

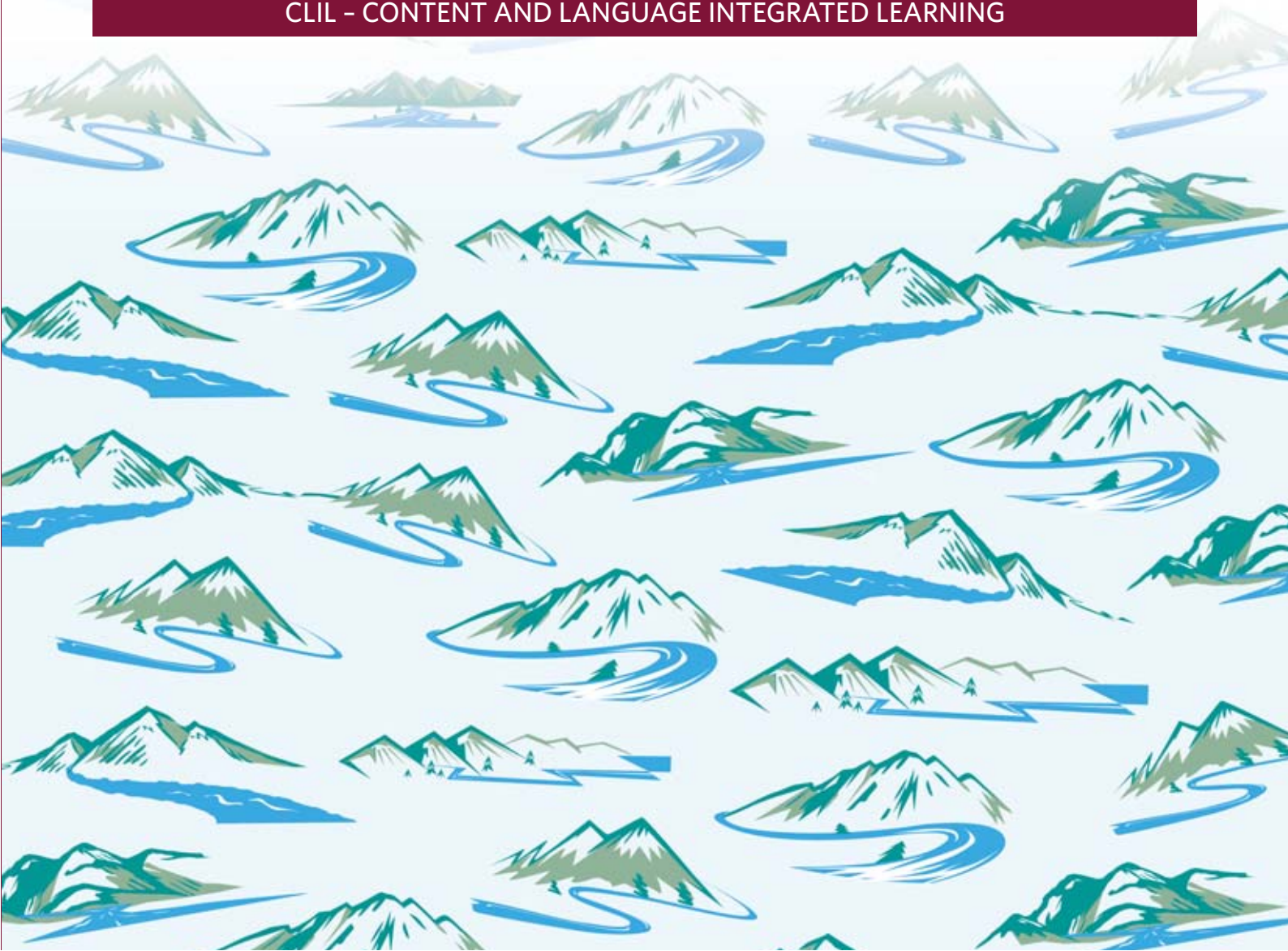


UNIVERSITY of CAMBRIDGE  
ESOL Examinations

# Cambridge English

## Teaching Geography through English – *a CLIL approach*

CLIL - CONTENT AND LANGUAGE INTEGRATED LEARNING







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# What is CLIL?

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CLIL is an acronym for Content and Language Integrated Learning. It is an approach to teaching the content of curricular subjects through the medium of a non-native language. In a CLIL course, learners gain knowledge and understanding of the curricular subject while simultaneously learning and using the target language.

## Content first

It is important to notice that ‘content’ is the first word in CLIL. This is because curricular content leads language learning. Learning about geography involves developing knowledge and understanding of: where learners live; other people and places; how people and places interrelate; the significance of location; human and physical environments; causes and consequences of change; explaining geographical patterns and processes.

In addition, learners are expected to be able to ask geographical questions. For example:

.....  
**QUESTION:** How and why is this coastal landscape changing?

**ANSWER:** It’s changing because of the hydraulic action of the waves. They crash against the base of the cliffs and undercut them. The overhanging cliff therefore collapses.  
.....

Geography teachers in CLIL programmes therefore have to know the specific academic language that learners need in order to question and explain, to analyse and evaluate evidence, to make conclusions and justify them. Teachers have to present the language of geography and help learners notice key grammatical patterns as well as key content vocabulary. By doing this, learners can effectively communicate their knowledge of geographical concepts.

## The 4Cs of CLIL

It is helpful to think of Coyle's 4Cs of CLIL for planning lessons (Coyle, 1999).

