Research and analysis

Research review series: geography

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Introduction

This review explores the literature relating to the field of geography education. Its purpose is to identify the nature of high-quality geography education in schools. We review pedagogical approaches, assessment practices and the impact whole-school policies and systems have on geography education.

We will use this understanding of subject quality to examine the state of geography education in England's schools. We will then publish a subject report so that we can share our findings with the sector and government. The ultimate goal is that, through this work, we will contribute to raising the quality of geography education for all young people.

In this review, we have:

- outlined the national context in relation to geography
- summarised our review of research into factors that can affect quality of education in geography
- considered curriculum progression in geography, pedagogy, assessment and the impact of school leaders' decisions on the quality of geography education

The review draws on a range of sources, including a programme of research from our Research and Evaluation team. This piece of work builds on previous research, including the 'Education inspection framework: overview of research' and 'Principles behind Ofsted's research reviews and subject reports'.[footnote 1]

The context of geography curriculum design in English schools

Since the writings of Ptolemy and Strabo in the first and second century, geography has been a curiosity that has interested scholars and philosophers. This is the subject that principally uses spatial organisation as its reference system and seeks to make sense of the world and its people, places and environments through explanatory relationships.

In schools, the teaching of geography gives pupils an understanding of the world around them, its environments, places near and far, and the processes that create and affect them.[footnote 2] Former US president Barack Obama commented:[footnote 3]

> The study of geography is about more than just memorising places on a map. It's about understanding the complexity of our world, appreciating the diversity of cultures that exist across continents. And in the end, it's about using all that knowledge to help bridge divides and bring people together.

With such responsibility, the centrality of geography in school curriculums should be commonplace. Indeed, geography has had a statutory place in the national curriculum since its inception,[footnote 4] and its place in primary education can be traced back to the 19th century.[footnote 5] However, despite having its roots in classical times, there are many definitions of the discipline.[footnote 6] In the United Kingdom, the Quality Assurance Agency for Higher Education has set out geography as:[footnote 7]

> [the] integrated study of the complex reciprocal relationships between human societies and the physical, chemical and biological components of the Earth. Geographers study place, space and time, recognising the great differences and dynamics in cultures, political systems, economies, landscapes and environments across the world, and the links between them.

The requirement for maintained schools and academies to offer a broad and balanced curriculum is set out in the Education Act 2002 (for maintained schools) and the Academies Act 2010.[footnote 8] This expectation is reflected in the national curriculum and is at the heart of the education inspection framework (EIF).[footnote 9] However, the subject has often had a relatively low status, particularly in primary schools.[footnote 10] Studies over the decades have shown the decline in the amount of time spent in classes studying geography, particularly in primary schools.[footnote 11] Subject reports by Her Majesty's Inspectors and Ofsted have repeatedly commented on the relatively poor state of geography education in primary schools.[footnote 12]

The situation in secondary schools has been more variable. Geography was a popular school subject and choice for O level or Certificate of Secondary Education (CSE) through the 1950s, 1960s and 1970s. The 'Geography and Young School Leaver' project was introduced in response to the raising of the school leaving age to 16 in 1972/73. It had the greatest take-up by schools of all the projects launched at that time.[footnote 13] Since the 1970s, there has been much work on curriculum development. However, at the turn of the century, the number of pupils entering geography examinations was in decline.[footnote 14] This has been turned around over the last decade. Now, almost half of key stage 4 pupils study geography.

Primary education and the early years foundation stage

Children start on their geography education journey in the early years foundation stage (EYFS). Until 2021, the EYFS framework contained few references to geographical learning. The 2021 update includes many more. For example, the 'people, culture and communities' and 'natural world' strands set out much clearer, identifiable geographical knowledge that children are to learn.[footnote 15] In other strands, there are opportunities for children to draw on geographical content. For example, they may develop their fine-motor skills when drawing plans and sketch maps. Crucially, in the early years, children begin to acquire some of the geographical vocabulary that they will build on through the rest of their schooling.

One article highlights the empowering nature of geography and its importance as a subject in its own right and also for strengthening pupils' comprehension across other subjects.[footnote 16] Others also emphasise the significant role geography plays in primary schools, helping pupils to understand their world, their role in it and the responsibilities that come with it.[footnote 17] The primary national

curriculum sets out, at a high level, what geography pupils are to learn by the ages of 7 and 11. However, the subject is often diluted or lost within the topic-based approach taken by many primary schools.[footnote 18] There is also a correlation with the reduction in time spent on primary initial teacher education courses.[footnote 19] If primary teachers, typically as generalists, do not have the geography subject knowledge they need, then it may be no surprise most primary pupils are taught little geography.[footnote 20]

Ofsted's research in 2020 on geography in primary schools showed that most were revising their geography curriculum.[footnote 21] Inspectors found that almost half of the schools inspected did not teach the breadth of knowledge set out in the national curriculum, particularly in key stage 2. Inspectors noted that pupils' geographical skills were weak and there was a paucity of meaningful fieldwork. Nonetheless, pupils showed a healthy appetite for geography. They also displayed concern for the world and its people.

The position in secondary schools

In contrast, there has been a steady rise in the number of pupils studying geography after the age of 14. The number of pupils entering the GCSE has risen sharply. In 2010, almost 170,000 pupils were entered for GCSE Geography in English schools.[footnote 22] By 2019, the number had risen to over 251,000, an increase of nearly 50%, even though the number of 16-year-olds fell by 9% in the same period. There is a clear link between this rise and the introduction of the English Baccalaureate (EBacc) in 2010. This performance measure is based on a suite of qualifications that must include geography or history.

Throughout this period, entry rates for boys have been slightly higher than for girls. The increase in entries came disproportionately from disadvantaged pupils, pupils from Black, Asian and minority ethnic groups, and those with lower prior attainment.[footnote 23]

Attainment has remained broadly similar over the last 10 years. Approximately a fifth of pupils gain grades 7, 8 and 9 (or A and A* before 2017) and 7 out of 10 pupils gain a grade 4 or better (C or better before 2017).[footnote 24]

The number of students taking geography at A level has also risen but at a much less marked rate. Again, this is set in the context of the falling number of 18-year-olds across the country. Since the current A level specifications were introduced in 2016, the gender gap in geography has been one of the smallest of all subjects.[footnote 25]

In September 2019, Ofsted launched the EIF.[footnote 26] This followed an extensive period of research into understanding what constitutes a good quality of education.[footnote 27] The EIF clarified the expectation that, regardless of a pupil's age, they would benefit from a curriculum that 'remains as broad as possible for as long as possible' and that pupils 'should be able to study a strong academic core of subjects, such as those offered by the EBacc'.[footnote 28] Again, this has strengthened the position of geography in the curriculum as schools take on board this research and respond to it.

Evidence from recent inspections of the quality of geography education also suggests that the subject is receiving greater attention.[footnote 29] Similarly, schools, particularly in the primary phase, are reaching out for support and training. Both the Geographical Association and Royal Geographical Society report that the number of schools taking out membership, subscribing to their journals and seeking consultancy support has risen dramatically in recent years.

In this review, we extend the research-based findings that led to the EIF, particularly around the quality of education, to geography education. We have set out the context of geography education across England and summarised a research review into effective practice in geography. We have considered curriculum progression in geography, pedagogy, assessment and the impact of school leaders' decisions on provision.

Curriculum

Summary

The geography curriculum in schools identifies the knowledge and skills that pupils are to learn. Like many subjects, knowledge in geography can be organised into 2 forms:

- Substantive knowledge sets out the content that is to be learned. The national curriculum and other geography education literature presents this through 4 interrelated forms:
  - locational knowledge
  - place knowledge
  - human and physical processes (the geography community also includes 'environmental' as part of this)
  - geographical skills.
- Disciplinary knowledge considers how geographical knowledge originates and is revised. It is through disciplinary knowledge that pupils learn the practices of geographers.

A successful geography curriculum reflects teachers' careful thought about what is to be taught, the rationale for it, the sequencing of learning and the relationships between the forms of knowledge. With this in place, pupils are likely to know, remember and be able to do more.

Curriculum progression

A high-quality geography education brings together careful selection of content, organisation of that content, choice of teaching approaches, assessment and other factors.

The geography curriculum maps out the knowledge that pupils learn to gain geographical expertise. In planning the curriculum, the nature of the discipline should inform content and activity choices to ensure that pupils learn and can consider their own answers to geographical questions.[footnote 30]

The nature of geographical education

The importance of a high-quality geographical education has been well emphasised, including through an international charter.[footnote 31] Establishing what a pupil should know and be able to do at different points throughout their education is, however, less well defined. This is despite the attempts of different groups over many years.[footnote 32]

Many geographical education academics show how complex it is to reach a definition of a high-quality geography education.[footnote 33] In geography, general statements may be the best that can be reached.[footnote 34] From here, with guidelines and principles, it is for the teacher to interpret and develop these generalisations in their own context.

Nonetheless, a clearly mapped journey starting in the early years and developing through the curriculum is critical if pupils are to move towards becoming experts in the subject. This has been described as working towards 'abstract clarity, which in turn imparts meaning to everything else below it'.[footnote 35]

Geography is a broad-ranging subject.[footnote 36] Therefore, leaders have to carefully select what content to include when designing a geography curriculum. Although the most recent edition of the national curriculum sets out broad forms of geography that are to be taught, the specific content is not detailed.[footnote 37] For example, in key stage 2, it stipulates that pupils should be taught to 'describe and understand key aspects of physical geography, including… biomes and vegetation belts…'. The specific biomes and vegetation belts are not named, nor is there any indication of what knowledge pupils need to have in order to be able to appreciate the factors that influence each type of biome. It is, however, critical that teachers have a secure appreciation of these factors when they are designing their schooling. Teachers, therefore, require secure subject knowledge, an appreciation of the structure of geography as a subject and an appreciation of the relationship between the two.[footnote 38]

As a subject that incorporates as much from the natural sciences as the social sciences, the structure of the geography curriculum is complex. However, rarely do these exist in isolation. Indeed, one of the strengths of geography is that it brings them together. Geography must have a curriculum that respects both discourses and the interplay between them.

