

Computing

GCSE Computer Science – Boolean Logic

Assessment Opportunities	Literacy/Reading opportunities	CEIAG Links
<p>Within every half term, there will be a minimum of 2 low stakes quizzes. These will be automatically marked out of 20.</p> <p>There will also be an end of unit test which will be based on past exam questions. These questions are then marked and gone through as a class.</p>	<p>4.1 - Boolean Logic - OCR GCSE (J277 Spec) CSNewbs</p> <p>Boolean Logic Diagrams OCR GCSE Computer Science Revision Notes 2022 Save My Exams</p> <p>Boolean Logic - Computer Science: OCR GCSE (senecalearning.com)</p>	<ul style="list-style-type: none">• Penetration tester• Application analyst• Applications developer• Cyber security analyst• Data analyst• Forensic computer analyst• IT trainer• Machine learning engineer

Curriculum vision:

“Our aim is to deliver a curriculum that is inclusive, relevant and progressive for all learners.”

Topic 2.4.1 Boolean logic

The big picture

Why is this relevant for the students?

1. Ask students to create a list of choices that they have made today.
2. What choices have they made that require more than one thing to be true?
3. What choices have they made that only require one of two things to be true?
4. How could we represent this in a computer?

Notes: Use Context Setting task to engage students and create discussion. May link to flipped resources if you use flipped learning.

Objectives

What should the students be confident/able to do at the end of the session?

1. Explain why data needs to be in binary form.
2. Draw logic diagrams for the operators AND, OR and NOT gates.
3. Create a Truth Table for AND, OR and NOT gates.
4. Draw logic circuits and Truth Tables for second level logic circuits.

Notes: These are the core learning that the students should develop during the lesson. This will link to the activities that provide ability to assess the Objectives.

Engagement

What will make the students want to learn?

1. Ask students to create a list of choices that they have made today.
2. Ask what choices have they made that require more than one thing to be true?
3. Ask what choices have they made that only require one of two things to be true?
4. Ask how could we represent this in a computer?

Notes: Use Context Setting task to engage students and create discussion. May link to flipped resources if you use flipped learning

Assessment for Learning

Expected progress

- Construct a truth table for AND, OR and NOT gates.
- Can describe why we use logic gates.
- Can complete truth tables for logic circuits (two inputs).

Good progress

- Can create logic circuits from logic statements (three inputs).

Exceptional progress

- Can create and describe more complex logic circuits that use four or more inputs.
- Can develop complex truth tables using third level circuits.
- Can create a half or full adder circuit.

The sticking points

What do I want students to remember?

- Logic gates allow manipulation of bits.
- Bits are processed by the CPU.
- The component in the computer that does this is a transistor.
- Combinations of logic gates can be shown using a diagram.

Notes: A list of concepts that you want the students to remember by the end of the lesson.

Keywords

What exam/specification specific words should the students be confident with and need to know?

- Logic gate
- Transistor
- Bit (Binary digit)
- Logic circuit
- AND
- OR
- NOT (Inverter)
- $A \wedge B$
- $A \vee B$

Multiple Choice Questions will assess these keywords; use the MCQs supplied. You may wish to customise these.

Notes

Differentiation

How will I enable access to each area of learning?

- Graduated learning tasks (complexity of circuits).
- Peer support.
- Lead students (those that complete tasks accurately can support lower achieving students).
- Choice of activity.

Notes: Use of stretch task ideas supplied may support high end differentiation. You will likely need to modify the resources to meet the needs of your students specifically. You may wish to refer to Departmental or School policies on differentiation methods used within your centre.

Lesson 1 Activity

What tasks will I ask the students to complete to develop their understanding during the lesson?**Creating notes:**

1. Students develop their earlier starter to create a basic guide to the three logic gates.
2. Students develop three challenge questions that can be used to check understanding.
3. Students create a Keyword Dictionary for the keywords mentioned.

Notes: Use the Activities given to develop the students' knowledge of the topic. Each activity may need further differentiation/adaptation for your needs. Reference the Common Misconceptions/FAQ guide to support your delivery of the topic.

Lesson 2 Activity

What tasks will I ask the students to complete to develop their understanding during the lesson?**Developing understanding through enhancing notes**

- Rule for creating truth tables.
- Students add notes for writing logic statements and notation.
- Students create truth tables for the circuits.
- Students then use online tools as needed to support checking accuracy.

Lesson 3 Activity

What tasks will I ask the students to complete to develop their understanding during the lesson?**Creating logic diagrams**

1. Students create logic diagrams for several expressions using draw.io or other similar software applications.

Summary/Plenary**Checking what the students know**

- Pair and share
- Targeted Multiple Choice Questions on Board
- Completion of Exam question(s) at target grade
- Expert Forum: write down anything they are unsure of a discuss answers to these anonymously at front of class using targeted student support

Notes: Use the MCQs to check basic understanding of Keywords and Topics.

Use the Level of Response (LOR) to develop deeper knowledge and allow Peer Assessment and Review. This can be developed to use the LOR ideas as homework etc.

Homework/flipped learning**Tasks that students will complete for next session:**

- Use LOR question/topic and create a short response using framework.

Lesson 4 Activity

How will I challenge high ability students or extend the lesson activities if needed?

- Complete Boolean Logic Challenges resource sheet.

Notes: *There are some stretch and challenge activities contained within the resource pack that may provide ideas or be modified for use to fit your students' needs.*



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OCR Resources: *the small print*

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