**Movement**

Movement is the change in location of phenomena, such as people, resources and ideas, between places across the earth's surface. It might involve the change in location of goods, services, water, money, energy, education and technology. Movement can be people travelling between locations, for example along roads or flight paths, and it can also be the movement of water between a river's source and its mouth. Movement might follow a purpose-built or pre-arranged route, such as a power transmission-line, a railway track, a telephone line, a freeway, a pipeline, a ski run or a tour-bus itinerary. Movement may also be more random in nature, such as seeds being dispersed by the wind, backpackers wandering throughout Europe, the smoke from forest fires, a locust plague or the movement of wind and waves (figure 1.15).

Movement is greatly affected by the scale or size of the material being shifted and the distance between locations. If there is a direct route such as a freeway between two locations, a very large volume of traffic can be moved. If there is only a small car ferry linking an island to the mainland, the volume of movement between these locations is limited by the capacity and frequency of the ferry. Movement is often identified on a map by arrows showing the direction of flow. Figure 1.14 shows the movement of Fares jay seaplanes from Gatwick to destinations in Europe.

**Activities**

1. a. The Camino de Santiago is a trail taken by pilgrims for over 1000 years. Use figure 1.16 to describe the patterns of movement taken by pilgrims along the Camino Frances section of the trail. (Camino Frances means the French Way.) In your description identify the possible starting points in France and the end point of Santiago de Compostela.

2. b. Identify the region within which this movement of pilgrims occurs.

3. c. What is the distance of this pilgrimage if the starting point is Paris, France?

4. d. The location of the route of this pilgrimage has not changed over time. How might the actual trail or path have changed?

5. 2. Draw a simple sketch of figure 1.15 and on it clearly label and indicate the direction of at least three possible examples of movement and two of a possible change over time.

6. 3. Investigate the way that movement patterns are illustrated in your atlas. Make note of the methods applied to illustrate movement and comment on their effectiveness.

**Figure 1.13**

Victoria's Indigenous language regions

**Figure 1.14**

Route network showing the movement of Fares jay aircraft

**Figure 1.15**

Movement of wind and waves. Twelve Apostles, Victoria

**Figure 1.16**

The route taken by pilgrims along the Camino de Santiago Frances

**Figure 1.17**

Spatial association between tourists and the Piazza San Marco, Venice

**Figure 1.18**

Annotation of a coastal scene to show spatial association
Spatial association

Spatial association is the association or connection that can be made between the distribution patterns of two or more geographic characteristics. Spatial association can occur between two natural-geographic characteristics or features of the earth’s surface.

For example, there is a strong spatial association between regions of the earth’s surface that receive less than 250 millimetres of rainfall annually and the occurrence of desert environments. Spatial association can occur between the human activities that take place on the earth. Most modern cities see a strong spatial association between the distribution of regions of highest population density with the occurrence of high-rise or multi-level apartment buildings. A spatial association can also occur between the distribution of a natural geographic characteristic and a human activity. For example, there is a strong spatial association between high mountains, the frequency of snowfall, and the development of facilities for snow sports.

The area over which a spatial association between two distributions takes place can be viewed at a range of scales: local, regional, national, or global. Throughout this text there are many references made to spatial association at a variety of scales. Spatial association can be observed when doing fieldwork or identified in photographs. Figure 1.17 shows that there is a strong spatial association between tourists, signs and safety barriers to manage tourists, souvenir stalls and the Piazza San Marco in Venice. Figure 1.18 shows that there is strong spatial association between the high tide mark and the location of driftwood.

Spatial association is most readily recognised on a map or between maps, when two geographic characteristics are mapped as a distribution in the same place. The use of map overlays or GIS map layers can help to identify a spatial association.

Geographers are concerned about the degree to which a spatial association may exist: they identify a ‘strong’ spatial association, a ‘weak’ spatial association or say that there is no evidence to show that any spatial association exists. A strong spatial association occurs when the connection between the two patterns being described is closely tied together. An example is that in mountainous regions there is a strong spatial association between the location of road and rail links and valley floor streams. If two factors are both low in frequency the connection between one characteristic occurring and the other characteristic occurring is also described as ‘strong’. In Australia there is a strong spatial association between regions with very little rainfall and low population densities.

