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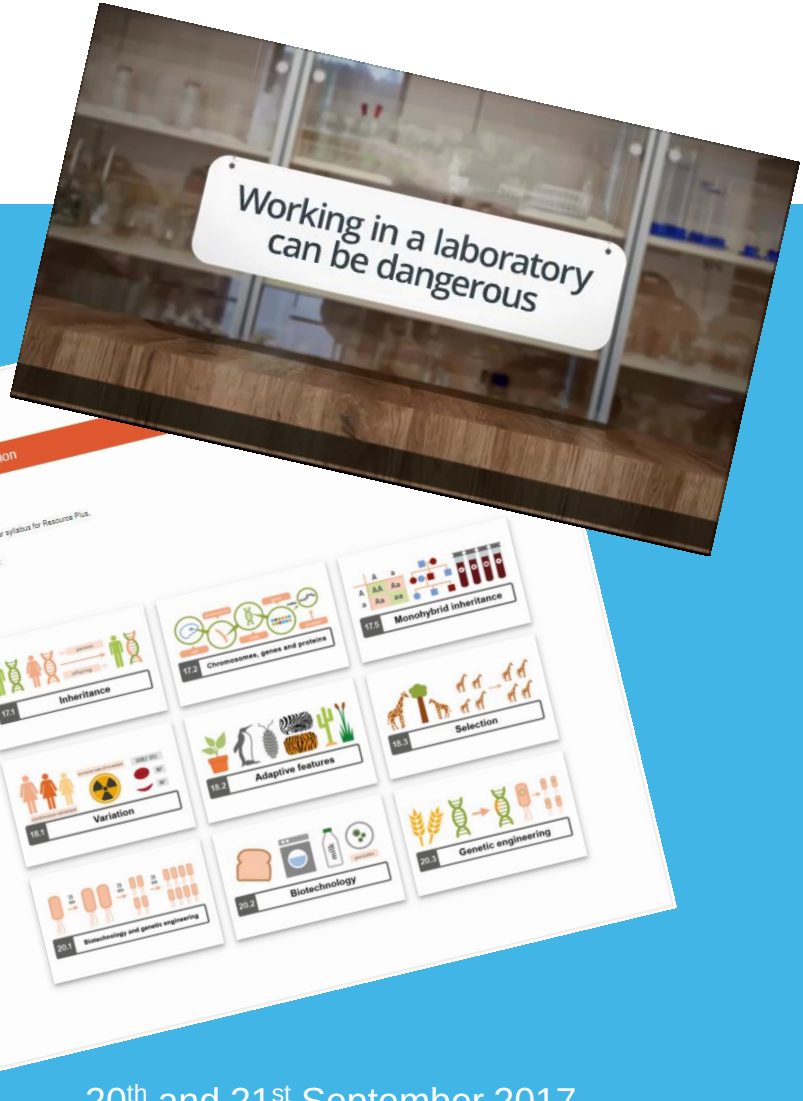

Resource Plus:

