

Cambridge NATIONALS LEVEL 1/2

INFORMATION TECHNOLOGIES



EXPANDED SCHEME OF WORK

Version 1



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INTRODUCTION

The purpose of this guide is to give you an overview of how you could holistically deliver the Learning Outcomes (LOs) from Cambridge Nationals in Information Technologies through the delivery and use of tasks that combine the theoretical and practical application of skills. It is intended to provide example activities to support the teaching and learning of the LOs specified.

The learning outcomes and teaching content for this qualification are not separated into individual units of teaching. There are two assessments to be taken and we refer to these as units of assessment (see page 5):

- Assessment Unit R012 - Understanding tools, techniques, methods and processes for technological solutions.
- Assessment Unit R013 - Developing technological solutions.

We've taken this direction to support a holistic approach to delivery and a synoptic approach to assessment. We want learners to develop their appreciation and understanding of the connections between the different elements of learning and show they can go on to apply what they learn from this qualification to new and different situations and contexts.

For more information on these units of assessments please go to:

<http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>.

This delivery guide will provide you with a structured plan to teach the learners how a range of topics work together across a number of LOs, providing them with understanding of how skills and knowledge link.

The intention is that once the learners are taught the required knowledge and skills within each of the LOs, they will have the opportunity to carry out activities that will enable them to practice the understanding and skills they have acquired. Learners should be considering the context any activity is placed in, as this will influence how they use their learning.

Please note that practice activities within this guide **MUST NOT be used for final assessment purposes.**

The objectives of this delivery guide are to:

- Support the delivery of the LOs from the Cambridge Nationals in Information Technologies by providing example activities which are exciting and engaging for learners.
- Provide a range of scenarios to be used, placing the learning in a 'real world' situation, to help further develop the learners knowledge and understanding of relevant topics.
- Provide learners with an overview of how the knowledge and skills gained in one LO, support the knowledge and skills used within other LOs.
- Provide the learners with an opportunity to consider how they would use their social and communication skills holistically.
- Indicate where opportunities to develop English and maths skills exist within the practice activities.

CURRICULUM PLAN

This plan suggests how all the Learning Outcomes (LOs) and teaching content within R012 and R013 could be taught.

Year 1						Year 2									
LO1.1	Stages of the project life cycle and the tasks carried out in each stage	LO4.4	(R013 RELEVANT) Prevention Measures	LO8.1	Learners should be taught how to carry out and document an iterative review ie Phase review	LO1.5	Planning tools and the software types used to develop project plans	LO3.1	Data types	LO6.1	Selection and justification of the appropriate tools and techniques and formats to process data to meet the defined objectives in a given context	LO8.1	"Learners should be taught how to carry out and document an iterative review"	LO3.1	Data types
LO1.2	Interaction and iteration between the stages of the project life cycle	LO4.5	(R013 RELEVANT) Current legislation, its implications and applications			2.3	Learners should be taught how to use planning documentation	LO5.1	Learners should be taught how to create, edit and delete data using appropriate software tools and techniques	LO6.2	Purpose and suitability of presenting methods			LO3.2	Information and relationships
LO1.4	Initial project considerations	LO2.2	Learners should be taught how to mitigate risks through the planning process			2.4	Learners should be taught how to undertake iterative testing for			LO7.1	How to select and present information for a given purpose and audience				
LO2.1	Learners should be taught how to initiate a project by analysing the requirements to a given context									LO7.2	Learners should be taught how to present information using appropriate software tools and techniques				
											Learners should be taught presentation techniques				
LO3.2	Information and relationships	LO1.3	The inputs and outputs of each stage of the project life cycle	LO4.4	Prevention measures					LO6.1	Selection and justification of the appropriate tools and techniques and formats to process data to meet the defined objectives in a given context				
LO3.3	Methods used to collect and store data and information, and the appropriateness of the use of these in a given context	LO4.1	Types of threats	LO4.5	Current legislation, its implications and applications					LO6.2	Selection of the appropriate tools and techniques to present information to meet the defined objectives in a given context and justification of the use of the selected tool and format				
LO3.4	Storage and the appropriateness of the use of these in context	LO4.2	The vulnerabilities – which can be exploited in a cyber-security attack	LO4.6	Importance of validity, reliability and bias when collecting and using data and information					LO6.3	The resources required for presenting information and data and the appropriateness of the use of these in context				
LO3.5	Use of data in a given context including Big Data	LO4.3	The impacts of a cyber-security attack												
												Christmas			
												Easter			
												January assessment			
												June assessment			
												June assessment			

SYNOPTIC DELIVERY AND METHODS OF ASSESSMENT

This guide enables the synoptic delivery and facilitation of learning of the following learning outcomes (LOs).

Unit R012 – Understanding tools, techniques, methods and processes for technological solutions.

Unit R013 – Developing technological solutions.

LO No	LO Title	How are they assessed?
LO1 (R012)	Understand the tools and techniques that can be used to initiate and plan solutions	Exam set and marked by OCR
LO2 (R013)	To be able to initiate and plan a solution to meet an identified need	Centre assessed and moderated by OCR
LO3 (R012)	Understand how data and information can be collected, stored and used	Exam set and marked by OCR
LO4 (R012)	Understand the factors to be considered when collecting, processing and storing data and information	Exam set and marked by OCR
LO5 (R013)	To be able to import and manipulate data to develop a solution to meet an identified need	Centre assessed and moderated by OCR
LO6 (R012)	Understand the different methods of processing data and presenting information	Exam set and marked by OCR
LO7 (R013)	To be able to select and present information in the development of the solution to meet an identified need	Centre assessed and moderated by OCR
LO8 (R013)	To be able to iteratively review the development of the solution	Centre assessed and moderated by OCR

Internal assessment must be done using the OCR set-task. Learning covered as part of this delivery guide cannot be submitted as final assessment.