A ‘weak’ spatial association can be described as when one characteristic is high in frequency and the other characteristic is lower in frequency, but the two characteristics can still be identified at a location. In Australia there is a weak spatial association between regions with over 1600 millimetres of rainfall each year and regions of high population density. To explain this weak spatial association, there are several relatively large settlements such as Darwin and Cairns within this rainfall distribution, but there are places such as the east coast of Tasmania or Cape York, which have very few settlements at all. The non-existence of spatial association refers to when one characteristic is present but the other characteristic is not present: for example, there is no spatial association between regions where rice can grow and polar climates.

Activities

1. Identify two examples of spatial association in figure 1.18.

2. Use your atlas maps at a variety of scales to identify and describe four examples of a strong spatial association and four examples of a weak or no spatial association.

Spatial interaction

Spatial interaction is the relationship between phenomena (such as people, resources or ideas) and the degree to which they influence each other or the patterns that they form on the earth’s surface. Ability to recognise a spatial interaction often grows from a study of spatial association, but two things that interact with each other may not occupy the same space. Most spatial interaction involves movement. Both movement and spatial interaction require a shift in location, linkages or influence between locations. Things that are located closer together usually have a stronger spatial interaction between them than anything separated by a great distance.

An example of two phenomena that are close in distance having a significant impact or high degree of spatial interaction are Melbourne’s Central Business District (CBD) and the Docklands Stadium, apartment and commercial precincts that are linked by Southern Cross Railway Station. The walkway/promenade across the railway line allows a high degree of spatial interaction between these locations (this can be seen in figure 1.20). Football fans, workers from the CBD, tourists and residents are able to move between the two locations and spatially interact with each other and the facilities available in each place. This spatial interaction produces the consequence of crowding or uneven usage patterns for this resource. This movement of people — especially before and after a match or concert, or when people seek access to car parks on work or game days — also involves Southern Cross Railway Station. The rail network allows for spatial interaction between this entertainment and commercial precinct and the greater urban area of Melbourne and beyond.

The intensity of the spatial interaction is usually described as having a ‘high’ or ‘low’ degree of connectivity. There is a high degree of spatial interaction between Australia and China, resulting in the movement of wealth and minerals and with China influencing and sometimes financing infrastructure projects within the mineral production regions of Australia. Australian tourists have a high level of spatial interaction with warm beach environments such as Bali, but show a much lower degree of spatial interaction with cold or inaccessible places like...
Organising geographic data

To make sense of what is a large, complex and often seemingly chaotic world, it helps to use organising concepts to focus your views and to provide a framework.

Describing geographic characteristics

Geographic characteristics are features and influences identified in the natural and human environment which can often be described using spatial concepts such as location, scale, distance and distribution. Geographic characteristics include natural features such as topography, natural vegetation and climate, and human features such as dams, plantations, buildings and roads.

As a geographer you interpret evidence in such a way that you are able to describe and explain the geographic characteristics of a location. A geographic characteristic is something that helps to identify a place as being the same or different to another place.

The geographic characteristics of the Tidewater Glacier, seen in figure 1.25, are the features and

Activities

1. On a simple sketch, clearly identify, through use of labels and arrows, one or more examples of spatial interaction in three of figures 1.1, 1.3, 1.16, 1.17, 1.18 and 1.22.

2. Compare figure 1.21 with a modern map of Melbourne in an atlas or street directory. Identify and describe four examples of the spatial change over time.

3. Describe an example of spatial change over time that has occurred within your local community within your lifetime.

Key Knowledge and Skills

- Identify and describe the geographic characteristics of environments.
- Analyse and explain data about the geographic characteristics of environments.
influences that can be identified in that environment. These include its location, height, the distance over which the glacier travels, its topography, the roads and trails which may allow access, and the distribution and density of snow and ice, and whether it is advancing or retreating.

