

# Thinking, Inquiring and Literacy skills in Geography

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## *Developing better thinking, inquiry and literacy skills using the Australian Curriculum: Geography*

*This workshop paper focuses on techniques to ignite students' skills of geographical thinking, inquiry and literacy in the Primary and Middle Years. Practical classroom resources are presented and discussed in the workshop, offering methods and content based around the new Australian Curriculum in Geography. It focuses on practical ways of developing geographical thinking; techniques for linking inquiry with skills; and ways of developing language and literacy through Geography. While this session offers a wealth of practical resources for classroom use, participants will also be given a map of Geography's place in the wider world of learning, and an appreciation of the many contributions that the study of Geography makes to a child's education.*

The introduction of the Australian Curriculum: Geography provides new opportunities to revitalize teaching, as well as building on the best practices. In particular, the incorporation of a strand specifically focusing on inquiry and skills, which intertwines and runs parallel to the other strand of knowledge and understanding, points to an important direction in geography curriculum. This strand of inquiry and skills encourages deep thinking. But students need to be taught a variety of ways of thinking, and also shown how skills can be used within inquiry. And because thinking, inquiring, and understanding all depend on capable use of language, the development of literacy within Geography is also essential. Geography is an ideal vehicle for the explicit teaching of literacy skills, through the comprehension and composition of a variety of texts.

Teachers of Geography in both primary and secondary schools can use the Australian Curriculum: Geography as an important vehicle in developing students' thinking, inquiry and literacy skills. For those teachers in charge of a faculty, or with responsibility for justifying time devoted to Geography in the curriculum, the understanding of the efficacy of Geography in developing these important capabilities gives them an influential argument to use within a school about the need for time devoted to teaching Geography. Emphasizing the important part that Geography can play in a student's overall development is a mission that all Geography teachers can take on in their school.

## **Inquiry**

Let's begin with some of the most important questions of the early 21s century:

- How can endangered species be saved?

- Will we be able to feed all the world's population?
- How can we limit further global warming?
- What kinds of jobs, and in what places, will there be for me in the future?
- How can we raise the standard of living of people in the poorest countries?
- What effects will the size and economic power of China and India have on us?
- In what ways can access to places and services be improved for disadvantaged people?
- Will there be an increasing risk from bushfires, floods and droughts in Australia?

The questions above are the kind that are being asked by 21<sup>st</sup> century students. They are broad questions about issues, and they need to be split into smaller parts to be investigated, but they are all major areas of concern to many people.

All of the inquiry questions and issues listed above have some connection with Geography. They deal with:

- different **places** in the world,
- or **environments**,
- or **sustainability**,
- or **interconnections** between places,
- or changes in **spatial** patterns.
- They ask questions about **change** over time,
- and they deal with a variety of **scales**.

These seven ideas reflect the seven key concepts of Geography: place, environment, sustainability, interconnections, space, change, scale.

Inquiring into questions about the world such as those above is a central purpose of Geography. Geographers have always explored the world in various ways. Nowadays, as well as exploring it in person by making visits to areas, they use tools such as maps, aerial photographs, statistics, digital data and many other sources of information. Teachers must combine the learning of **skills** of these geographic tools with the **purpose** of using them to make inquiries about the world.

The stages of inquiry, as described in the Australian Curriculum: Geography are:

- Observing and questioning
- Planning, collecting, evaluating
- Processing, analysing, interpreting, concluding
- Communicating
- Reflecting and responding

Some inquiries will start from the first stage and progress in order through all five stages. Others, however, will be briefer, or have a different focus. They might emphasize some stages and omit others. This difference is a consequence of inquiry being basically an individual activity, often aided by a teacher, and sometimes done by groups, but essentially happening in the brain.<sup>i</sup>

Starting points for inquiries vary in different situations and for different are groups. Some starting points are:

- The need to know
- Stimulus material
- Observations
- Real experiences / visits / speakers
- Questions
- Fieldwork
- Virtual experiences
- Hypothesizing

Research and classroom experience has found that teachers can stimulate inquiry in particular ways: by enabling inquiry, enhancing inquiry, and empowering inquiry.

•*Enabling inquiry*: This is where teachers draw on the students' sense of exploration and inquisitiveness. It should enable children to put forward their own questions.

•*Enhancing inquiry*: This is where the teacher encourages children to take an increasing level of responsibility for identifying the questions to investigate. The teacher challenges the children's questions and approaches, to focus them consistently on matters of geographical relevance.

