3 MORE map skills

3.1 >> Distribution patterns

Aim – to understand that maps can guide further research

An important part of a geographer's role is to recognise patterns in information as this helps in understanding the physical and human environment. When we look at a map it helps if we can describe the patterns we see.

When you describe a pattern you use terms like linear, dispersed, radial, clustered, random or grid. You can also refer to other information on the map such as the directions (north, south east and west) and distance (calculated using the scale). Describing the pattern that you see is a good way to begin thinking about other maps that might help to explain why this distribution pattern exists.

handy hint

Answers to many questions will include a description of a distribution pattern.

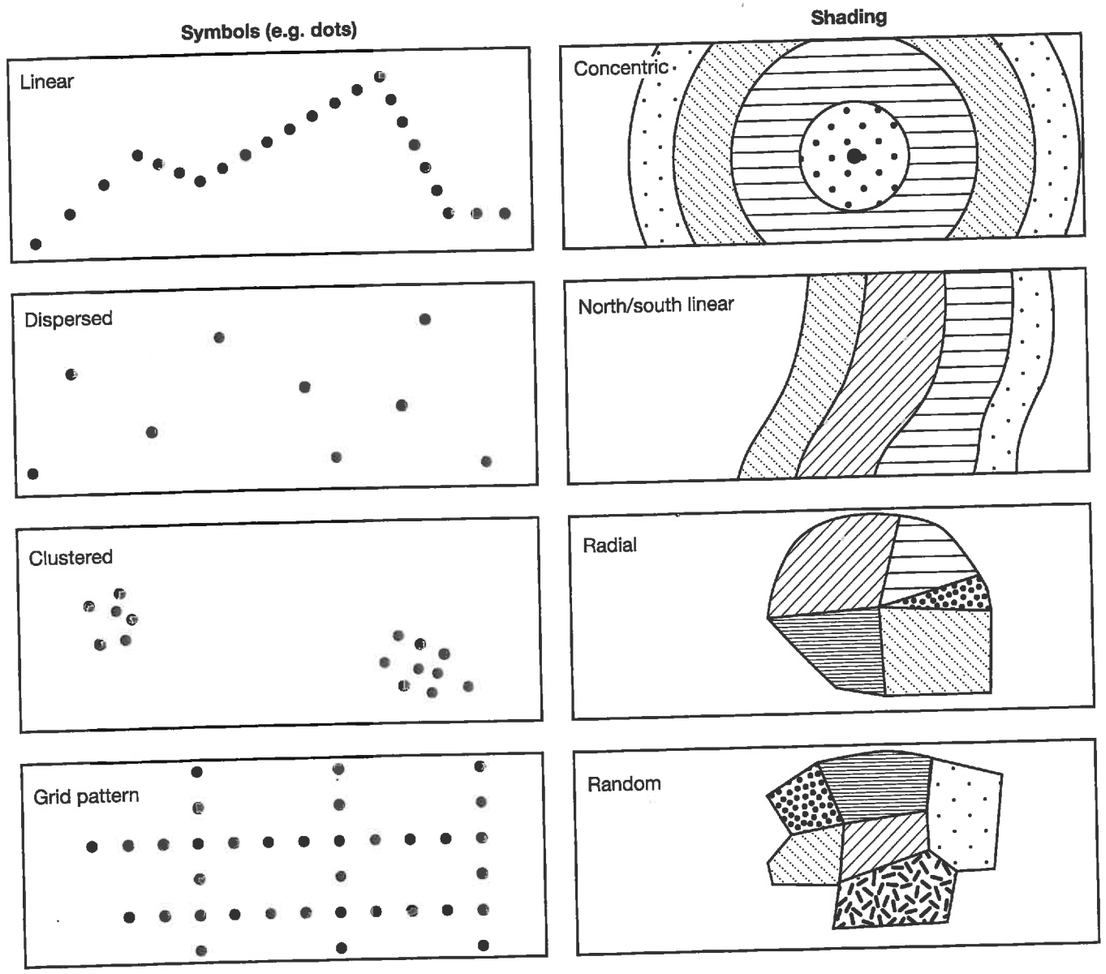

Figure 3.1 Examples of patterns in map information

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Activities

1 Patterns will often be a combination of the samples shown in Figure 3.1. Draw combination patterns in the space below. Describe each one.

2 Go to the atlas pages listed below and describe the distribution pattern. If the pattern appears to be related to something else on the map, include this in your answer.