Deep learning & digital resourcing

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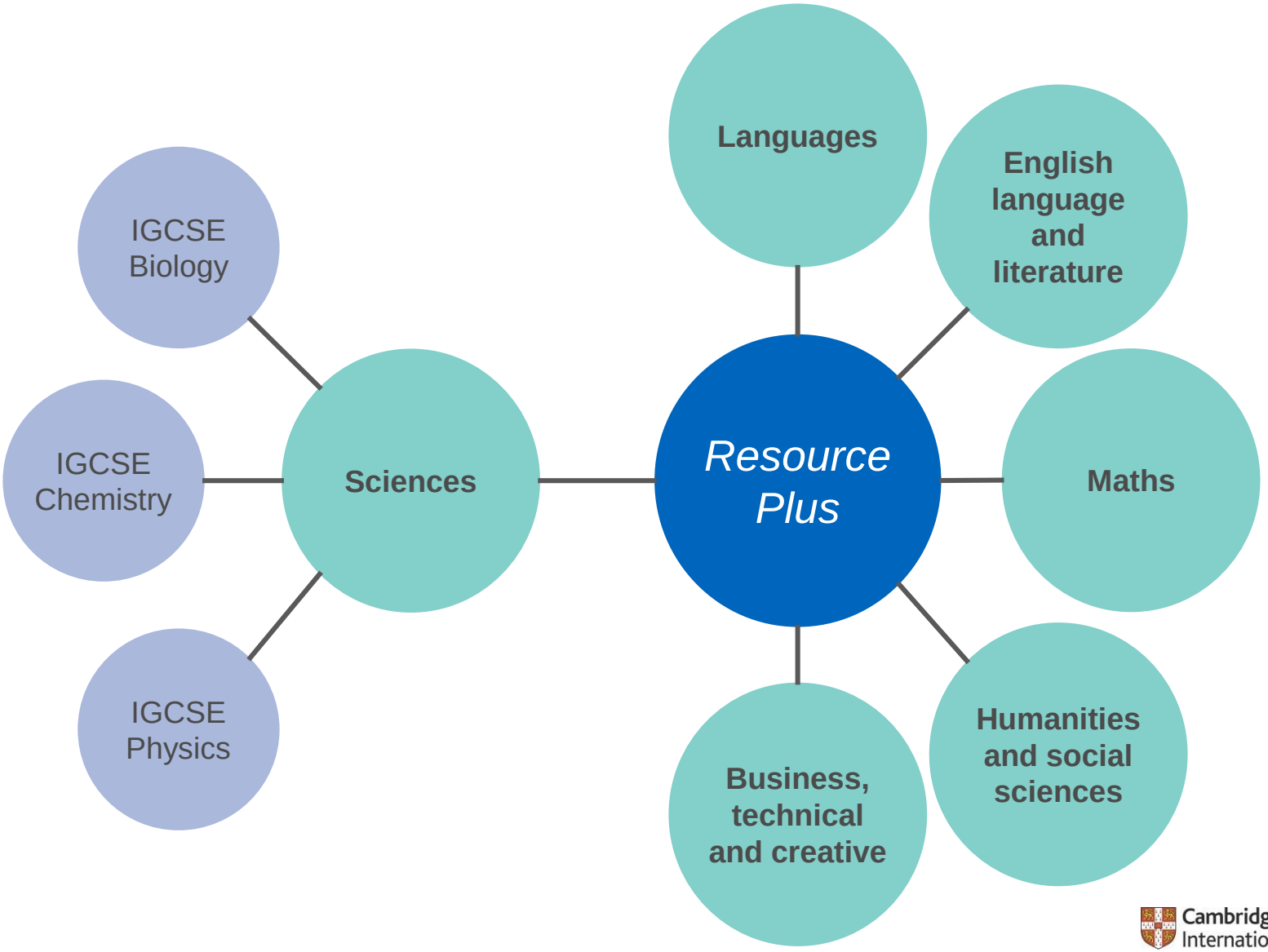
20th and 21st September 2017

What is Resource Plus?



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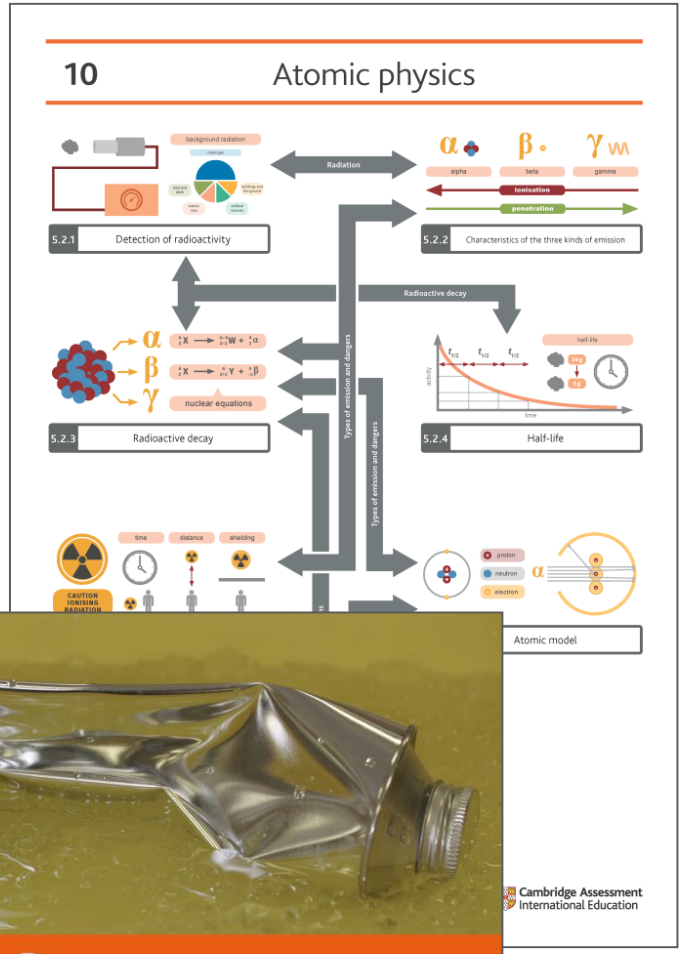
What's included for the IGCSE Sciences?