•*Empowering inquiry*: This is empowering students to structure the way they work, and also helping them to select their approaches and method.

(See Catling, Willy, Butler *Teaching Primary Geography for Australian Schools P.90*)<sup>ii</sup>

When students ask broad questions, such as those quoted at the start of this paper, such questions need to be teased out and refined, so that the students investigate relevant material, and make their thinking as broad and as deep as possible. Broad questions should be split into smaller ones, and these should be further sub-divided. An example of this is shown in the figure below.

# Teasing out broad inquiry questions



## An example of inquiry in Year 7: Water in the World

Stage of Inquiry	Investigating water scarcity	
Observing Questioning Planning	What is a definition of water scarcity? Is it all over Australia? Is it seasonal or permanent?	
Collecting Recording Evaluating Representing	Maps of Australia's climate Climate graphs Diagrams of the water cycle Weather maps Statistics	

## An example from Year 7: Water in the World

Collecting Recording Evaluating Representing	Maps of Australia's climate Climate graphs Diagrams of the water cycle Weather maps Statistics
Interpreting Analysing Concluding	Interpreting graphs Transforming statistics to graphs
Communicating	Written report
Reflecting Responding	Different values about water and its uses

### Skills

To find out some possible answers to questions such as those listed at the start of this paper, students need to develop and use a range of skills. They need to operate like detectives undertaking an investigation. They need to find evidence of many different kinds; locate it in all kinds of places; check the reliability of the evidence; and combine it together to present a case. For all of these stages of investigating, students will need skills in finding, using and presenting the evidence.

To make an effective inquiry in Geography students need a wide range of skills. Some of these are generic skills that are used in any subjects. Generic skills include:

- Finding material using search engines
- Finding the most useful books in the library
- Extracting relevant material from print and digital sources
- Omitting irrelevant information
- Writing clearly in the style needed for the task
- Organizing material logically
- Making the most important points stand out
- Drawing appropriate conclusions from evidence

However there are a group of skills which geographers use most often, and it is these skills which are explained and developed in a number of Geography texts. The most obvious of these are **map skills** because maps show features of place, space, and scale so clearly. **Field techniques, photographs, statistics, graphs, diagrams** are also important to master. Almost all of these can now be created

digitally, and therefore the skills of using and interpreting digital versions are as important as those which use non-digital versions.<sup>iii</sup>

## Grid Check list of Skills use and mastery

SKILL	Used	Used	Used	Used	Used	Mastered	Mastered
Using maps							
Constructing large-scale maps							
Using map conventions							
Using photographs and satellite images							

Students should be challenged often to use the most appropriate skill in a particular situation. For example, in relation to the set of figures shown below, which is the best way of illustrating them visually?

*Which would illustrate these figures best: bar graph? / line graph? / pictorial diagram?*

### Origin of Australian visitors to Byron Bay 2011 (source MacMillan Atlas)

<b>Queensland</b>	<b>41%</b>
<b>Sydney</b>	<b>22%</b>
<b>Regional NSW</b>	<b>20%</b>
<b>Victoria</b>	<b>12%</b>
<b>ACT</b>	<b>1%</b>
<b>Other places</b>	<b>4%</b>

### Thinking skills

There has been a large amount of research and theorizing on what constitutes a comprehensive list of thinking skills. The intention of much of the literature is that, if

teachers and curriculum developers could agree on a list of thinking skills, there would be clearer aims for curriculum, and more correspondence between aims, methods and outcomes.

A major project team at the University of Melbourne has identified and grouped four broad categories of skills needed for the 21<sup>st</sup> century. They are:

1. Ways of thinking:
  - a. Creativity
  - b. Critical thinking
  - c. Problem-solving
  - d. Decision-making
  - e. Learning
2. Ways of working
  - a. Communication
  - b. Collaboration
3. Tools for working
  - a. Information and communications technology
  - b. Information literacy
4. Skills for living in the world
  - a. Citizenship
  - b. Life and career
  - c. Social responsibility

Another group of researchers (Ritchart, Perkins Tishman and Palmer) came up with six types of thinking which develop understanding. They are:

1. Observing closely and describing what's there
2. Building explanations and interpretations
3. Reasoning with evidence
4. Making connections
5. Considering different viewpoints and perspectives
6. Capturing the heart of the matter and forming conclusions

Other researchers have added two more:

7. Wondering and asking questions
8. Uncovering complexity and going below the surface of things

These eight types of thinking are the basis of gaining understanding about a situation, problem, or idea. Thinking to solve problems, make decisions and form judgements may also involve:

1. Identifying patterns and making generalizations
2. Generating possibilities and alternatives
3. Evaluating evidence, arguments and actions
4. Formulating plans and monitoring actions
5. Identifying claims, assumptions and bias
6. Clarifying priorities, conditions and what is known

Putting much of this research and theorising together, I have suggested that the following list of thinking skills covers most of those that we would agree we should aim at in schools.