Organising concepts

The geography community typically refers to 'concepts' as a means of categorising geographical knowledge of natural and human phenomena. These concepts can be seen as the 'grammar' of geography.[footnote 39] They are also described as to be used as a 'facilitating tool' that is 'fundamental to structuring and supporting how people learn geography'.[footnote 40]

Concepts are a way in which to group geographical content or 'a container for geographical ideas or content'.[footnote 41] This aligns with Taylor's 'basic level' description of 'ways of dividing up our experience of a messy world into more manageable units, enabling us to communicate about the things we can't immediately see'.[footnote 42]

There is increasing, although by no means universal, agreement within the geography education community that many high-level concepts are central to a pupil's geographical education.[footnote 43] These include:

- place
- space
- scale
- interdependence
- physical and human processes
- environmental impact
- sustainable development
- cultural awareness
- cultural diversity

Concepts are important in geography as they draw out the links between processes and ideas.[footnote 44] To develop their understanding of each of these concepts, pupils need to learn the range of relevant knowledge and skills. It is from this knowledge and development of these skills that pupils gain a more abstract appreciation of the subject. Therefore, it is critical that the content of the curriculum is broken down into component parts (or chunks) that pupils can first comprehend in their own right, before combining different components to gain a fuller conceptual appreciation.

Based on the above, high-quality geography education may have the following features

- The geography curriculum identifies sufficient breadth of content and ensures that pupils learn this in sufficient depth.
- Pupils' geographical education begins in the early years and builds year on year, developing pupils' expertise.
- The organisation of the curriculum builds knowledge so that pupils can draw on it in future learning. Pupils are increasingly able to apply generalisations to understand the world around them.

- Teachers are the adjudicators of curriculum content and select it judiciously. They use their good subject knowledge to do this and take into account how pupils build their geographical knowledge over time.
- Geographical expertise is built on substantive geographical knowledge. Drawing from the breadth of concepts gives pupils the knowledge they need to appreciate the whole domain of geography. They understand how common concepts draw different aspects of the subject together.
- Teachers break down the content they wish pupils to learn into component parts. When selecting that content, teachers take into account what their pupils need based on their prior knowledge and experiences.

Forms of geographical knowledge

As concepts provide a framework or 'grammar' for geography, so the content or substantive knowledge is the 'vocabulary'. It supplies the detail that pupils need to learn.[footnote 45] Content is vast and poses one of the challenges to a school's geography curriculum: the balance between breadth of coverage and depth of study.

At the turn of the 20th century, there was a shift in focus that promoted the relational nature of the subject.[footnote 46] This has remained the view of geographers to the present day. In his presidential address to the second meeting of the Association of American Geographers in 1905, William Morris Davis identified the breadth of concepts covered in the subject, the complexity of content and the importance of relationship.[footnote 47] He commented on the move from facts to explanatory relationships.

This is important to consider when devising a geography curriculum. There is a need to identify both the content (substantive knowledge) that is to be taught and the knowledge of relationships that allow pupils to understand the connections between ideas (disciplinary knowledge). Pupils' combined appreciation of both substantive and disciplinary knowledge can be described as geographical understanding.

The national curriculum, since its introduction in 1991 and through its revisions since, has maintained a focus on 4 forms of geographical knowledge:[footnote 48]

- locational knowledge
- place knowledge and understanding
- knowledge of environmental, physical and human geography processes
- geographical skills

Looking at each form of substantive knowledge in turn demonstrates both the substance of each and the relationships between them, as illustrated in the graphic below.

Locational knowledge

'Knowing where's where' is one of the mainstays of geographical education. In building pupils' locational knowledge, teachers recognise that this not only helps pupils to identify specific features but also to:

- build their own identity and develop their sense of place
- develop an appreciation of distance and scale
- learn about the orientation of the world, including references such as the continents and oceans that they can navigate from

However, the absence of this locational knowledge in pupils is well evidenced.[footnote 49] This absence limits pupils' ability to 'use the uniqueness of places to explain why the outcome of universal environmental and human processes may vary, and why similar problems may require different strategies in different places'.[footnote 50]

Curriculum plans can develop pupils' locational knowledge and thus their capacity to locate and navigate ('spatial thinking'). Research shows that pupils need a secure understanding of directional and locational information so that they can locate features and navigate their way.[footnote 51] Typically, children in the early years grasp positionality (where one feature is in relation to another). This is fundamental in appreciating relative positioning, one of the main ways by which people identify location.[footnote 52] This includes the concepts of near and far, left and right, and behind and in front.[footnote 53] It is important that children secure the concepts and language by the end of the Reception Year. Without these, they struggle with future learning. With these basic positional notions and the language to describe them secured, children are able to move on to learn about and use more technical terms such as north, south, east and west in key stage 1 and then the 8 points of the compass in key stage 2.

Pupils also need to be taught about the absolute positioning (reference) systems used in geography, particularly latitude and longitude. Location influences so many of the earth's systems that without a grasp of it early in their education, pupils do not have one of the critical geographical frameworks that allow them to make sense of many natural and human phenomena. For example the effect of proximity to the equator.

A review of research throughout the 20th and early 21st centuries concluded that at the age of 5 pupils start to gain knowledge of their own country and its features.[footnote 54] At around 8 years of age, there is a significant increase in pupils' knowledge about other countries. One of the major contributors to this increasing knowledge is pupils' personal experiences, particularly visits or holidays to other countries.

However, these experiences vary between pupils. The curriculum must ensure that all pupils, regardless of their experiences, build an increasingly extensive knowledge of different countries, regions and features. Not only should their knowledge increase but the fluency with which they can recall the location should improve.[footnote 55] This reduces the call on pupils' working memory. Ultimately, pupils should be able to automatically pinpoint certain locations at each stage of their education and be able to associate these locations with the peculiarities that identify them. For example, they may appreciate the unique climatic conditions of the world's hot deserts and their geographical situation.

Based on the above, high-quality geography education may have the following features

- Pupils gain a secure knowledge of distance, orientation, scale and positioning systems, which begins in the early years. This gives them the framework they need to understand locational knowledge.
- 'Knowing where's where' supports pupils' identity and sense of place and contributes to their understanding of geographical processes.
- Over time, pupils learn and remember more locational knowledge. They become increasingly fluent in identifying specific locations.

Place knowledge

The second of the 4 forms of knowledge is place. It is considered by many to be the most important term used in geography.[footnote 56] Place allows a pupil 'to locate or orient oneself with respect to the larger global space and to other places'.[footnote 57] The human brain is naturally structured to enable such spatial cognition.[footnote 58]

Place is an ordinary word that is used on a daily basis in most people's lives and is almost ubiquitous. In everyday use, the word 'place' is used in a variety of ways. However, it has developed a more specific meaning in the geography classroom. Principally, place is a physical area that can be located (found on a map) and that has a personal meaning, attachment or distinct identity.[footnote 59] Hence, we use terms like 'my place' or 'your place'. Indeed, giving a location a name is one of the ways we attach meaning and so a space becomes a place. In respect of the school curriculum, we may consider place to be a specific location on the earth's surface, or in the atmosphere, where a particular physical or human process took place. For some processes, the particular time it occurred is also relevant.[footnote 60]

It is place that connects the physical topography and physical or human geography processes with personal experience and how geographical conceptualisation brings meaning to undifferentiated 'space'. This then gives meaning to a location.[footnote 61] As a result, pupils' understanding of place gives them a connection that brings together many aspects of geography and makes it very real. This also supports pupils' memory.

Curriculum planning and place knowledge

Early on in infancy, children develop a sense of place.[footnote 62] Through their schooling and experience, pupils build an increasingly complex appreciation of why certain locations have particular meaning and create an affinity between themselves and the location.[footnote 63] A high-quality geography curriculum provides the knowledge necessary to build such an increasingly complex understanding of place.

Typically, this begins from places like their home or their classroom at school, which they know intimately, to the areas along their route to school, to their town or city, to a more conceptual understanding at regional, national and global scales. This does not preclude teaching about the unfamiliar, but a cohesive curriculum provides pupils with links to what they already know.

Linked closely to locational knowledge, pupils' place knowledge supports them in their understanding of one of geography's organising concepts, scale.

The requirements for place knowledge set out in the national curriculum show that the emphasis at key stages 1 to 3 is on exploring localities and understanding similarities and differences between them. In order to do this, the curriculum must be structured to give pupils the component knowledge of what makes a place the way it is. From this knowledge base, pupils can identify similarities and differences.

At GCSE, the guidelines require a focus on 'the geography of the UK' and for pupils to draw on 4 meanings of place:

- place as location
- place as community (a sense of place)
- place as landscape
- place as an idea or way of understanding the world[footnote 64]

At AS/A level, the requirements for place study are more detailed, focusing explicitly on the idea of place and the meanings and representations of place that change and shape how we see the world.[footnote 65] With increasing complexity of understanding of place, it is critically important that from the early years onwards pupils gain the building blocks of knowledge to understand what place is and how it is represented.

Building a sense of place

From the early years, the geography content that children learn can allow greater awareness of people, the environment, the relationships between them and the child's place in this relationship. This sense of belonging is recognised as being significant in children's social and emotional development and in preparing them for more formal learning.[footnote 66] It is important, therefore, in Nursery and Reception, that teachers set curricular goals so that children build their place knowledge and begin to appreciate the connections between people and the physical environment. In doing so, pupils need to learn the vocabulary in order to express these ideas.

The national curriculum requires teachers to identify content that allows pupils to make comparisons between different places but also the same place over time. For example, pupils may study the effect of migration on 2 different cities or explore how the retreating coastline of the Holderness coast in Yorkshire has affected human land use through the ages.

As pupils progress through their schooling, the curriculum supports them in acquiring the place knowledge to consider the content being explored from different perspectives. For example, in exploring water security in north-eastern Africa, pupils may learn about the possible benefits of building the Grand Ethiopian Renaissance Dam for Ethiopians in the form of hydro-electric power supplies and the impact on Egyptians downstream who depend on the water supply from the River Nile, especially in times of drought. Through these standpoints, pupils are able to identify the different advantages and drawbacks for each stakeholder.[footnote 67]

Based on the above, high-quality geography education may have the following features

- Place knowledge is prioritised in the geography curriculum. It brings meaning to locations and processes studied.
- The curriculum and teachers' plans build pupils' knowledge of place by linking to places pupils already know or are familiar with. This may be from their personal experience as well as through what they have been taught.
- The curriculum gives pupils the knowledge they need to develop an increasingly complex understanding of place. Their understanding of place helps them to connect different aspects of geography. It also gives them different perspectives through which to consider the content studied.
- The curriculum builds pupils' place knowledge over time. This allows them to make meaningful comparisons.

Environmental, physical and human geography

The third form of knowledge includes phenomena, human and natural, that are central to the interest of a geographer. Knowing why a phenomenon occurs and the impacts that it has are at the core of the discipline.[footnote 68] Through the curriculum, there should be a balance between the 2 aspects.