- Skills Packs and experiment videos
- Infographics
- Interactive Example Candidate Responses (iECRs)
- Past paper questions by topic
- Schemes of Work by topic
- Safety animation
- Safety poster
- Periodic table poster
- Skills for science booklets



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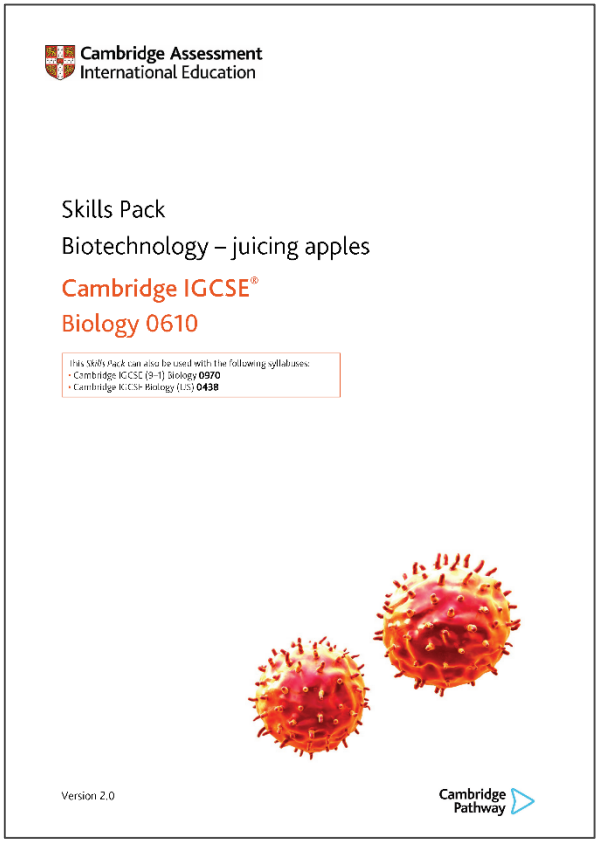
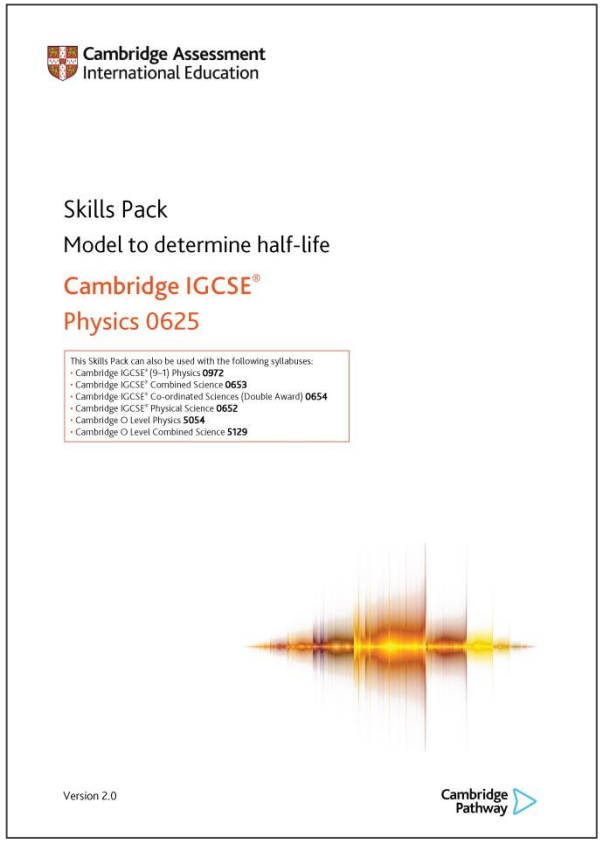
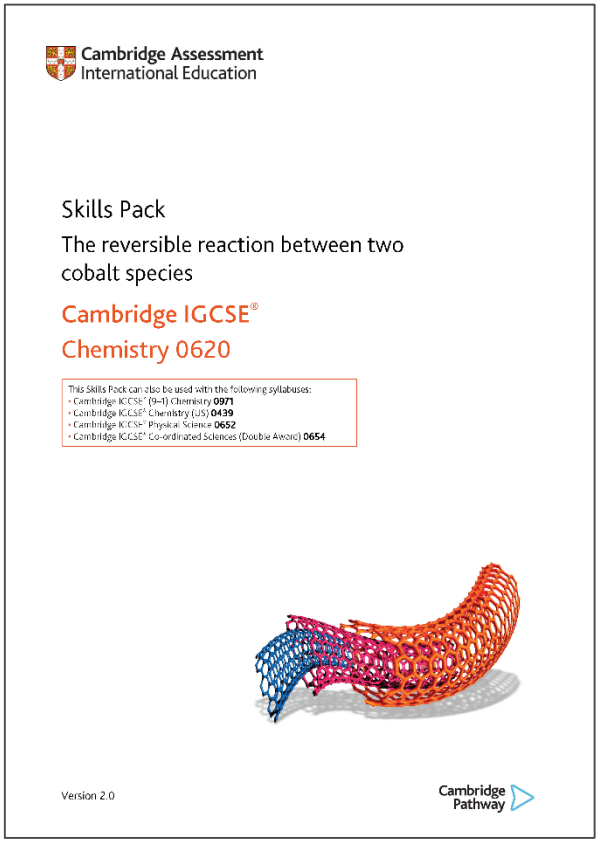
Skills Packs