- Explaining
- Analyzing
- Synthesizing
- Conceptualizing
- Seeing relevance
- Discriminating
- Creative thinking
- Being constructively critical
- Logical reasoning
- Transforming information
- Predicting
- Evaluating
- Empathizing
- Identifying cause and effect
- Comparing
- Futures thinking

## **Literacy<sup>iv</sup>**

### *Types of Literacy*

Literacy is a wide term, and there are certainly many kinds of literacy which are relevant to schools. They include information literacy, media literacy, computer literacy and visual literacy. This article uses literacy as defined in the Australian Curriculum <sup>v</sup> and the notion of different kinds of texts within each subject.

The Australian Curriculum states that: Literacy encompasses the knowledge and skills students need to access, understand, analyse and evaluate information, make meaning, express thoughts and emotions, present ideas and opinions, interact with others and participate in activities at school and in their lives beyond school.<sup>vi</sup> The Australian Curriculum describes in detail the literary continuum which students move through, learning to comprehend and compose texts through listening, reading, viewing, speaking, writing and creating.

As with other subjects, younger students use mainly a 'spoken-like' language, and in the activities, concepts and skills of Geography in the first years of schooling, this kind of language is employed. The 'written-like' language is gradually introduced where it is suitable for the developmental level of the child.

### *The early years – conversations and play*

In Foundation and Year 1, children do much of their learning through play which then generates other learning situations such as conversations. The language which is employed by the children and the teacher is the 'spoken like' language, and this is part of the texts used, such as stories, photographs, picture maps. Children begin school with an



*embryonic geographical background. Children play inside and in the garden or the outdoor area, possibly 'explore' a little, watch television, and talk. Children are taken out and make journeys because parents or siblings go shopping, visit places and meet relatives and friends. Through such experiences the youngest children begin to develop a number of facets of their personal or everyday geographies (Catling, Willy, Butler 2013).<sup>vii</sup>*

Young children learn the location and layout of places they visit often. By the time they are in Foundation year, they are ready to express this in words. They draw on their own experiences, but the more words they have at their disposal, the easier and more accurate is their expression.

Some of the pedagogy which is used in the early years in geography, and which develop Literacy include:

- Using play as a tool to encourage talking about place and space .
- Tapping into children's direct experience of new and familiar places
- Imagining places in stories, drawing them and modeling them
- Developing mental maps of the local area and the rest of the world

### *Middle and Upper Primary*

In middle and upper primary, learning comes from a huge breadth of texts and direct experiences. Geography uses not only written factual material, but much visual filmed material, photographs, maps, (including digital interactive maps on the computer) globes of the world, field trips to new locations, guest speakers, websites with interactive games, interviews and surveys, inquiries into issues and reports of the findings.

From all of these, students can take stimulation to expand their knowledge and their interests. It may be an interest in travel to far-off places, or it may be just the names of far-off places! Some might develop passionate interests in animals of the African savanna; others might be whole-hearted in their desire to improve their environment.

In these years developing complexity of language is important. The Geography experiences listed above can help take students to reading more complex texts, writing for a range of audiences in a variety of forms, giving analytical answers orally or in writing, and organizing more complex ideas.

It is well known that a mastery of language is an important step to mastery of ideas, so development of literacy must go hand-in-hand with the development of all subject areas.

### *Breadth of experiences in Geography useful for language development*

- *maps (on paper)*
- *digital interactive maps on the computer*
- *atlases*
- *electronic atlases*
- *photographs*
- *globes of the world*

- *field trips to new locations*
- *guest speakers*
- *websites*
- *email contact with distant children*
- *story books*
- *films and videos*
- *websites with interactive games,*
- *interviews and surveys,*
- *inquiries into issues*
- *reports of findings*

There are many activities for Middle and Upper Primary students which combine the use of language with the development of spatial reasoning, map understanding and visual literacy. An example of one of these is the use of a written description from which students are asked to draw a map. This involves accurate reading and understanding of the writing, the transformation of that into a spatial image, and the representation of that spatial image as a map with standard conventions which make it intelligible to others.

