

Your guide to the changes for 2021

Following [Ofqual's consultation](#) on arrangements for the assessment of VTQs in 2020/21, we've reviewed units in our Cambridge Nationals and Cambridge Technicals being taken this academic year to provide specific guidance at qualification and unit level on changes to requirements or alternative approaches to support public health guidance.

Our changes are designed to make units to be taken in 2020/21 possible to complete, given the constraints you are all working with, and to make sure that the learning outcomes and assessment criteria can still be met.

We understand that the current disruption continues to change and also varies across regions, so our guidance gives acceptable alternatives you can consider when delivering units in your school /college while following the public health guidance.

Please use the [specification and assignments](#) available on our website, alongside this document, to plan and carry out assessment in 2020-21.

General notes

Throughout the units, candidates must do practical investigations. There may be some difficulties with this since some centres are unable to deliver practical work.

Wherever possible, centres should allow candidates the opportunity to do practical work so they can develop the skill of using scientific equipment.

Most practical activities within the units could be done as a demonstration or simulation. A simulation might be a series of photographs, series of images or video

Where possible candidates should observe measurements or "end points". If this is not possible, results could be made available.

To demonstrate that candidates have the understanding to **be able to carry out/use/produce/measure** a practical procedure, they must produce:

- a method for the specific procedure.
This would include:
 - o aim of the procedure
 - o risk assessment
 - o equipment list with an explanation as to why the equipment was used
 - o a step by step explanation of the procedure.
- a record of observed or given measurements.

If data is premade, the values should be as realistic as possible.

If candidates need to do an environmental survey, then a case study would be applicable. The case study should be based on a location or scenario that would have been used if COVID-19 restrictions were not in place.

If candidates need to monitor a crop, then a series of scaled images could be given rather than going to the location of the crop.

Evidence that meets the grading criteria but is delivered as specified in these adaptations will be acceptable.

CLEAPSS gives guidance on practical work during the COVID-19 Pandemic. (see: [Cleapss supporting practical science and technology](#))

Suggested adaptations

Unit number(s) and title(s)	Learning objectives (LO)	Criteria	Issues identified in the unit(s)	Adaptations / solutions
Unit 7 Human nutrition	LO2 Be able to calculate nutritional requirements to maintain energy for different levels of activity	P3 Measure the energy content of a carbohydrate food	LO2 requires candidates to measure the energy content of food using a calorimeter	<p>Candidates watch the video on how to measure calories, energy in a crisp. They then produce a method and explain how improvements could be made to the procedure.</p> <p>The method for the specific procedure should include:</p> <ul style="list-style-type: none"> • aim of the procedure • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure <p>Calorific values of foods for a healthy balanced diet will have been researched (P1). Results for a variety of crisps (within the reliability and accuracy of the method used) could be given for candidates to do calculations.</p> <p>Resources: Investigate how much energy in food How to measure calories Carbohydrate and Calorie Content of Foods by Item</p>

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Unit 8 Cell biology	LO2 Be able to use cytological techniques	P2 Demonstrate the use of microscopical and differential staining techniques P3 Demonstrate the use of an appropriate cell counting technique	LO2 requires candidates to demonstrate the use of light microscopes, staining techniques, and cell counting techniques	Having watched the relevant video/demonstration, candidates produce an illustrated instructional materials pack for laboratory technicians: <ul style="list-style-type: none"> • using a light microscope. • using a haemocytometer. • Gram staining. For each technique, include: <ul style="list-style-type: none"> • aim of the technique • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. Resources Using the microscope. Light microscopy techniques Oil Immersion Microscopy Animation Gram staining Counting cells with a Hemocytometer Coulter Counter

