Social and Spiritual Development Strand
Social Science

Unit 1: Natural and Cultural Environments

Module 1.1 Geography Skills

Lecturer Support Material
Acknowledgements

Materials written and compiled by Sue Lauer.

In consultation with

<table>
<thead>
<tr>
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<tr>
<td>Helen Walangu</td>
<td>PNGEI</td>
</tr>
<tr>
<td>Cornelius Gumbira</td>
<td>Madang TC</td>
</tr>
<tr>
<td>Lena Rifi</td>
<td>St Benedict’s TC</td>
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<tr>
<td>Teng Waninga</td>
<td>Holy Trinity TC</td>
</tr>
<tr>
<td>Aloisia Maradangoi</td>
<td>Balob TC</td>
</tr>
<tr>
<td>Carol Cottingham</td>
<td>Balob TC</td>
</tr>
<tr>
<td>Pilari Hiraya</td>
<td>OLSH Kabaleo</td>
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Layout and diagrams supported by Nick Lauer.

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## Unit outline

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### Icons

- **📖**: Read or research
- **📝**: Write or summarise
- **✍️**: Activity or discussion
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Module 1: Geography Skills

Rationale
This module is designed to introduce you to the range of skills appropriate to the study of the natural environment. You will be given opportunities not only to learn about the skills but also to apply them in a variety of situations.

Objectives
By the completion of this module you will be able to:

• Create, interpret and use maps, diagrams, graphs, and charts
• Apply a range of essential geographical skills such as observing, gathering, measuring and recording data, using data to explain, draw conclusions, and make predictions
• Recognise and discuss cause, effect and consequences
• Solve problems
• Think logically and develop informed opinions about geographical problems
• Identify and discuss geographical issues from a range of perspectives

Teaching Module 1.1: Geography Skills
The strategies and activities outlined below may be substituted for any included in the module. The main emphasis in the teaching of each topic is to include a range of activities and to develop skills which will be useful for beginning teachers in their own classrooms.

• Map the grounds of the college applying appropriate mapping techniques such as scale and a key
• Research an industry and present information in a flow chart
• Explain the formation of a landform feature using a diagram
• Observe a natural process and write a brief report eg a weather report
• Interpret statistics taken from a newspaper report
• Make a line drawing of a local view which shows distinct landform features
• Draw a sketch map to give detailed directions to a tourist group describing what they are likely to see on their travels around the area
Module 1.1 Content

Much of the content of Module 1.1 should be familiar to students. The activities are designed to revise what they already know. Observe student’s competence as they complete activities to determine which concepts and skills need more concentrated study.

Completion of the module in the time available depends on students’ prior knowledge and skills development. Students should be encouraged to revise background content in their own time so you can concentrate on enhancing existing skills and developing new ones.

Colleges should have an adequate supply of general Geography text books that contain more detailed explanations of how to draw maps, graphs etc.

It is recommended that considerable use be made of the *Papua New Guinea Primary* and/or *Secondary School Atlas* (OUP) for the teaching of this unit.

**Topic 1 – Introduction to Geography**

Geography is the branch of Social Science that studies how people relate to where they are – the environment around them. Geography is the study of people and places. We study geography to learn about our world and to understand what is happening around us.

There are three main branches of Geography – physical, human and regional. There are also several specialist areas such as cartography (see Figure 1). These branches often overlap with other Social Science or Science subjects.

*Figure 1: Branches of Geography* Source: Bonner and Ralph – *Key Skills in Geography*, Longman
Geographers are always asking questions such as:

- Where is it?
- What is it?
- Why is it there?
- What are the effects or benefits of it being there?
- How is it changing?

All these questions have one thing in common. They relate to where things are or how they are distributed on the earth. To answer these questions geographers must be able to:

- **INQUIRE** - Ask questions and search out information
- **OBSERVE** - Look carefully at the world around them
- **CLASSIFY** - Sort out the information
- **RECORD** - Write down or draw the information they have seen
- **INTERPRET** - Explain how or why
- **COMMUNICATE** - Tell others of their findings

Geography is a practical subject. It involves a lot of fieldwork and the best place to start is the local area. The most important tools which geographers use are observing and recording skills. Here are some of the tools which geographers use.