#### *Word knowledge: Vocabulary*

An important part of literacy is the development of breadth of vocabulary, and Geography like other subject areas has its own set of terminology with many descriptive nouns. Many of these are words which are not confined only to use in Geography, but after explicit teaching of them, students will find them useful additions to their functional vocabulary. Some examples of these are given in the list below.

*A small sample of the developing vocabulary through Geography>*

*Foundation: place, earth, globe, map, plan*

*Year 1: weather, seasons, natural, managed, constructed*

*Year 2: continents, ocean, equator, north and south poles, tropics, hemispheres*

*Year 3: state, territory, border, capital city, mountain range, plain, river valley, desert*

*Year 4: coastal, river basin, alpine, raw materials, wastes, rainforest, savanna*

*Year 5: topography, relief, environmental change, residential, retail, industrial, hazard*

*Year 6: diversity, life expectancy, per capita income, South Asia, indigenous*

Developing Geography vocabulary is not only about acquiring new words. It is primarily about having the words available as part of functional literacy and being able to use them to describe places, spatial features, directions, functions, changes, environments and patterns.

#### **Texts and the Literacy continuum**

Geography, like other subjects, employs its own particular set of 'texts'. For Geography the most common texts used are:

- maps (paper and digital)

- three dimensional models – including the globe of the world
- diagrams
- statistical tables and graphs (numerical data displays)
- photographs (paper and digital)
- factual descriptions
- explanations
- fictional stories (based on geographical concepts)
- interviews
- field study reports

The literacy continuum in the Australian Curriculum suggests a framework for the use of these particular geographical texts for developing language and literacy, as shown in the table below. Each of these texts is comprehended through listening, reading and viewing, and students develop the power to compose each of these through speaking, writing and creating.

	<b>Australian Curriculum: Geography</b>	
<b>Literacy Continuum</b>	<b>Language</b>	<b>Literacy</b>
<i>Comprehending</i> texts through listening, reading and viewing	Expressing and developing geographical concepts	Observing, collecting, interpreting, analyzing, evaluating
<i>Composing</i> texts through speaking, writing and creating	Using appropriate language for interacting and communicating	Creating texts which are effective in achieving their purpose
<b>Literacy Continuum</b>	<b>Language in Geography</b>	<b>Literacy in Geography</b>
Text knowledge	Knowledge of elements of different kinds of texts. Knowledge of structure and organization of different kinds of texts.	Interpreting, analysing, evaluating, concluding within the inquiry approach. Creating texts – explanations, reports, recommendations
Grammar knowledge	Knowledge of sentence structures and word groupings.	Expressing opinions and points of view.
Word knowledge	Using geographical terminology. Spelling terms correctly. Expressing and developing ideas clearly.	Using geographical terminology appropriately and effectively. Choosing words carefully for a purpose.
Visual knowledge	Knowing and using the elements of maps. Recognizing and using statistical data forms. Knowing and using the elements of photography.	Interpreting and analyzing maps. Creating maps on paper and digitally. Analysing statistical data. Interpreting and creating geographical photographs.

One interesting issue about literacy in Geography is that one could argue that a

further 'text' could be added to those discussed above: the landscape. In a study of Geography, a key 'text' that needs to be comprehended is the outdoor landscape/the real world/the physical and human environment around us. Although it does not fit the definition of text as used in the Australian Curriculum (whereby texts are both comprehended and composed), in Geography it will be one of the key 'texts' that needs to be comprehended, because Geography is nothing unless it has a clear focus on the real world that the learner sees and perceives around them

### **Text knowledge: Writing**

Geography provides another purpose for involving students in many different kinds of writing. In particular it encourages the use of written reports on outdoor observations, a language skill which is quite different to that of writing other kinds of reports. Students need a breadth of vocabulary, a set of accurate observation skills, and a level of literacy that can put their own thoughts into a form which is clearly communicated.

Report writing is best developed through the use of scaffolding and models of the kind of writing that is needed in Geography. Students cannot be expected to write in this way without models and scaffolding structures. Reports in Geography use precisely worded observations, carefully chosen and labeled photographs, maps which have a clear communicating purpose, and statistics which have been processed to enable conclusions to be drawn.

To develop power with language, Geography encourages teachers to take the children at Foundation level and Year 1 into the school-yard on observation visits, using digital cameras to record places, writing words to accompany photographs, and displaying their observations together in the classroom. From these small beginnings, students in Years 5 and 6 should have developed the language and the experience to conduct the own inquiries into fieldwork locations they visit, and write reports about their observations, the issues and their recommendations.