Skills Packs

- The *Skills Packs* are built around the **experimental skills** listed in AO3.
  - safely use techniques, apparatus and materials
  - plan experiments and investigations
  - make and record observations, measurements and estimates
  - interpret and evaluate experimental observations and data
  - evaluate methods and suggest possible improvements.
- Each pack has a **specific focus** on two or three of these.
- All of the lessons and activities have been designed to help learners **develop** their **skills** in these areas.

Skills Packs

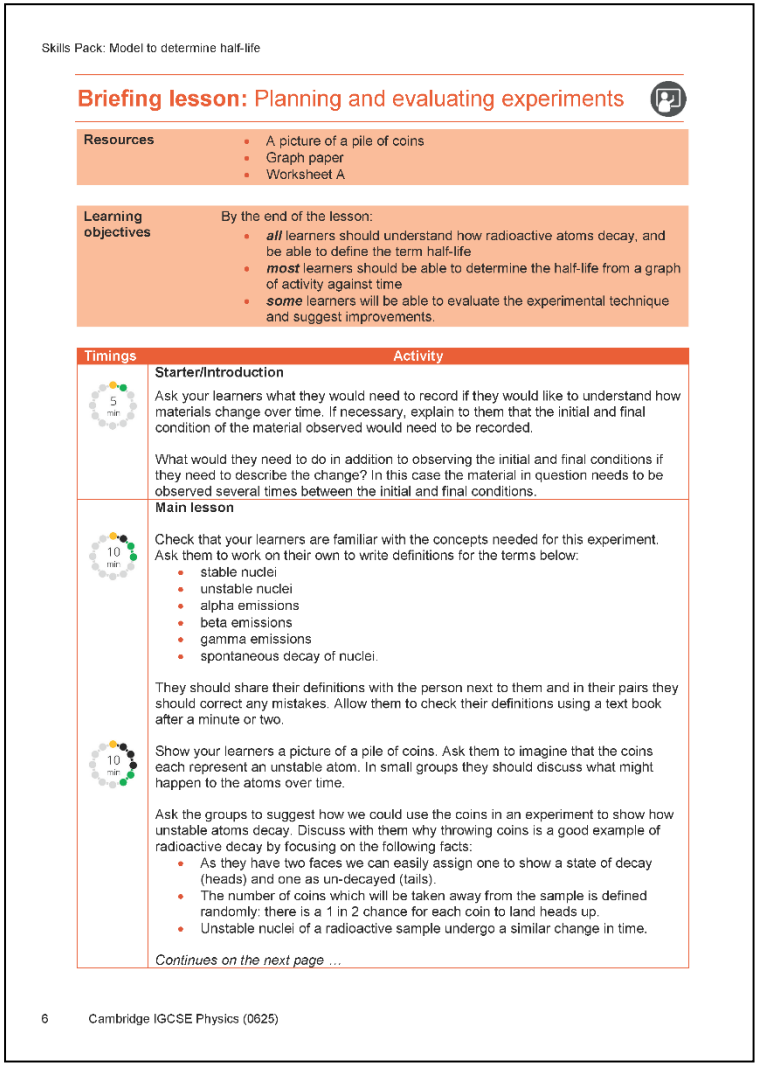
- To help our teachers to develop learners' experimental skills, the packs have three main sections:
  - Briefing lesson
  - Lab lessons:

