L1: Abstraction and Automation, Finite State Machines, Turing machines

This is a revision lesson on Abstraction and Automation, Finite State Machines and Turing machines. With the aim of giving students practice at the types of exam questions they are likely to get and how to solve them.
Aims:

- Recap the key points of the topic.
- Give students an approach to tackle exam questions to ensure they can access as many marks as possible.
- Give students an opportunity to write more advanced Turing machine Programs beyond what they would be expected to in exams.

Time	Activity	How will learners be assessed?
10:55	**Abstraction and Automation MentiMeter** - A Mentimeter with the following questions on Abstraction and Automation:	Through online Mentimeter Quiz
11:05	**Finite State Machines** - Teacher to introduce and give students a brief overview of Finite State Machines and discuss the types of Exam Question likely to come up. - Exam Practice Questions - Give students (5mins) to work through a practice exam question on Finite State Machines. Have an extra question ready for more advanced students in the class. - Go through the exam question with students	Practice Exam Question on Finite State Machines
11:15	**Turing Machines** - Teacher to recap what Turing machines are and how they work. And discuss the types of exam questions that students are likely to get. - Exam Practice Question - Give students (5mins) to work through an exam practice question on Turing machines. Students can then themselves move onto the next activity when they're ready.	Practice Exam Question on Turing machines

11:30	**Extension: Turing Machine Programming - Can be used if Students are working well on previous exercise.**
	- Set students a variety of challenges of building Turing machine Programs. They can use an online Turing machine simulator to help them visualise and write their programs. They're unlikely to need to write programs in their exams however it would be a good way for them to understand how they properly work.
	  - Increment Binary Number Turing machine.
	  - Denary to Binary Turing machine.
	  - Binary addition Turing machine.	

Time	Activity	How will learners be assessed?
11:40	**END LESSON** Stop students and ask them to mark their Turing machine exercise and fill out the weekly feedback survey.	A survey that asks them what they have learnt Turing the lesson giving them an opportunity to reflect on what they've learnt.

L2: Regular and Context Free Languages, Mathematics for Regular Expressions

This is a revision lesson on Regular and Context Free Languages and Mathematics for Regular Expressions. With the aim of giving students practice at the types of exam questions they are likely to get and how to solve them.
Aims:
- Recap the key points of the topic.
- Give students an approach to tackle exam questions to ensure they can access as many marks as possible.
- Give students an opportunity to build their own language and make some fun modifications.

Time	Activity	How will learners be assessed?
10:55	**Mathematics for Regular Expressions MentiMeter Activity** - A set of quiz questions on Maths for regular expressions	The Pentameter will allows them to answer the questions in a Game/Quiz style.

11:05	**Regular Expressions**
	- Teacher delivers a short presentation recapping how to construct Regular Expressions
	  - What Regular Expressions represent.
	  - *, +, ?, |, ()
	  - RE = FSM
	- Exam Practice Questions - Give students (5mins) to work through practice exam question on writing simple Regular Expressions. Have extension questions with complex regular expressions ready for more advanced students.
	- Go through the exam question with students
		They will have a go at the exam practice questions while the teacher supports students that might be struggling more with the topic.

11:20	**Regular Languages and Context Free Languages**
	- Teacher delivers a short presentation on Regular Languages and Context Free Languages.
	  - Regular Languages = Langauge that FSM will accept.
	  - BNF - Allows Recursion
	  - How to read and write BNF with some tips on answering exam questions.
		Next Section

11:35	**Building a Programming Language** - A worksheet that gets students to write BNF to build up a programming language. - They will then convert their simple programming language into a Syntax Diagram.	They will then use all of their knowledge from the lesson to be able to work through and build a programming language.
11:43	**END LESSON** Ask students to complete survey based on the lesson for feedback.	

L3: Big O Notation and the classification of Algorithms

This is a revision lesson on Abstraction and Automation, Finite State Machines and Turing machines. With the aim of giving students practice at the types of exam questions they are likely to get and how to solve them.
Aims:
- Recap the key points of the topic.
- Give students an approach to tackle exam questions to ensure they can access as many marks as possible.
- Give students an opportunity to write more advanced Turing machine Programs beyond what they would be expected to in exams.

Time	Activity	How will learners be assessed?
10:55	**Kahoot on Mathematics** A Mentimeter Quiz to go over the types of Orderings i.e Constant, Logarithmic, Linear, Polynomial, Exponential. Questions will focus on getting students to recognise graphs from the names and names from graphs and on which are greater or smaller.	Quiz Game style which gives students points for correct answers.
11:05	**Conditions** - Review conditions and logic - a topic that students struggled with in a previous lesson - Student Exercise??	
11:15	**Complexity of Algorithms** - Teacher will give a short presentation on complexity of algorithms and the common signs of each of the 5 types and how to recognise them. - Teacher will also briefly touch on Space Complexity and Tractable vs Untracktable problems - Students will complete some exam style practice questions based on recognising complexity of algorithms. - Then the teacher will go over the answers with the students.	
11:35	**Computable vs Non-Computable and the Halting Problem** - Teacher will give a short presentation on Computable vs Non-Computable Problems	
11:40	**Halting Problem Investigation** - Students will be given 5minutes to research and find out as much as they can about the Halting Problem. - After 5mins they should paste everything they have written and discovered onto Teams and we will go round the class and explain as much as we can about it.	

Time	Activity	How will learners be assessed?
11:43	**END LESSON** Ask students to complete survey based on the lesson for feedback.	