Page	Feature	Distribution pattern
175	Towns in Egypt	
210	Volcanoes and earthquakes in the Pacific region	
13	Major cities in Australia	
89	Streets in Canberra	
107	Bases in Antarctica	
83	Street pattern in Katoomba	

3 MORE map skills

3.2 Choropleth maps

Aim – to understand that regions on a map can be predetermined

A **choropleth map** is a type of thematic map. Regions are chosen and data is gathered within each region. All data gathered for a region is averaged and the region is given one value on the map. The value is shown as shadings or different colours to illustrate the concentration of a particular feature. Examples of regions include suburbs, local government areas, electorates or countries. See the world urbanisation map on pages 228–9 of the *Heinemann Atlas 5th Edition*. You will notice that each country has been given one value only.

This type of map can be a little misleading. Look at the choropleth map for gross national income per capita on page 232 of the *Heinemann Atlas 5th Edition*. Because each country has been given an average figure you may be mistaken in thinking income was similar throughout the country. You would be well aware that there are many stark variations within countries and even within cities.

On page 179 of the *Heinemann Atlas 5th Edition* there is a map showing poverty in South Africa. The provinces have been chosen as the regions for the choropleth map and you will notice that each province has been assigned only one value. Choropleth maps often end up looking like a checkerboard and suggest that abrupt changes occur as you move across a mapped region.

The strengths of this type of mapping include the ability to make comparisons between countries and to compare maps of different features where the chosen regions are the same (for example in the world section of the atlas you could compare GNI (gross national income) and HDI (human development index), or GNI and urbanisation).

Different categories are marked by using shading or colours. The darker colours or shading indicate greater amounts.

handy hint

Many maps in the world section of the atlas are choropleth maps.

Activities

1 Refer to the map of internet users on page 245 of the *Heinemann Atlas 5th Edition* and note the rate of internet use per 1000 people in each of the following countries.

Australia _____ USA _____

Brazil _____ Egypt _____

Italy _____ China _____

2 Refer to the graph showing internet use by region (also on page 245 of the *Heinemann Atlas 5th Edition*). Which choropleth map in the World section (beginning on page 202) would have assisted in providing data for this graph?

_____

3 a Look at the map showing literacy on page 243 of the *Heinemann Atlas 5th Edition* and identify three countries in the highest category.

1 _____ 2 _____ 3 _____

b Locate these same three countries on the map showing gross national income per capita ('per capita' means 'per person') on page 232 of the *Heinemann Atlas 5th Edition*. In which category does each of them fall?

1 _____ 2 _____ 3 _____

c Check two other countries to see if you have found a pattern. Describe your findings.

_____

_____

3.3 Satellite images

Aim – to appreciate the involvement of technology in mapping

Satellite images provide us with another way of observing spatial patterns. Information is gathered by satellites orbiting the Earth. The data, based on light reflection, is sent to computers and converted into images. The colours we see are called **false colours** or pseudo natural colours as the computer has assigned particular colours to particular light levels.

- **Geostationary satellites** orbit at a high **altitude**, that allows them to stay over the same point on the Equator.
- **Polar orbiting satellites** have orbits that pass over the North Pole and the South Pole.
- Satellites in near-Earth orbits circle the Earth in about 90 minutes.
- Other satellites have different orbits.
- Some satellites provide images of the Earth and some are used for communication.

Since there are many satellites it is possible to get pictures of every piece of the Earth in a matter of hours.

These digital images can be at a very high resolution and they are used for a wide range of reasons, for example:

- to show land use change over time
- to track major environmental events
- to follow the impact of one event in one place on another place
- to map the distribution of a particular plant or animal species.

handy hint

Remember to read the legend because the colours could be false colours or pseudo natural colours.

Psuedo natural colour Landsat image	
White–cream	Bare ground; dry sand and salt areas, dunes and beaches; clouds
Light pink–orange–brown	Cleared farming land; early growth in crops and grasslands
Bright green	Healthy growing green vegetation; rainforest and mangroves
Bright light green	Grassland, growing crops and pastures; suburban parks and gardens
Brown–light brown	Drier vegetation such as eucalypt and arid woodlands; bare rock
Mauve–blue-green	Urban and industrial areas; concrete, asphalt, and buildings. Depth of mauve colour increases with density of development
Light blue	Shallow water
Dark blue–black	Deep water in oceans, lakes and dams

False colour Landsat image	
White–cream	Bare ground; dry sand and salt areas, dunes and beaches; clouds
Yellow	Areas with little vegetation cover, heavily grazed areas, desert sand dunes
Pink–red	Early growth in crops and grasslands, suburban gardens, lawns and parks
Red	Healthy growing green vegetation; rainforest (deep red); growing crops and pastures; mangroves (deep red)
Brown	Drier vegetation such as eucalypt and arid woodlands; bare rock
Light green	Moist, ploughed bare soils; light grass cover
Dark green	Deep muddy floodwaters, clear shallow water
Blue–light blue	Arid shrubland; very shallow water
Mauve–blue-green	Urban and industrial areas; concrete, asphalt, and buildings. Depth of mauve colour increases with density of development
Dark blue–black	Deep water in oceans, lakes and dams

Table 3.1 Sample colours used in satellite images. It is important to check the legend for any colours used in a particular image.