- ① **Content:** What is the geography topic? e.g. rivers, ecosystems, population.
- ② **Communication:** What geography language will learners communicate during the lesson? e.g. the language of cause and effect to talk about flooding and landslides.
- ③ **Cognition:** Which thinking skills are demanded of learners in geography lessons? e.g. identifying locations, comparing maps, giving reasons for changes in the environment.
- ④ **Culture** (sometimes the 4th C is referred to as **Community** or **Citizenship**):  
Is there a cultural focus in the lesson? e.g. Can learners from different language backgrounds compare and contrast physical features of their home countries with the physical landscape of their new country? What is similar, what is different and why? In multilingual contexts, it is important to encourage learners to share descriptions of the physical and human features of their home environments and to help learners understand the reasons for any differences.

## Content-obligatory or content-compatible language?

Learners need to produce the academic register of geography and they need to know both content-obligatory and content-compatible language. 'For every academic topic, certain language is essential for understanding and talking about the material.' (Snow, Met & Genesee, 1992)

### Content-obligatory language

Every subject has its own content-obligatory language associated with specific content. This is the subject-specific vocabulary, grammatical structures and functional expressions learners need to:

- learn about a curricular subject
- communicate subject knowledge
- take part in interactive classroom tasks.

### Content-compatible language

This is the non-subject specific language which learners may have learned in their English classes and which they can then use in CLIL classes to communicate more fully about the curricular subject.

For example, geography teachers could identify the following language for learning about rivers:

Content-obligatory language	Content-compatible language
source ↔ mouth delta estuary meander tributary ( <i>explaining processes</i> ) It is the process of dropping sediment.	small ↔ large rain water the start of a river the sides of a river ( <i>defining</i> ) It's the place where...

Teachers do not need to use the technical descriptions of these two types of language. Usually content-obligatory language is described as subject-specific or specialist language.



# Considerations when planning a CLIL geography lesson

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## Activating prior knowledge

It is helpful to start a lesson by finding out what learners already know about the geography topic. Learners may know many facts about a topic in their L1 (first language) but may have difficulty explaining this knowledge in a second or third language. When brainstorming ideas about a new topic, expect learners to use some L1 and then translate.

## Input and output

Teachers need to plan the input, i.e. the information that is being presented in the CLIL class. Will it be delivered orally, in writing, on paper, electronically? Is it for whole class work, group or pair work? Will it include practical demonstrations? Teachers also need to plan for learner output. How are learners going to produce and communicate the content and language of the lesson? Will it be communicated orally, in writing or by using practical skills? What will success for the learners look like?

## Wait time

Wait time refers to the time teachers wait between asking questions and learners answering them. When subjects are taught in a non-native language, a longer wait time than usual is needed so that learners can process new subject concepts in a new language. This is especially important at the start of new CLIL courses so that all learners are encouraged to take part in classroom interaction.

## Collaborative tasks

Include tasks that involve learners in producing key subject-specific vocabulary and structures in meaningful pair or group work activities. Tasks may be at word level, e.g. a pair work information-gap or labelling a river activity, or at sentence level, e.g. pairs asking and answering questions about different local rivers, groups giving short presentations on different rivers. They can do this either digitally or face-to-face. Activities should support processing of new geography content and language.

## Cognitive challenge

Learners usually need considerable support to develop their thinking skills in a non-native language. They need to communicate not only the everyday functional language practised in many English classes, but they also need to communicate the cognitive, academic language of school subjects. In CLIL, learners meet cognitively challenging materials from the beginning of their courses.

Providing scaffolding, i.e. content and language support strategies which are appropriate but temporary, is therefore very important. For example, writing a substitution table on the board to support skills of explaining cause and effect:

The cause of	the erosion	is that river water wears away	the rocks.
Erosion is	caused by the water wearing away	the rocks.	the sides of the valley.

Providing effective scaffolding is a challenge to all CLIL teachers because learners vary in the amount of support they need and in the length of time the support is needed. Learners might need more support and for longer in one subject than in another.

## Developing thinking skills

Teachers need to ask questions which encourage lower order thinking skills (LOTS), e.g. the what, when, where and which questions. However, they also need to ask questions which demand higher order thinking skills (HOTS). These involve the why and how questions and therefore require the use of more complex language. In CLIL contexts, learners often have to answer higher order thinking questions at an early stage of learning curricular content.



# What kind of challenges are there in CLIL?

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## Challenges for teachers

**Subject teachers** need to feel confident about their English language level, especially if they have not used English for some time. For example in geography, subject teachers need to:

- be able to present and explain concepts in their subject area clearly and accurately
- check pronunciation of subject-specific vocabulary which may look similar to other words in English but have different pronunciation
- be able to use appropriate classroom language to present new concepts, to question, paraphrase, clarify, encourage and manage their classes in English.

**Language teachers** may decide to teach subjects in CLIL or may be asked to. They need to feel confident about their knowledge and skills related to the subject they are going to teach. For example in geography, language teachers need to:

- know how to present and explain environmental change such as soil erosion or deforestation in ways that will deepen learners' understanding
- be prepared to answer learners' questions about geography concepts which may be unfamiliar to them, for example, 'What is abrasion?'
- widen their knowledge of geography vocabulary and its pronunciation.

## Challenges for learners

Most learners need considerable support in the first two years of CLIL courses. Most teachers do not know how long learners will take to do tasks, complete worksheets or understand instructions and explanations until they have used materials for the first year. Learners are all different; some need more support in order to understand subject concepts, while some need more support to communicate ideas about subject concepts. Learners may need differentiation of:

- input
- task
- support

The table below gives an example of the way a classroom activity can be differentiated for less able learners who are finding out about rivers in the hills.

Types of differentiation	Examples
outcome	study the course of a well-know river rather than an unfamiliar one
task	compare the course of two rivers rather than three
support	provide sentence starters to help communication: At its source the river is _____ and the water is _____. As it flows down the hills it _____. At the bottom of the V-shaped valley _____.