**FIELDWORK TOOLS**
- Surveys
- Questionnaires
- Sketches
- Notes
- Observations

**VISUAL TOOLS**
- Photographs
- Sketches
- Diagrams
- Flow charts
- Line drawings
- Profiles
- Cross sections

**MAPPING TOOLS**
- Scale
- Distance
- Direction
- Symbols
- Heights
- Reference points
- Latitude and longitude
- Contours
- Features

**STATISTICAL TOOLS**
- Graph
- Averages
Geographers collect **data** i.e. information that is known or available to people. Data is used to support points of view and to make generalisations. It can be used to show changes over time and to make comparisons between places. Data consists of a variety of facts, figures and statistics.

Sources of data include:

- Lists
- Tables
- Graphs
- Diagrams
- Pamphlets
- Brochures
- Government publications
- Textbooks, reference books
- Encyclopaedias
- Maps, atlases, magazines
- Newspaper articles
- Television programs
- Video
- Film
- Computer
- Audio and visual software
- People

### 1.1 Activity 1

*Select five sources of data from the list above and provide an example of how each one could be useful for a geographer, for example, a newspaper article that describes a natural disaster.*
**Topic 2 – Fieldwork**

One of the best ways to learn about things is through fieldwork, getting outside. Your fieldwork may involve anything from a walk around the college to an excursion lasting several days. Fieldwork gives you the advantage of seeing things as they really are. When you are conducting fieldwork, there are certain skills which are needed. Fieldwork involves the use of observation skills, an ability to describe the things you see, and skills in collecting data through methods such as conducting interviews, questionnaires and surveys.

Many people believe fieldwork involves an excursion away from the college/school, with troublesome details such as permission notes and transport arrangements. This is not true. There are many valuable activities that can take place within the grounds or in the immediate neighbourhood. You need to model these activities with your students so they may do the same at their schools in the future.

**Observation Skills**

There are a number of ways you can improve your powers of observation.

- Keep a sharp lookout for interesting places, people, things, and events.
- Ask yourself what is happening, what is it about, what makes it interesting?
- Concentrate on what stands out most – a person, a group of people, an activity, a place
- Think of ways you could describe what is happening
- Ask questions and investigate further
- Sort or classify what you can see into different groups. Is it natural (made by nature), or cultural (made by people)?
- Divide observations classified as either natural or cultural even further under different sub-headings such as landforms, land use, customs

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**1.1 Activity 2**

*Work with a small group of your peers. For this activity you will need a pencil and a notebook. Choose a site where there are people gathered, for example a market, school playground, sports field.*

- Decide on a category, for example, males/females/children/people wearing shoes and record the number of people of that category who pass you in a given time.
- Select one person and sketch what they are wearing.
- Describe the colour of their shirt/jacket/blouse.
Compare your statistics or sketches with others in your group. Can you see any similarities in the classification you made?

**Observation/Description - Cloud Study**

Students will need a notebook or sketch pad, a pencil and a cloud chart for reference.

- **Estimate the percentage of the sky that is covered with cloud**
- **Choose three or four different clouds and identify them**
- **Sketch their shape as they appear in the sky**
- **Label any noticeable features such as colour and thickness**
- **Select one cloud and describe it in detail, mentioning its type, appearance, time and date, direction of movements, part of the sky its located in**

**Describing skills**

An important skill in Geography is to be able to describe the places or things you see in the field or find out about in your studies. You must be able to use the right words to get your message across. The description may be in the form of a report, answers to questions, lecturettes or essays. You can use headings suggested in Figure 2 to help with your descriptions.

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*Figure 2: A checklist for describing places - Source: Bonner and Ralph – *Key Skills in Geography*, Longman Cheshire*
Interviews

An interview involves asking someone questions in order to find out more information about a subject. Through an interview you can learn about things and peoples’ opinions first hand. There are usually many people with special knowledge about a topic. You can invite them to your classroom or meet them during fieldwork.