From the early years on, the curriculum should set out how pupils gain knowledge of environmental, human and physical processes so that pupils can:

- describe their own and others' environments
- recognise the similarities and differences between the world around them and contrasting environments
- understand important processes and changes in the world around them, including those affecting the land, bodies of water and the air, people, and wildlife

In order for pupils to get better at understanding environmental, human and physical processes, the curriculum needs to be sequenced carefully. For example, most of the physical processes, and many human processes too, are driven by the atmospheric conditions (the weather). So, pupils first need to secure an understanding of components such as air pressure, the water cycle and longitude.[footnote 69] With this knowledge, pupils have a strong basis to understand why certain biomes exist and also how they are changing. It also contributes towards pupils' understanding of climate change and the effects, both physical and human, that are happening in different locations, such as changes to agricultural practices and rising sea levels.

Research shows how important it is to ensure that pupils understand how human and physical processes interact to influence and change landscapes, environments and the climate, as well as how human activity relies on the effective functioning of natural systems.[footnote 70] Indeed, several authors are critical of the false divide that can be presented between physical and human environments.[footnote 71] Successful curriculum plans ensure that pupils gain the knowledge needed to explain the relationship between processes and their impact in different locations and at different times.[footnote 72]

A well-crafted curriculum moves pupils on from learning about those processes that they experience and the impact they can see to a broader, more global array of processes. They also develop a more complex understanding of processes. For example, in key stage 2 pupils may learn about fold mountains and in key stage 3 consider how glaciation shaped upland landscapes. By developing pupils' knowledge in this way, older pupils should be able to generalise and appreciate models that represent the phenomena.[footnote 73] This is particularly important for pupils studying geography beyond the age of 14. Students in the sixth form are likely to have learned the geographical knowledge necessary to be able to offer some critique of models, generalisations and theories and recognise their limitations.

Based on the above, high-quality geography education may have the following features

- Increasingly detailed knowledge of physical and human processes allows pupils to describe and explain different environments. Through this, pupils develop an appreciation of interconnectedness.
- Component knowledge is identified precisely and sequenced so that pupils first learn underpinning phenomena before moving on to more complex, multi-variate processes. This allows pupils to fully understand a wide range of environmental, human and physical processes.
- Over the course of study, pupils learn about processes that they are less familiar with or that are less visible.
- The curriculum ensures that older pupils are able to take a broader view, generalise, and critique models that represent specific processes.

Geographical skills and fieldwork

The final form of knowledge to explore is the procedural knowledge, generally called 'geographical skills', including the knowledge necessary to carry out fieldwork.

Geographical skills allow pupils to collect, represent and interpret spatial information and their acquisition is an important dimension of the geography curriculum.

Fieldwork

The case for fieldwork and its importance has been long made.[footnote 74] Through fieldwork, pupils encounter geographical concepts first-hand and connect their learning in classrooms with the complexity of the real world. Through observing, collecting data for themselves, analysing it and describing their findings, pupils learn how to observe and record the environment around them. In effect, they have been immersed in relevant thinking and so key geographical knowledge sticks in their memory. The ability to explain what is observed draws on pupils' knowledge of human and physical processes as well as locational knowledge.[footnote 75] These experiences give pupils 'a critical insight into the nature of geographical knowledge, by helping students appreciate that both the 'theoretical' world of the textbook and their own investigative research is partial and limited'.[footnote 76]

In recognising the importance of fieldwork, some research argues that it brings 'conceptual, cognitive, procedural and social gains'.[footnote 77] It goes beyond a signature pedagogy and is knowledge in and of itself and is one element of the geography curriculum that particularly motivates and interests pupils.[footnote 78]

Fieldwork has been described as 'the medium that enables formal education outside of the classroom'.[footnote 79] However, in order to engage in this 'medium', pupils first need substantial procedural knowledge of the processes and techniques that geographers use and the conditions for using them.[footnote 80] Furthermore, AS- and A-level students must design their own investigation and involve fieldwork.[footnote 81] In addition to learning different data collection methods and approaches, pupils need to appreciate which method is

most appropriate to use.[footnote 82] There are many other considerations before actually collecting the data, like considering where data should be collected, as well as how and when. Fieldwork knowledge also includes an understanding of how to process the data and then draw on knowledge of environmental, human and physical processes and locational knowledge to analyse the data and draw conclusions.

Therefore, a high-quality geography curriculum includes opportunities for pupils to learn the procedural knowledge they need. This is integral to the exploration of human and physical processes so that pupils can conceptualise their classroom learning. Through their geography education, pupils need to learn and apply geographical skills, increasing in range and complexity, to interpret 'real life' geography.[footnote 83] The curriculum is likely to build in complexity from basic observation in the early years through to complex data-gathering techniques in the sixth form. For example, in the Reception class, children may observe the weather daily and record it on a chart. Over time, they may be able to identify the seasonal changes in the weather they observe. Older pupils should learn to use sampling strategies and to apply statistical techniques and more complex presentation methods when exploring changes in beach sediment or investigating people's perceptions of a particular location.

Fieldwork connects pupils with the complexities of the real world, making it both stimulating and fascinating and a valuable element of the subject. However, it also requires teachers to have sound subject knowledge so that they can confidently explore the uncertainties and ambiguities that come from moving geography from the classroom into real environments with pupils. Unlike in other subjects, it is not possible to tightly control variables in geography. Pupils need to have sufficient knowledge of the limitations of procedures and mitigation they can use and knowledge of the processes they are exploring, in order to be able to draw valid conclusions.

When leaders and teachers are designing the curriculum, they take into account that fieldwork teaching and practice support pupils in deepening their understanding of geographical processes and the interplay between them. In order to do so, fieldwork experiences need to be more than tokenistic events to satisfy the minimum expectation set out in the specification for a qualification.

Geographical skills

Within geographical skills, pupils learn to interpret spatial representations, particularly maps, globes and atlases, and construct their own plans and maps. Pupils also draw on these skills to support their knowledge of environmental, physical and human systems and also to gain a sense of place. This aspect of geography is widening as governments and commerce recognise the value of it and technology advances.[footnote 84] Pupils need to learn how to interpret resources such as aerial photography, satellite imagery and digital mapping. As well as thinking about the technical, or procedural, knowledge that pupils need, teachers and leaders also need to ensure that pupils can apply that knowledge. Consequently, the integration of this aspect with other aspects of geography is important. For example, pupils need to apply technical knowledge when using maps to identify settlement patterns.

Throughout the national curriculum, the role of fieldwork is clear. This is also reflected in qualification specifications:

- at AS and A level, students must carry out fieldwork in both human and physical geography. There are specific minimum times set to be spent on this. It is assessed through the individual study and makes up 20 to 30% of the award.[footnote 85] The Department for Education requires 'geographical skills and fieldwork to be embedded within the required content knowledge'[footnote 86]
- at GCSE, 15% of the award is attributed to assessing pupils' knowledge of fieldwork

Map skills

Geographical skills include both constructing and interpreting hard-copy and digital maps and plans. This involves developing pupils' abilities to use atlases and globes. Maps are, to a certain extent, the language of geography. A graphical or visual form of representation is generally more effective than a textual account.[footnote 87] Indeed, it is often in the graphical plotting of data that geographers identify patterns.

In order for pupils to become proficient in map skills, the curriculum ensures that pupils have the knowledge they need, such as knowledge of direction and scale, to draw and analyse maps. This is likely to build from drawing plans of areas that children in the early years are familiar with, such as their classroom or the school premises, through to more complex maps of larger areas and more distant places. Through drawing maps, pupils may identify relationships between features or ask questions about which processes have led to particular patterns, such as settlement distribution.[footnote 88]

In a high-quality geography curriculum, plans introduce pupils to different types of mapping, including topological and thematic mapping, as they progress through key stage 2 and secondary education.[footnote 89] A high-quality geography curriculum also includes sufficient opportunity for pupils to practise:

- decoding information from maps
- constructing (or encoding) maps
- analysing distributions and relationships
- route-finding
- interpreting the information to draw conclusions[footnote 90]

Integrating opportunities to develop these skills throughout the curriculum supports pupils' development of fluency and automaticity. For example, once they become familiar with the symbols used on an Ordnance Survey 1:50,000 scale map, pupils no longer need to routinely reference the key. This both speeds up their map reading and frees up working-memory space to process the information more efficiently. Of course, much mapping is now available digitally and the same principles apply.

The more proficient a pupil is in using maps, the stronger their ability to relate to geographical concepts.[footnote 91] For example, pupils are better able to interpret the spatial information and identify increasingly complex patterns, such as land use.

Aerial photography and satellite imagery

In recent decades, aerial imagery has become readily available digitally and so used much more in daily life.[footnote 92] Similarly, satellite (or remotely sensed) imagery has become increasingly available to teachers. As they often use particular (or false) colours to represent different phenomena, these can be complex to read and analyse. Therefore, the curriculum needs to prepare pupils adequately with the knowledge to decode the images and interpret the representations.

The importance of aerial and satellite imagery should be recognised by its presence in curriculum plans. It is noted that this imagery provides the contextual setting that strengthens pupils' schema and deepens their understanding.[footnote 93] Also, images such as these often spark pupils' curiosity and lead them to ask their own questions or spur their interest to further their knowledge of the human and/or physical processes they see.

As with map skills, aerial and satellite imagery should be integral to pupils' study. If used effectively, it helps pupils to visualise the physical or human phenomena that is present.[footnote 94] Regular use of aerial and satellite imagery improves pupils' knowledge of and fluency in interpreting such resources.[footnote 95] It should, consequently, be taught intentionally throughout the curriculum.

Geographic information systems

In a digital age, many of the traditional cartographic skills are now incorporated into digital mapping.[footnote 96] It is this mapping that underpins geographic information systems (GIS). A GIS is a framework for capturing, managing and analysing geo-located data that is spatially organised. This technology is now commonplace in our lives. For example, clicking on a digital map brings up information about that place and choropleth maps show the prevalence of a particular issue based on individual data points. However, appreciating the more technical aspects of spatial modelling, geographical query and spatial analysis is knowledge that secondary-aged pupils need to be taught.

GIS is also a useful resource in developing pupils' spatial 'literacy', in helping them navigate locally and globally, and in combining datasets to identify relationships between them.

The curriculum should incorporate opportunities to teach and make use of GIS throughout topics. This contextualises pupils' learning. Although the national curriculum explicitly states that pupils should be taught about GIS in key stage 3, there are systems available that are accessible to primary-aged pupils.