    Option 1 – run the experiment

    Option 2 – virtual experiment
  - Debriefing lesson
- Each section has a lesson plan and worksheets.

Briefing lesson

- Each briefing lesson introduces the practical skill(s) from AO3 that learners will be developing during the experiment.



Skills Pack: Model to determine half-life

Briefing lesson: Planning and evaluating experiments

Resources	• A picture of a pile of coins • Graph paper • Worksheet A
Learning objectives	By the end of the lesson: • ***all*** learners should understand how radioactive atoms decay, and be able to define the term half-life • ***most*** learners should be able to determine the half-life from a graph of activity against time • ***some*** learners will be able to evaluate the experimental technique and suggest improvements.

Timings	Activity
5 min	**Starter/Introduction** Ask your learners what they would need to record if they would like to understand how materials change over time. If necessary, explain to them that the initial and final condition of the material observed would need to be recorded. What would they need to do in addition to observing the initial and final conditions if they need to describe the change? In this case the material in question needs to be observed several times between the initial and final conditions.
10 min	**Main lesson** Check that your learners are familiar with the concepts needed for this experiment. Ask them to work on their own to write definitions for the terms below: • stable nuclei • unstable nuclei • alpha emissions • beta emissions • gamma emissions • spontaneous decay of nuclei. They should share their definitions with the person next to them and in their pairs they should correct any mistakes. Allow them to check their definitions using a text book after a minute or two.
10 min	Show your learners a picture of a pile of coins. Ask them to imagine that the coins each represent an unstable atom. In small groups they should discuss what might happen to the atoms over time. Ask the groups to suggest how we could use the coins in an experiment to show how unstable atoms decay. Discuss with them why throwing coins is a good example of radioactive decay by focusing on the following facts: • As they have two faces we can easily assign one to show a state of decay (heads) and one as un-decayed (tails). • The number of coins which will be taken away from the sample is defined randomly: there is a 1 in 2 chance for each coin to land heads up. • Unstable nuclei of a radioactive sample undergo a similar change in time. *Continues on the next page …*

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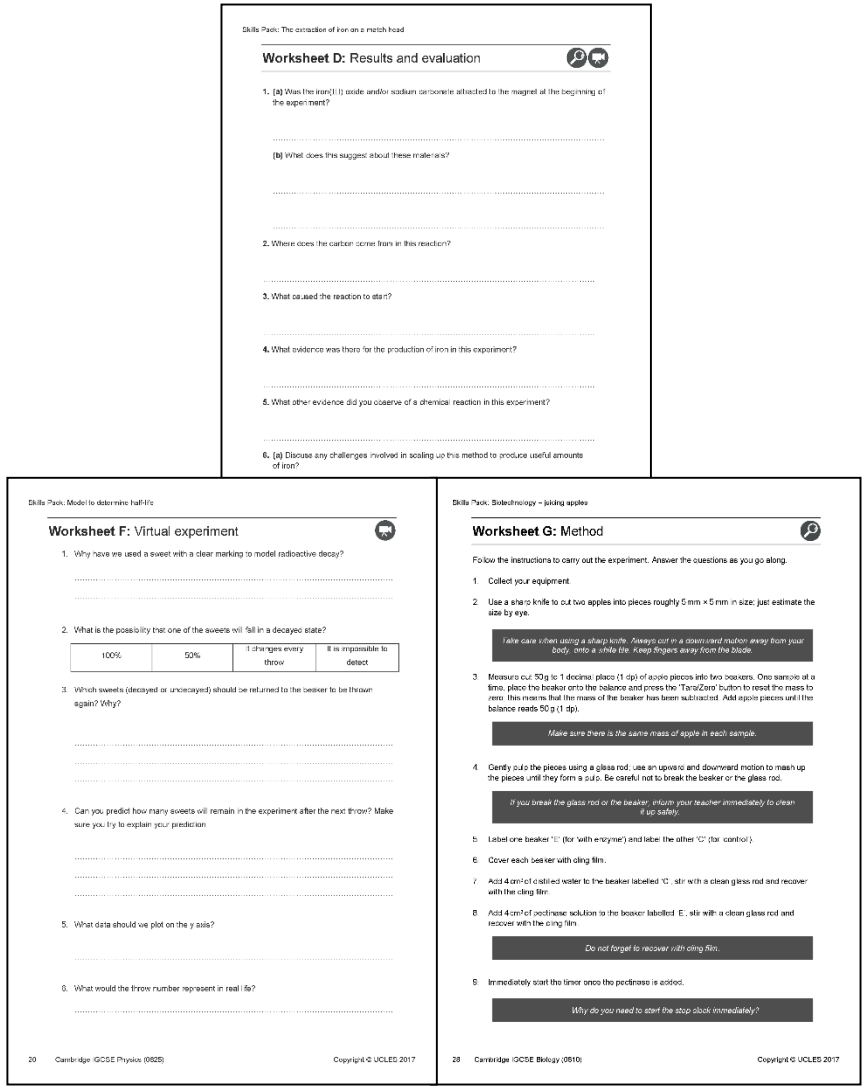
Lab lessons