ABOUT THE MODULES AND ACTIVITIES

This guide is divided into nine modules.

Modules may be sub-divided or combined according to the teaching time available.

The tables below show where each of the modules in this guide provides delivery approaches and learning opportunities to ensure a thorough review of skills and understanding, prior to final assessment and evidencing by the learner.

Please note that should assessment be presented in a similar holistic way, learners must be able to present clearly mapped evidence for each LO.

BY LO

LO No	Module 1 Activity No	Module 2 Activity No	Module 3 Activity No	Module 4 Activity No	Module 5 Activity No	Module 6 Activity No	Module 7 Activity No	Module 8 Activity No	Module 9 Activity No
LO1 (R012)	1, 2		1						
LO2 (R013)	3, 4	1	2, 3, 4						
LO3 (R012)				1, 2, 3			1, 2, 3, 4,		
LO4 (R012)		1, 2, 3						1, 2, 3, 4	1, 2, 3
LO5 (R013)				4, 5					
LO6 (R012)					1, 2, 3				
LO7 (R013)					2, 3				
LO8 (R013)			5			1			

BY MODULE

	LO No	Activity No
Module 1	LO1, 1.1	1
	LO1, 1.2	1
	LO1, 1.3	1
	LO1, 1.4	2
	LO2, 2.1	3, 4

	LO No	Activity No
Module 2	LO2, 2.2	1
	LO4, 4.4	1
	LO4, 4.5	2, 3

	LO No	Activity No
Module 3	LO1, 1.5	1
	LO2, 2.3	2, 3
	LO2, 2.4	4
	LO8, 8.1	5

	LO No	Activity No
Module 4	LO3, 3.1	1, 3
	LO3, 3.2	2, 3
	LO5, 5.1	4, 5

	LO No	Activity No
Module 5	LO6, 6.1	1
	LO6, 6.2	1
	LO6, 6.3	1, 2, 3
	LO7, 7.1	2, 3
	LO7, 7.2	2, 3
	LO7, 7.3	2, 3

	LO No	Activity No
Module 6	LO8, 8.1	1

	LO No	Activity No
Module 7	LO3, 3.3	1, 2
	LO3, 3.4	3
	LO3, 3.5	4

	LO No	Activity No
Module 8	LO4, 4.1	1
	LO4, 4.2	2
	LO4, 4.3	3
	LO4, 4.4	4

	LO No	Activity No
Module 9	LO4, 4.5	1
	LO4, 4.5	2
	LO4, 4.6	3

MODULE 1 – Stages of the project life cycle

Module 1 – Starts with developing learners understanding of the project life cycle itself. The understanding of this module will underpin the learners' method of working. Before learners can develop their own technological solution, they need to have a good understanding of:

- The phases of the project life cycle.
- What inputs and outputs flow through the different phases of the project life cycle and how they influence each other?
- How to initiate a project considering its main objectives.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO1 (R012)	Understand the tools and techniques that can be used to initiate and plan solutions	1, 2
	1.1 Phases of the project life cycle and the tasks carried out in each phase	1
	1.2 Interaction and iteration between the phases of the project life cycle	1
	1.3 The inputs and outputs of each stage of the project life cycle	1
	1.4 Initial project considerations	2
LO2 (R013)	To be able to initiate and plan a solution to meet an identified need	3, 4
	2.1 Learners must be taught how to initiate a project by analysing the requirements to a given context	3, 4

MODULE 1 ACTIVITY

Activity 1	What are the stages of the Project Life Cycle?
Relates to LO No(s)	LO1 (1.1, 1.2, 1.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	20 minutes

We are starting with the project life cycle which has four phases:

- Initiation
- Planning
- Execution
- Iterative review/final evaluation

Some project management theorists have developed more, but for your learners project life cycle we are only concerned with these four phases.

Using the web sources provided and other sources that may be available create a diagram or table that shows what activities each of the stages involve and how each phase links to the next in the project life cycle.

Web sources:

https://www.sqa.org.uk/e-learning/ProjMan01CD/page_28.htm

<https://www.smartsheet.com/blog/demystifying-5-phases-project-management>

<http://www.mppm.com/project-management-methodology.php>

http://www.sage.co.nz/life_cycle.htm

<http://pmo.gmu.edu/pmframework/pmlifecycle.cfm>

MODULE 1 ACTIVITY

Activity 2	SMART goals
Relates to LO No(s)	LO1 (1.4)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	30 minutes
<p>When a project is being developed, it is important that learners should set goals that will allow them to measure how well it's progressing. To do this we can create SMART goals. SMART stands for:</p> <ul style="list-style-type: none"> • Specific • Measurable • Achievable • Realistic • Time <p>Learners could create a presentation to deliver to the class that explains what each aspect means and how SMART goals help people manage a project.</p> <p>Web sources:</p> <p>http://topachievement.com/smart.html</p> <p>https://www.wrike.com/project-management-guide/faq/what-is-smart-in-project-management/</p> <p>http://blog.capterra.com/10-smart-goal-setting-best-practices-for-project-planning/</p> <p>https://www.projectsart.co.uk/smart-goals.php</p>	

Activity 3	Work plans
Relates to LO No(s)	LO2 (2.1)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	30 minutes
<p>It is important for learners to be able to monitor and keep their technological solutions on track. A good tool for this is the development of a work plan, which when created allows the different activities and tasks within the project to be scheduled.</p> <p>Learners could create a help sheet to be given to someone starting a project that explains what a work plan is and explaining each of the following aspects:</p> <ul style="list-style-type: none"> • Tasks • Activities • Workflow • Timescales • Resources • Milestones • Contingencies <p>(Learners may want to include diagrams.)</p>	

MODULE 1 ACTIVITY

Activity 4	Project considerations	
Relates to LO No(s)	LO1 (1.4)	LO2 (2.1)
Opportunity to develop English skills	Yes	
Opportunity to develop maths skills	No	
Estimated time for activity	20 minutes	

When a project is first looked at there are a range of aspects that learners need to consider before deciding how to proceed with solutions. Examples of questions they could ask include:

- Why does this project need to be created?
- Who is the project for?
- Who will carry out the project?
- What constraints are placed on the project? (time, resources, regulations, security)
- What resources are available?
- How will you know that the project is a success?