Based on the above, high-quality geography education may have the following features

- Pupils' procedural knowledge (geographical skills) allows them to gather, analyse, present and interpret spatial information. In doing so, they are adept at identifying patterns and trends.
- Pupils have the specific skills they need to represent and interpret geographical data. These skills are integrated into the curriculum so that pupils understand their application.
- Repeated practice of geographical skills improves pupils' fluency and accuracy.
- Fieldwork includes data collection, analysis and presentation. The experience of fieldwork draws together pupils' locational knowledge and that of human and physical processes. It supports pupils to appreciate the interplay between them.

Spatial thinking in the curriculum

Geographers think about the world in spatial terms. 'Spatial thinking' is a term used to describe the desirable disposition and capacity that is the result of geographical study: to analyse, interpret and describe 'spatial patterns and organisation of people, places, and environments on Earth'.[footnote 97] It is not developed purely thorough inviting pupils to 'think spatially' because to do this thinking successfully requires prior knowledge of concepts of space and tools of representation before using processes of reasoning.[footnote 98]

Geographers visualise and analyse spatial relationships between objects. For example, through the use of maps, pupils are presented with a spatially referenced framework and visual cues. Through such visualisation, pupils draw on concepts they have already learned, such as location, distance, direction, shape and pattern. Taught well, spatial thinking develops a meaningful sense of place and appreciation of the interconnectedness of the subject.

A curriculum to 'think like a geographer': choosing, building and linking knowledge

The 2007 national curriculum set out some principles that are useful to bear in mind when planning the geography curriculum.[footnote 99] The first principle, 'build on and expand [pupils'] personal experiences of geography' is recognised in research as highly influential when pupils are learning geography.[footnote 100] Many researchers note that the concept of building from what is known or familiar to pupils gives them security in their understanding and so helps them commit knowledge to their long-term memory.[footnote 101] This does not mean we should exclude teaching the unfamiliar. It is important that pupils gain knowledge about the world beyond their own experience, for example to appreciate how people live in other parts of the world.[footnote 102] However, pupils must still be able to relate

this to what they already know if they are to build a strong schema.[footnote 103] In this context, a schema is a cognitive structure that connects knowledge previously learned. This helps pupils to build, connect and remember different aspects of the curriculum in the long term.

Other factors can further support pupils' learning of geography. The use of real and relevant contexts is important in helping pupils relate general principles to actual locations. Using contemporary examples is also helpful. However, a particular example or a more detailed case study should not be chosen simply because it is recent. In selecting examples, teachers ensure that their choice best demonstrates the phenomenon or phenomena being studied. Furthermore, it may be that a comparison over time is a useful means of exploring a particular aspect of geography. For example, teachers could use a case study showing the influence of economic development on a region and resilience to the effects of natural hazards over a lengthy period of time.[footnote 104]

Geographers are concerned with the local and the global. They are interested in how local, regional and national decisions have global impacts. They are interested in the relationships between regions and countries, for example in exploring trade and their interdependence on each other. When identifying content, it is important that pupils are able to consider scale and have the ability to 'zoom in' and 'zoom out' in order to view processes and their impact from local, regional, national and international perspectives.[footnote 105]

Teachers and leaders can consider the breadth of the body of knowledge pupils should learn, the organisation of the subject and the interrelationship between locational knowledge, place knowledge, human and physical processes and geographical skills. A high-quality geography curriculum ensures that each form of knowledge gets due consideration.[footnote 106]This supports pupils to recognise the characteristics of a place and so gain the understanding, or meaning, that helps them to know more, remember more and be able to do more.[footnote 107]

Teachers can also develop pupils' disciplinary knowledge as pupils learn more about the content of the geography curriculum. Disciplinary knowledge has been defined as knowing: 'how that [substantive] knowledge was established, its degree of certainty and how it continues to be revised'.[footnote 108] In considering disciplinary organisation, the curriculum should model to pupils the way geographers question and explain the world.[footnote 109] Sometimes this is coined as 'think like a geographer'. This adds rigour to the programme of study. It also strengthens pupils' abilities to bring a geographical perspective to their own studies and to their wider understanding of and encounters with events and phenomena.

'Thinking like a geographer'

The phrase to 'think like a geographer' has long been used. It captures how pupils can learn to:[footnote 110]

- use what they know from one context in another[footnote 111]
- think about alternative futures
- consider their influence on decisions that will be made

This means, for example, that pupils are shown a river or volcano as an entity in itself but also the ways they can think more broadly about its impact. They may consider the impact of a flood or volcanic eruption on people living in the area and their response. Lambert, for example, cites the example of climate change.[footnote 112] He notes that this is a multi-faceted issue and one that exists at many scales, including globally, but also that the impacts can be very different in different locations. This draws on the concept of interconnection. It manifests itself through pupils asking questions such as 'where is this place?', 'why is it here and not there?', 'what is it like?' and 'how did it get like this?'[footnote 113]

These are questions that geographers are best placed to answer. And so, it is important that the curriculum gives pupils the knowledge they need to habitually ask these geographical questions and learn how geographers reach their answers.[footnote 114] In doing so, the curriculum goes some way to reveal the ways of geographers to pupils.

Based on the above, high-quality geography education may have the following features

- Leaders who plan the curriculum appreciate that the body of knowledge covered by geography is vast. They make informed and careful choices about what is taught. This may go beyond the content prescribed in the national curriculum. For example, they may choose to explore particular phenomena that are prevalent in the locality.
- The curriculum includes the most appropriate examples and case studies to demonstrate each aspect being learned. These are always real and relevant to the content.
- When introducing new component knowledge, teachers make sure that pupils can relate this to what they already know, so that they build a strong schema and so remember more. Teachers emphasise this interconnectedness between forms of knowledge to help pupils do this.
- Through careful curriculum design, each form of knowledge receives due consideration. Pupils build their knowledge both within the form and in how each form relates to others. Crucially, the interplay between each develops pupils' secure geographical thinking.
- Leaders appreciate the structure of the subject, so their curriculum plans are constructed effectively to ensure that pupils know more, remember more and are able to do more.

Thematic or topic-based approaches

The task of sequencing geographical content is complex. When considering the curriculum as the progression model, what pupils are to know needs to be identified precisely and sequenced clearly. There needs to be a clear progression 'map' for each subject. The challenge of doing this in a topic-based or cross-subject approach is extremely complicated. But this approach is common in many primary schools and special schools.

Thematic or topic-based approaches are designed to make the most of a multi-disciplinary structure in a school. However, in such an approach the clarity of the curriculum goals can be lost. Potentially, one subject can dominate at the expense of the others. This is especially the case if a teacher's subject knowledge is stronger in one subject than others. Add to this the notion that the knowledge to be learned must build, within its own discipline, on what is already known and look forward to what is next to be learned. Furthermore, each subject has its own disciplinary structure to be respected and substantive knowledge to be learned. It is particularly challenging where subjects have different structures as, too often, the integrity of one or more subjects can be lost to another. Furthermore, there are 'discontinuities in the methodological skills' across disciplines.[footnote 115]

With all this in mind, to construct this kind of curriculum approach across subjects requires the most expert teachers with strong multi-disciplinary knowledge.

Based on the above, high-quality geography education may have the following features

- Over time, curricular goals are increasingly challenging. For example, they may increase in complexity, consider more variables, make multiple comparisons or require the application of abstract ideas.
- Teachers revisit content taught previously in order to introduce new, more complex knowledge to deepen pupils' understanding.
- In cross-subject or thematic approaches, each subject is carefully planned to ensure that pupils can make progress in each subject. The curriculum goals retain subject specificity.
- In planning a thematic curriculum, teachers are aware of the disciplinary nature of the subject. Their plans respect these disciplinary structures.
- Staff who plan thematic approaches are sufficiently expert in each discipline. They have a secure appreciation of how geography relates to other subjects and use this to develop clear plans.

Selecting examples and case studies

When considering how best to teach pupils about a particular phenomenon, teachers give considerable thought to their selection of examples or case studies.[footnote 116] Contextualising geographical phenomena to particular locations or events expands and extends pupils' knowledge of the world. Their studies should take them beyond their own experience and allow them to appreciate how their own lives are affected by the phenomena explored through examples and case studies.[footnote 117] However, care should be taken so as not to limit pupils' understanding of a particular event. For example, Bangladesh is often only studied as the location of river floods. This denies pupils the full appreciation of the diversity of the country.[footnote 118] Some studies advocate a 'multi-faceted approach' to explore a range of topics through the case study.[footnote 119] This allows pupils to gain richer and deeper geographical knowledge and to see the links between different factors.

Each place is unique and is continually changing. Ultimately, the examples and case studies chosen should help pupils to appreciate the diversity of cultures, environments and economic settings and how they change both in time and by location. Pupils' place knowledge is particularly strengthened by studying case studies. Drawing on different perspectives, such as Freeman and Morgan's '3 lamps' model helps pupils to deepen their appreciation of the location and its people, cultures and environmental conditions.[footnote 120]This is the point at which the concept being explored becomes 'real'.

Some geography educators advocate that teachers should go to primary sources to ensure accuracy and currency of case studies.[footnote 121] This ensures the authenticity of the representation and can personalise the case study. Case studies should help pupils build knowledge of the world and provide an opportunity to use GIS in order to turn the space into place knowledge. In doing so, the connectedness of the subject is further embedded.

Across the programmes of study, the examples and resources used should be of a sufficiently wide range, at varying scales and complexity.[footnote 122] This allows pupils to apply their knowledge in different contexts. Over the course of study, they should develop an appreciation of generalisations, models and theorisation. Bennetts exemplifies this, taking individual concepts, drawing out generalisation and then modelling, or theorising, as shown in the table below.[footnote 123]

	Concepts	Generalisation	Model/theory
Weather and climate	Weather, climate, depression, anticyclone, air mass, weather system	Britain's weather and climate are variable due to Britain's position in relation to the global atmospheric circulation	Global atmospheric circulation
Urban settlements	Town centre, inner city area, suburb, suburbanisation, re-urbanisation, transport network, accessibility, land-value surface	The land use pattern of a large town or city is a consequence of innumerable decisions, made by individuals and organisations, about the value of different locations for various purposes	Urban land-use models (for example, Burgess, Hoyt, Harris and Ullman, Mann); bid rent theory (Alonso)

There is also a need to ensure that examples and case studies, data and images are appropriate. Older resources may portray inaccurate or outdated stereotypical representations. There is a risk of a 'single story' being presented of people and places.[footnote 124] The 'single story' shows people or place as only one thing, over and over again. Then that is what they become in pupils' minds.

