FaSMEd

Raising Achievement through Formative Assessment in Science and Mathematics Education

Selling Soup: Maximising Profit

Subject:	Mathematics
Age of students:	11-14 years
Hardware:	iPad minis (1 per class or one for each student)
Software:	Socrative or Classflow, Apple airserver, OR Showme and Reflector software OR Plickers
Functionalities:	Sending and displaying, Processing and Analysing
Time:	2 – 3 hours (1 week)
FaSMEd partner:	Newcastle University
Short Abstract:	This lesson is intended to help you assess how well students are able to solve real-life mathematical problems. In particular, students will develop their abilities in the following areas: • Using proportional relationships to solve multistep ratio and percent problems. • Drawing inferences about a population from a random sample of data. • Making and stating assumptions based on real-life situations.

1. Content

Understand ratio concepts and use ratio reasoning to solve problems.

2. Activity

2.1 Aims

Make sense of problems and persevere in solving them. Reason abstractly and quantitatively. Construct viable arguments and critique the reasoning of others. Model with mathematics.

2.2 Structure / Methodology

The lesson is structured in the following way:

- Before the lesson, students attempt the Selling Soup task individually. You review their solutions and formulate questions that will help students to improve their work.
- At the start of the lesson, students respond individually to the questions set.
- In groups, students combine their thinking and work together to produce a collaborative solution in the form of a poster.
- In the same small groups, students evaluate and comment on some sample responses. They evaluate these responses and compare them with their own work.
- In a whole-class discussion, students explain and compare solution strategies.
- Finally, students reflect on their work and their learning.

2.3 Technology

A PC and projector is used to show slides of sample work for students to critique, the interactive whiteboard and Promethean software allows students to annotate the sample solutions. A mini iPad is used by the teacher who takes pictures of students' solutions. Then 'Showme' software allows the photo of the student work to be projected for the whole class to view (with Reflector software which allows the iPad to communicate with the projector via the PC). The Showme software also allows the student to annotate their work from their desk (using the iPad) to emphasise particular aspects of their thinking. Classflow software and Apple airserver are also available to support this process.

Teachers have observed that while the process of critiquing other sample solutions is a valuable element of the formative process, the knowledge that their solutions can be displayed for other students to view also has an impact on the quality of the students' work.

2.4 Aspects of Formative Assessment

- Clarifying/ Understanding/ Sharing learning intentions and criteria for success.
- Engineering effective classroom discussions and other learning tasks that elicit evidence of student understanding.
- Providing feedback that moves learners forward.
- Activating students as instructional resources for one another.
- Activating students as owners of their own learning.

The technology supports these strategies through sending and sharing information for the whole class.

3. Further Information

Here are some statements from teachers, who taught the lesson:

The class was split up and based around the response that we had got from the pre-task with those that seemed to have some understanding with those with not so much and surprisingly the one that hadn't understood the pre-task as well were very happy to contribute. I think this is because of type of characters in the class they really do want to please and what was refreshing was that they decided they wanted to keep persevering which has been an issue.

At the end of lesson 1, I used Socrative to collect info on whether students had been able to improve their individual work and what question they would like to ask someone in the class to help reach a joint solution. I used their responses to promote a whole class discussion.

I will be using photographs of students' work to aid discussion much more in lessons. My students like the anonymity of this. I will also use Airplay to display students' work during lessons.

4. References

Full lesson materials: http://map.mathshell.org/lessons.php?unit=6100&collection=8

Reflector software: http://www.airsquirrels.com/reflector/

Showme software: http://www.showme.com

Classflow software: https://classflow.com