To conduct an interview successfully you need to:

- Prepare your questions beforehand
- Make sure the questions are simple and to the point and that they require more than a single word answer
- Make sure you tell the interviewee your purpose and thank them at the end
- Listen carefully to answers
- Take notes during the interview if possible

You may like to use the following activity to teach students how to construct interview questions and draw conclusions from data.

Public opinion survey - Students to identify classmates who read the newspaper every day and find out their opinions on the lead stories for the past week. They will need to identify the lead stories beforehand and decide on the questions they will ask. Students can then draw conclusions about the average readers attitudes to specific issues.

Questionnaires

A questionnaire is a set of questions aimed at getting the opinions of a number of people on a particular topic or issue. It can be left for people to fill out, or the questions may be asked directly in an interview situation. A questionnaire is really only useful if a large number of people take part.

Developing a questionnaire requires careful thought and some testing. The aim should always be to get clear answers from those participating in the survey. The views of those being questioned should not be influenced by confusing questions or the views of the interviewer.

Surveys

Surveys usually involve either counting or measuring. A lot of information can be gathered from just counting things you see everyday e.g. the number of students using the library. Once you have counted and recorded, the next step is to describe the results to see what answers they may provide to the problem under investigation

Measuring is often done using special instruments or maps, but it can also be done with simple items such as a tape measure. You can measure such things as length, height, size, speed and volume.
When conducting a survey you need to:

- Decide the purpose of your survey
- Decide on the categories you will observe - categories could include times, locations, subjects, types of object or action
- Draw up a grid for recording your data
- Collect data
- Present your data graphically, pictorially or as a written report
- Summarise the information or draw conclusions

1.1 Activity 3

Work together with your peers to design a set of interview questions or a written questionnaire to find out how many different provinces each of your classmates has visited. Describe your findings using percentages and appropriate diagrams.

Use the questions formulated above to conduct a survey of about twenty students. Present your findings as a pie or column graph.
**Topic 3 – Drawings, diagrams and charts**

It is not necessary to set activities for this topic. Instead, students should refer to these notes and examples when completing activities that require these skills in other modules.

**Line drawings (field sketches)**

Line drawings can be done from a photograph or when you are out in the field. When you look at a photograph or scene, imagine it in three sections:

- the *foreground* - the area closest to you
- the *middle distance* – the area further away but the details are still clear
- the *background* - the area furthest away, details may not be clear.

Each of these areas will take up about a third of your sketch. (See Figure 3)

![Diagram showing foreground, middle ground, and background](image1)

When planning to complete a field sketch:

- Select a suitable observation point
- Consider why you are doing the sketch and decide what features you intend to highlight
- Determine the boundaries of your sketch and what to draw in the foreground, middle and background
- Use a firm surface as a backing sheet and pencil in the main features. Use shading where appropriate
- Name important features
- Give your sketch a title and date

Figure 4 is an example of a completed sketch, with a title and labels.

*Source: Cramma and Dodd – Discover Your World 1, Jacaranda Press*
Diagrams and flow charts

Diagrams are employed by geographers in a variety of situations. They may be used to illustrate outlines and features of an object. They can show how something complex like a power station operates. They can show the stages in the creation of a particular landform. The best diagrams are clear, with all the necessary details, and labels to identify features and explain processes. An example of a diagram can be seen in Figure 5.

A flow chart is a diagram showing a series of step-by-step operations which make up a particular process. The main elements of the process are shown in picture form and are linked by arrows to indicate how one operation leads to the next. A flow chart can also be used to show stages in the development of a consumer product. Figure 6 is an example of a flow chart.

![Diagram](source)

**Figure 5: Diagram**  
Source: Cramma and Dodd – *Discover Your World 1*, Jacaranda Press

![Flow Chart](source)

**Figure 6: Flow Chart**

Cross-sections or profiles provide a side view. They are used to determine the slope or height of something or the layers within it. Figure 7 shows a cross section or profile of soil, illustrating what can be found at the various layers.

