AfL Lesson Example 4 (Math)

Subject	Math	**Level / Stream**	Sec 3 Express
Topic	Length of a line segment	**Class size**	34
Lesson Duration	1 hour	**Date conducted**	26 March 2019
Prior knowledge	Students have learnt to 1. define the Pythagoras theorem 2. sketch x and y axis 3. sketch a graph on the x and y axis	**Student profile**	Students are generally higher ability students who can follow a faster pace as they are able to understand concepts well. Some of the weaker students may struggle because they are more used to numbers than algebra.

Intended Learning Outcomes

1. Apply the formula to find the length of line segment using rectangular coordinates of two points on the linear graph
2. Derive the formula for length of line segment using rectangular coordinates
3. Solve geometrical problems involving the use of coordinates

Lesson

AfL process	Timestamp	Activity	Tips/Remarks
 **Exploring**	[00:00]	Teacher starts the lesson with a pop quiz to recap what the students have learnt in the previous lesson and ensure that they have a grasp of the basic concepts before moving on to a new topic.	⏳ Make use of online platforms/mini whiteboards to get student results on the spot. ✍ Quizzes help decide whether students need more time to recap a previous topic or are ready for the next one.
	[00:21]	Screen capture of the pop quiz.	
 **Exploring**  **Explaining**	[00:35]	Teacher gets a student to verbalise the steps to solve the pop quiz and writes the steps on the whiteboard.	

	**Engaging**	[01:16]	Teacher writes on the whiteboard a response she discovered while she observed the students attempting the pop quiz. She picks a student to ask if the answer is right and asks him to justify his answer. The teacher then tells students to check their friends' written responses to ensure none of them made the same mistake.	✍ Peer marking allows students to learn from their friends' mistakes and encourage greater student ownership.
	**Explaining**	[02:17]	Teacher provides a 'checklist' of the things students need to check for in their friend's work as they do peer marking.	
	**Explaining**	[02:43]	Teacher explains the learning outcomes for the day as they move on to a new topic.	
	**Exploring**	[03:15]	Teacher asks a series of questions to elicit students' understanding of previous topics. She guides them to deduce which math concepts can be used to derive the formula for length of a line segment.	✍ Involve students through questioning. ✍ Use of technology can enhance learning and save time.
 	**Explaining** **Exploring**	[05:15]	Teacher recaps the steps she had taken. She asks them to attempt to derive the formula on their own.	
	**Exploring**	[05:35]	Teacher calls on a student to give the steps that lead to the formula for length of line segment.	
	**Engaging**	[06:21]	Teacher shows on the screen a response she discovered while she observed the students attempting to derive the formula.	⏳ If the classroom environment is safe enough, take the student's paper and

			She asks the class if it is correct and gets a student to justify his answer. The teacher then elaborates why the response is conceptually wrong.	show it on the screen using the visualiser. 📖 For students who still struggle with algebraic expressions, examples to explain this further might be helpful.
	**Exploring**	[06:59]	Teacher gets students to practise on their own, specifying questions one and five to be mandatory. [Other questions given in the worksheet may be optional, depending on the level of difficulty and the individual student's progress.] Teacher walks around to observe the students as they write, intervening where necessary.	📝 Students find it useful when the issues they face are addressed on the spot.
 	**Exploring** **Engaging**	[07:36]	Teacher addresses an issue faced by a student where his answer is different from the answer in the answer key by showing it on the screen. She invites another student to provide an explanation.	
		[08:30]	Teacher ends lesson by reminding students about another pop quiz about line segments in the next lesson.	

Legend

📖 Alternative activities ⏳ Time saving tips 📝 General remarks

Planning stage

It is common practice for the teacher to start with a quiz that allows her to gauge whether the students have grasped the concepts well. For her, she would go through the concepts again if they appear to be struggling, just to make sure they get it right.

A lot of the planning done is not captured in the video. First, the teacher prepared questions beforehand for her to ask the students in class. These questions are designed to help her gauge their understanding and also challenge them to think about the math concepts more deeply. Secondly, the questions she picked for the students to try are tailored to pick up common misconceptions that she has encountered from students in the past. Thirdly, she provides three sets of questions – at the beginner, intermediate and advanced level – in the worksheets she gave out. The intermediate and advanced questions are optional, for those students who want to push themselves further.

Comment by research team: In terms of the lesson flow, there were many AfL elements planned that are easily incorporated into daily lessons. Suggestions were made to improve on the kind of questions asked to probe the students' thinking more.

Post-Lesson Reflections

The teacher felt that at the end, she should have done either a quick summary of the main points, gone through any important feedback or made the students do an exit ticket to ensure that students have learnt at the end of the lesson.

Comment by research team: It is worth noting that although the teacher did not manage to go through all the questions she had planned, many misconceptions were picked up throughout the lesson. However, due to constraints, not all the misconceptions could be shown in the final video.

Points to Ponder

Reflect on your daily AfL practices in class.

1) Do you ensure that you complete at least one cycle of the AfL process of 'Explaining', 'Exploring' and 'Engaging' for each topic/skill that you teach?
2) Do you elicit evidence of students' learning during the lesson itself or depend mainly on assignments/quizzes after the lesson?
3) Think about the profile of your class. Will the AfL strategies here work for your class? How can you modify them to suit their profile?

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