Past geographical events should not be presented as if they are representative of the here and now. It is important, therefore, that teachers critically reflect on the imagery, data and attitudes they portray and the messages that are conveyed to pupils, even unwittingly. This is particularly pertinent in light of current thinking about matters such as ensuring that geography accurately represents the nature of the world's people, their communities, economies, diversities and experiences.[footnote 125]

Also, there is a temptation to piggy-back on contemporary media representations. For teachers, the foremost consideration must be what geography is being learned and how their teaching is building up pupils' knowledge step by step. Films and documentaries are appealing for the quality of their production, but they often cover complex composite ideas without exploring the component knowledge that pupils first need to understand.

Based on the above, high-quality geography education may have the following features

When selecting case studies and examples, leaders and teachers take great care in:

- accurate representation
- avoiding portraying a 'single story'
- ensuring sufficient depth of understanding
- reflecting the dynamic nature of geography
- supporting pupils to see the interconnected nature of the subject
- broadening pupils' knowledge of the world
- fostering a sense of place
- supporting pupils' appreciation of generalisations and models

A further dimension to be considered through curriculum design is the nature and conventions of the discipline – disciplinary knowledge.

Disciplinary knowledge

In geography, unlike some other subjects, there is not a commonly held view on what disciplinary knowledge is. Disciplinary knowledge can be viewed as the connection between the academic discipline and the school subject. As the scope of geography is complex, so the discipline is too. Broadly, disciplinary knowledge introduces pupils 'to specialised forms of knowledge, modes of thought and experience, which are the symbolic products of past human endeavours to better know the world and the people within it'.[footnote 126]

Research states that the 'task of academic geography is to inform, challenge and conceptually re-wire people's understanding of the world'.[footnote 127] This gives some insight into the disciplinary knowledge of geography. Other research highlights the importance of initiating pupils into how geographers develop their own thinking.[footnote 128] An example would be generalisation, which allows pupils to go beyond their everyday experiences and gain 'insights and understandings'. Consequently, the geography curriculum in schools should allow pupils to gain an understanding of the interconnectedness of the subject and give some insight into the ways of academic geographers.

Teachers need to consider how pupils gain an insight into the discipline when planning the curriculum.[footnote 129] Through their experience of geographical education, particularly through critical evaluation, the nature of the discipline can be revealed to pupils.

One way of doing this is through the 'powerful knowledge' approach.[footnote 130] This approach emphasises pupils' need to learn about disciplinary knowledge, in particular that knowledge is 'open to debate, challenge and discussion by subject experts'.[footnote 131] Through building from pupils' personal and 'everyday' geographies in 'dialogue with the academic', there can be 'the possibility of the creation of new knowledge that can give learners a sense of social and environmental agency'.[footnote 132]

Given the complexity of disciplinary knowledge in geography, research suggests that 'subject-specialist, qualified, professional teachers are key to the process'.[footnote 133]

Based on the above, high-quality geography education may have the following features

- The curriculum is designed to allow pupils to see that geography is a dynamic subject where thinking and viewpoints change.
- In developing pupils' disciplinary knowledge, teachers' plans allow pupils to:
  - take a holistic view of the content studied
  - establish whether the geographical questions posed, the methods used, and the answers found are valid
  - recognise the interconnectedness of different geographical content

- appreciate what it means to be a geographer by asking geographical questions such as ‘why is this place like this?’, ‘how is this place changing?’ and ‘how are other places affected?’
- Disciplinary knowledge ensures that pupils appreciate the context in which substantive knowledge was generated. This helps pupils to appreciate context and the perspective from which knowledge was created, different standpoints and how views have changed as time has moved on.

Misconceptions

In exploring the here and now of the world’s people, places and environments, geography teaching has a specific responsibility to tackle misconceptions that pupils may hold about people’s lives, in the United Kingdom and across the world.

Either from their own experiences or inferences, or from inaccurate teaching in the past, many pupils approach their geographical learning with misconceptions. These are often deep rooted, for example the assertion that ‘they come to our country and take our jobs and leave us on the streets’ in an article on pupils’ comments made when teaching about immigration.[footnote 134] Other researchers cite numerous examples in physical geography where pupils demonstrate misconceptions drawn from their own experiences, such as the belief that the sun moves across the sky or that humid air has greater density than drier air.[footnote 135] It is noted that myths, superstitions, children’s fiction and news reports influence pupils’ thinking. Furthermore, research highlights stereotypical, out-of-date or overly simplistic representations of processes or their impact in textbooks and ‘imperfections’ in teachers’ knowledge.

The role of the teacher is to tackle these misconceptions (or errors) so that pupils are able to properly understand the phenomena that are being studied.[footnote 136] To do so, it is fundamental that teachers’ knowledge is secure. Understanding pupils’ misconceptions, however ill-conceived they may be, is useful in establishing how best to teach pupils to correct erroneous thinking.

In the case of tropical cyclones, pupils may start off with many different explanations of their causes, processes, patterns and impacts. For example, pupils may hold beliefs about matter and the fact that stationary air does not occupy space, have mass or exert pressure.[footnote 137] Also, they may have an absent or misguided view of air pressure and the global heat budget, perhaps only a partial appreciation of the water cycle and limited understanding of the properties of matter. All of these are critical components that lead to the formation and processes of tropical cyclones. If any component is misunderstood, then pupils’ overall understanding of the tropical cyclonic system is impaired. Therefore, it is critical that teachers plan learning activities that identify what pupils misunderstand.

A further contributing factor to misconceptions may be how terminology is used in different ways. In geography, particular language has specific, and often detailed, meaning. Everyday use of the same terminology can often lead to pupils having a naïve understanding of it. For example, many children are familiar with the term ‘oasis’. They may associate it with peace or calm. Few are likely to appreciate that it is the geographical term for a fertile area in the midst of a desert due to the presence of water.[footnote 138] Importantly, through their teaching, teachers ensure that pupils have an accurate, subject-specific understanding of the terms that are used.

In planning teaching activities, it is important that the sequencing of content is thought through carefully. It should build pupils’ knowledge and skills progressively. Pupils will need sufficient time to gain the knowledge they need and to apply their learning. These conditions are critical if misconceptions are to be avoided. During lessons, teachers should be alert to pupils’ misconceptions and use techniques to help pupils gain the clarity they need. ‘Corner-cutting’ in teaching content and not doing it deeply enough often lead to pupils’ misconceptions.[footnote 139]

Based on the above, high-quality geography education may have the following features

- Teachers correct pupils’ misconceptions through secure subject knowledge and effective teaching approaches. They also ensure that their own teaching is accurate and clear. This means that pupils learn the individual building blocks before moving on to broader composite (or conceptual) knowledge.
- Teachers respect that in many aspects of geography there is a necessary order to the sequence of learning.
- Teachers teach content thoroughly without ‘corner-cutting’.

Curriculum structure

Over time, the curricular goals should be increasingly challenging. A high-quality geography curriculum takes a pupil from learning the basic building blocks to developing in-depth knowledge.

In a well-structured curriculum, the prior content that pupils have remembered allows them to understand the conditions, processes and interactions that explain geographical features, distribution patterns and changes over time and space. Building pupils’ knowledge in this way allows them to make comparisons with an increasing number of different contexts and at different scales. Thus, the curriculum helps pupils make greater sense of the world by organising and connecting knowledge and ideas about people, locations, processes and environments.

Through their geographical education, pupils should become increasingly aware of generalisations and models. Older pupils need to be able to apply this knowledge in their studies. Consequently, the curriculum supports pupils’ appreciation of space, place and interdependence: 3 of geography’s ‘big concepts’.

Components, composites and schema

In mapping progression over the course of a programme of study, a well-constructed curriculum sets out the substantive knowledge that pupils need to learn in a connected way. To do so, critically, the curriculum identifies this substantive knowledge in components or small chunks. For example, in the early years and key stage 1, these components include associating geographical features or processes with the language used to describe them and more generally equipping pupils with the common vocabulary that geographers use.

This builds a strong and increasingly complex schema, or interconnected web of knowledge, that helps pupils to connect individual pieces of knowledge (components) and remember it in the long term.[footnote 140] A curriculum designed in such a way ensures that the breadth of knowledge is covered and that pupils remember more of the content studied. A well-structured geography curriculum is also likely to generate curiosity which, in turn, encourages pupils' motivation.[footnote 141]

Sequencing

By learning each component in an ordered way and appreciating how one component relates to another, pupils gain a composite knowledge of a geographical process or phenomenon. A review of curriculum changes in South Africa notes the need for 'careful and deliberate sequencing of learning so that learners can build on their prior learning and prepare for their future learning'.[footnote 142]

In the early years, pupils need to first learn the vocabulary associated with describing the weather, often gained through activities that require them to observe the elements of weather (precipitation, wind, temperature and so on). The curriculum then requires pupils to recall this knowledge subsequently to learn that certain combinations of weather relate to the seasons. For example, in the UK, we typically associate cold temperatures, and perhaps snow, with winter. This early start to gaining geographical knowledge requires that pupils acquire and remember the language that is common to the subject and comprehend how it translates to outdoor atmospheric conditions. From here, curriculum can begin to build a geographical knowledge of where these conditions are typically found through learning about climate belts and later study into biomes.

When pupils have learned and retained knowledge through their primary education, they can also build on their appreciation of why certain phenomena happen. For example, they may learn about the water cycle. When pupils have this knowledge secure, then at secondary school they can learn about atmospheric processes, such as air masses and fronts, and consider the global circulation model, leading to A-level study of features such as Rossby Waves.[footnote 143] Consequently, over time, the complexity of pupils' knowledge can increase. Therefore, curriculum goals can become progressively more complex and challenging as pupils' knowledge increases. This can be seen, for example, in increasing the distance from pupils' experiences, abstraction, precision and interconnectedness.[footnote 144]

It is important to note that some geography content links with other curriculum areas, particularly science. This can lead to some challenges, as matters specified for particular year groups may not align with the preferred sequence in geography.

How knowledge is remembered

Pupils need to draw on prior knowledge to learn more complex ideas. Therefore, key content needs to be not just briefly understood but to be remembered in the long term. A well-structured geography curriculum will help pupils to do this.

Typically, the curriculum organises and repeats substantive and disciplinary knowledge in ways that show pupils how each component fits together and how each composite idea fits with others. Through this, pupils gain a secure grasp of well-connected pieces of knowledge and consequently know more, remember more and are able to do more, thus making good progress in the subject. Similarly, pupils have developed their disciplinary knowledge as they engage critically with the content. Curriculums help pupils build an effective schema when they further embed previously learned knowledge in memory through recall and review, build on what pupils know and increase both the quantity and complexity of content and disciplinary appreciation.[footnote 145]

Teachers consider the knowledge they have selected, what they emphasise, the order in which they teach it, and how they assess pupils' grasp of it. Selecting the knowledge has been covered in the previous sections, so we now turn to the organisation of the curriculum.