>>

Activities

1 Turn to the satellite image of Bangladesh on page 148 of your *Heinemann Atlas 5th Edition*.

a Look at the area covered by the satellite image (on the small map) and locate that area on the map showing the extent of floods. Estimate the proportion of the area on the satellite image that was flooded.

_____

b What is the dominant land use in the satellite image? _____

2 Turn to the satellite image of Ouargla Oasis on page 170 of the *Heinemann Atlas 5th Edition*.

a In which desert is this oasis located? _____

b In which section of the image are the regions of thickest vegetation? Use compass directions in your answer.

_____

c Identify three changes that have occurred between 1972 and 2000.

1 _____ 2 _____ 3 _____

3 Turn to the satellite image of Tokyo on page 138 of the *Heinemann Atlas 5th Edition*.

a On which side of Tokyo Bay is Tokyo situated? _____

b How can you tell from the satellite image that Tokyo is densely settled?

_____

_____

c Is the ocean shallow or deep? How can you tell? _____

d Describe the distribution of farming regions near Tokyo. Look at the sample colours in Table 3.1 to find crops and grassland.

_____

4 Suggest two reasons why a planning authority might want access to satellite images.

1 _____

2 _____

3.4 >> Weather maps

Aim – to interpret a common map

Weather maps, also known as **synoptic charts**, are familiar to many people as they appear daily on television, on websites and in the newspapers. A weather map summarises the state of the atmosphere at a particular time and helps us predict what might happen.

Here are some tips to help you understand a weather map.

- The lines on the map are **isobars** and they join places of equal air pressure.
- The air pressure is measured in hectopascals.
- The centres of regions of **low** and **high pressure** are identified for us.
- High means the air is heavy (compared to the air around it), meaning conditions will be stable.
- Low means the air is light (compared to the air around it), meaning conditions will be unstable.
- The atmosphere is always aiming for a balance and this means air will move out of regions of high pressure into regions of low pressure.
- If there is a big difference in air pressure between adjacent regions the air will rush from the high to the low. This is what happens in a **cyclone**. If there is little difference in pressure the air will move gently.
- This movement of air is wind.
- We can see this air pressure difference by looking at the pattern made by the isobars. If they are close together the pressure is changing quickly over a small distance.
- Air moves in and out of pressure systems in a circular pattern. This is due to the shape and rotation of the Earth.
- In the Southern Hemisphere the air moves out of a high in an anticlockwise direction and moves into a low in a clockwise direction.
- A cold front is the leading edge of a mass of cold air.
- As the cold front meets lighter, warmer air the lighter air will rise.
- When air is forced to rise it will cool, which means there is a chance of clouds forming and rain occurring.
- As a cold front passes the wind moves to a south-westerly direction.
- Wind blowing off the sea will often bring rain.
- Wind blowing from the land will usually bring dry conditions.
- Weather systems move from west to east.

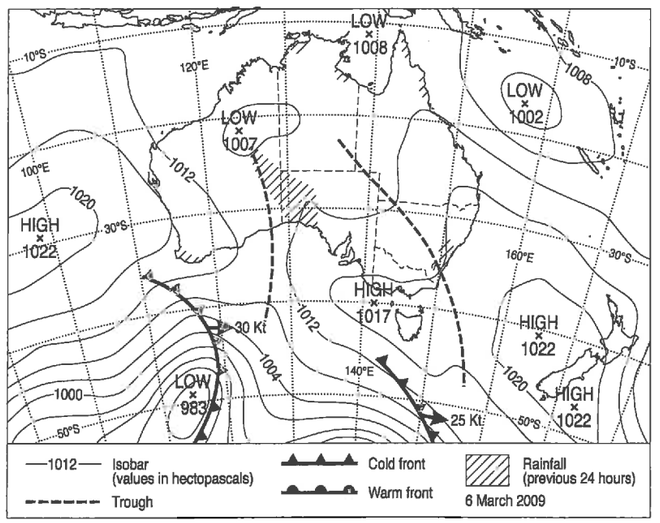

Figure 3.2 Weather map of Australia

handy hint

The patterns formed by isobars provide much information.