- There are two options for running the lab lessons:
  - Option 1 – run the experiment
  - Option 2 – virtual experiment
- Each experiment is supported with a *Teacher walkthrough* video, a *Virtual experiment* video and a range of worksheets.



Skills Pack: The extraction of iron on a match head

Worksheet D: Results and evaluation

1. (a) Was the iron(II,III) oxide and/or sodium carbonate attracted to the magnet at the beginning of the experiment?

(b) What does this suggest about these materials?

2. Where does the carbon come from in this reaction?

3. What caused the reaction to start?

4. What evidence was there for the production of iron in this experiment?

5. What other evidence did you observe of a chemical reaction in this experiment?

6. (a) Discuss any challenges involved in scaling up this method to produce useful amounts of iron?

Skills Pack: Model to determine half-life

Worksheet F: Virtual experiment

1. Why have we used a sweet with a clear marking to model radioactive decay?

2. What is the possibility that one of the sweets will fall in a decayed state?

100%	50%	1 changes every throw	It is impossible to detect

3. Which sweets (decayed or undecayed) should be returned to the beaker to be thrown again? Why?

4. Can you predict how many sweets will remain in the experiment after the next throw? Make sure you try to explain your prediction

5. What data should we plot on the y axis?

6. What would the throw number represent in real life?

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Skills Pack: Biotechnology – juicing apples

Worksheet G: Method

Follow the instructions to carry out the experiment. Answer the questions as you go along.

1. Collect your equipment.
2. Use a sharp knife to cut two apples into pieces roughly 5 mm × 5 mm in size; just estimate the size by eye.

Take care when using a sharp knife. Always cut in a down and motion away from your body, onto a white tile. Keep fingers away from the blade.

3. Measure out 50 g to 1 decimal place (1 dp) of apple pieces into two beakers. One sample at a time, place the beaker onto the balance and press the 'Tare/Zero' button to reset the mass to zero; this means that the mass of the beaker has been subtracted. Add apple pieces until the balance reads 50 g (1 dp).

Make sure there is the same mass of apple in each sample.

4. Gently pulp the pieces using a glass rod; use an upward and downward motion to mash up the pieces until they form a pulp. Be careful not to break the beaker or the glass rod.

If you break the glass rod or the beaker, inform your teacher immediately to clean it up safely.

5. Label one beaker 'E' (for 'with enzyme') and label the other 'C' (for 'control').
6. Cover each beaker with cling film.
7. Add 4 cm³ of distilled water to the beaker labelled 'C', stir with a clean glass rod and recover with the cling film.
8. Add 4 cm³ of pectinase solution to the beaker labelled 'E', stir with a clean glass rod and recover with the cling film.

Do not forget to recover with cling film.

9. Immediately start the timer once the pectinase is added.

Why do you need to start the stop clock immediately?