Based on the above, high-quality geography education may have the following features

- The knowledge pupils learn is well organised with clear connections between components, which means they are more likely to remember it in the long term.
- The curriculum builds on pupils' prior learning and re-visits the content, which supports pupils in developing strong schemata.

Pedagogy

Summary

The approaches teachers take are critical when translating the planned curriculum into effective experiences that allow pupils to learn and remember new content. Research shows how, through the choices they make about their approaches, teachers can helpfully promote pupils' spatial thinking, improve their efficiency and gain insight into the way of geographers (disciplinary knowledge).

Research also notes the risk of the curriculum being driven by popularisation, while acknowledging the motivational effect that this can have.

Pedagogical considerations

Geographical education has been described as being trifold: 'the phenomena that is concerned with the subject content that is taught, the way it is taught and how we will know if students have learnt what has been taught'.[footnote 146] Having identified the content and its rationale in the curriculum, the ways in which teachers identify and plan activities (pedagogy) is critical if pupils are to gain the knowledge and skills, and develop their empathy, values and perspectives.[footnote 147] Through their chosen approaches (pedagogical choices) to implementing the curriculum, teachers need to ensure that pupils build both the forms of geographical knowledge and develop their disciplinary knowledge.

In high-quality geography education, teachers are clear about the rationale for the teaching approaches they adopt and why they are successful. In doing so, teachers give considerable thought to how pupils learn geographical content most effectively so that they are able to reach ambitious curriculum goals.

In this section, we are covering the pedagogical considerations of spatial thinking as opposed to the knowledge (or skills) as is often presented.[footnote 148] When pupils have the necessary knowledge of geographical concepts and tools, teachers can develop pupils' spatial thinking by contextualising subject content spatially. This can range from considering the implications of locations in non-fictional and fictional texts to identifying distributions, patterns and relationships.

Drawing pupils' attention to scale and interrelationships using maps in all subjects gives pupils a visual representation that fosters spatial thinking. Several researchers argue the importance of the concept of space that pupils will gain through familiarity with maps to give them a spatially organised frame of reference that links geographical content and concepts.[footnote 149]To do this, teachers may ask pupils to create their own mental (or 'memory') maps.[footnote 150] They can also highlight to pupils the links between physical and social features and their location through digital technologies such as GIS, which allows pupils to plot data sets (for example, the prevalence of crime in certain areas) onto base maps that can be analysed.

Through teaching approaches that require pupils to consider spatial representations, pupils consolidate their appreciation of scale and interrelationships. Spatial representations also set the reference frame within which pupils can solve problems and make decisions.

Memory

In order for pupils to know more, remember more and be able to do more, teachers need to think carefully about the activities they use to put the planned curriculum into practice. The working memory has limited capacity and so teaching must not overwhelm this.[footnote 151] Teachers can avoid overloading working memory by devising activities where the most important knowledge components are relatively few in number, and by identifying tasks that help pupils secure that knowledge.

It is important for pupils to practise what they have learned. Repeatedly recalling previously taught content (retrieval practice) and revisiting content in lessons (spaced practice) have been shown to be effective.[footnote 152] To ensure that information moves from pupils' working memory to long-term memory, the content can be broken into small chunks of material. This reduces cognitive load and gives pupils the opportunity to connect related ideas, which improves pupils' fluency and allows more knowledge to be learned.[footnote 153] It also strengthens the schema that pupils are building, as they see the relationship between prior learning and new knowledge. For example, we often see this when pupils are learning map skills, especially grid references. Where pupils have automaticity in working out 4- or 6-figure grid references, it is because they have practised to the point that they need give it little conscious thought. The same is likely to be true where pupils have strong recall of the location and features of countries relevant to the case studies they are learning.

Based on the above, high-quality geography education may have the following features

- Teachers avoid overloading pupils' working memory. They break larger concepts or ideas into smaller 'bite-size' chunks and teach a small number of these
- Pupils commit knowledge to their long-term memory through recalling and repeated practice
- Pupils are efficient at carrying out tasks such as using grid references because they practise their procedural knowledge regularly

Carrying out enquiries and making decisions

Before exploring enquiry-based learning, it is important to distinguish between geographical questions as an organisational tool and as a pedagogy. In the former, the teacher poses a geographical question and selects the curriculum content that allows pupils to reach an answer. As a pedagogy, geographical enquiry is described as 'any activity that opens up problems and issues, encourages questions and begins to find solutions'.[footnote 154]

Within the geography education community, there is a long tradition of using enquiries, including decision-making exercises. Although no longer explicitly set out in the national curriculum, the enquiry approach is still reflected in GCSE specifications and in the non-examined assessment at A level. Studies have advocated for this approach because it can support pupils gaining an insight into disciplinary knowledge.[footnote 155] Drawing on her earlier work, Roberts identifies 4 essential characteristics of an enquiry-based approach:[footnote 156]

- it is question-driven and encourages a questioning attitude towards knowledge (including posing geographical questions)

- pupils analyse geographical data and sources of information as evidence
- pupils interpret information for themselves to develop understanding
- pupils reflect on their learning

In undertaking enquiries, pupils process and connect knowledge. The challenge is that this can place substantial cognitive load on pupils who are relative novices. We know that novices do not have the same success with more open-ended learning tasks as experts. [footnote 157] When enquiry-based pedagogies are used successfully, a number of factors set out in Ofsted's research on learning and memory are likely to have been taken into account.[footnote 158] Teachers can ensure that pupils' working memory is not overloaded by:

- checking that pupils are secure in the prior knowledge they need to carry out the enquiry
- structuring tasks carefully, such as ensuring that there is sufficient teacher instruction, guidance and scaffolding for pupils to learn the intended content[footnote 159]

In doing so, teachers can ensure that pupils have the capacity to learn and apply their knowledge successfully.

Based on the above, high-quality geography education may have the following features

- Pupils are proficient in carrying out enquiries and decision-making exercises because they are secure in the prior knowledge they need for these.
- Carefully structured tasks give pupils sufficient instruction, guidance and support.
- The enquiry approach supports the development of pupils' disciplinary knowledge. For example, it increases their capacity to recognise and ask geographical questions, and to critique sources and reflect on what they have learned, as well as the methods used.

Special educational needs and/or disabilities

Very little has been written about geography education for pupils with special educational needs and/or disabilities (SEND). In our set of inspections of outstanding mainstream primary schools, we found that schools had rarely found it necessary to make changes to the curriculum for pupils with SEND but had often modified their teaching approaches.[footnote 160] There is a need for all pupils to share the same curriculum, with the same level of ambition and expectation of the geographical knowledge that pupils should know.[footnote 161] In the case of pupils with the most complex learning needs, there may be occasions when it is appropriate to modify the curriculum. However, this will be the exception.

Several authors note that, in modifying teaching approaches, appreciating each pupil's specific needs dictates the changes that need to be made.[footnote 162] For example, teaching visually impaired pupils may necessitate enlarging texts, using clear fonts, using overlays or printing on paper of a specified colour.[footnote 163] These pupils may also benefit from relief models for mapwork or audio description of images. Dyslexic pupils may benefit from well-spaced print.

Gaps in pupils' knowledge are likely to be one of the main barriers to making good progress. In 2 studies, researchers showed that, where pupils with SEND were not fluent in component knowledge, they experienced difficulties.[footnote 164] Although we know this to be true for all pupils, these reports highlighted its significance for pupils with SEND. Teachers must be alert to the specific gaps in knowledge that these pupils may have so that they can prioritise the concepts that are most fundamental to future learning. For example, pupils in key stage 3 should understand how human activity relies on effective functioning of natural systems. In order to do this, teachers need to know how securely pupils understand the water cycle and carbon cycle before moving on to look at human reliance on balanced ecosystems.

Teachers can identify and break down the components of the subject curriculum into manageable chunks for pupils who find learning more difficult, particularly those with cognition and learning needs. These may be smaller 'steps' than those taken by other pupils. For example, for some pupils to understand glacial landforms, specific teaching about climate change over geological time and weathering and erosion processes may need to be more explicit and broken down into individual components.

In many schools, teaching assistants are deployed to support pupils with SEND.

Studies note that few teaching assistants have the same geography content knowledge as the teacher.[footnote 165] Consequently, it is important that teaching assistants are briefed sufficiently about the content for the pupils they support. With expert input from the school's special educational needs coordinator (SENCo) and other specialists, teachers can work with teaching assistants to discuss their approaches. Where necessary, they can appropriately modify their curriculum or pedagogy to meet pupils' needs, as set out in their education, health and care plan or individual education plan.

For pupils with physical disabilities, teachers have to make adjustments both in the classroom and to the ways in which fieldwork is carried out. Depending on the nature of disability, this may involve selecting locations (and sampling sites) carefully or adapting itineraries.[footnote 166] Furthermore, it may be possible to use additional adults to support pupils' mobility or adapt resources so that pupils with SEND can engage fully.

Pupils with colour-vision deficiency (colour blindness) face particular challenges when analysing multi-coloured resources, particularly maps. Teachers should ensure that the resources (including digital resources) are accessible to pupils with colour-vision deficiency. [footnote 167]

There is no single teaching strategy that meets the needs of all pupils with SEND.[footnote 168] However, ensuring that there are adequate structures and sufficient scaffolding in place to support those who need it is crucial. Fundamentally, planning to ensure that pupils with SEND make strong progress is likely to have a positive impact on all pupils. Teachers' expectations should be suitably high for all pupils. Too often, however, the focus is on teaching to the middle and so many pupils with SEND and those who struggle are likely to fall further behind.[footnote 169]

Based on the above, high-quality geography education may have the following features

- Pupils with SEND generally study the same curriculum scope as other pupils.
- Teachers have the same level of ambition for all pupils. They use specialist advice to adapt their teaching approaches where necessary.
- Teaching assistants are well briefed in the geography that is to be learned and the approaches taken. Teachers and specialists, including the SENCo, support them in their role.
- Classroom resources and fieldwork are adjusted as required to ensure that all pupils take part.

Pupils' motivation and interest

A number of factors that motivate and engage pupils have been identified over the years. Research shows that pupils are more motivated when they learn new knowledge that they can link to what they already know.[footnote 170] There has been research that suggests that interest in the subject content is the best stimulus for engaging and motivating pupils.[footnote 171] Drawing on research from other subjects, there is evidence that success leads to intrinsic motivation, although this finding is not evidenced in reverse.[footnote 172] Therefore, the importance of ensuring that pupils acquire a secure grasp of the content they learn cannot be underestimated as a source of motivation.