Differentiation is also necessary for more able learners. Teachers need to plan extension activities to develop learner autonomy and learners’ higher order thinking skills for geography. This is when Information and Communications Technology (ICT) can be very useful for online learning activities such as web quests and independent fact-finding.

## Use of L1

In CLIL, it is recognised that some use of L1 by learners, and sometimes by teachers, is a bilingual strategy that helps learners communicate fluently. Moving between L1 and the target language, either mid-sentence or between sentences, is quite common for learners in CLIL. This is known as code switching. Classroom observations show that use of L1 and the target language happens between learners in the following interactions:

- clarifying teacher’s instructions
- developing ideas for curricular content
- group negotiations
- encouraging peers
- off-task social comments

It is important that teachers avoid using L1 unless they are in a situation when it would benefit or reassure learners. Some schools have a policy where no L1 should be used. Teachers should be able to justify their use of L1.

## Lack of materials

One of the most common concerns of CLIL teachers is that they can’t find appropriate geography materials for their classes. Either they cannot find anything to complement the work done in the L1 curriculum or adapting native speaker materials takes too much time. Increasingly, publishers are producing resources for specific countries. However, as teachers gain more experience of CLIL, they generally start to feel able to adapt native speaker materials from geography websites and from subject-specific course books.

## Assessment

CLIL assessment leads to much discussion. Teachers are unsure whether to assess content, language or both. Different regions, different schools and different teachers assess in a variety of ways. What is important is that there is formative as well as summative assessment in CLIL subjects and that there is consistency in how learners are assessed across subjects in each school. Learners, parents and other colleagues need to know what learners are being assessed on and how they are being assessed.

One effective type of formative assessment is performance assessment. It involves learners in demonstrating their knowledge of content and language. For example, they could:

- explain to others how they collected and recorded data about river channel characteristics
- describe how they selected and used aerial photographs of places from ICT based sources.

Teachers observe and assess learners' performance using specific criteria. Performance assessment can involve individuals, pairs or groups of learners. As CLIL promotes task-based learning, it is appropriate that learners have opportunities to be assessed by showing what they can do individually and collaboratively. Performance assessment can also be used to evaluate development of communicative and cognitive skills as well as attitude towards learning. For example, teachers can look for evidence of learners' ability to state geographical facts using secondary sources (communication), evaluate secondary sources (cognitive skills) and co-operate with group members (attitude).

# How can CLIL teachers overcome the challenges they face?

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What can teachers do?

## What subject teachers can do

- use an online dictionary with an audio function to hear the pronunciation of geography vocabulary e.g. Cambridge School Dictionary with CD-ROM
- use a grammar reference book in order to practise producing questions which involve high order thinking skills such as hypothesising. For example:
  - What might happen if the water level of the river rose/fell?
  - How could the problem of flooding be reduced at this part of the river?
  - Study two maps of the river then decide how the settlers could have used the fertile land on the west side of the river.
- make sure learners know the functional language needed to talk about their subject area e.g. analysing maps, describing the effects of human activity on rivers.

## What language teachers can do

- using online sources or subject-related books in English or the L1, read about geography and the environment and the concepts learners will need to understand
- highlight the subject-specific vocabulary learners need to understand and communicate and present new words in topic-related word banks rather than in alphabetical order, e.g. types of climate: desert, tropical, monsoon, warm temperate, cool temperate, tundra, polar
- practise delivery of geography materials, prepare questions which demand low and high order thinking skills and predict questions learners might ask about the topics presented.

## What both subject and language teachers can do

- if possible, plan curricular topics together so that both benefit from each other's area of expertise.

## How can teachers plan for CLIL?

There are more components in a CLIL lesson plan than in a subject or a language lesson plan. The following nine areas need to be planned:

### • Learning outcomes and objectives

Teachers first need to consider the learning outcomes of each lesson, each unit of work and each course. What will learners know and understand about geography? What will they be able to do at the end of the lesson, unit or course that they couldn't do at the beginning? What skills will they master and what attitudes about collaboration will they develop? Learning outcomes are learner-centred as they focus on what the learners can achieve rather than on what the teacher is teaching.

For example, in geography:

Learners should know ...	Learners should be able to ...	Learners should be aware of ...
that as a result of human processes, changes take place in all landscapes that deforestation and soil erosion are changes which can be managed	give examples of changes in landscapes as a result of human activity explain the causes and effects of deforestation and soil erosion	examples of soil erosion in the local area how to collaborate in a group to collect evidence

### • Subject content

Which content will learners revisit and what content will be new? Learners need to hear subject-specific language more than once, so revisiting a new concept is necessary. For example, abrasion and erosion may be confused because the words are similar, or shore and coastline may be confused because the concepts are similar. To revisit concepts, teachers should present learners with different tasks that demand different language skills but that are aimed at communication of the same concepts. While planning, teachers should also note any anticipated difficulties learners may have with content and language learning.

### • Communication

As CLIL promotes collaborative learning, teachers need to plan pair work or group work activities so that learners can communicate the language of the subject topic. Communicative activities should be integrated during the lesson, rather than left to the end of the class. They can be:

- **short**, e. g. tell learners they have 3 minutes to work with a partner to brainstorm words related to the water cycle
- **longer**, e.g. tell learners they have 10 minutes to work with a different partner to draw the water cycle. Finally, pairs tell their partners how accurate their diagrams are.