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<p>Unit 10 Testing consumer products</p>	<p>LO3 Be able to use quantitative titration techniques on consumer products</p> <p>LO4 Be able to use extraction and separation techniques on consumer products</p>	<p>P4 Use titrimetric techniques on consumer products</p> <p>P5 Use solvent extraction to separate and determine the mass of the active ingredient of a consumer product</p> <p>P6 Use TLC to investigate qualitatively the composition of a consumer product</p>	<p>LO3 and LO4 require students to carry out a variety of practical techniques</p>	<p>Having watched the relevant video/demonstration, candidates produce an illustrated instructional materials pack for laboratory technicians.</p> <p>For each technique, include:</p> <ul style="list-style-type: none"> • aim of the technique • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>For candidates to observe end points and burette measurements, it may be necessary to produce a series of images so candidates can read-off the needed measurements. (P4)</p> <p>Candidates could be given a value that has been obtained from a solvent extraction practical which they then can compare to an actual value. (P5)</p> <p>Candidates could be given an image of a TLC-sheet to take measurements from. (P6)</p> <p>Resources</p> <p>Titration of HCl with NaOH</p> <p>Methyl orange and phenolphthalein colours in acid and alkali, with end points. A-Level Chemistry Prac</p> <p>Solvent extraction</p> <p>TLC of plant photosynthetic pigments</p>

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Unit 11 Drug development	LO3 Be able to carry out a basic extraction, synthesis, isolation and purification of a simple drug or pharmaceutical	P4 Demonstrate the use of a procedure to extract a pharmaceutical from plant, animal or microbial source	LO3 requires candidates to carry out a basic extraction, synthesis, isolation and purification of a simple drug or pharmaceutical	Having watched the video/demonstration, candidates produce an illustrated instructional materials pack for the laboratory technician, For the technique, include: <ul style="list-style-type: none"> • aim of the technique • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. Resources Synthesis of a Solid Organic Product (Aspirin) - WJEC A Level Experiment
Unit 13 Environmental surveying	LO3 Be able to use field and laboratory techniques to conduct environmental investigations	P5 Carry out an environmental investigation, to include field and laboratory work which produces both qualitative and quantitative data	LO3 requires students to carry out environmental investigations. LO4 requires students to use the data from LO3	Candidates must carry out an environmental survey. If this is not possible due to COVID-19, tutors should then create a case study based on a location/ scenario. For example: You will carry out an environmental survey of a location that has been affected in some way by human activities and produce a short environmental report for your local council. . You will need to consider and produce: <ul style="list-style-type: none"> • a justification of the choice of procedures you will use to measure the effects of human activity on a local environment • a selection of appropriate sampling, testing methods and the equipment needed to carry out testing

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				<ul style="list-style-type: none"> • the range of data that needs to be collected and recorded with the appropriate accuracy and precision • relevant and accurate visualisation of data and correct calculation of complex measures such as indices of biodiversity. <p>Tutors will need to provide values of “pollution” at set locations, from which samples would be taken. A photograph could be used to indicate the location of the samples.</p> <p>The locations will need a geographical and climatic description.</p> <p>For each sampling procedure, candidates will produce the relevant:</p> <ul style="list-style-type: none"> • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>From the tutor given “pollution” data at the specific location, candidates will record the data in a systematic format which will then be used in LO4.</p> <p>Resources</p> <p>Soil sampling</p> <p>Collection and preparation of water samples</p> <p>Water sampling</p>

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<p>Unit 14 Environmental management</p>	<p>LO2 Be able to identify pollution in the environment</p>	<p>P4 Carry out an environmental investigation, to include field and laboratory work which produces both qualitative and quantitative data</p>	<p>LO5 requires students to carry out and report outcomes of an environmental management survey (survey is practical work in this case)</p>	<p>Candidates must carry out an environmental survey. If this is not possible due to COVID-19, tutors should then create a case study based on a location/ scenario.</p> <p>For example:</p> <p>You will carry out an environmental survey of a location that has been affected in some way by human activities and produce a short environmental report for your local council.</p> <p>You will need to consider and produce:</p> <ul style="list-style-type: none"> • a justification of the choice of procedures you will use to measure the effects of human activity on a local environment • a selection of appropriate sampling and testing methods and the equipment needed to carry out testing • the range of data that needs to be collected and recorded with the appropriate accuracy and precision • relevant and accurate visualisation of data and correct calculation of complex measures such as indices of biodiversity. <p>Tutors will need to provide values of “pollution” at set locations, from which samples would be taken. A photograph could be used to indicate the location of the samples.</p>