Using these questions as a starting point and the knowledge and understanding that learners have learnt in the other activities, read the following example of a project brief.

A new virtual reality rollercoaster ride is due to open in 12 months' time. There will be four multimedia sections for the virtual reality aspect covering different periods in the history of the UK:

- Victorian era
- World War II
- The 1970s
- Modern times

Each of the multimedia sections will include video, a soundtrack (music, noises, etc.) and a narration guiding the rider through the history of the UK.

The planning for these four multimedia sections needs to be completed with ten months remaining on the project. This will then allow the creation of these sections to be carried out, each within a 2-month period. There can only be a small team to keep costs down, so the construction of each section will need to be completed before the next one is started. Learners could:

1. Construct a mind map that summarises the key aspects of the project brief.

OR

2. Construct SMART goals for the project.

(Trying to show that there is an option on how you could carry out the work – not necessarily have to do them all.)

MODULE 2 – Mitigating risks for a project

Module 2 seeks to develop learners' ability to reduce the risks that can affect the development of and use of a technological solution. Before learners can develop their own solution, they need to clearly understand:

- How to look at the risks that affect a project.
- How to use the various tools, techniques and technology available to reduce these risks.
- The legislation that has to be considered when developing and using a technological solution and to conform to it.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO2 (R013)	To be able to initiate and plan a solution to meet an identified need	1
	2.2 Learners should be taught how to mitigate risks through the planning process	1
LO4 (R012)	Understand the factors to be considered when collecting and processing data and storing data/information	1, 2, 3
	4.4 Prevention Measures	1
	4.5 Current legislation, its implications and applications	2, 3

Activity 1	Prevention Measures	
Relates to LO No(s)	LO4 (4.4))	Part of LO2 (2.2)
Opportunity to develop English skills	Yes	
Opportunity to develop maths skills	No	
Estimated time for activity	40 minutes	
<p>There are always risks that can affect a project, such as security threats and data integrity threats. Learners will need to consider these when developing their project for R013 so that data and information is protected.</p> <p>Learners could create a help sheet(s) that explains:</p> <ol style="list-style-type: none"> 1. How they can prevent data being accidentally deleted from a spreadsheet and/or database. 2. How they can prevent access to a spreadsheet/database/word processor document. 3. How access to a cloud account can be set up and protected from access by other people. 4. How can access to Smart devices and PC's/Laptops etc. be protected from an unauthorised use? 		

MODULE 2 ACTIVITY

Activity 2	Current legislation and regulations – Data Protection Act
Relates to LO No(s)	LO4 (4,5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	20 minutes

Learners should understand the different risks associated with the collection, storage and use of data and information and understand the relevant legislation and regulations which protect its use.

It is important for learners, to consider the Data Protection Act (DPA) when personal data is collected, stored and used by an organisation. Learners must understand what the DPA dictates and how the data must be treated and what the organisation can do with the data. There are eight principles to the DPA.

Learners could, using the resources provided, create a presentation that on each slide:

- State one of the principles for the DPA.
- Explains one action that an organisation could take to make sure that it complies to this principle.

Web resources:

<https://www.gov.uk/data-protection/the-data-protection-act>
<https://ico.org.uk/for-organisations/guide-to-data-protection/>
<http://www.bbc.co.uk/schools/gcsebitesize/ict/legal/0dataprotectionactrev1.shtml>
<https://www.itgovernance.co.uk/data-protection>

Activity 3	Current legislation and regulations – Computer Misuse Act
Relates to LO No(s)	LO4 (4,5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	30 minutes

Following on from activity 2 above, learners also need to understand and consider The Computer Misuse Act, an Act of Legislation passed by the UK Government, the purpose of which is to protect computer users against wilful attacks and theft of information. There are three offences under the Computer Misuse Act.

Learners could, using the resources provided, create a case study fact sheet that:

- States each offence of the Computer Misuse Act.
- States the maximum penalty that an individual could face for committing each offence.
- Describes a situation where each offence has been broken (use the internet to find real life examples).
- Explains at least one action that could be taken by an individual or organisation to help reduce the risk of a Computer Misuse Act offence being committed to their computer system.

Web resources:

<http://www.bbc.co.uk/schools/gcsebitesize/ict/legal/1dataandcomputermisuserev1.shtml>
https://www.sqa.org.uk/e-learning/ITLaw01CD/page_03.htm
<http://www.legislation.gov.uk/ukpga/1990/18/contents>
https://thenextweb.com/uk/2012/05/17/uk-facebook-account-hacker-hit-with-12-month-prison-sentence/#.tnw_PdX4kgLy
<http://www.computerevidence.co.uk/Cases/CMA.htm>

MODULE 3 – Planning and reviewing project phases

Module 3 develops learner's ability to plan a project and then review the phases of the project life cycle. Before learners can plan their own solution and create a technological solution, they need to understand:

