Differentiating existing learning sequences for English as an Additional Language students

Science, Design and Technologies, and Mathematics, Levels 7 and 8, for EAL learners at Level C2

Existing learning sequences linked to particular learning areas in the Victorian Curriculum F–10 can be adapted to support differentiated teaching for English as an Additional Language (EAL) students. Teachers can adapt, remove or add to elements of their learning sequences in order to cater for all students in their classrooms.

1. Identify an existing learning sequence

**Existing learning sequence:** STEM – Film canister rockets

**Curriculum area and levels:** Science, Levels 7 and 8; Design and Technologies, Levels 7 and 8; Mathematics, Level 8

2. Identify the level of language learning of your students

The EAL curriculum is a continuum structured as three EAL pathways (A, B, C). Each pathway describes a different stage of English-language learning (early, mid and late), and each pathway is divided into different levels of language learning (A1, A2, BL, B1, B2, B3, CL, C1, C2, C3, C4).

While the implementation of the EAL curriculum is the responsibility of all teachers, the EAL specialist plays a leading role in its delivery, as the expert in the field. Your EAL specialist will determine the most appropriate pathway for each EAL learner in your classroom and advise you of their current level of learning.

**The differentiation suggestions provided in this document are for students working at Level C2 of the EAL curriculum.**

EAL learners at Level C2 will typically be able to:

* listen and participate in class discussions, using formulaic expressions
* clarify key ideas and vocabulary with a home language peer
* produce simple written descriptions and reflections, with support and using modelled structures
* translate words from provided lists or take notes in their home language and/or English.