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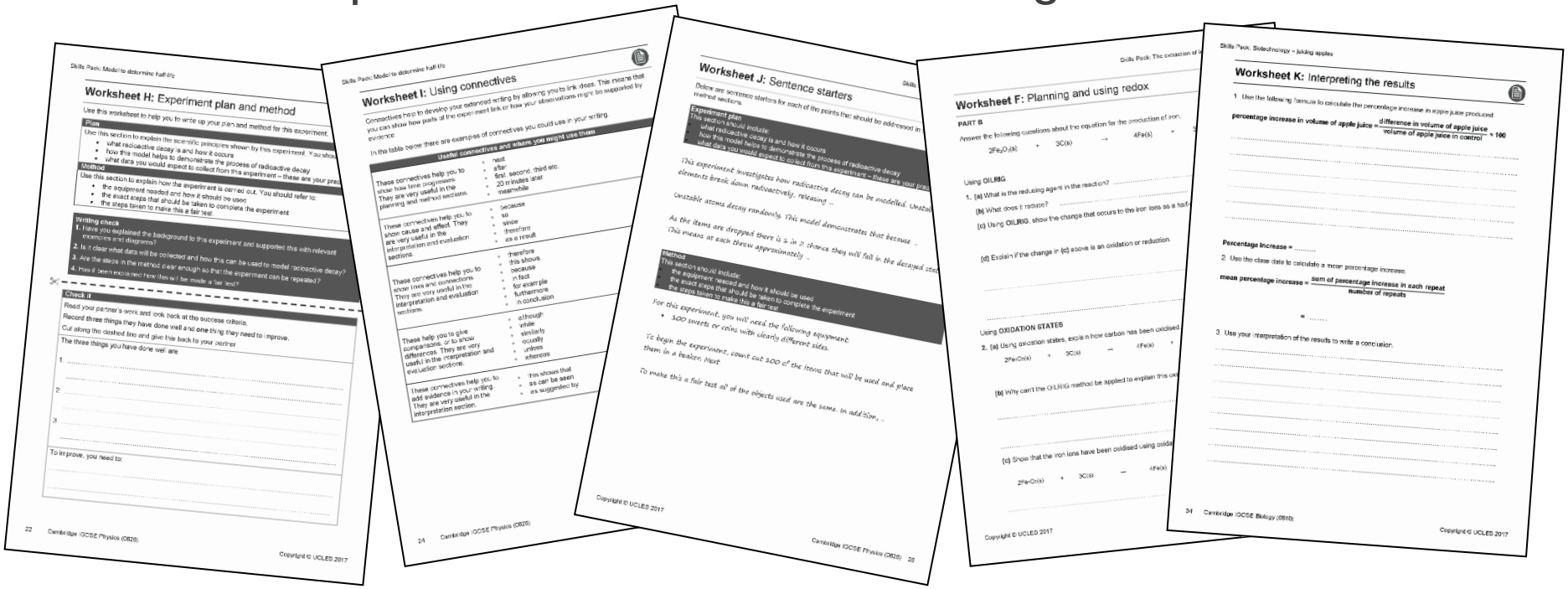
Debriefing lesson

- These lessons are designed to allow learners to consolidate their knowledge and understanding.
- Where appropriate they also provide opportunities for learners to practise their extended writing skills.



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The videos

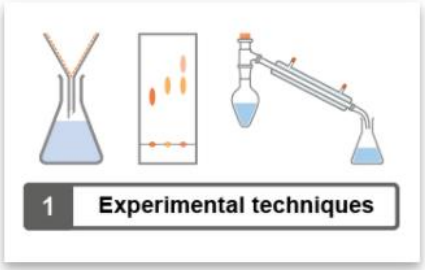
- Each Skills Pack is accompanied by three videos:
  - A master video
  - A teacher walkthrough video
  - A virtual experiment video

The videos on Resource Plus

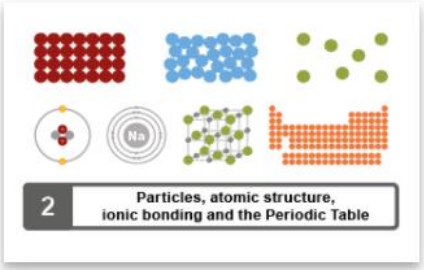
Cambridge IGCSE® Chemistry (0620) Resource Plus