### • Thinking and learning skills

The development of both thinking and learning skills needs to be planned. Do learners move from lower order to higher order thinking skills during the lesson? Subject teachers need to plan and sometimes practise types of questions they will ask to develop both types of thinking. The table below provides some examples:

Lower order thinking questions	Purpose	Higher order thinking questions	Purpose
Which habitat is rural and which is urban? How do people make a living in a rural community?	to check understanding of a new concept to review learning	What are the advantages and disadvantages of living in a rural community and why do you think this? How could facilities in rural communities be improved?	to develop skills of evaluating and reasoning to develop skills of hypothesising



CLIL teachers need to plan how to support learners in developing learning skills, such as observing details on maps, taking notes, editing work, summarising, planning how to do problem-solving tasks and evaluating work produced.

- **Tasks**

Teachers need to think about the kind of tasks learners will do during the lesson. It is important to plan a range of tasks which require different challenges, such as less demanding tasks which involve transferring data about population into a table, finding similarities and differences between two places, and finding secondary sources. More demanding tasks include interpreting data about populations from the data in a table, evaluating evidence of changes in landscape and applying subject knowledge to everyday or hypothetical situations, e.g. How could the satellite images of the inner city help urban planners?

- **Language support**

All teachers need to plan to support for:

- ① the language of input
- ② the language of output

Sometimes support for input and output can be the same. It is useful to think of support at word, sentence and text levels. In geography, tasks include all three. The table below shows some examples from the topic of changing coastlines:

Word-level support	Sentence-level support
<p><b>Word bank:</b>                      cliffs                      waves                      weathering                      attrition                      deposition                      erosion                      transportation</p>	<p><b>Substitution table:</b>                      The   coastline   has   become _____.                        cliff face                            rocks   have  </p> <p><b>Sentence starters:</b>                      At the coast the effects of weathering are seen _____.                      Evidence of coastal change is shown _____.</p>

- **Materials and resources**

In all teaching, teachers need to find or create materials and then evaluate them to make sure the content and language are suitable for the stage the learners are at. In CLIL most subject materials need adapting because of the complexity of language used in the instructions, the texts or in the activities themselves. When teachers recommend geography websites for learners to access, web pages need to be checked to ensure the language is comprehensible.

## • Cross-curricular links

CLIL promotes links with other subjects in the curriculum so teachers should plan to include references to learning similar content in other subjects. For example, if learners are studying population growth in geography lessons, it is useful to find out if they have been taught how to find percentages and how to transfer data into pie charts in mathematics. Teachers can then consolidate learning about statistics presented in other subject areas. In the example of river materials that follows, teachers can make a link to scientific processes by reminding learners there are many examples of natural cycles such as the life cycle of a plant or animal.

## • Assessment

In CLIL plans, it is important to link the assessment of learning, i.e. formative assessment, to the attainment of learning outcomes for the lessons. Many European CLIL programmes use 'Can Do' statements as these are clear for both teachers and learners. Assessment criteria are therefore transparent. For example, in a geography topic:

Learning outcomes <i>Most learners should:</i>	Assessment <i>Most learners can:</i>
know: <ul style="list-style-type: none"> <li>▪ there are many different types of ecosystem which can be small or large-scale (biomes)</li> <li>▪ the characteristics of the ten major world biomes</li> <li>▪ that ecosystems change over time</li> </ul> be able to: <ul style="list-style-type: none"> <li>▪ locate the ten different biomes on a world map</li> <li>▪ describe and explain the characteristics of the main biomes</li> <li>▪ describe and explain physical and human processes which lead to changes in the main biomes</li> </ul>	<ul style="list-style-type: none"> <li>▪ define what an ecosystem is</li> <li>▪ state the characteristics of different biomes</li> <li>▪ locate the biomes on a world map and describe their locations</li> <li>▪ describe and explain physical changes to biomes and give examples of those changes</li> <li>▪ describe and explain changes to biomes as a result of human activities</li> </ul>

Teachers should keep ongoing records of continuous, formative assessment done through observation of learning experiences in the classroom. It is not necessary to record information about each learner during each lesson but over a period of several weeks, evidence of learners' progress as they work towards achieving the learning outcomes needs to be recorded.

Here is part of a record for formative assessment in geography. Teachers record the date when they observed learners' achievement of the following:

Assessment criteria				
name	can describe a tectonic process	can give examples of the effects of a tectonic process on landscapes	can give examples of the effects of a tectonic process on people	can explain the global distribution of tectonic activity

## What helps learners learn?

Two different surveys carried out with secondary CLIL learners produced interesting findings (Bentley and Philips, 2007). The first set of questionnaires was completed by 14–15 year-old Spanish learners who were studying science in English. As geography is a subject related to science, the comments are relevant. It was their second year of learning science and fifth year of learning English. Here are a few learner responses to the question 'What helps you learn science in English?'

- *'More vocabulary and more diagrams on the worksheets'*
- *'Give us more explanations'*
- *'Use easy words for the explanations and vocabulary'*
- *'Work with games'*
- *'The complicated words in English with the Spanish words next to the English'*
- *'Put the hard vocabulary in a side of the page in Spanish. Put more pictures'*
- *'Add a list of vocabulary and illustrations'*
- *'Maybe put the most difficult science words with translation.'*

It is clear that the quantity and complexity of new subject vocabulary caused problems. Highlighting key content vocabulary with explanations is helpful (see page 21 Explaining a process).

The second set of questionnaires asked learners to tick a list of factors that help them learn school subjects in English. The learners were aged between 13 and 16 and were from different Spanish schools implementing CLIL programmes.

- translations: 49%
- word lists: 18%
- use of computers: 19%
- teacher explanations: 56%
- diagrams: 19%
- friends: 36%
- pictures: 38%

The results of the survey show, firstly, how important it is that teachers explain their subject content effectively and, secondly, the importance of including interactive tasks so learners can support one another as they learn.