3. Adapt the learning sequence to differentiate for EAL students

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| Existing learning sequence | Differentiated teaching for EAL learners at Level C2  |
| **Overview** | Overview |
| **Learning intentions:** * Students will understand that the reaction of acids and carbonates is an example of a chemical change and that this reaction can be used to power a rocket
 | **Learning intentions:** * Students will learn specific technical vocabulary: reaction, acids, carbonates, to power, chemical change, launch, rocket, film canister
* Students will learn how to use the new vocabulary in context
* Students will apply the new vocabulary in an experiment
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| **Success criteria:*** Students will identify signs of a chemical change in a reaction
* Students will use a chemical reaction to launch a film canister rocket
 | **Success criteria:*** Students will identify signs of a chemical change in a reaction
* Students will use a chemical reaction to launch a film canister rocket
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| **Relevant content descriptions in Science, Levels 7 and 8:**Chemical change involves substances reacting to form new substances [(VCSSU098)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSSU098)Collaboratively and individually plan and conduct a range of investigation types, including fieldwork and experiments, ensuring safety and ethical guidelines are followed [(VCSIS108)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS108)In fair tests, measure and control variables, and select equipment to collect data with accuracy appropriate to the task [(VCSIS109)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS109)Reflect on the method used to investigate a question or solve a problem, including evaluating the quality of the data collected, and identify improvements to the method [(VCSIS112)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS112)Communicate ideas, findings and solutions to problems including identifying impacts and limitations of conclusions and using appropriate scientific language and representations [(VCSIS113)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCSIS113)**Relevant content descriptions in Design and Technologies, Levels 7 and 8:**Generate, develop and test design ideas, plans and processes using appropriate technical terms and technologies including graphical representation techniques [(VCDSCD050)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD050)Effectively and safely use a broad range of materials, components, tools, equipment and techniques to produce designed solutions [(VCDSCD051)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCDSCD051)**Relevant content descriptions in Mathematics, Level 8:**Find perimeters and areas of parallelograms, trapeziums, rhombuses and kites [(VCMMG287)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG287)Establish properties of quadrilaterals using congruent triangles and angle properties, and solve related numerical problems using reasoning [(VCMMG293)](http://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCMMG293) | **Additional EAL Level C2 content descriptions:****Speaking and Listening**Provide information or assistance when requested in classroom interactions [(VCEALC609)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALC609)Negotiate interactions with reliance on an attentive conversation partner [(VCEALC610)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALC610)Interact with peers in routine pair or group work activities [(VCEALC614)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALC614)Express simple opinions and describe feelings [(VCEALC615)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALC615)**Writing**Write information texts for general school use, based on modelled language [(VCEALC654)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALC654)Access new words from bilingual dictionaries or word lists [(VCEALA659)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALA659)Organise the content of a topic at paragraph level, with teacher guidance, to reflect given or new information [(VCEALL662)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALL662)**Cultural and Plurilingual Awareness**Use home language resources to support use of English [(VCEALA620)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALA620)Ask for the translation of specific words from other home language speakers [(VCEALA619)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALA619)Transfer academic and communication skills from home language to English [(VCEALA621)](https://victoriancurriculum.vcaa.vic.edu.au/Curriculum/ContentDescription/VCEALA621) |
| **Relevant achievement standard:** **Science**By the end of Level 8, students … use the particle model to predict, compare and explain the physical and chemical properties and behaviours of substances … They provide evidence for observed chemical changes in terms of … heat change, gas production …They plan experiments, identifying variables to be changed, measured and controlled. They consider accuracy and ethics when planning investigations, including designing field or experimental methods. Students summarise data from different sources and construct representations of their data to reveal and analyse patterns and relationships, and use these when justifying their conclusions. They explain how modifications to methods could improve the quality of their data and apply their scientific knowledge and investigation findings to evaluate claims made by others. They use appropriate scientific language, representations and simple word equations to communicate science ideas, methods and findings.**Design and Technologies**By the end of Level 8 … Students create designed solutions for each of the prescribed technologies contexts based on an evaluation of needs or opportunities. They develop criteria for success, including sustainability considerations, and use these to judge the suitability of their ideas and designed solutions and processes. They create and adapt design ideas, make considered decisions and communicate to different audiences using appropriate technical terms and a range of technologies and graphical representation techniques. Students apply project management skills to document and use project plans to manage production processes. They independently and safely produce effective designed solutions for the intended purpose. **Mathematics**Students … find the perimeter and area of parallelograms, rhombuses and kites … Students identify conditions for the congruence of triangles and deduce the properties of quadrilaterals. They use tools, including digital technology, to construct congruent shapes.  | **Relevant achievement standard:****Speaking and Listening**At Level C2 students use simple but effective strategies [to] … communicate effectively in a range of familiar social and some basic academic contexts … With support … they extract some specific information from texts and understand teacher explanations involving familiar specific curriculum area vocabulary … They use some standard expressions to express views and attitudes. **Reading and Viewing**At Level C2 students read and comprehend a range of short, familiar fictional and factual texts and, when well supported, some unfamiliar texts … **Writing**At Level C2 students write with a degree of autonomy for a range of everyday classroom and personal purposes … They independently write some basic texts [and] show varying grammatical accuracy … They choose appropriate text structures and use headings, tables and images. They use basic text models as a basis for their own texts … |

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| Existing learning sequence | Differentiated teaching for EAL learners at Level C2 |
| Teaching and learning activities | Teaching and learning activitiesDifferentiated teaching is required to support EAL learners with the following learning activities.Students working at Level C2 will be confident communicating on familiar topics but not in subjects new to them. EAL students may say they understand so as to appear knowledgeable in front of the class. See [Appendix 1 – Vocabulary reference table](#App1) for a helpful vocabulary table that you can refer to and add to throughout the learning activities. You may need to pre-teach some of this vocabulary to students. |
| **Materials:**Students will require the following equipment and resources for this session: * 10 millilitres white vinegar per rocket
* 1.5 grams sodium bicarbonate (bicarbonate of soda) per rocket
* one 10 × 10 centimetre square of paper towel per rocket
* photo of two empty camera film canisters, one with its lid offup to six identical film canisters per student. Teachers should test these in the manner described in [Appendix 2](#App2).
* [Appendix 2 – Launch procedure](#App2)
* mass balances capable of measuring to an accuracy of 0.1 gram
* 10 millilitre measuring cylinders (preferably plastic)

**Tip:** You may be able to source film canisters from a local photography store, or you can buy empty film canisters via online shopping websites. | **Materials:**Provide a list of the materials with images to support an understanding of new vocabulary.