Planning | Skills Packs | Further support

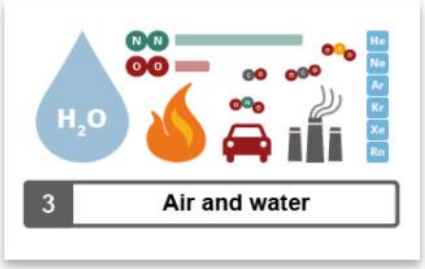
Your feedback



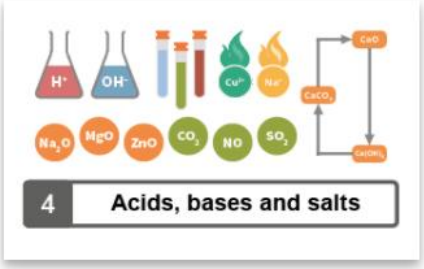
1 Experimental techniques



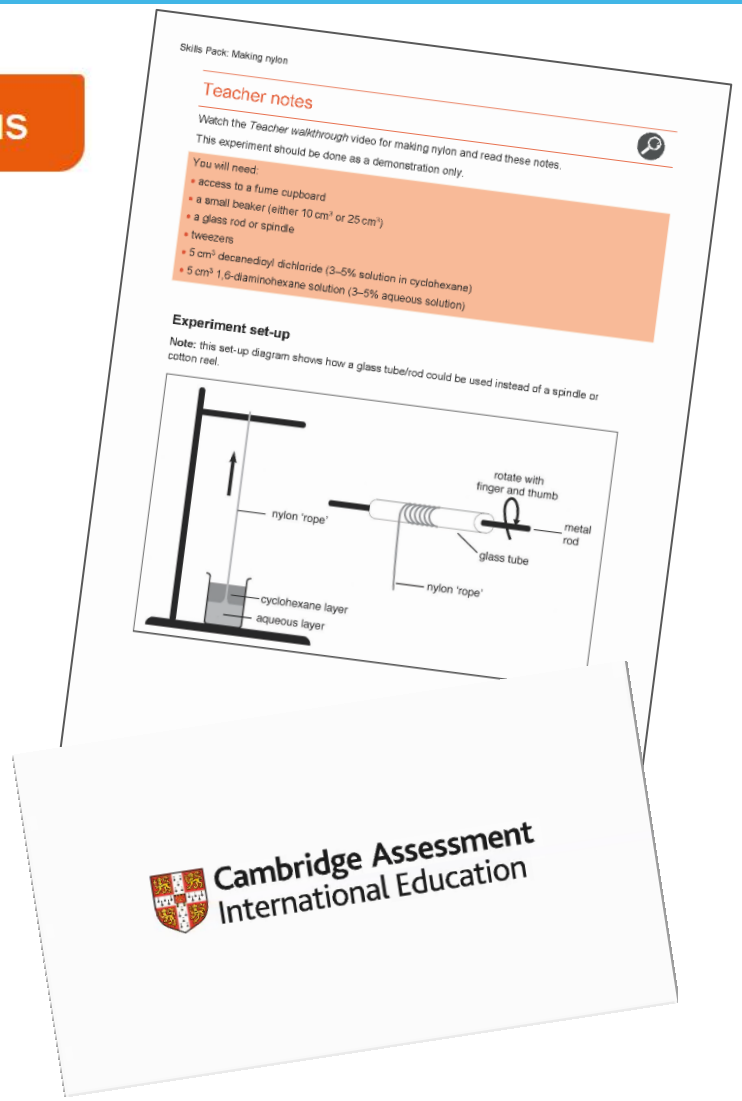
2 Particles, atomic structure, ionic bonding and the Periodic Table



3 Air and water



4 Acids, bases and salts



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The experiment

Now it’s your turn

- Turn to page 16 in the Skills Pack
- Follow the method
- Record your results on the paper provided (not in the Skills Pack)

Skills in other subjects

- Developing Resource Plus has allowed us to think about skills that are both explicit and implicit in the sciences.
- We are now thinking about how we would support skill development in other subjects.
- We are starting with the A Level Sciences, IGCSE English Literature and IGCSE Mathematics.

What about your subject?

- Now it is your turn to think of an activity for your own subject.
- First of all think about the skills learners in your subject need to develop.
- Then consider an activity or group of activities that will help them to develop these skills.

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Thank you for taking part in this session

Please stay if you want to ask any more questions