In geography, interest can be promoted in different ways.

The selection of content has to be carefully considered. It may be that an event that has affected pupils or is of particular interest to them helps the teacher in selecting other examples that pupils can relate to or in emphasising a particular aspect of geography.[footnote 173] For example, if pupils live in an area of a city that is experiencing redevelopment or where an industrial development is being constructed, this can give a useful 'way in', or 'hook', to the teaching of urban morphology.

Many teachers use contemporary headlines in the media to engage pupils in learning effectively. Some studies support this and comment on the need to introduce 'fresh topics and new perspectives' as a means of motivating pupils and expanding their knowledge.[footnote 174] Sometimes, however, the discussion stimulated by such headlines marginalises the geographical knowledge that can be learned, for example in favour of political or moral debates about how much humans value the earth. It is important that the geographical knowledge that is to be learned is not lost.

Using both personal experiences and media headlines to spark pupils' interest in geography can be effective. But there can be risks associated with these approaches. In using personal experiences, teachers need to be aware of potential narrowing of the curriculum. They need to give careful thought to other, similar and contrasting, examples. Comparison as a cognitive process is valuable in identifying common features and generalising but also in comparing differences and similarities.[footnote 175] If teachers use topical issues in the media, it is important they keep their attention tightly focused on the geography that they intend to be learned. Often, the concepts that are broadcast on media channels are in fact high-level, challenging and complex. Teachers need to ensure, therefore, that pupils have learned the underpinning knowledge sufficiently well in order to have the level of understanding needed.

Encouraging pupils to be responsible citizens (often teachers' intention when using media coverage) and ensuring that they appreciate their role and impact on the world, such as in sustainability, is a function of schools. Geography provides a clear framework for this learning.[footnote 176] However, this should not lead to teachers advocating a partisan perspective.

Based on the above, high-quality geography education may have the following features

- Through its very nature, geographical knowledge is stimulating and motivating. Teachers make the most of this and use many thought-provoking aspects of geography in the curriculum.
- Teachers motivate pupils by building on what pupils already know, ensuring that they experience success.
- Events or locations that interest pupils may be chosen to exemplify specific aspects of geography.
- When using personal experiences to generate interest, teachers manage the risks of:
  - narrowing the geographical curriculum
  - politicising teaching
  - losing subjectivity.
- Teachers use examples carefully to compare and contrast, as well as to stimulate interesting discussion.
- When using contemporary media coverage to engage pupils, teachers ensure that the geographical knowledge to be learned is always at the forefront of their teaching. Teachers are alert to the need to check that media content is geographically accurate.

Assessment

Summary

It is helpful if teachers evaluate how secure pupils' prior learning is in order to plan lessons. They need to know what difficulties pupils may face. Teachers need to appreciate any misconceptions that pupils have as well as any gaps in pupils' knowledge. Findings from assessments inform teachers about how to adapt their teaching appropriately and build on what pupils know.

The importance of assessment

In a 2021 review of formative assessment, the Council of Chief State School Officers stated that formative assessment is a 'planned and ongoing' process.[footnote 177] Research also notes that, taking the curriculum as the progression model, any judgement of progress is an evaluation of how much knowledge pupils have learned and remembered.[footnote 178] Assessments should check what pupils know, check their understanding and ensure that pupils have remembered the curriculum content in the long term.

Evaluating the progress that a pupil has made is therefore a multi-faceted operation. Assessments may happen in a range of ways, such as through questioning, short tests, longer synoptic tests, extended writing, decision-making exercises, and self- or peer-assessment.[footnote 179]

Class teachers should use assessments that are designed to check that the intended curriculum has been covered and that identify how secure pupils' knowledge is. Research has found that this kind of assessment flags any areas that may need further teaching and highlights any misconceptions that pupils have. Equally, it identifies aspects that pupils quickly grasp.[footnote 180]

It is likely that teachers will want to establish what pupils already know at the start of the academic year, particularly when pupils have moved to the next key stage.[footnote 181] Carefully crafted, these diagnostic (baseline) assessments provide a useful insight into pupils' knowledge and what may need to be taught again and help to ensure that the curriculum is well balanced.

Formative assessment

Assessments allow pupils to demonstrate what they have learned, appreciate areas where they need to revise or identify what they need to do to improve further. In a systematic review of assessment in geography education, formative assessment (or assessment for learning) was found to have a significant impact on pupils' outcomes, their motivation, and their autonomy in learning.[footnote 182] Students with an understanding of assessment criteria – focusing on the knowledge to be drawn on – could more effectively articulate quality and interpret teacher feedback to improve their scores.[footnote 183]

For some pupils, assessment is motivational in itself. However, it is noted that this tends to be the case for those pupils who anticipate success.[footnote 184] There is a clear risk here that the attainment gap widens. It is critical, therefore, that the curriculum and its assessment are carefully designed and implemented effectively. This should make sure that all pupils know more, remember more, and can do more, and so experience success.

Studies indicate that retrieval practice enhances recall, particularly when questions are drawn from recent teaching and that in the further and far past.[footnote 185] In completing these activities, pupils can 'over-learn' concepts and procedures, increasing their fluency. Similarly, observing pupils' questioning and discussions in class is an effective method for teachers to establish pupils' understanding on a day-to-day basis.[footnote 186] When used in this way, assessment can move pupils on in their learning.

Summative assessment

Assessments are also used to issue graded qualifications, to make selection choices (such as for university admission) and for accountability purposes. Typically, these focus on more summative approaches at the end of a course of study, where an extensive body of geographical knowledge is assessed.

Although summative tests and exams at the end of a course serve these purposes, they also pose risks if they are used throughout a course or if the assessment criteria are extrapolated to progress measures.

First, they typically assess a broad body of knowledge. It is not until the end of the course of study that pupils have the breadth of knowledge, depth of understanding, appreciation of the interconnectedness of components from each form of substantive knowledge, and disciplinary knowledge to attempt these assessments. Therefore, they are not so useful for diagnostic purposes and are likely to be used infrequently.

Second, the criteria were not written to be broken down into milestones. Consequently, using GCSE criteria to evaluate progress from Years 7 to 11 in a secondary school presents a flawed picture.

Finally, fixing attention on a terminal assessment or exam runs the risk of narrowing the curriculum. If particular geographical concepts are omitted from the curriculum, for example weather and climate, then pupils will struggle to comprehend the systems that lie behind many geographical processes. As a result, pupils' responses will lack a detailed understanding and full appreciation of phenomena and their impact.

Progress tracking

Since levels were removed from the national curriculum in 2014, school leaders have looked to other ways of tracking pupils' progress.

Many secondary schools have constructed models of progress and target-setting based on key stage 2 outcomes in English and mathematics national curriculum tests. These have often identified specific points that a pupil, having reached a particular level of attainment in English and/or mathematics at the age of 11, should reach each term as they progress through key stage 3.

The nature of the geography curriculum, being cumulative,[footnote 187] means that knowledge of complexity is often not reached until pupils are nearing the end of the key stage.[footnote 188] In fact, many concepts are not properly appreciated until key stage 4 or even sixth-form study. Linear progress ladders therefore do not serve the subject well.[footnote 189]

Workload

Assessment systems must be manageable and useful for both pupils and staff. The potential to overwhelm teachers' workload is significant. Careful thought should be given to ensure that assessment, in whatever form, can provide pupils and teachers with an indication of how secure pupils' knowledge and understanding are.

In formative assessment, pupils need to be clear about what they are to do to improve, and teachers should use their findings to adapt their teaching.

Based on the above, high-quality geography education may have the following features

- Assessments allow pupils and teachers alike to appreciate what has been learned.
- Teachers are clear about the assessment criteria, which both helps pupils to improve their attainment and motivates them.
- Assessments are designed so that teachers can identify specific gaps in pupils' knowledge and any misconceptions.
- Assessment information flags areas where pupils have a secure knowledge and where they need some aspects to be retaught. If there are common issues, leaders review and adapt the curriculum.
- Teachers recognise that progress is rarely linear due to the cumulative nature of geography.

Culture, policies and systems

Summary

A high-quality geography education depends on the priorities established at a whole-school level. Fundamentally, the expertise and professional development of teaching staff have a significant impact on the curriculum and its implementation. This is especially true in geography because few primary teachers and a substantial proportion of secondary teachers have not studied geography beyond A level.

Other considerations, such as allocating sufficient curriculum time to teach geography, adequately resourcing the subject and the leadership of the subject, all contribute to a high-quality geography education.

Whole-school factors that affect high-quality geography education

Beyond, and often underpinning, the quality of geographical education are the policies, decisions and structures both in schools and in teacher education.

Oates identified 13 'control' factors that operate at a national level.[footnote 190] However, many of these can be usefully explored at school level. Several factors can play a significant role in ensuring a high-quality education:

- professional development
- resources (or support materials)
- institutional structures

We shall look at each of these factors in turn.

Professional development

Perhaps most the most critical factor in ensuring a high-quality geographical education is teachers' subject knowledge. Brooks discusses how encouraging teachers to focus on their 'synoptic capacity' draws together the importance of teachers' professional knowledge of:

- the content (substantive knowledge)
- the nature of the subject (disciplinary knowledge)
- the ways in which they can teach it (pedagogy)[footnote 191]

The first issue to consider here is the low number of geography specialists training to teach. The Geographical Association, Royal Geographical Society and others point out the confluence of too few secondary trainees at a time when the number of pupils is rising.[footnote 192] This in itself presents a challenge. However, it is compounded by the fact that an increasing number of postgraduate trainees do not have a relevant post-A-level qualification in the subject they teach.[footnote 193] Furthermore, a very small proportion of primary trainees have studied geography beyond A level. Initial teacher training courses for primary typically have little time allocated to geography.[footnote 194]

If 'good geographical subject knowledge is a prerequisite for good teaching', then subject-specific training becomes critical. Teachers need to have the knowledge to successfully plan and revise the geography curriculum, as well as to consider their own teaching and the impact that it has on pupils' learning.[footnote 195]

Until recently, the increase in teachers taking 'subject knowledge enhancement' courses before or during their teacher training courses was helping. However, these are no longer available in geography.