- The planning tools and software that are available for them to use.
- How to analyse a brief and select the key information from it.
- How to test their solution as they develop it ensure that it meets the client needs.
- How to review what they have already completed and suggest possible improvements.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO1 (R012)	Understand the tools and techniques that can be used to initiate and plan solutions	1
	1.5 Planning tools and the software types used to develop project plans	1
LO2 (R013)	To be able to initiate and plan a solution to meet an identified need	2, 3
	2.3 Learners should be taught how to use planning documentation	2, 3
	2.4 Learners should be taught how to undertake iterative testing	4
LO8 (R013)	To be able to iteratively review and evaluate the development of the solution	5
	8.1 Learners should be taught how to carry out and document an iterative review i.e. Phase review	5

MODULE 3 ACTIVITY

Activity 1	Project Evaluation and Review Technique
Relates to LO No(s)	LO1 (1.5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	30 minutes

It is important that learners are able to recognise planning tool and understand their purpose. They should know about the components used in different planning tools and be able to consider the advantages and disadvantages of using them.

The Project Evaluation and Review Technique (PERT) is a tool used to schedule, organise and coordinate a project.

Learners could create a help sheet to give to others in the class. It should:

- Explain the benefits of using a PERT chart.
- Explain the weaknesses of a PERT chart.
- Illustrate how to create a PERT chart.

Web resources:

<http://www.investopedia.com/terms/p/pert-chart.asp>

<http://searchsoftwarequality.techtarget.com/definition/PERT-chart>

<https://www.edrawsoft.com/PERT-Chart.php>

<https://www.smartdraw.com/pert-chart/examples/pert-chart-1/>

https://en.wikipedia.org/wiki/Program_evaluation_and_review_technique

NOTE:

This activity style could be used for other project tools and techniques in the specification such as a Gantt chart, visualisation diagrams etc.

MODULE 3 ACTIVITY

Activity 2	Planning documentation and planning tools
Relates to LO No(s)	LO2 (2.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	20 minutes
<p>A new virtual reality rollercoaster ride is due to open in 12 months' time. There will be four multimedia sections for the virtual reality aspect covering different periods in the history of the UK:</p> <ul style="list-style-type: none"> • Victorian era • World War II • The 1970s • Modern times <p>Each of the multimedia sections will include video, a soundtrack (music, noises, etc.) and a narration guiding the rider through the history of the UK.</p> <p>The planning for these four multimedia sections needs to be completed with ten months remaining on the project. This will then allow the creation of these multimedia sections to be carried out, each within a 2-month period. There can only be a small production team to keep costs down, so the construction of each section will need to be completed before the next one is started.</p> <p>Using the scenario above learners could:</p> <ol style="list-style-type: none"> 1. Construct a mind map that summarises the key points from the project brief. 2. Construct a work plan for the project as a Gantt chart. 	

Activity 3	Planning documentation and planning tools – visualisation
Relates to LO No(s)	LO2 (2.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	20 minutes
<p>Emily runs a small shop that sells clothing and shoes. Her stock levels are stored on a database and include items that she can't display in the shop as it is too small.</p> <p>Emily wants to use tablet computers in the shop to show customers what she has in stock, including the sizes, amount in stock and prices. Customers will be able to select the product they want and Emily, or another member of staff can bring it out to them.</p> <p>Using the presenting data scenario above learners could:</p> <ul style="list-style-type: none"> • Create a visualisation of the tablet computer screen interface that customers could use to see and select the clothing that they want to try on. 	

MODULE 3 ACTIVITY

Activity 4	Testing that solutions will work
Relates to LO No(s)	LO2 (2.4)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	10 minutes

Having created a visualisation of the tablet screen for Emily, learners could now test the appropriateness of their solutions by showing it to possible users (focus group).

Learners should develop a number of questions (approximately five to seven) that they would like a focus group to answer based on their visualisation diagram.

Learners should consider the following aspects when constructing the questions:

- Who the users are?
- What is the aim of the tablet screen interface?
- How easy the interface is to use?
- Are there any suggested improvements from the focus group?

Learners could then gather data from a small focus group and adjust the visualisation diagram based on results.

MODULE 3 ACTIVITY

Activity 5	How have you done so far?
Relates to LO No(s)	LO8 (8.1)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	25 minutes

When developing a project using the project life cycle it is important that continual reviews take place at the end of each of the phases to ensure that the project is developing as it should. Learners could select a planning task (or any other task) that they have already carried out and review its effectiveness based on the following questions:

- What worked well in the task?
 - Did you make the right choices? If not, why not
- What did not work well in the task?
- Did you have to change your plan?
- Did you run to time on the task?
 - Or did you complete it too quickly/slowly?
 - Why do you think this was?
- Looking back is there anything that you missed out in your planning?
 - If so why is it important?
- Looking back was there anything you planned that was not needed and wasted time/resources?
- Were there any issues and constraints that developed that you needed to consider?
 - How did you deal with these?
- What would you do differently in your next project?
 - Why is this a good idea?
- What will you do differently to your plan, in the next phase of the project because of what you have already done?
 - Why have you decided to change from the plan?
- Was the software used the most suitable or would you use a different one next time
- Did the task allow you to meet the client/end user's needs?
- Did the task solution allow you to proceed with the project?

MODULE 4 – Creating, updating, deleting and using data

Module 4 looks at how data is stored and manipulated using a computer system and then how it can be searched and used effectively to meet a given objective. To be able to do this, learners need to be able to understand:

- The difference between data and information.
- How to enter the data into a computer system in a variety of data handling software.
- How to manipulate the data in a variety of data handling software so that usable information is generated.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO3 (R012)	Understand how data and information can be collected, stored and used	1, 2, 3
	3.1 Data types	1, 3
	3.2 Information	2, 3
LO5 (R013)	To be able to import and manipulate data to develop a solution to meet an identified need	4, 5
	5.1 Learners should be taught how to create, edit and delete data using appropriate software tools and techniques	4, 5

Activity 1	Data types
Relates to LO No(s)	LO3 (3.1)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	15 minutes

A motorbike hire company uses a computer system to collect and store the details of customers who want to hire motorbikes to tour the country for a month in August. The company needs to store the customer details, including details about their driving licence and the motor insurance.