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				<p>The locations will need a geographical and climatic description.</p> <p>For each sampling procedure, candidates will produce the relevant:</p> <ul style="list-style-type: none"> • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>From the tutor given “pollution” data at the specific location, candidates will record the data in a systematic format which will then be used in LO5.</p> <p>Resources</p> <p>Soil sampling</p> <p>Collection and preparation of water samples</p> <p>Water sampling</p>

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<p>Unit 15 Sustainability and renewable energy</p>	<p>LO2 Be able to measure energy transfer and calculate energy efficiencies of energy sources</p>	<p>P4 Carry out investigations, to collect qualitative and quantitative data relevant to energy transfer</p>	<p>LO2 requires students to carry out investigations relating to energy transfer, and collect qualitative & quantitative data from them</p>	<p>Having watched the relevant video/demonstration, candidates produce an illustrated instructional materials pack to measure energy transfer, for at least two energy sources, for laboratory technicians.</p> <p>Range of energy sources includes:</p> <ul style="list-style-type: none"> • wind • solar • hydro • fossil fuel. <p>For each energy transfer, include:</p> <ul style="list-style-type: none"> • the energy transfer • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>For each procedure, tutors will need to give candidates qualitative and quantitative data relevant to energy transfer so that candidates can manipulate equations to calculate energy efficiencies for criteria M2.</p> <p>Resources</p> <p>Wind Turbine Investigations</p> <p>Solar cell</p> <p>Energy from Burning Fuels</p> <p>Energy from falling water</p>

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Unit 16 Waste management	LO4 Be able to test air and water emissions	P8 Carry out an environmental investigation, to include field and laboratory work which produces both qualitative and quantitative data	LO4 requires students to carry out an environmental investigation, examining air and water quality	<p>Candidates must carry out an environmental survey. If this is not possible due to COVID-19, tutors should then create a case study based on a location/ scenario.</p> <p>For example:</p> <p>You will carry out an environmental survey of a location where air and water quality have been affected in some way and produce a short environmental report for your local council.</p> <p>You will need to consider and produce:</p> <ul style="list-style-type: none"> • a justification of the choice of procedures you will use to measure the effects of human activity on a local environment • a selection of appropriate sampling and testing methods and the equipment needed to carry out testing • the range of data that needs to be collected and recorded with the appropriate accuracy and precision • relevant and accurate visualisation of data and correct calculation of complex measures such as indices of biodiversity. <p>Tutors will need to provide values of “pollution” at set locations, from which samples would be taken.</p> <p>The locations will need a geographical and climatic description.</p>

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				<p>For each sampling procedure, candidates will produce the relevant:</p> <ul style="list-style-type: none"> • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>From the tutor given “pollution” data at the specific location, candidates will record the data in a systematic format which then can be analysed.</p> <p>Resources</p> <p>Collection and preparation of water samples</p> <p>Water sampling</p> <p>Air sampling</p> <p>Measuring Particulate Air Pollution in the Atmosphere</p>

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Unit 17 Food technology	LO4 Be able to test product samples	P5 Carry out product testing	LO4 requires students to carry out product testing methods of samples and produce test data to then analyse	Having watched the video/demonstration, candidates produce an illustrated instructional materials pack for the laboratory technician. Candidates will describe their sample preparation: <ul style="list-style-type: none"> • label samples for traceability • document sample information • maintain hygiene • store sample following manufacturer's instructions • protect the sample from sources of contamination. For the technique, include: <ul style="list-style-type: none"> • aim of the technique • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. Tutors will need to provide test result data which can then be presented (M3) then analysed (D2) Resources Nutrition and food tests Food tests Salt determination FSA food sampling advice 2: Sampling for analysis