The rapid increase in membership of the professional organisations and uptake in subject-specific in-service training in recent years show a recognition that subject-specific insight is essential.[footnote 196]

As geography is a dynamic subject, the need to maintain both up-to-date subject knowledge and also to engage in discourse about the nature of the subject and pedagogy are key. Many authors identify the supportive role of the Geographical Association and the Royal Geographical Society (with the Institute of British Geographers) in this regard.[footnote 197]

Non-specialist teachers

With relatively few geography specialists in the primary phase and the increased uptake of geography in key stage 4, the proportion of geography-specialist teachers teaching the subject has decreased.[footnote 198]

Research from primary highlights the outdated image of geography that school headteachers and teachers may have, and the difficulty they experience interpreting the nature of geography.[footnote 199] Limited time in initial teacher education programmes on the substantive and disciplinary knowledge in geography is well documented and compounds the matter.[footnote 200]

One geography educator notes: 'The sad thing is there is so much chance for EY [early years] and primary teachers to be curriculum makers… but, sadly, for so many this is beyond them due to time, capacity, interest, internal/external pressure and accountability.'[footnote 201] This highlights that the need for in-service professional development for non-specialist teachers, in primary and secondary schools, is paramount.

Resources

Access to high-quality and up-to-date resources is an important factor in implementing the geography curriculum. The national curriculum set out some resources that pupils should become more proficient in through their schooling. These include different types of maps (including topographical as well as topological) at various scales (in hard copy and digitally), atlases, globes, aerial and satellite imagery, and GIS.

In order to develop pupils' spatial cognition, teaching about these resources, including their construction and interpretation, is critical. Of course, the world is dynamic both physically and politically. Therefore, it is important that teachers know how locations and features have changed when they are teaching. Atlases should be up to date, reflecting the current names that are used. For example, Eswatini is the African nation previously known as Swaziland and the city of Chittagong in Bangladesh was renamed to Chattogram in 2018.[footnote 202]

The move to web-based GIS has removed some of the challenges that teachers used to face with computing hardware in schools. As with locally hosted solutions, the providers are frequently upgrading the interfaces and functionality. This has a knock-on consequence for teachers as, ultimately, the use of GIS in schools and its effectiveness depends on teachers' experience and expertise. Some studies provide a detailed summary of the features of effective professional development in this area.[footnote 203]

Textbooks and online resources (slide sets, film clips and so on) are also a common feature of geography teaching. As with case study design, critical considerations with these include:

- the purpose for which they were created and their provenance
- the author or producer's representation
- the accuracy of portrayal

For example, older textbooks and other resources may include imagery, maps and data that present an obsolete, inaccurate or inappropriately stereotypical view.

Live, or real-time, data can provide additional stimuli and interest in a topic. Research has noted the positive impact of using live data sources on pupils' knowledge and engagement.[footnote 204] It brings realism and relevance to pupils' studies and allows them to practise geographical skills and apply knowledge of geographical processes in their analyses.

A further consideration in terms of resources is the learning environment. Various researchers have explored how this contributes to developing pupils' sense of place, particularly for younger children.[footnote 205] Findings show how essential it is to have maps and, more so, globes in classrooms.[footnote 206] Having maps and globes around them is shown to contribute to pupils' spatial cognition as well as their locational and place knowledge, from the early years on.

Institutional structures

School leaders and those responsible for governance have a significant impact on the quality of the geography education through the decisions they make.

Subject leadership arrangements, curriculum organisation, the time afforded to teaching geography and the allocation of teachers are all critical factors in ensuring that pupils benefit from a high-quality geography education.

Subject leadership

Similar to the need for secure subject knowledge, geography also needs clear leadership of the subject. Indeed, one of the characteristics of a high-quality education noted in research is leaders' sound subject knowledge and understanding.[footnote 207]

The nature of leadership varies school by school. Many primary school leaders are responsible for the curriculum design and implementation and for leading all teaching staff. In secondary schools, on the other hand, subject leaders typically oversee a small team of teachers who teach geography. Regardless of the organisational structure, the leader must use their subject expertise and experience to ensure that those teaching geography are clear about what pupils are to learn and how it is best taught. This vision should demonstrate how geography contributes to the school's overall aims and ethos.[footnote 208] Of course, many who lead geography, particularly in primary schools, are not specialists. This means that there is an even greater need for subject-specific support and professional networks that they can draw on.[footnote 209]

Geography leaders are also typically responsible for pupils' performance in the subject. Having clearly identified what it means to get better at geography when designing or revising the curriculum and aligning assessments to the content, it should be possible to track pupils' progress.[footnote 210] Through reviewing pupils' work and assessment information, it is possible to track the gains in each pupil's geographical knowledge.

The insight from these and other monitoring activities gives geography leaders a clear understanding of the strengths and relative weaknesses of the subject. From this analysis, they can ensure that any professional development is closely matched to teachers' needs.[footnote 211] It should also help them to reflect on how effective the curriculum is and whether any changes are needed.

Curriculum organisation

Time allocations

The decisions that school leaders and those responsible for governance make about the curriculum are a significant factor in its design and implementation at a subject level. The 'low status' of the subject and the different calls on curriculum time can limit pupils' exposure to geography.[footnote 212]

A 2006 study reported the reduction in time given to teaching geography in primary schools.[footnote 213] The study found that, from 1997 to 2004, teaching time had fallen by a fifth in key stage 1 to 3.8%, and by over a quarter in key stage 2, to 4.1%. Consequently, this placed geography tenth of 12 subjects taught in key stage 1 and eighth in key stage 2.

There is little evidence to show this has changed. Considering the breadth of geographical knowledge that pupils need to learn, it is important that sufficient time is allocated to allow pupils to gain the knowledge they need. Without this, it is likely that a school is narrowing the curriculum.[footnote 214] The position in secondary schools is more positive.[footnote 215]

A further call on time is that for field trips. When pupils go off site, this requires a significant investment of curriculum time. However, undertaking fieldwork is a core part of the geography curriculum and pupils need to practise their geographical skills regularly and in different environments. For some purposes, this is possible on the school site, which is less time consuming. For most, it involves visiting other locations.

Timetabling

Both the amount of time allocated to geography and the way it is organised in the school timetable affect the quality of geographical education overall.

In secondary schools, an increasing number of non-specialist teachers are being used to teach geography. It is reported that the proportion of GCSE hours taught by subject specialists is approximately 80% for the least deprived schools and 70% for the most deprived schools.[footnote 216] In primary education, the proportions are significantly higher.[footnote 217] This means that, when timetabling geography teaching in secondary schools, leaders have to take into account:

- the availability of specialist teachers
- the need to split classes, where one class of pupils is taught by 2 (or more) different teachers for geography, both of whom may be non-specialists
- the classes to which particular teachers, especially non-specialist teachers, are allocated

The ability to apply knowledge requires significant contextual information, including pupils' prior learning, the way in which it was taught and how new content links to other learning.[footnote 218] When different teachers are responsible for a group, knowing how one teacher has introduced the topic and/or related it to others is critical if the second teacher is to build meaningfully on it.[footnote 219] When both teachers may be non-specialists, this may present extra challenges.

When 2 or more teachers are responsible for the same class, this is even more challenging.[footnote 220] It may be that teachers cover different forms of knowledge. However, they still need an appreciation of how other forms are being covered. A carefully constructed, cohesive curriculum that is implemented consistently may help mitigate the impact of split classes. Equally, it may go some way to supporting changes in teacher during or between years.

Based on the above, high-quality geography education may have the following features

- Leaders invest in high-quality, subject-specific professional development for teaching staff. This ensures that teachers have the substantive, disciplinary and pedagogical knowledge they need.
- Teaching staff have a wide range of up-to-date resources to develop pupils' locational knowledge and spatial cognition. They use live data sources to motivate pupils.
- Geography leaders have sound subject knowledge and understanding of the discipline. They ensure that they, and the teachers of geography they support, have clarity about both the content to be learned and effective teaching approaches.
- Geography leaders use their monitoring of pupils' progress to evaluate the strengths and relative weaknesses of the subject. The curriculum is revised based on their findings.
- Sufficient teaching time is allocated to cover the breadth of subject knowledge pupils are to learn. School leaders give careful thought to how geography is timetabled.
- Wherever possible, specialist teachers are allocated to teach geography classes. Non-specialist teachers are well supported and receive further professional development and support in both subject knowledge and the nature of geography.

Conclusion

This review has drawn on a range of evidence to identify the features of a high-quality geography education. High-quality geography is underpinned by sufficiently knowledgeable teachers who have the necessary subject knowledge and appreciation of the discipline. They can construct a curriculum that respects the discipline, contains judiciously selected content, is cohesively organised and is contextualised to the school.

The review shows the significance of a well-planned curriculum, both in terms of what pupils are to learn and how it is organised to ensure that pupils remember what they have been taught. Research from a range of studies shows the importance of sound locational knowledge for pupils. However, international studies show us that this is a weaker aspect of pupils' geographical knowledge. This impedes pupils' abilities to locate features, navigate effectively and appreciate the impact location has on geographical processes.

Similarly, prioritising pupils' understanding of place knowledge brings meaning to the locations and processes that they learn about. When pupils have an appreciation of place, the connections between different geographical processes and locations are revealed.

Through teachers' careful identification of each component of geographical knowledge and thoughtful sequencing, pupils learn and remember more and more. Curriculum plans reflect the importance of each interrelated form of substantive knowledge (locational knowledge; place knowledge; environmental, human and physical processes; geographical skills and fieldwork). They consider each in a proportionate manner and reveal the connections between them. Through teachers' curriculum planning and pedagogical approaches, pupils gain an insight into the discipline. Research shows that this is most effective when pupils build on their existing knowledge.

As pupils progress through their school years, they develop their knowledge from specific examples to generalisations that they can apply in different locations. Pupils will also be developing the range of geographical skills they use. Foregrounding the use of maps is critical in supporting pupils to present spatially organised data and to analyse it using their knowledge of geographical processes. Research shows that pupils learn geographical skills most effectively when they are integrated into the teaching of processes and when pupils have sufficient opportunities to practise using them.

Fieldwork is a mainstay of geography education. Through first-hand data-gathering, analysis and presentation, pupils gain an insight into the discipline of geography. The connections between processes and location are revealed and pupils remember more of what they have been taught.

The literature shows that a well-planned curriculum is implemented successfully when it is accompanied by effective teaching approaches. Research identifies the range of different approaches and specific considerations that teachers reflect on when planning their teaching. The research also notes the risk of misusing popular contemporary media representations when teaching geography as this can limit or skew the content that is taught.

The importance of accurate assessment to ensure that pupils have learned the components of the curriculum is a common feature in the literature. By using assessment information to shape (and sometimes reshape) the curriculum, teaching ensures that pupils remember the content.

The research also highlights the impact of decisions made by leaders and those responsible for governance. Their allocation of resources, time and investment in professional development, as well as their operational decisions, such as timetabling and who teaches which class, all contribute to the quality of geography education in a school.

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