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| paper towel | sodium bicarbonate | photo of two empty camera film canisters, one with its lid offfilm canister |
| millilitres | vinegar | grams |
| lid | centimetre | mass balance |
| rocket | flat surface | sheets |

Then ask EAL students to classify the materials individually, or with a peer, to consolidate key knowledge:

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| **Objects** | **Solids and liquids** | **Measurements** |
|  |  |  centimetre |
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| **Activity: Film canister rockets****Introduction:** Introduce the concept of chemical change. Describe the reaction of acids (in the form of vinegar) and carbonates (in the form of bicarbonate of soda), and how this can be used to power a film canister rocket. This can be done in a number of ways, including by drawing the reactants and products on the whiteboard. Emphasise to students that we can identify this as a chemical change because a new substance (carbon dioxide) is formed.**Demonstrating how to launch a rocket:**Using [Appendix 2](#App2), demonstrate to students how to launch their rockets, using set amounts of sodium bicarbonate and vinegar (1.5 grams and 10 millilitres are reliable amounts for an effective launch) to create the fuel mixture that produces a gas; that is, a chemical reaction. Help students practise using a balance to weigh out the prescribed amount of bicarbonate of soda and a measuring cylinder to measure the vinegar. Explicit teaching of how to read the volume using the bottom (glass measuring cylinders) or the top (plastic) of the curve of the meniscus will help students achieve more accurate measurement.Students can conduct multiple tests with these quantities of reagents to become familiar with the general launch procedure for the rockets. Guide students through reflection on what they noticed throughout the launching process and discuss any questions they have regarding an improved rocket design. | **Activity: Film canister rockets****Introduction:** Using images of rocket launchers and fireworks, ask students to share whether they have launched rockets or fireworks before and why they were successful or not. Discuss traditions involving fireworks or rockets that students may have experienced. This can also be explained with a home language peer, if available, to easily activate prior knowledge about the topic.Ensure students draw the concept of chemical change shown on the board in their exercise books and label each part using the key vocabulary from the word list above.**Demonstrating how to launch a rocket:**Before demonstrating how to measure substances and launch the rocket, provide EAL students with a flow chart that has visuals representing each step of the process. They can then label each step or mix and match using the list of key phrases below:1. Measure the vinegar and sodium bicarbonate.
2. Put 1.5 grams of sodium bicarbonate in the centre of the paper towel and fold each side together.
3. Place the wrapped package into the film canister.
4. Pour 10 millilitres of vinegar into the canister.
5. Quickly replace the lid.
6. Give the film canister a one quick shake, then place it on a flat surface, lid-side down.
7. Move away from the film canister and wait (up to two minutes) for it to launch.

**Modelling how to measure:**Before explaining how to read measurements, provide an image of the meniscus on the board. Ask EAL students to add the teacher representation and label it next to the ‘Pour 10 millilitres of vinegar …’ step in the flow chart.**Tip:** Following the presentation and modelling of measurement, a cloze exercise task (see [Appendix 2](#App2)) can be offered to reinforce EAL students' understanding of the key terminology and processes. **Testing in pairs:**When conducting the tests in pairs, EAL students could work with a home language peer, if available, to identify and explain what strategies do or do not work, using their home language.If not, provide a brief table to help students structure their ideas in English. For example:

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| --- | --- | --- |
| Step | Works/Does not work | Why? |
|  |  |  |
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**Class reflection:**As EAL students are often shy when talking in front of the class, follow these steps to support class discussion regarding the test results:1. Refer back to the list of materials and images in the Materials section.
2. Project or write sentence starters for reflecting on the board (see below).
3. Model a reflection using one of the sentence starters together with relevant key vocabulary.
4. Then allow EAL students to write down their findings.
5. Following this, allow them to share their reflections in small groups.
6. Then discuss with the whole class.
* The rocket launched more easily when we …
* One problem we had was when …
* We both think that the easiest way to make the rocket launch higher is to …

To develop their language skills, students could also use comparison to help them discuss observations or strategies. For example:* The rocket flew higher the first time than the second time because …

**Tip:** Further language to support language development and class discussions for this unit of work can be viewed in the third column of [Appendix 1 – Vocabulary Reference Table](#App1). |

Additional resources

You can access the EAL curriculum on the [Victorian Curriculum F–10 website](https://victoriancurriculum.vcaa.vic.edu.au/english/english-as-an-additional-language-eal/introduction/rationale-and-aims).