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Unit 18 Microbiology	LO3 Be able to use microbiology in food production	P5 Produce a microbiological food product under optimum conditions	LO3 requires students to produce a microbiological food product under optimum conditions, with a log book of how it was produced	Candidates select a food product to produce. They will produce a scientific logbook of the food's production, The logbook must have a record of: <ul style="list-style-type: none"> • how the food is to be produced • an explanation of the optimum conditions of production. The production must include: <ul style="list-style-type: none"> • aim of the production • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the production Resources Making yogurt Bread making Brewing

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<p>Unit 19 Crop production and soil science</p>	<p>LO3 Be able to monitor the growth of a crop plant species</p> <p>LO4 Be able to carry out soil testing</p>	<p>P5 Select and set up equipment to take and record measurements using an appropriate format</p> <p>P6 Select and set up equipment to take and record appropriate measurements</p>	<p>LO3 and LO4 requires students to take and record measurements whilst monitoring the growth of a crop plant species and carry out soil testing</p>	<p>For P5, if candidates need to monitor a crop, then a series of scaled images could be presented rather than going to the location of the crop.</p> <p>The images might show the growth of barley seeds which have been placed in cotton wool in the top of a series of test tubes. Each test tube contains a different growth solution.</p> <p>The series of images should show the growth of the seeds over a period of days.</p> <p>Candidates will explain the procedure and take measurements and record the growth of the seeds from the series of images.(If the tutor cannot supply a series of images, growth data could be given.)</p> <p>For the explanation of the procedure, candidates will require:</p> <ul style="list-style-type: none"> • a risk assessment • an equipment list with an explanation of why the equipment was used • the make-up of the solutions used • a step by step explanation of the procedure. <p>For P6, tutors will need to provide values of “soil” at set locations where samples would be taken. A photograph could be used to indicate the location of the samples.</p> <p>The locations will need a geographical and climatic description.</p>

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				<p>For the sampling procedure, candidates will produce the relevant:</p> <ul style="list-style-type: none"> • risk assessment • equipment list with an explanation of why the equipment was used <p>a step by step explanation of the procedure</p> <p>Resources</p> <p>Soil sampling</p> <p>Soil Sampling and Methods of Analysis</p> <p>Sampling soils for testing</p>
<p>Unit 21 Product testing techniques</p>	<p>LO3 Be able to use quantitative titration techniques on consumer products</p> <p>LO4 Be able to use extraction and separation techniques on consumer products</p>	<p>*P4 Use titrimetric techniques on consumer products</p> <p>P5 Use solvent extraction to separate and determine the mass of the active ingredient of a consumer product</p> <p>P6 Use a TLC chromatographic technique to investigate qualitatively the composition of a consumer product</p>	<p>Requires students to carry out a variety of practical techniques</p>	<p>Having watched the relevant videos/demonstrations, candidates produce an illustrated instructional materials pack for laboratory technicians:</p> <p>For each technique, include:</p> <ul style="list-style-type: none"> • aim of the technique • risk assessment • equipment list with an explanation of why the equipment was used • a step by step explanation of the procedure. <p>For candidates to observe end points and burette measurements, it may be necessary to produce a series of images so candidates can read-off the required measurement. (P4)</p> <p>Candidates could be given a value that has been obtained from a solvent extraction practical which they then can compare to an actual value. (P5)</p> <p>Candidates could be given an image of a TLC-sheet to take measurements from. (P6)</p>

Unit number(s) and title(s)	Learning objectives (LO)	Criteria	Issues identified in the unit(s)	Adaptations / solutions
				Resources Titration of HCl with NaOH Methyl orange and phenolphthalein colours in acid and alkali, with end points. A-Level Chemistry Prac Solvent extraction TLC of plant photosynthetic pigments

Support

OCR's team of expert Subject Advisors has created videos, webinars, and other resources to guide you through these changes and help you prepare your students for their exams in summer 2021.

These resources can be found on [the qualification page on our website](#).

Contact us

If you would like to contact us, you can do so at:

✉ vocational.qualifications@ocr.org.uk

🐦 [@OCR_Vocational](https://twitter.com/OCR_Vocational)

☎ 01223 553998