Using this scenario learners could work in pairs to create a document:

- Explaining what data is.
- List the categories that would be needed to store the data.
- List the appropriate data types for each category.

Web resources:

https://www.w3schools.com/sql/sql_datatypes_general.asp

https://www.w3schools.com/sql/sql_datatypes.asp

<https://docs.microsoft.com/en-us/sql/t-sql/data-types/precision-scale-and-length-transact-sql>

MODULE 4 ACTIVITY

Activity 2	Turning data into information
Relates to LO No(s)	LO3 (3.2)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	20 minutes

Learners could work in pairs to create a presentation with detailed speaker notes that explains the differences between data and information and how data is transformed into information that is useful to use.

Learners must include examples of raw data and explain how information has been generated from this data.

Web resources:

https://www.tutorialspoint.com/computer_fundamentals/computer_data.htm

<http://www.business2community.com/strategy/difference-data-information-0967136#YF4iOZ583p4tLHPc.97>

<http://www.bbc.co.uk/schools/gcsebitesize/ict/databases/0datainfoev1.shtml>

<https://www.computerhope.com/issues/ch001629.htm>

<https://www.tutor2u.net/business/reference/the-difference-between-data-and-information>

http://www.diffen.com/difference/Data_vs_Information

<https://www.youtube.com/watch?v=bitUrAmXTnI>

https://www.youtube.com/watch?v=dJkB_ITY1pE

Activity 3	Using data and information
Relates to LO No(s)	LO3 (3.1, 3.2)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	20 minutes

Websites like Amazon, Facebook, Twitter and Instagram depend on data and information. Teachers could ask learners to look at these sites (or ones like them) to look at how they collect data (likes, stars in reviews, hits on page) and information (reviews, comments). Then learners could create a revision work sheet that explains the differences between data and information with examples from these sites to help them.

MODULE 4 ACTIVITY

Activity 4	Creating a database
Relates to LO No(s)	LO5 (5.1)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	50 minutes

Learners could then create a database to store the information about ordering of revision guides for GCSE subjects.

Learners could:

- In pairs, using appropriate software, create the database for the data supplied.

See Word document Creating a database - [Customer details](#).

Activity 5	Using a spreadsheet
Relates to LO No(s)	LO5 (5.1)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	50 minutes

Using the data provided from the sales of revision guides learners could create a spreadsheet that would produce the following results:

- Cost per school for each subject.
- Total cost per school including discount and delivery.
- Total sales per subject resource.
- Total income per subject resource.
- Total income per subject.
- Total income to publishing company.

Learners could use the following tools (as well as others/equivalents) within the spreadsheet software to efficiently produce a solution for this task:

- VLOOKUP / HLOOKUP
- SUMIF
- COUNTIF
- SUMIF
- CONCATENATE/CONCAT
- DATE
- Create Macros to carry out calculations automatically.

See Excel spreadsheet Using a spreadsheet - [Guide prices](#).

MODULE 5 – Presenting information in a meaningful way

Module 5 looks at how information is presented so that it is useful and easy to use for its intended audience. To do this, learners should understand:

- The factors that will influence the decision about what method to select. These include:
 - o Audience
 - o Location
 - o Device(s)
 - o Transfer method(s)
 - o Data security
- How to present this information, what tools to use and why.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO6 (R012)	Understand the different methods of processing data and presenting information	1, 2, 3
	6.1 Selection and justification of the appropriate tools and techniques and formats to process data to meet the defined objectives in a given context	1
	6.2 Purpose and suitability of presenting methods	1
	6.3 The resources required for presenting information and data and the appropriateness of the use of these in context	1, 2, 3
LO7 (R013)	To be able to select and present information in the development of the solution to meet an identified need	2, 3
	7.1 How to select and present information	2, 3
	7.2 Learners should be taught how to present information using appropriate software tools and techniques	2, 3
	7.3 Learners should be taught presentation techniques	2, 3

MODULE 5 ACTIVITY

Activity 1	What tools and techniques should you use?
Relates to LO No(s)	LO6 (6.1, 6.2, 6.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	50 minutes

A sports centre is setting up a project to collect data about a person's swimming activities.

If people want to allow this data about their activities to be collected, they must register before taking part. The registration details will include their name, address and contact details including telephone numbers and email addresses. When they have completed the registration a user name and password will be allocated. This user name and password must be entered before the data is input.

Each person would have to input the number of lengths they swam, the total time they took to swim the lengths and their age.

At the end of every month each person will get an individual report. The report will show:

- their personal details
- the number of lengths they swam
- the amount of time they swam for
- the average time taken to swim a length.

A software development company will work on the project and carry out all phases of the project life cycle. It will liaise with staff of the sports centre during the project. The sports centre has asked that the project be completed within two months.

A) Learners could individually research into the different methods that are available to present and distribute information. For each method they should include:

- Brief description of method.
- Its advantages.
- Its disadvantages.
- List of situations where it could be used.

B) Using the scenario presented learners could:

- In small groups create a mind map that shows the factors that need to be considered when selecting the most suitable types of software to meet the scenario requirements.
- Write a short presentation that justifies each software choice for this scenario.