![Profile or cross-section](source)

**Figure 7: Profile or cross-section**  
Source: Bonner and Ralph – *Key Skills in Geography*, Longman Cheshire
Contour diagrams

Contour maps can be used to provide landform cross-sections. A **contour line** on a map joins points at the same height above sea level. These lines are the most accurate way of showing **relief** on maps, because they describe shape, size and steepness of all landform features. Examples of a contour cross section and a contour map can be seen in Figures 8 and 9.

![Contour cross-section](image1)

*Figure 8: Contour cross-section*

![Contour map](image2)

*Figure 9: Contour map*

*Source: Codrington and Chittenden – *The Geography Skills Book*, Heinemann*

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*This is a very interesting activity if you have time and the necessary equipment. At the completion of this activity, students should fully understand the concept of contours as well as the benefits of using models/simulation to demonstrate concepts.*

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**Divide the class into suitable mixed groups to complete the following exercise**

**Simulation - Making your own contours**

For this task you will need a deep tray, thin piece of board or card, clay or mud, water, a sharp-pointed object

- Divide into groups and each group make a landform model on the thin board. The model should be made from the clay and each one should show different-shaped features such as hills, ridges, valleys
- Put the model in the tray
- Pour some water into the tray
- Use the sharp-pointed tool to draw a line around the model level with the top of the water. This will become a contour line.
- Put more water in the tray and draw your next contour line in the same way. Repeat until the tray is filled with water
- Tip out the water. You now have a contour pattern of the model.
- Look at the model from directly overhead. Observe the pattern made by the landform feature.
**Topic 4 – Maps and mapping**

A map is a picture or plan of a place, with its various features shown as symbols. These symbols can provide detailed information about a particular part of the Earth’s surface.

Depending on the purpose of the map, it could show things like:

- Physical features – hills, rivers, forests, deserts
- Human features – towns, roads, land use
- Specific features – weather patterns, holiday resorts, electoral boundaries

There are many types of maps. Some of the more common types of maps are listed below.

- Topographic maps – very accurate and detailed, showing the major natural and cultural (made by humans) features of an area. These are used by groups such as the army and emergency services.
- Road maps – roads, streets and buildings of a town or area. Street directories are a small-scale version of a road map. Figure 10 is an example of a road map.
- Cadastral maps – show information such as property boundaries, allotment areas
- Tourist maps – show the layout of an area, accommodation, local attractions
- Political maps – boundaries of countries, transport routes
- Orthophoto maps – aerial photographs with information such as names of rivers overlaid on them
- Charts – which aid in navigation by sea or air
- Plans – maps of buildings

*Figure 10: Completed map with essential elements Source: Bonner and Ralph – Key Skills in Geography, Longman Cheshire*
To enable people to read it accurately a map should have a number of features.

- A title – tells the place, country, main data shown
- A key/legend  - explains the meaning of symbols, colours, print sizes
- A scale – indicates distances and sizes (shown as ratio, line or description)
- A north arrow – to determine direction
- Latitude and longitude
- Relief – height, contours

The following activity requires students to use a number of skills including using a compass and measuring distances. It is also a good example of a fieldwork activity that does not require any special arrangements. Students can construct a simple compass before commencing the activity.

Divide into groups of three or four students each, with a pencil and paper

The whole class is to meet in the middle of a large open space such as on oval.

- Mark out the four compass points with crossed sticks, stones or other markers
- Choose six features you can easily recognise around the area such as trees, seats, steps, taps, goal posts
- One group is to go to each of the features
- From there each group will work out the direction (bearing) to three other features
- Next, the group will measure the distance to each feature by pacing and converting to centimetres

Each group should draw a simple sketch map showing all the features and the bearings and distances they recorded.