Activities

1 Refer to Figure 3.2.

a What is the date of this map? _____

b Describe where rain has fallen in the previous 24 hours. _____

_____

c What sort of weather conditions are being experienced in south-east Australia?

_____

d Based on the information on the map, what type of weather do you predict for the next two days in south-east Australia?

_____

_____

e Where is the lowest air pressure on the map? _____

2 Refer to the overlay on page 14 of your *Heinemann Atlas 5th Edition*.

a What has a strong association with the cold front? _____

b Even if Tropical Cyclone Vance wasn't labelled, why would you expect strong winds in that region?

_____

_____

c Describe the shape of Tropical Cyclone Vance. _____

_____

d Why is it this shape? _____

_____

e What is the likelihood of rain in each of the State and Territory capital cities?

_____

_____

3.5 >> Time zones

Aim – to understand the link between longitude and time

Once people were able to move quickly between places it became important to have agreement about time. Up until then people had set the time for their town based on noon being when the sun was directly overhead. It was decided at a conference in 1884 to measure times around the world from one meridian of longitude. The meridian of longitude chosen, the prime meridian, goes from the North Pole to the South Pole, through Greenwich, near London. As this line continues round the other side of the world its name changes to the International Date Line, which is where the day changes.

The Earth rotates once on its axis every 24 hours.

This means it moves through 15 degrees every hour: 360 degrees (one turn) divided by 24 (hours) = 15 degrees per hour.

The world is divided into 24 **time zones**.

Local variations are made to the boundaries of the time zones to avoid a town being in two time zones.

Because the Earth rotates in an easterly direction, times to the east are ahead of you and times to the west are behind you.

If you travel from west to east across the International Date Line you go back one day.

If you travel across the International Date Line from east to west you skip forward one day.

handy hint

Sometimes places change their time with daylight saving.

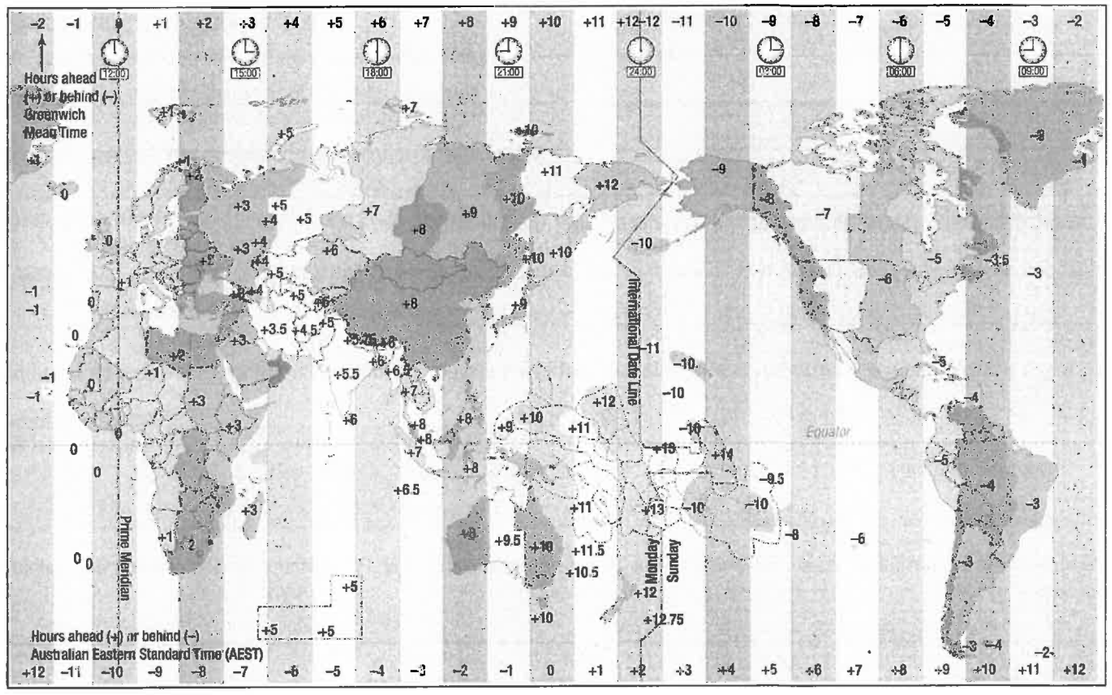

Figure 3.3 World time zones