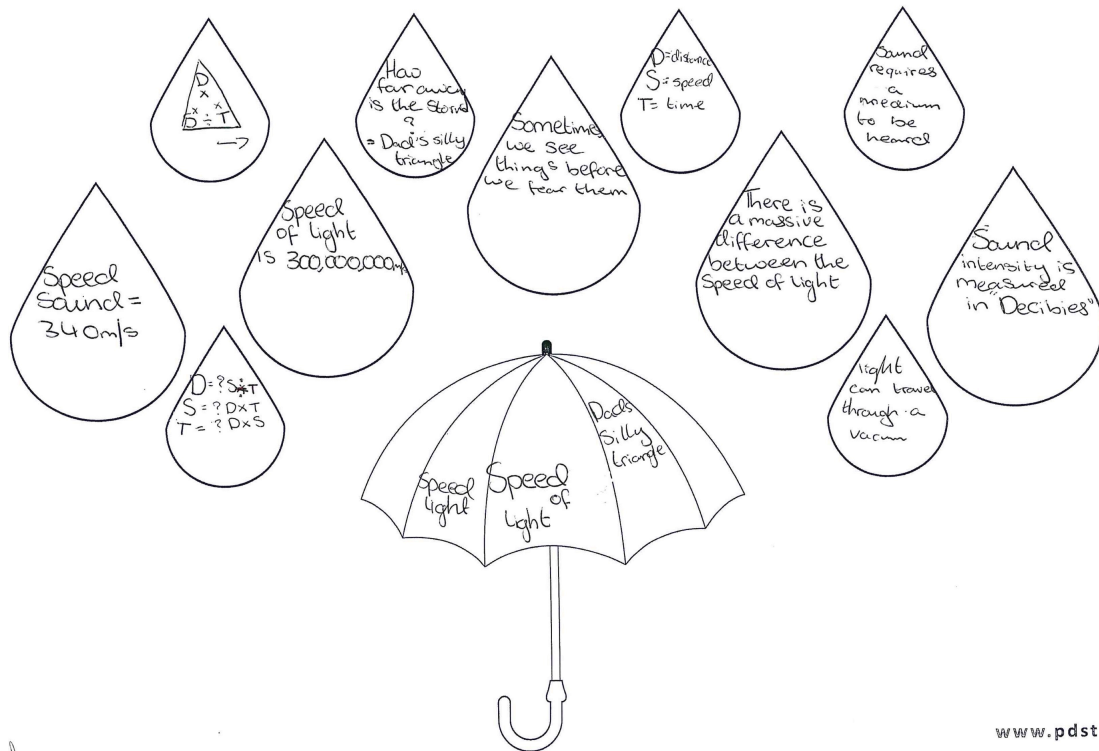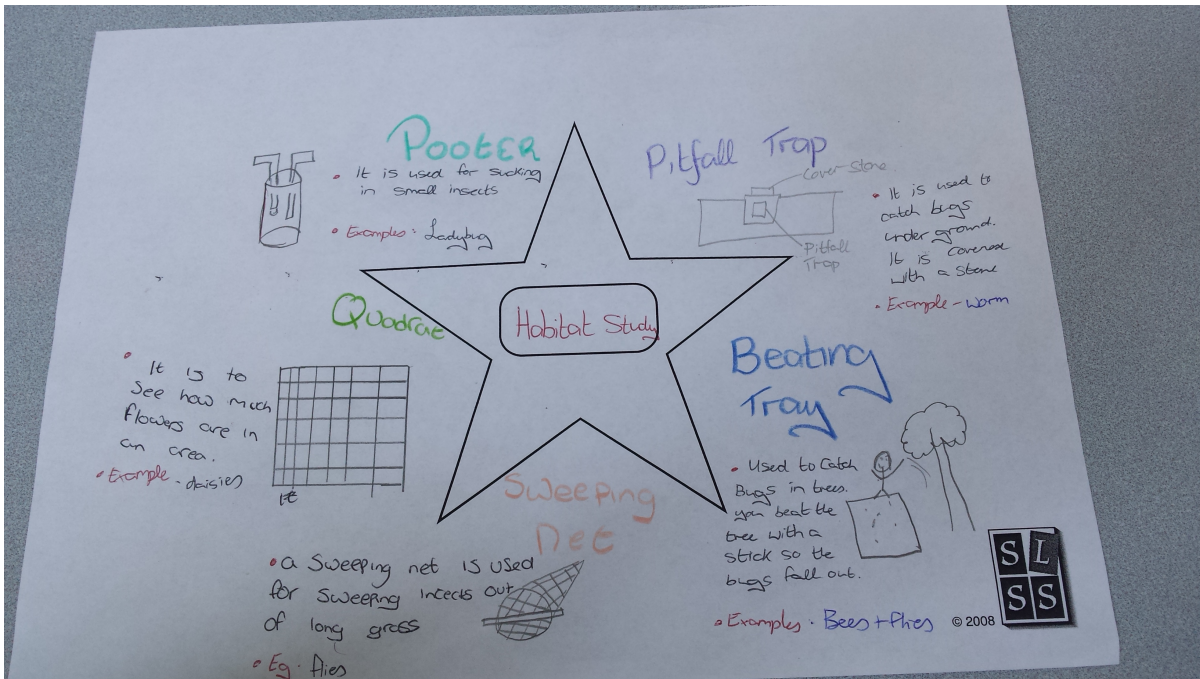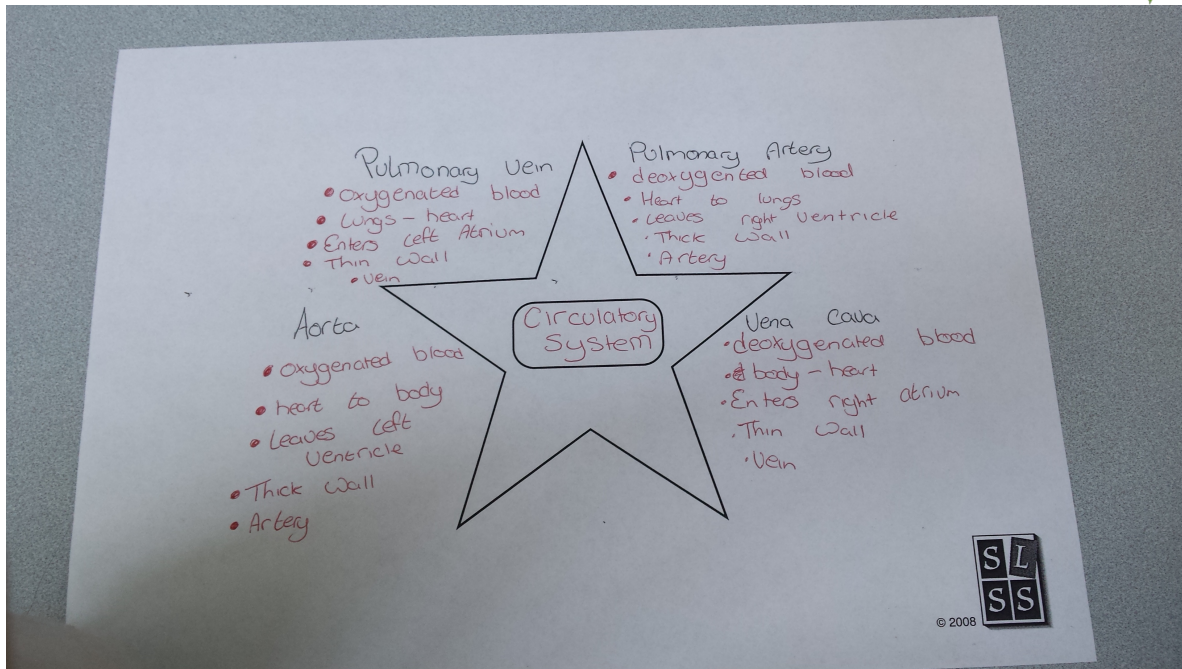

Figure 3: Sample Schoology page

3.1   Sample Graphic Organizers

4. References

Popplet	Any device with	Allows student to create graphic or-
	a modern web	ganisers (or mind maps). This helps
www.popplet.com	browser – smart	them to think and learn visually, all
	phones, tablets,	while organising their thoughts and
	PC's, laptops	creating relationships between differ-
	etc. (available as	ent topics.
	an iPad app)	

Please Insert links to the used technology (how to/ where to get the technology)

Bell, B., & Cowie, B. (2001). The characteristics of formative assessment in science education. *Science Education*, 85(5), 536-533.

Black, P., & Wiliam, D. (1998). Assessment and classroom learning. *Assessment in education*, 5(1), 7-74.

Student Self-Assessment and Reflections

Give a brief description of the activity you have completed.	What did you like about this activity? What were you able to do well?
What did you not like about this activity? What problems did you have? Why?	What did you learn about yourself? Strengths, interests, preferences, and needs.