CLIL teachers also report that at the start of courses, learners need a huge amount of scaffolding and encouragement to help them learn. This can be in the form of clearly presented step-by-step instructions or explanations, constructive feedback and use of language frames. Learners respond positively to meaningful contexts which personalise learning. They also need regular consolidation of new content and language.

## Appropriate task types

There is a range of task types that teachers can use in CLIL. Learners need a variety of tasks to stimulate output of content and language. Some tasks are more time-consuming to create and take more time to complete so teachers need to be aware of this.

It is useful to keep a list of task types and to tick off the ones that have been used over a school term or a year. Here are some examples of task types for geography:

circle/underline/tick the word/sentence/diagram which is true	describe and guess the place/landscape/climate	information transfer from text to graph or table	sequence stages in a process
classify types of environment/jobs	domino games	jigsaw map	word searches and web searches
collect and organise information	find the mistake or find the link between several ecosystems	label or match diagrams or maps	true/false; yes/no, e.g. an elimination game Does the place have a cold climate? ( <i>no</i> ) Is it hot and dry? ( <i>no</i> ) Is it hot and humid? ( <i>yes</i> ) Is it a desert? ( <i>yes</i> )
compare and contrast two places/countries	gap-fill	multiple choice/odd one out	
complete the diagram/table/graph	identification keys, e.g. a flow diagram with questions to help learners identify a type of rock	PowerPoint presentations	

Questions teachers should ask about the tasks they use are:

- Which tasks motivate the learners?
- Which tasks involve interaction?
- Which tasks develop thinking skills for the subject I teach?
- Which tasks need language support?

# Applying CLIL to a geography lesson

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## Rivers

### Learning outcomes

- to understand that equations explain the relationship between coordinate pairs
- to become familiar with the basic terminology of rivers
- to know how to explain and interpret a range of diagrams
- to understand the concept of the water cycle and understand that water changes its physical state within the cycle
- extension activity: to observe, collect data and make notes about the features of a local river

Write these on the board so that learners are clear about what they should work towards achieving by the end of the geography lesson.

### Content-compatible language

The following terms may have been met already in English lessons. However, some may have to be pre-taught or elicited to check comprehension. To support the learning of new geography vocabulary, it is important that these words are arranged in topic-related groups rather than alphabetically.

solid  
liquid  
gas  
cloud  
rain  
snow  
river  
sea  
lake  
rock  
freezing ↔ melting



## Content-obligatory language

The following terms are introduced and explained through the use of maps or photographs.

Confluence	The point where two rivers join
Delta	The area of low, flat land, built from material deposited by a river as it enters a lake or sea
Estuary	The area where a river becomes much wider as it approaches a lake or sea
Meander	A bend in a river
Mouth	The place where a river enters a sea or lake
Source	The point of origin of a river
Tributary	A smaller river joining a larger one

*The glossary is in the form of a table rather than a list that makes the new vocabulary more learner-friendly. The definitions are mostly written in simple sentences and for some learners it may be helpful to adapt longer definitions by breaking them into two shorter sentences, e.g.*

### **delta**

*The area of low, flat land, built from material deposited by a river as it enters a lake or the sea.*

*An area built from material deposited by a river as it enters a lake or the sea. It is low and flat.*

*Sometimes CLIL teachers add a third column so that learners can record vocabulary in the L1. This helps learners who have a different L1 to learn the vocabulary in two new languages.*

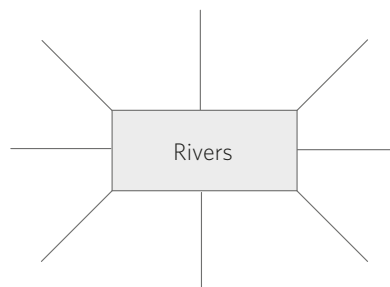
*The new vocabulary will be introduced with the visual support of maps or photographs so learners hear and see the words in context.*

## Introduction to rivers

The purpose of this activity is to give learners an understanding of the basic vocabulary of rivers: river, source, mouth, tributary, lake, confluence, estuary, delta, meander. Other terms such as river banks, river bed, flooding or bridges may arise naturally in the lesson. If possible, show learners a picture of a local or a well-known river as a stimulus before the brainstorming activity.

## Activating prior knowledge of rivers

Brainstorm what learners already know about rivers by drawing a mind map on the board and asking them to give you any facts that they know.



Learners in CLIL are more likely to provide single words or phrases rather than sentences. Some may use L1 at this stage of the lesson because they know the technical vocabulary. Accept and translate. The picture of a familiar river will help them brainstorm vocabulary more effectively.

One way of developing this and extending the range of the learners' knowledge is to use a series of photographs, easily accessible from an image search engine. Putting any of the basic vocabulary terms into the search engine will produce a rich variety of photographs which can be projected in the classroom. Using the photographs, you can introduce the other terms that you want the learners to know about. It would be useful to add these to the mind map, or list them on the board.

## Anticipating problems

- Sometimes learners think that rivers flow inland from the sea
- In some countries the word "river" is given before the name of the river but in others it is given after it
- The pronunciation of the names of rivers needs to be consistent. Decide if learners are to use the English or the L1 pronunciation of river names.

It is important to consider problems related to both content knowledge (bullet point 1) and also language problems (bullet points 2 and 3).

## Consolidation and evaluation

In addition to presenting new vocabulary in context, maps can be used evaluate or consolidate learning in a variety of ways. Teachers need to consider: types of activities; progression of cognitive demand and classroom interaction to ensure the consolidation or evaluation is meaningful. Here both oral and written work is expected and individual and pair work encouraged. For example, using the map below, learners could:

### orally

- name each feature after you provide the first letter
- provide the word after you give clues (eliciting), e.g. it has one syllable and begins with 'm.'