MODULE 5 ACTIVITY

Activity 2	Presenting swimmers' data	
Relates to LO No(s)	LO6 (6.3)	LO7 (7.1, 7.2, 7.3,)
Opportunity to develop English skills	Yes	
Opportunity to develop maths skills	Yes	
Estimated time for activity	20 minutes	

A sports centre is setting up a project to collect data about a person's swimming activities.

If people want to allow this data about their activities to be collected, they must register before taking part. The registration details will include their name, address and contact details including telephone numbers and email addresses. When they have completed the registration a user name and password will be allocated. This user name and password must be entered before the data is input.

Each person would have to input the number of lengths they swam, the total time they took to swim the lengths and their age.

At the end of every month each person will get an individual report. The report will show:

- their personal details
- the number of lengths they swam
- the amount of time they swam for
- the average time taken to swim a length.

A software development company will work on the project and carry out all stages of the project life cycle. It will liaise with staff of the sports centre during the project life cycle. The sports centre has asked that the project be completed within two months.

Using the scenario provided learners could design and create an interface for how they would present the data in the individual report provided for each swimmer at the end of each month.

Learners would need to consider:

- What software would be most appropriate to present the report/data
- Who the audience is and how they could view the report/data – what device would they look at on?
- How the interface would be laid out
- Design the interface before creating it, using the appropriate planning tools.

MODULE 5 ACTIVITY

Activity 3	Presenting to audiences	
Relates to LO No(s)	LO6 (6.3)	LO7 (7.1, 7.2, 7.3)
Opportunity to develop English skills	Yes	
Opportunity to develop maths skills	Yes	
Estimated time for activity	30 minutes	

A project team must collect data about people's use of a local bus route. The data must be collected when people are using the bus.

The data will be used to decide if the buses are big enough, if the route is only used at certain times of the day or if the route needs more buses.

The collected and processed data will be given, as an integrated document, to an audience. The audience for the integrated document will include people who use the bus route, the transport department who provide the money to run the bus route and the company who provides the buses and drivers.

The collected data and processed results will be presented by a member of the project team at a community meeting with the data also being available on-line.

Using the scenario provided learners could design and create an appropriate method of presenting the data from the survey to the community meeting.

Learners would need to consider:

- What software would be most appropriate to present the data
- Who the audience is and how they could view the report/data
- How the data should be laid out so its easiest to view
- Design the interface before creating it, using the appropriate planning tools.

MODULE 6 – Final evaluation for a project

Module 6 looks at how a project is completed by carrying out a final evaluation of both the working processes that have been used together with the final product and how it meets the clients' needs. To do this, learners must understand:

- How to review what they have done to meet the client's needs.
- How to review the technology they have used and judge if was the most appropriate for the tasks.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO8 (R013)	To be able to iteratively review and evaluate the development of the solution	1
	8.1 Final review.	1

Activity 1	Reviewing
Relates to LO No(s)	LO8 8.1
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	30 minutes

Learners could select any of the tasks that they have already carried out and review its effectiveness based on the following questions:

- What worked well in the project?
 - Did you make the right choices? If not, why not?
- What did not work well in the project?
- Did you have to change your plan(s)?
- Did you run to time on the task?
 - Or did you complete it too quickly/slowly?
 - Why do you think this was?
- Looking back is there anything that you missed out in your planning?
 - If so why is it important?
- Looking back was there anything you planned that was not needed and wasted time/resources?
- Were there any issues and constraints that developed that you needed to consider?
 - How did you deal with these?
- What would you do differently in your next project?
 - Why is this a good idea?
- Was the software used the most suitable or would you use different software next time
- Did the solution you developed allow you to meet the client/end user's needs?
- Would you develop a different solution if you were to repeat the project?
 - If so how would it be different and why?

MODULE 7 – Collecting and storing data

Module 7 looks at how data is collected and stored. Everything we do generates data, how it is collected and stored differs based on the situation in which it is being generated and how it is to be used. To be able to decide upon the most appropriate method(s) to use to collect and store the data learners need to understand:

- The different methods of collecting data that can be carried out by people.
- The different methods of collecting data that can be carried out by machines and technology.
- How to judge which is the best method of storing data in any situation.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO3 (R012)	Understand how data and information can be collected, stored and used	1, 2, 3, 4
	3.3 Methods used to collect and store data and information, and the appropriateness of the use of these in a given context	1, 2
	3.4 Storage and the appropriateness of the use of these in context	3
	3.5 Use of data in a given context including Big Data	4

MODULE 7 ACTIVITY

Activity 1	Methods to collect and store data – human
Relates to LO No(s)	LO3 (3.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	30 minutes
<p>A project team must collect data about people's use of a local bus route. The data must be collected when people are using the bus. The data will be used to decide if the buses are big enough, if the route is only used at certain times of the day or if the route needs more buses.</p> <p>A) In pairs learners could research and create a mind map of all the different methods that could be used to collect data from the users of the bus route.</p> <p>B) Learners could design and create one way that could be used to collect data from users of the bus route. Learners should consider:</p> <ul style="list-style-type: none"> • What data is needed? • How that data can be recorded on the bus route (consideration of being on the move and time being short)? • What technology could be used to collect the data? • What data is ALLOWED to be collected (links back to legal issues)? 	