Latitude, longitude and map references

Geographers often refer to a global network of lines that enable them to locate the position of any point on the Earth’s surface. They are measured in degrees because they are based on angles out from the centre of the earth e.g., Wabag is 30° S and 40° E

Parallels of latitude encircle the Earth from east to west. They run parallel to the Equator which divides the Earth in two, the northern and southern hemispheres. Each parallel has a value between 0° and 90°. Lines of latitude are associated with changes in climate.

Meridians of longitude are lines that run vertically on the globe and pass through the North and South Poles. Longitude is measured in degrees east or west of the line running through Greenwich Observatory (near London). Meridians of longitude are used to calculate world time. Time is measured as so many hours ahead or behind Greenwich Mean Time (GMT). Port Moresby is 10 hours ahead of GMT. Figure 11 shows lines of latitude and longitude marked on a map of the world.
Most maps have a set of numbers or letters around the borders. The number or letter that gives us the location of a particular place is called a **map reference**. Sometimes a four or six number scale is used. These are called **grid references**. When using a four number scale the first two numbers are called an **easting** which is found by looking along the bottom of the map. The next two numbers are the **northing** which is found by looking up the side of the map. This is illustrated in Figure 12.

![Figure 12: Grid references](source: Bonner and Ralph)

### 1.1 Activity 4 - Interpreting a map

*Work with a small group to complete this task. Choose an appropriate map from an atlas, street directory or another source. The map will need to be fairly detailed. Complete the following activities that incorporate all the basic mapping skills.*

- Identify four landform features e.g. creeks (natural.)
- Identify three signs of human habitation e.g. bridge (cultural).
- Work out the distance between three locations (distance/scale).
- Identify aspects of the landscape represented by three different symbols (key).
- Select a feature and describe what you would find to the southeast of it (direction).
Topic 5 – Tables and graphs

There are many examples of graphs and tables in Geography and Commerce textbooks. Use such books to revise graphing skills for ‘homework’ activities.

A graph is a drawing of statistics. It can show important facts at a glance. Graphs are used to show how an item or items of information change over a given time. Most graphs will have some or all of the following features:

- A title – heading or name
- A source – where the information came from
- Horizontal axis – line running across graph with numbers or words on it
- Vertical axis – line running up the side of the graph with numbers or words on it
- A scale – a number line on either axis

Line graphs may take the form of a smooth curve or may consist of line segments that join places plotted on the graph. Figure 13 is an example of a line graph.

Bar graphs are used to show totals of information. This information can be shown for one item over a number of time periods, or for a number of items over one time period. The height of the bars indicates clearly the total of the information being shown. Bar graphs can also be used to compare totals of one or more items. Figure 14 is an example of a bar graph.

Figure 13: Line graph
Source: Codrington and Chittenden – The Geography Skills Book, Heinemann

Figure 14: Bar/column graph
Source: Codrington and Chittenden – The Geography Skills Book, Heinemann
A circle or **pie graph** is an accurate way of showing how each item of data contributes to complete picture. The ‘slices’ of the ‘pie’ are drawn proportionally in a clear, colourful way to show the percentages they represent. Figure 15 is an example of a pie graph.

Climatic statistics can be more easily read and compared when presented in a **climate graph**. Figure 16 is an example of a climate graph. Rainfall is drawn at the bottom of the graph using bars to represent precipitation each month. Temperatures are represented by a line graph. Rainfall and temperature can be shown on separate graphs or they can be combined in one climograph. A climograph lists the temperature on the left axis and the rainfall measurements on the right axis.

Graphs can provide valuable information, but sometimes only a certain amount of information is required. This is where a **table** becomes a useful method for presenting data. A table is also useful for organising information. Figure 17 is an example of a table.