### in writing

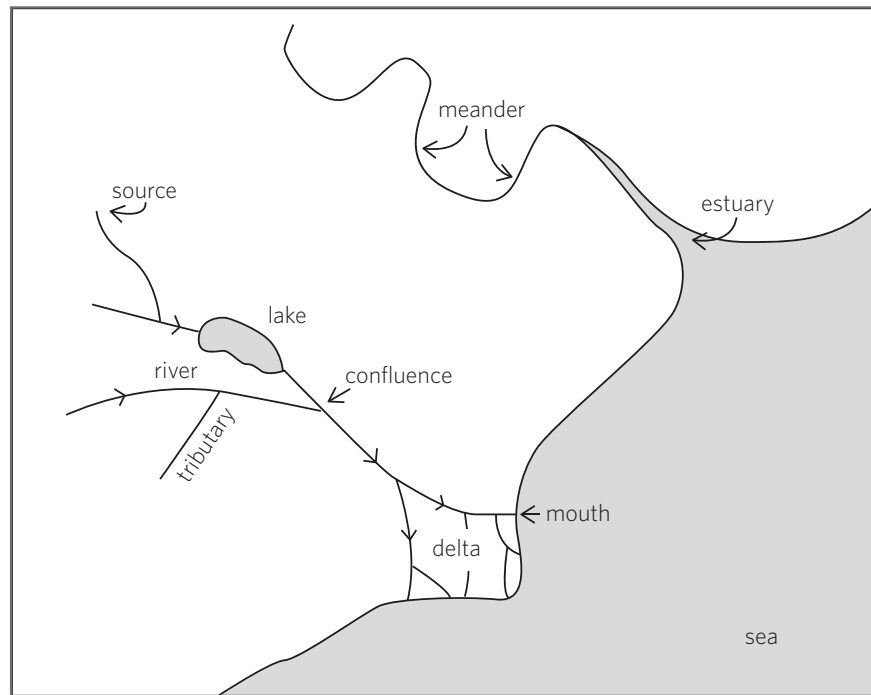
- label each of the features as you point to them
- complete the key words by looking at the first letter of the features only.

### collaboratively

- in pairs, learners take turns to read the definition of the feature and to write it on the map.

## Use of resource materials

After presenting key concepts on a diagram (such as the one below), learners can apply their knowledge to a map of a real river. This could be an atlas map, a survey map or any other map that shows a local or other river. If possible, scan and project diagrams onto a whiteboard so all learners can see the vocabulary clearly. Check understanding of the purpose of the compass point and what the scale shows. Keep instructions for tasks short and clear.



Learners can complete sentences as a follow-up activity so they can read the whole definitions. A list of words to fill the gaps can be given to those learners who need support. For example:

Complete the sentences about rivers:

The start of the river is called the \_\_\_\_\_. The mouth of the river is the place where the river meets the \_\_\_\_\_. A small river that joins a bigger river is called a \_\_\_\_\_. A meander is a \_\_\_\_\_ in the river.

## The Water Cycle

### Vocabulary

The following terms are introduced and explained through the use of diagrams and practical demonstrations.

Condensation	The process of a gas turning into a liquid
Evaporation	The process of a liquid turning into a gas
Glacier	A mass of ice on the land, formed originally from snow
Water vapour	Water in its invisible gaseous form

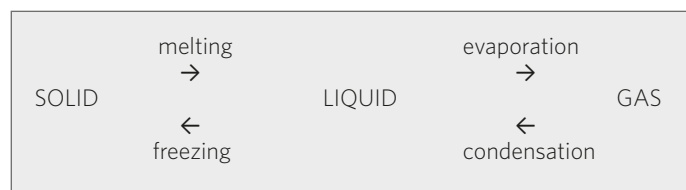
The following terms are introduced and explained through the use of diagrams.

Precipitation	Water in any form, rain, snow or hail, falling to the ground
Surface runoff	Water running off the land surface and into rivers, lakes or seas

## The water cycle

The first objective is to ensure that learners understand that water exists in three states: solid, liquid and gas, and that the state can change. The gaseous state, water vapour, is invisible.

The key facts can be summarised in a diagram on the board as follows:



## Explaining a diagram

Describe how water changes states by explaining the concepts in sentences. For example:

When a solid melts, it becomes a liquid. When a liquid evaporates it becomes a gas. When a gas condenses it becomes a liquid. When a liquid freezes, it becomes a solid.

Presenting the key concepts in a diagram on the board helps learners understand a process. Make sure learners hear you explain the diagram more than once using simple sentences so that they can then explain it to a peer using the target language. Provide language support by writing a gap-fill sentence on the board for those who need it:

When a \_\_\_\_\_, it becomes a \_\_\_\_\_.

Some teachers like to add more specific language support, e.g.

When a (noun) \_\_\_\_\_ (verb) \_\_\_\_\_, it becomes a (noun) \_\_\_\_\_.

## Practical demonstrations

The processes of change of state are best shown by practical demonstrations:

- **Melting:** allow ice cubes to melt on a tray (break the cubes up to make it work faster).
- **Evaporation:** allow a small amount of water to dry in a saucer in a warm place such as a windowsill.
- **Condensation:** get learners to breathe onto a cold surface such as a windowpane. This is useful because it demonstrates that there is water vapour in the air.
- **Freezing:** put a beaker containing some water into a larger container of ice cubes and salt.

Depending on time and classroom conditions, melting and evaporation experiments may have to be set up in one lesson, then left to see evidence of what has happened in the following lesson. These need to be planned, set up and managed efficiently. Learners benefit from being given thinking questions to develop their cognitive skills before, during and after each experiment.