### **Text knowledge: Reading**

Obviously Geography requires students to develop the same level of reading skills as other subjects to interpret factual material. However, Geography provides particular help in this for some children, with the prolific use of visual material to accompany written material. Maps, diagrams, photographs, film clips, and in particular the outdoors give children different ways of learning about the world, which go side-by-side with language development. For some children a map or diagram can stimulate a plethora of ideas which they would not get from words alone, but which stimulate the need to use words in increasingly complex ways to express the ideas.

Story books are a great stimulus about other places and peoples for younger readers, but as the example given later in this article shows, stories written for older children can teach concepts just as well as non-fiction writing. For some children, stories about adventures of children in different environments will stimulate them to write their own stories.

### **Text knowledge: Speaking**

In the section on early years learning, the point was made that playing with toys, role-playing, or making models have their place in learning Geography because of the conversations they generate. For the early years, listening to children talk about what they have created, or what they see around them is an effective method of assessment of their learning.

In the middle and upper years there are many opportunities to continue the use of conversation as a central learning tool, through groupwork in the outdoors, discussions about issues in class or planning of inquiries. There are also many opportunities to use more formal speaking experiences, such as group reports about findings, and presentations of points of view on geographic issues.

### **Text knowledge: Listening**

We expect children to have listening skills, but we often don't deliberately teach them or assess them. In Geography the range of visual material is so great that listening skills may get overlooked. Nevertheless, there are many opportunities to focus consciously on this aspect of literacy by methods such as having the class listen to a guest and then question the speaker, watch a video clip and then repeat what was said, and summarise the main points given by another student in a talk.

### **Visual knowledge: Maps**

Maps are a major stock-in-trade of Geography, because, like the subject itself, they focus on the spatial. Therefore comprehending and composing maps is essential to learning Geography. There is a sequential set of understandings of elements of maps, from Foundation Year to Year 10, described on the GeogSpace website.<sup>viii</sup> Maps can contain multiple layers of information, and the rapidly developing field of GIS (Geographic Information Systems) explicitly uses layers of information in the digital creation of maps to communicate specific information. In Geography students of all ages will engage in comprehending and composing maps, using them to inquire into issues, discover locations, patterns and interconnections, and demonstrate concepts.

### **Visual knowledge: Photographs**

Photographs of many kinds are used as a text in Geography. They are important both as a vicarious means of seeing places and environmental features, and in themselves as a text which tells a story effectively. They include not only photographs taken from the usual horizontal viewpoint, but also aerial (vertical and oblique) photographs which contain a different kind of information, and are texts which need to be read in a different way to other photographs.

In primary school geography, children should be shown many photographs for the purpose of *comprehending* - interpretation, analysis and increased depth of understanding. With the widespread availability, and inexpensiveness of digital photography, the *creation* of geographic photographs also becomes a key technique used in the subject.

## **Conclusion**

This workshop and paper has attempted to show both theoretical and practical aspects of three of the most important capabilities that students need to develop, and the contribution that the Australian Curriculum: Geography can make to this. Improvements in inquiry, thinking and literacy skills can be developed using the aims, inquiry process and content descriptors of Geography. The important contribution that Geography teaching can make to the development of these capabilities should be made explicit in all schools.

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<sup>i</sup> The most complete and up-to-date coverage of inquiry in Geography is in Margaret Roberts **Geography through Enquiry** published by the Geographical Association (UK) in 2013

<sup>ii</sup> Catling, S; Willing T; Butler, J; **Teaching Primary Geography for Australian Schools** Hawker-Brownlow 2013

<sup>iii</sup> The specific skills of Geography are best covered by **Keys to Geography** published by MacMillan (second edition) and AGTA (third edition).

<sup>iv</sup> This section on literacy is reproduced from an article entitled **The Geography of Literacy** by the author (John Butler) published by the Primary English Teachers Association of Australia in 2013.

<sup>v</sup> ACARA, **Australian Curriculum, General Capabilities: Literacy** 2013

<sup>vi</sup> ACARA, **Australian Curriculum, General Capabilities: Literacy** 2013

<sup>vii</sup> Catling, S; Willing T; Butler, J; **Teaching Primary Geography for Australian Schools** Hawker-Brownlow 2013

<sup>viii</sup> **GeogSpace**.edu.au Year F-4, Key Understandings, Illustration 2: *Sequential development of understanding maps*