Environmental and physical factors

Environmental factors are the characteristics of a natural or human environment. The natural factors are often referred to as physical factors, and include the shape of the land, drainage, soils, indigenous vegetation and climate. A human, highly built environment such as New York City may have little in it that is identifiably natural, except its topography, coastline and atmosphere. General features of the human environment include structures such as roads, buildings, mines, farmland and wind farms.

Political factors

Political factors are the work of individuals, government agencies and non-government organisations which shape natural and human environments. Political influence can protect an environment, as easily as it can destroy it. Policy, legislation, planning permission, election promises, trade deals and protest activities are all political actions that can greatly influence the state of the environment. Political factors have had a great influence on Vietnam (Chapter 7), for example.

Technological factors

Technological factors show the global influence of developments in science, engineering and communications. Our ability to be able to do things and to think and act to promote sustainability is underpinned by technological developments. Can you think of several ways our towns and cities would function differently without electronic technology?

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Interpreting the instructional wording used in Geography

The following instructional terms are commonly used in Geography examination questions, as fieldwork and practical task instructions and for class activities. Use them as a check to help you to understand the meaning of terms and how to approach a particular task.

<table>
<thead>
<tr>
<th>Term</th>
<th>Definition</th>
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<tbody>
<tr>
<td>Analyse</td>
<td>Show the essence of something by breaking it down and critically examining the relationship between each part.</td>
</tr>
<tr>
<td>Classify</td>
<td>Make clear or simplify facts, opinions, issues or arguments.</td>
</tr>
<tr>
<td>Compare</td>
<td>Show the similarities and differences when you compare two events, theories, features or processes.</td>
</tr>
<tr>
<td>Contrast</td>
<td>Show the differences between two or more processes, features or things.</td>
</tr>
<tr>
<td>Describe</td>
<td>Say what something is like by using information from available data.</td>
</tr>
<tr>
<td>Discuss</td>
<td>Investigate to show whether you understand a situation and, where appropriate, both sides of an issue or event. Include the strengths and weaknesses of the available data.</td>
</tr>
<tr>
<td>Evaluate</td>
<td>Weigh up and interpret a statement, viewpoint or situation.</td>
</tr>
<tr>
<td>Explain</td>
<td>Give reasons why a situation exists or a process occurs.</td>
</tr>
<tr>
<td>Identify</td>
<td>Establish the nature of a situation by distinguishing its features and naming them.</td>
</tr>
<tr>
<td>Justify</td>
<td>You will be expected to use examples or find sufficient evidence to show why (in your opinion) a viewpoint or conclusion is correct.</td>
</tr>
<tr>
<td>Outline</td>
<td>Summarise the main events of a situation.</td>
</tr>
<tr>
<td>Predict</td>
<td>Suggest what may happen based on evidence gathered.</td>
</tr>
<tr>
<td>Quantify</td>
<td>Use numbers or statistics to describe a phenomenon.</td>
</tr>
<tr>
<td>Rank</td>
<td>Arrange factors or elements according to their importance.</td>
</tr>
<tr>
<td>Suggest</td>
<td>Present a hypothesis about a particular situation.</td>
</tr>
</tbody>
</table>

Figure 1.31
Mountain gorillas in Rwanda. Rwanda’s famed mountain gorillas have been trapped in a war zone for many years but they have managed to survive. There have been incursions into their park by armed rebels, human spread of disease, loss of habitat, poaching, government instability and pressure from landless local farmers to clear land for crops. Even with a rapidly increasing local population, the prospect for the survival of the gorillas is improving as this region moves toward a fragile peace. Despite initiatives such as improved education, increased tourism and rangers patrolling the forest’s borders, park authorities still find protecting the gorillas an ongoing challenge.

1. Which factors have been responsible for threatening the future survival of the mountain gorillas?
2. Rank these factors in your order of importance. Justify your ranking.
3. Explain which factor/s may be the most successful means of protecting these gorillas into the future and why.