Activity 2	Methods to collect data - Automatic
Relates to LO No(s)	LO3 (3.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	
<p>Learners could create a revision leaflet that explains the different methods of automatically collecting data, providing examples of where the method has been used. Learners could include:</p> <ul style="list-style-type: none"> • Brief description of the technology. • How and where it is used (use real life examples to back up statements). • Benefits and limitations of methods. <p>Website resources:</p> <p>http://www.fao.org/docrep/003/x2465e/x2465e09.htm</p> <p>http://www.teach-ict.com/gcse_new/databases/data_capture/miniweb/pg2.htm</p> <p>http://www.inventoryops.com/ADC.htm</p> <p>http://www.bbc.co.uk/schools/gcsebitesize/ict/databases/2databasesrev3.shtml</p> <p>https://www.invensis.net/blog/data-processing/10-effective-ways-to-data-capture/</p> <p>https://www.tutor2u.net/business/ict/intro_information_data_collection.htm</p>	

MODULE 7 ACTIVITY

Activity 3	Where to save the data
Relates to LO No(s)	LO3 (3.4)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	30 minutes
<p>Learners could research into the different methods of data storage that exist covering both the cloud and physical devices. They could then present this information as a website or as a digital document.</p> <p>For each method, they should include:</p> <ul style="list-style-type: none"> • Image. • Brief description of how it works. • Benefits of use. • Limitations of use. • Technology required. • Example of where it has been used. 	

Activity 4	Using data in context
Relates to LO No(s)	LO3 (3.5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	Yes
Estimated time for activity	60 minutes
<p>Data is used in all walks of life and is used to aid decision making, from deciding what clothes to stock in a shop to what transport links to develop.</p> <p>Learners could create several 'case study' files that explain how data is used in a variety of global contexts. These contexts are listed in the specification:</p> <ol style="list-style-type: none"> law enforcement education health and fitness shopping entertainment / leisure lifestyle. <p>Web resources:</p> <p>The following websites could be used to provide examples of how data can be used.</p> <p>https://www.ons.gov.uk/peoplepopulationandcommunity/crimeandjustice</p> <p>https://www.apple.com/uk/ios/health/</p> <p>https://www.fitnessyncer.com/</p> <p>https://data.cdrc.ac.uk/dataset?tags=Shopping+Habits</p> <p>http://www.oecd.org/berlin/42675407.pdf</p> <p>https://data.gov.uk/publisher/department-of-culture-arts-and-leisure</p>	

MODULE 8 – Cyber security – threats and preventions

Module 8 looks in detail at the threats that our data and computer systems face daily, together with the measures that can be taken to deal with these threats. Learners should be able to select the most appropriate prevention method for a situation. To do this learners' need to understand:

- The threats that exist.
- Why and how these threats are used.
- The impact of these threats and attacks on individuals and organisations.
- How these threats can be dealt with and the measures that can be put in place to stop them having an effect.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO4 (R012)	Understand the factors to be considered when collecting and processing data and storing data/information	1, 2, 3, 4
	4.1 Types of threats	1
	4.2 The vulnerabilities –which can be exploited in a cyber-security attack	2
	4.3 The impacts of a cyber-security attack	3
	4.4 (DETAILED) Prevention methods	4

MODULE 8 ACTIVITY

Activity 1	Threats to the collection, processing and storage of data
Relates to LO No(s)	LO4 (4.1, 4.3 and 4.4)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	60 minutes

In pairs learners could create and deliver a presentation, with detailed speaker notes that summarises each of the threats such as, Botnet, Malware, Social engineering, Hacking, DDOS, Pharming, (full list can be found in the specification).

For each threat learners should explain:

- what the type of threat is
- why the threat is used/ what is its purpose
- how the threat works
- how the threat can be reduced/stopped.

Activity 2	Cyber security vulnerabilities
Relates to LO No(s)	LO4 (4.2)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	45 minutes

It is important for learners to be able to identify vulnerabilities and understand how they can be attacked, so that prevention methods may be put in place.

The specification lists three cyber-security vulnerabilities that should be considered when developing and using information technology systems.

Learners could research each of the vulnerabilities and produce three posters/info-graphics that:

- explain what the vulnerability is
- how it is a risk to an information technology system
- how to reduce the risk – what measures can be used to prevent damage to the system/breach of data security.

These posters can then be copied and provided for each learner or placed on the walls of the learning environment for learners to use a revision resource.

MODULE 8 ACTIVITY

Activity 3	Impacts of an attack
Relates to LO No(s)	LO4 (4.3)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	60 minutes

Learners need to understand that a cyber-attack has a different impact depending on who (individual or organisation), how and when they are attacked.

Learners could research each of the impacts below:

- denial of service (DoS) to authorised others
- identify theft
- data destruction
- data manipulation
- data modification
- data theft.

Learners could for each impact create a business report that explains the effect of the impact on individuals and organisations covering:

- Loss
- Disruption
- Safety.

This activity could also be carried out in groups and findings presented back to the whole group.

MODULE 8 ACTIVITY

Activity 4	Protecting information technology systems
Relates to LO No(s)	LO4 (4.4)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	60 minutes

There are several prevention methods listed in the specification that learners must be aware of, these include:

- physical i.e.
 - biometric access device
 - emerging measures.
- logical i.e.
 - access rights and permissions including authentication, usernames and passwords
 - anti-virus software
 - encryption
 - secure backups of data
 - emerging measures.
- secure destruction of data i.e.
 - over writing
 - magnetic wipe
 - physical destruction.

For each of these methods, learners could create a flow chart of the steps that could be followed to implement the protection method on an information technology system.

MODULE 9 – Legislation and data reliability

Module 9 looks at the laws that govern the use data and computer systems. This is an aspect that is always changing as the law tries to catch up with the development of technology. Learners need to understand:

- The laws that are relevant to the use and storage of data.
- The laws that are relevant to a digital society, both in the creation and use of computer systems and products.
- How to ensure that the data we access on a variety of digital platforms is correct and free from any bias or reliability issues.