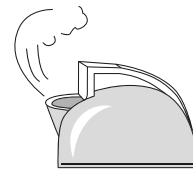
For example:

- What do you think will happen? (predicting)
- What happened? (recounting observations)
- Why do you think this happened? (giving reasons)

A diagram of a boiling kettle can be used and the key words labelled on the board.

## Explaining a process and giving examples

**Heating** water to 100°C **evaporates** water in the kettle. **Water vapour** rises up through the spout. Water vapour **condenses** back into steam. The “gap” between the spout and the steam is water vapour, which is invisible.



*Words written in bold font help learners to notice key vocabulary they need to remember.*

If learners cannot give examples of the three states of water to add to the table, decide whether it is because they know the words in their L1 but do not know them in English, or they have not understood the concepts presented. In both cases, it may be appropriate to use some L1 to find out the reason.

Put the following table headings on the board and ask learners to think of natural examples of the three states of water; solid, liquid and gas. Explain that these correspond respectively to ice, water and water vapour so that they can think of some examples. If learners find it hard to suggest ideas, draw and complete a table which may prompt them to add other examples.

SOLID	LIQUID	GAS
ice	water	water vapour
glaciers particles in clouds	oceans rivers lakes particles in clouds steam	in the air (invisible)

Where any language is new to the learners, e.g. glaciers, photographs may be the best way to clarify the meanings.



## Oral activities

In pairs or small groups, ask learners to guess where most of the water on the Earth is. Alternatively, write the places water is found on the board in a random order and learners sequence them from largest to smallest. Show them the data. What was surprising?

Examples of water distribution	Approximate amounts of water (rounded to the nearest decimal point).
oceans and seas	96.5%
glaciers	1.7%
groundwater [water held inside rocks]	1.7%
rivers and lakes	0.01%
clouds/water vapour	0.001% (although small, this is very important for the Earth)

Source: Igor Shiklomanov's Chapter "World fresh water resources" Peter H. Gleick (editor), 1993, *Water in Crisis: A Guide to the World's Fresh Water Resources*. (Oxford University Press, New York.)

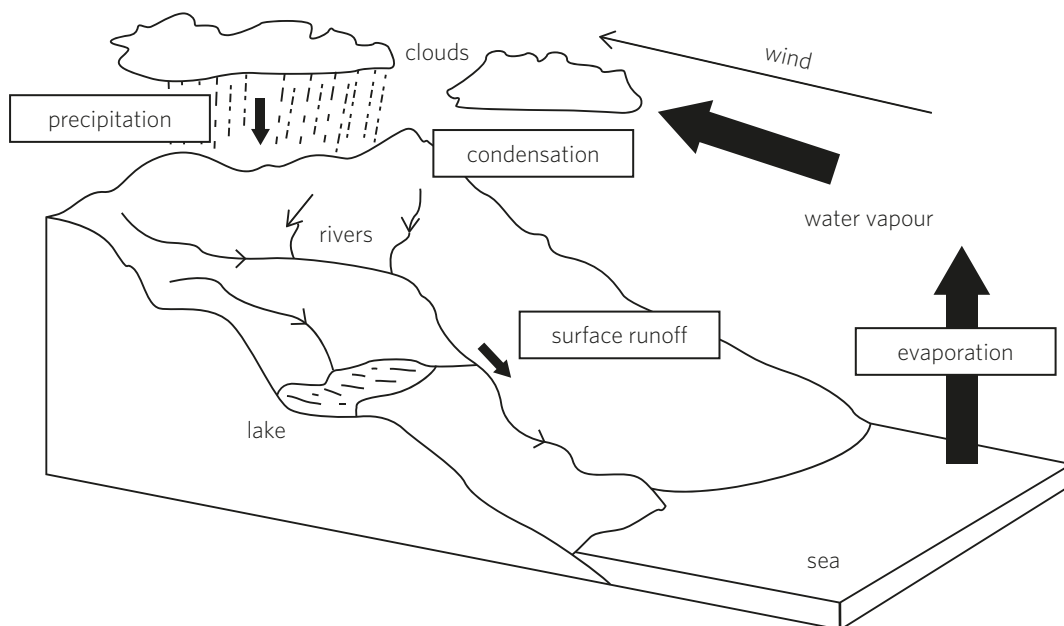
Ask learners to total the percentages. Where could the rest of the water come from? (swamps)

Whenever possible, include some short oral activities so that learners have opportunities to produce the key content language.

It is helpful to present data in the form of a table rather than in a text as it is easier to read. In this example, learners practise skills from maths classes so cross-curricular links are strengthened. After some activities, ask an open question such as, 'What was surprising?' to encourage learners to give opinions. The question asked at the end of the activity, 'Where could the rest of the water come from?' challenges learners' thinking.

## Interpreting a diagram (1)

The concept of the water cycle can then be introduced using a diagram like the one below. It is important to check understanding of the concepts of precipitation and surface runoff. Use the diagram as support for learners to explain their meanings. Remind learners that precipitation is not only rain, but also snow and hail.



Ask why they think four words are written in boxes (these are processes).

Project one of the many coloured versions of the diagram that are available from image search engines. Printed diagrams like the one below can be used with the labels removed. Learners can then complete the labels so you can evaluate or consolidate their learning.

Exploit the labelled diagram by asking questions that demand both lower and higher-order thinking skills. For example:

- Lower-order  
What form is the precipitation?  
What state of water is water vapour?
- Higher order  
Why are the arrows pointing upwards?  
Why is the process a cycle?

## Anticipated problems

- Many learners believe that clouds are gaseous whereas they are made of liquid and sometimes solid particles
- Many learners think precipitation involves only rainfall
- Learners may know the vocabulary in the L1 but don't know it in English or learners may not understand the concepts.