You can access a range of resources to assist with implementing the EAL curriculum on the [VCAA English as an Additional Language webpage](https://www.vcaa.vic.edu.au/curriculum/foundation-10/resources/english-as-an-additional-language/Pages/default.aspx), including profiles of EAL learners, sample progressions through the EAL pathways, a language and learning interview, FAQs, professional learning opportunities and links to external resources.

Appendices

Appendix 1 – Vocabulary reference table

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| --- | --- | --- |
| **Content-specific vocabulary** | **Linguistic-specific vocabulary (verbs of instruction)** | **Language for clarification or communication** |
| reaction/reactants acidscarbonates/bicarbonateproductscylindermeniscusreagentsfuelchemical changegasrocketfilm canistersubstancesdatamethodfindingsvariablesgraphsperimetersaccuracymass balancevariables | **Verbs > Nouns**to power > the power ofto impact > the impactto launch > the launching ofto measure > a measurementto reflect > a reflectionto limit > a/the limitationto produce > the productionto find > the findingsto react > a/the reactionto vary > one/some/the variables | **Observing changes** Did you notice/I noticed that when I …I was surprised when …**Evaluating findings or methods**Don’t you think that the rocket launched more easily when we …?One problem we had was when …**Explaining solutions to problems** Next time I/we will … because …I/we think it would be a good idea to …**Asking questions/ making suggestions on how to improve the design**Is it possible to …?What if I/we … (made, changed, added, removed)?I/We should … (make, change, add, remove)**Identifying impacts and limitations of conclusions**The first time I … I thought that it would…But after I … I realised my first idea was wrong because... |

**Tip:** Not all of the vocabulary and expressions in this table will necessarily be used in each class. However, as can be seen, there is a lot of complex vocabulary that may be used by the teacher and other students at different stages in the unit of work. It is therefore recommended that EAL students are able to experience a range of activities that build and recycle all relevant vocabulary over time to consolidate understanding of the new key terms and concepts. For further ideas for the development of vocabulary, grammar and expression see the [Level C2 Linguistic Structures and Features](https://victoriancurriculum.vcaa.vic.edu.au/english/english-as-an-additional-language-eal/pathway-c-late-immersion/curriculum/f-10) content descriptions in the Speaking and Listening, Reading and Viewing, or Writing strands.

Appendix 2 – Launch procedure

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| **Launch procedure:** | **Launch procedure (EAL):** |
| The following procedure is a general guide for launching film canister rockets. They will rarely fly further than 15 metres.1. Take a 10 centimetre × 10 centimetre piece of paper towel.
2. Place 1.5 grams of sodium bicarbonate in the centre of the paper towel and fold each side over the powder, wrapping it entirely.
3. Place the wrapped package into the film canister.
4. Pour in 10 millilitres of vinegar.
5. Quickly replace the lid, give the film canister a single, quick shake, then place it on a flat surface, lid-side down.
6. Move away from the film canister and wait for it to launch. This can be instantaneous, or it may take up to two minutes.
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| --- | --- | --- |
| paper towel | sodium bicarbonate | film canister |
| millilitres | vinegar | grams |
| lid | centimetre | mass balance |
| rocket | flat surface | launch |

Fill in the gaps using the vocabulary in the table:1. Take a 10 \_\_\_\_\_\_\_ × 10 centimetre piece of \_\_\_\_\_\_\_\_.
2. Measure 1.5 \_\_\_\_\_\_ of sodium bicarbonate on the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
3. Place the 1.5 grams of \_\_\_\_\_\_\_\_\_\_\_\_\_ in the centre of the paper towel and fold each side over, wrapping it completely.
4. Place the wrapped paper towel into the \_\_\_\_\_\_\_\_\_.
5. Pour in 10 \_\_\_\_\_\_\_\_\_ of \_\_\_\_\_\_\_.
6. Quickly replace the \_\_\_\_\_\_\_, then quickly shake the film canister once. Then place it on a \_\_\_\_\_\_\_\_, lid-side down.
7. Move away from the film canister and wait for it to \_\_\_\_\_\_\_\_. This can happen straight away, or the \_\_\_\_\_\_\_ may not launch for up to two minutes.

**Tip:** To put ‘lid-side down’ means to put the object with the lid on the bottom, touching the table. |