Link to qualification <http://www.ocr.org.uk/qualifications/vocational-education-and-skills/cambridge-nationals-information-technologies-level-1-2-j808/>

The delivery begins with:

LO No	LO Title	Activity No
LO4 (R012)	Understand the factors to be considered when collecting and processing data and storing data/information	1, 2, 3
	4.5 Current relevant IT legislation, at time of delivery, its implications and applications	1, 2
	4.6 The importance of validity, reliability and bias when collecting and using data and information	3

MODULE 9 ACTIVITY

Activity 1	Test your knowledge of the law
Relates to LO No(s)	LO4 (4.5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	30 minutes

Teachers could outline to the learners the current legislation that is relevant to the six aspects of legal protection listed in the specification, including:

- individuals
- organisations
- technological equipment
- data
- information
- intellectual property.

Showing how various acts cover a number of these aspects.

It is important that learners understand how the law impacts on our use of computer systems, both as an individual but also within an organisation.

Learners could:

- a) Write several exam (between five and seven) questions and mark schemes for each of the legislations covered that other learners could then answer.
- b) Develop a case study for each legislation explaining:
 - what the act is
 - how it works
 - what actions must be taken to comply with the act
 - what the consequences are of not complying with the act.

For example, to comply with the **intellectual property laws**, who creates the content, where they are 'working' at that time, any contracts that have signed together with a product/ artefact is used needs to be considered.

MODULE 9 ACTIVITY

Activity 2	Ethical issues
Relates to LO No(s)	LO4 (4.5)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	60 minutes

It is important that learners understand the different moral and ethical issues associated with the collection, storage and use of data/information. Learners must be aware of the impact of these issues on organisations and individuals, understanding how these can be mitigated against.

Learners could be split into groups with each group being given an ethical/moral issue relevant to the use of information technologies. The learner groups could then create a presentation that would be delivered to the rest of the class that:

- Explains the issue.
- Explains the possible impact of the issue.
- Explains any steps that should be taken to deal with the issue.
- Provide 'real world' examples of the issue.

Issues that could be covered are:

- Privacy
- Ownership of data
- Access to data
- Automation reducing the work force
- Artificial intelligence.

This could be notes in OneNote or PowerPoint attached (or any other software that the centres choose to use collaboratively for their course delivery).

Website resources:

https://bigdata.ukdataservice.ac.uk/media/604711/big-data-and-data-sharing_ethical-issues.pdf

<http://www.gdrc.org/info-design/4-ethics.html>

<https://www.weforum.org/agenda/2016/10/top-10-ethical-issues-in-artificial-intelligence/>

<http://www.techrepublic.com/article/10-ethical-issues-confronting-it-managers/>

http://conflict.lshrm.ac.uk/page_13.htm#Ethical_Introduction

https://study.cardiffmet.ac.uk/AcSkills/Documents/Research/Research_Ethics_lesson/page_22.htm

MODULE 9 ACTIVITY

Activity 3	Validity, reliability and bias
Relates to LO No(s)	LO4 (4.6)
Opportunity to develop English skills	Yes
Opportunity to develop maths skills	No
Estimated time for activity	45 minutes

It is important that learners need to understand the implications of validity, reliability and bias of data and information when collecting, processing and using internal or external data and information sources. Teachers could set some research tasks into these terms and follow up with class discussions.

When carrying out research tasks, it is important that the sources of information are looked at carefully to assess how reliable they are and how accurate the information is that they provide.

A) Create a revision sheet that defines (in learner speak) the following:

- Validity of information.
- Reliability of information.
- Bias in information.

B) Learners could create a research sheet to assess the validity of a website, book or magazine. The research sheet could contain the following questions that should be asked to help assess the reliability of the resource.

- Name of the source:
- Who (person/organisation) created the source.
- Is the person/organisation working for or owned by someone else?
- When was the source created?
- When was the information last updated?
- Is the person/organisation credible? (You may need to look into them a little to see if they have a certain viewpoint.)
- Is the person/organisation well known?
- Is the source written in an easy to understand language?
- Did the source give you all the information you needed?

FILE TYPES

Accepted File Formats for the OCR Repository

Movie formats for digital video evidence
MPEG (*.mpg)
QuickTime movie (*.mov)
Macromedia Shockwave (*.am)
Macromedia Shockwave (*.dcr)
Flash (*.swf)
Windows Media File (*.wmf)
MPEG Video Layer 4 (*.mp4)
Audio or sound formats
MPEG Audio Layer 3 (*.mp3)
Graphics formats including photographic evidence
JPEG (*.jpg)
Graphics file (*.pcx)
MS bitmap (*.bmp)
GIF images (*.gif)
Portable networks graphic (.png)
Animation formats
Macromedia Flash (*.fla)

Structured markup formats
XML (*.xml)
Text formats
Comma Separated Values (.csv)
PDF (.pdf)
Rich text format (.rtf)
Text document (.txt)
Microsoft Office suite
PowerPoint (.ppt) (pptx, pptm)
Word (.doc) (docx, docm)
Excel (.xls) (xlsx, xlsm)
Visio (.vsd)
Project (.mpp)
Database software
Access. accdb mdb odb (or equivalent)
Web technologies
Hypertext mark-up language (.html)
Cascading Style Sheets

OTHER RESOURCES

Skills Guides

We have produced a range of skills guides covering a variety of topics, including:

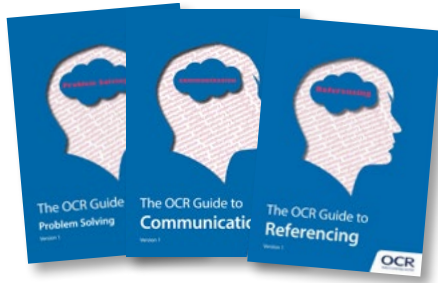
Managing projects

Research

Communication skills

Problem solving

Referencing



You can find the full range of the skills guides from the following link.

<http://www.ocr.org.uk/i-want-to/skills-guides/>



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