### Vegetable production in PNG

(‘000 tonnes)

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</tr>
<tr>
<td>Beans</td>
<td>120</td>
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</tbody>
</table>
1.1 Activity 5

Constructing a diagram

For this activity you are required to draw a diagram which records the height of the tallest mountain in each continent. To construct your diagram:

- Draw an axis with each of the seven continents as column headings (horizontal)
- Decide on a vertical height scale for your diagram
- Use an atlas to find the height of the highest mountain in each continent and mark the height on your diagram
- Record the name of each mountain and its actual height on the diagram
- Name your diagram

Constructing a pie graph

Conduct a survey of the members of your class to gather the following information or use the information collected in Activity 3

- The province in which each student was born
- Calculate the percentage of students born in each province
- Construct a pie graph to show this information
Topic 6 – Research and recording

Students will be required to research topics and present their findings as reports, group or individual presentations, charts, essays and summaries in all strand units. It is important that these skills are taught or revised early in the course. Work with the Expressive Arts lecturer to introduce students to layout and design skills for posters and wall charts. It is not appropriate to mark students on presentation if they have not been shown the skills first.

Research

One of the best ways to learn about any subject is to think of the questions you want answered or what you want to know, and inquire about the things which interest you. This means doing your own research to find the answers. Completing your own research involves using many of the skills outlined above. There are a number of steps involved in doing research and the best results are achieved through a systematic approach. One approach to conducting research is outlined below.

- You need to **clarify** the task i.e. work out exactly what you want to know
- **Review** any available information related to your research topic e.g., find relevant material from the library
- **Plan** how you will go about the research e.g. what equipment might you need
- **Collect** your data by observation, interview, surveying or other appropriate methods
- **Analyse** your data, that is, decide what the results of your research tells you
- **Present** your findings in an appropriate format such as a report, chart, or diagram

Information you have gathered from the field or during research needs to be presented appropriately. It could take the form of a report, answers to questions, lecturers or essays. You must be able to choose the right words to get the message across. It is often easier to describe something if you have been given hints about what to look for.

A big problem after collecting data through surveys, interviews or other methods, is to know whether the results are interesting, important, alarming or unusual in any way. You can get a better idea by comparing your data with other information you have collected or contrasting it with what others have found out.

Writing a report

Reports usually follow the same sort of pattern.

- **Introduction:** State the topic and perhaps why you chose it. Then state clearly your research question and what you intended to find by your research. Explain where the problem exists. Define any special words that are important in your project.
• **Method:** Explain the methods you have used in your research, for example, observation, counting, measuring, interviews, questionnaires. Why did you choose some methods and not others? Show the steps and the methods you took in your data collection. Explain how you processed your data so that it told you something. Explain any limits you faced in time or resources.

• **Body of the report:** This is where you present all your information. You might use written information, photographs, maps, graphs, statistical tables, diagrams, models, and so on. It is more interesting to present information in a variety of ways. In this part of your report you will analyse your data to indicate what it tells you.

• **Conclusion:** This is where you present the conclusions of your research. What did you discover as a result of your efforts? Don't be concerned if the results were different to what you expected, it is far more important to be accurate in your conclusion. Think about the importance of your findings: what are the implications of your research?

### Activity 1.7 – Research and presentation

*People’s clothing usually reflects the weather in their home region.*

*Consult your library and other resources to find out about the traditional clothing of one of these groups of people:*

- Eskimos
- Sherpas
- Pygmies
- Bedouins.

*Present your findings as a resource which could be used in the primary classroom. For example, chart, diagrams, text, sketches, and models.*

### Writing an explanation

An explanation is used to explain how or why something occurs. An explanation usually contains

- A general statement about the feature or process being described
- A series of paragraphs that tell how or why. These should be in sequence so that the reader or listener builds up their understanding of the feature or process.
- A concluding paragraph
Discussions and expositions

A discussion is used to present the different opinions on a particular issue or topic, that is, the arguments for and against. A discussion can be written or oral. A written discussion should contain

- An introductory paragraph that introduces the issue or topic. It can contain a question or it can state the view of the writer.
- A series of paragraphs that outline the arguments for or against the issue or topic. It should use words that show a comparison or contrast and words that link arguments.
- A conclusion that sums up the issue and outlines the writer’s own point of view or recommendation.

An exposition only presents one side of an issue. It is used to persuade the reader by presenting a particular point of view. A new paragraph should be used for each new argument.

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References

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