## Consolidation and evaluation through games

Games usually motivate learners and those which encourage the four skills: listening, speaking, reading and writing are good for developing communicative skills as well as for consolidating new language and subject concepts. A domino game provides practice with listening, speaking and reading and is a good way of consolidating learning of key subject vocabulary. Learners listen and match words with their definitions. Make a series of dominoes out of card, each with a key concept written on one half but with the definition of a different key concept on the other half. The illustration below has examples of four cards but make more for each concept presented.

Precipitation	When a liquid turns into a gas
Water vapour	Rain and snow and hail
Surface runoff	Water as an invisible gas
Evaporation	Water flowing off the land towards the sea

Make several sets of dominoes for small groups of learners to match correctly.

The dominoes can also be used as a revision exercise at the start of a lesson. To do this you need to make a domino card for each pair of learners in the class. One reads out the definition on the domino. The pair with the correct concept for that definition puts up their hands. One learner then reads out the definition and so on until all the class has contributed and the dominoes are finished.

You will need to support any pair of learners who are unable to answer. When making the dominoes, it is important to make them to form a continuous sequence that ends with a domino which matches the word on the first domino. If not, the game can end before all the dominoes are used.

## Rivers: erosion

The following concepts are introduced and explained through the use of photographs and diagrams.

**Erosion:** The wearing away of the bed and banks of the river by the flow of water

**Deposit:** When rivers drop small stones and mud in their water at the sides of the river or at the inside bends of meanders.

## Interpreting a diagram (2)

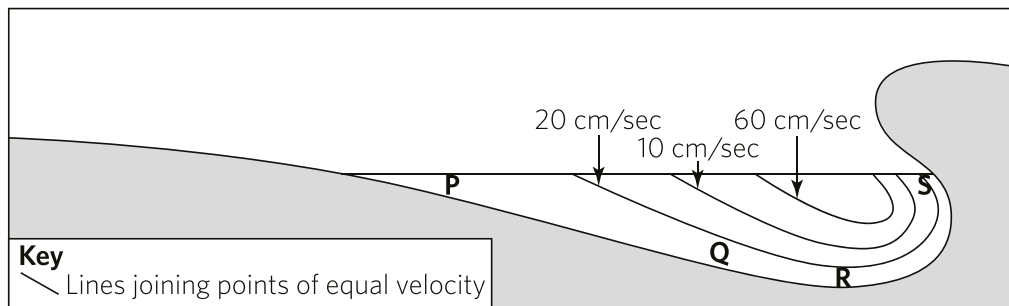
This activity builds upon the subject knowledge presented in the lesson and is more cognitively demanding than the diagram on page 24. This is because it is abstract and involves learners in interpreting and analysing lines in a cross-section of a river so they can then answer the questions about it. The questions involve high-order thinking skills such as hypothesising: What effect could a fast flow of water have on the bed and banks of a river?

Using a diagram of a river, ask learners where in the river they think that the water will flow fastest (usually at the outside of bends). This can be done with a diagram of a cross-section of a river like the one below (adding drawings of some "match stick men" helps establish that it is a cross section), or with a simple map of a river drawn on the board.

If you use one of these, then the other can be used later for consolidation and evaluation.

Ask learners what effect a fast flow of water could have on the bed and banks of the river. This will allow the term erosion to be introduced. Look at photographs which show collapsed riverbanks or rivers which are brown with sediment after heavy rainfall. This consolidates their understanding of 'erosion'.

Return to the term meander, introduced earlier, and refer to the effect of erosion on meanders. A series of simple sketch maps on the board or photographs can be used to show that erosion on the outsides of the meanders causes them to get bigger. On the inside of the meanders, rivers deposit their load of stones and mud.



## Extension: an investigative approach

### Fieldwork activities

Providing opportunities for experiential learning is important, so it is useful to plan geography fieldwork if the school is near a river and if the timetable allows for additional lessons on a particular topic. The investigation can be teacher led but involve learners in independent, collaborative learning. The research question should be clear and the process of observing features, collecting data and noting evidence must be followed responsibly. Learners should know what they are expected to observe and record when they are at the river. They also need the support of a writing frame which guides the process of collecting data and also helps learners to record notes in English. Follow a sequence of enquiry and give learners a series of tasks to do at the river. For example:

**In class**

1	Identify an issue or research question	Is there evidence of erosion in our local river?
2	Decide what data is required and how it will be collected.	Put learners in groups. Give them a mind map to write down ideas about data they will collect. Feedback ideas from class. Accept some L1 and translate. Ensure all groups understand what they are going to observe and record. Provide large-scale maps of the river, clipboards, digital camera if possible.

**At the river**

3	Do the investigation: collect and record data	<ul style="list-style-type: none"> <li>• mark examples of features onto maps</li> <li>• make field sketches of river features</li> <li>• write notes.</li> </ul>
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**In class**

4	Analyse and write about the data	In class, groups look at notes and sort them into features of the river and evidence of erosion.
5	Present the data and evaluate it	Learners evaluate the work of another group using group feedback forms.

In addition to organising the trip, take time to explain the purpose of the fieldwork and what learners are expected to observe and to record when they are outside. They need to understand that the better their notes, the better their writing and presentation when they return to class. In some contexts, less able learners need to be paired with more able peers to ensure enough evidence is noted. It is reassuring to tell some learners that they can record some of their notes in L1 but they will be writing in the target language in school.

For peer evaluation of another group’s work, it is useful to provide a feedback form. For example:

Name of river:	Date:
Research question:	
Where we are observing the river:	
Data we are collecting:	



# References

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