AQA
Questions matter

Teaching guide: Fieldwork

This resource supports our A-level Geography (7037) specification and provides some guidance on how to interpret the fieldwork requirements of the specification, the opportunities for fieldwork and detailed sample fieldwork investigations.

Version 2.0
November 2024

Contents

You can use the title links to jump directly to the different sections of this Fieldwork Teaching guide.

Fieldwork requirements

A-level specifications require students to undertake fieldwork which meets the minimum requirements of four days of fieldwork for A-level – Department for Education (DfE) Geography A-level subject content (page 13).

Fieldwork is an essential aspect of geography which ensures that young people are given the opportunity to consolidate and extend their achievement by relating learning to real experiences of the world. Specifications require that fieldwork is carried out, outside the classroom and school grounds, on at least two occasions

Approaches

Fieldwork can be conducted as a day trip, a residential experience or a mix of both. It is not a requirement that residential components be included, but this approach can enable students to explore landscapes that offer the most valuable learning opportunities.

Fieldwork should prepare students for their Independent investigation as well as complement subject content. Ideally, the fieldwork should be embedded within the content to which it relates so that it maximises its impact on students' understanding of that topic. The duration of the fieldwork should not be restricted to a single day per topic; it should be long enough to effectively enhance classroom learning.

Fieldwork can take place at any time during the time students are studying for their A-level. It is an acceptable approach that three days of fieldwork are delivered with close supervision with the fourth day being one that students independently collect their own primary data for their NEA.

Guidance on location

Students are required to take part in fieldwork in both a physical and human context. Locations where fieldwork take place do not need to be far apart in terms of distance, but they do need to demonstrate different characteristics that suit the fieldwork students are undertaking.

It may not be possible for many reasons for centres to take students to locations far away from where students live (e.g. cost, resources etc). There may be opportunities to carry out some fieldwork in close proximity to the school, whilst being outside of the school grounds, e.g. local urban investigation, coastal location within short walk etc. This is an ideal opportunity to embed fieldwork for the local place study within Changing places.

Issues with students attending fieldwork

There may be occasions where students are unable to attend the planned fieldwork. This may be due to medical reasons, unforeseen circumstances or a student joining the centre after fieldwork has taken place. There are a series of steps teachers should take to ensuring that the student(s) has alternative provisions:

- can the student attend the fieldwork at an alternative time? (E.g. if there is another year group conducting the fieldwork)
- can the student undertake the fieldwork independently with a parent or guardian with some guidance from the teacher?
- do you have the resources available to prepare those students for a virtual experience of the fieldwork undertaken, if all other avenues have been exhausted?

It is important that all students are provided with the same opportunity to access fieldwork as with all other students. The Geographical Association (GA) provides some useful guidance on accessible fieldwork as does the following guide of 10 ways to make fieldwork more inclusive and accessible (Bangor University).

Enquiry sequence

Engaging with the fieldwork enquiry process is fundamental to planning, preparing and delivering fieldwork. Below is a list of how the six stages of the enquiry process map to the areas of the NEA mark scheme.

Area 1: Introduction and preliminary research

Stage 1. Develop an enquiry focus.
Stage 2. Critically research the literature to provide a context.

Area 2: Methods of field investigation

Stage 3. Plan methodology and carry out the fieldwork.

Area 3: Methods of critical analysis

Stage 4. Make sense of the results through data presentation and analysis.

Area 4: Conclusions, evaluation and presentation

Stage 5. Draw conclusions and establish their significance.
Stage 6. Evaluate and reflect on the enquiry's wider reading.

Fieldwork opportunities arising from the specification

This resource identifies some opportunities for fieldwork found across the specification and gives some examples of how these opportunities could be implemented as fieldwork investigations.

This is not a prescribed or exhaustive list, and centres are able to plan fieldwork investigations that are not included in these lists. The opportunities are divided into subject topics. Note that there are no examples suggested for the topics of 'Hot desert systems and their landscapes,' 'Hazards' or 'Global systems and global governance' due to logistics and scale.

You can use the title links to jump directly to the different sections of this part of the Fieldwork guide.

Water and carbon cycle fieldwork opportunities

Link with the specification

- Flows and transfers at hill slope and drainage basin scales.
- Drainage basins as open systems – inputs and outputs, to include:
  - precipitation
  - evapo-transpiration
  - runoff.
- Stores and flows, to include:
  - interception
  - surface
  - soil water
  - groundwater
  - channel storage
  - stemflow
  - infiltration overland flow
  - channel flow.
- Concept of water balance.
- Runoff variation and the flood hydrograph.

Investigation ideas

- How do infiltration rate and infiltration capacity vary with slope, steepness, soil texture, geology and/or land use?
- Do infiltration rate and capacity decrease down a slope?
- How do rainfall and evaporation affect the level of water and speed and discharge of a river?
- How do different sections of a river respond to a period of rain?
- How does the passage of a storm affect interception, infiltration rates or stream characteristics such as discharge and velocity?
- How does the amount of interception vary with vegetation type and rainfall intensity?
- How is evaporation affected by wind speed, temperature, hours of sunshine, humidity and/or aspect?
- How do urban and grassy surfaces differ in their response to floods/rainfall?

Possible hypothesis

- Steep slopes have a higher infiltration capacity than gentle slopes.
- A change in weather conditions influences infiltration rates at the same site.
- Infiltration rates vary with vegetation type.
- Infiltration rates are affected by geology, soil type, slope angle and slope position.
- Different sections of a river respond to rainfall at different rates.

Possible data collection methods

- Measure rainfall at set times (hourly, daily etc).
- Measure interception by placing rain gauges in different places (under trees, in open ground etc).

- Measure evaporation using a plastic bucket containing water. Measure the depth at different times.
- Measure infiltration using a tube or infiltration ring. Fill with water and record the drop in water levels every minute.
- Take soil samples to test for texture and moisture levels.
- Measure river flow variables – width, depth, velocity, discharge.

Coastal systems and landscapes fieldwork opportunities

Link with the specification

- Sources of energy in coastal environments: winds, waves (constructive and destructive).
- Geomorphological processes: weathering, mass movement, erosion, transportation and deposition.
- Origin and development of landforms and landscapes of coastal erosion: cliffs and wave-cut platforms, cliff profile features (including caves, arches and stacks), factors and processes in their development.
- Origin and development of landforms and landscapes of coastal deposition: beaches, simple and compound spits, tombolos, offshore bars, barrier beaches and islands and sand dunes. Factors and processes in their development.
- Human intervention in coastal landscapes. Traditional approaches to coastal flood and erosion risk: hard and soft engineering. Sustainable approaches: shoreline management/integrated coastal zone management.

Investigation ideas

- How and why do cliff profiles vary between different locations?
- What differences are there in the shore above the high water mark and below it?
- To what extent does coastal orientation and geology influence landforms at two locations?
- How does wave energy vary in different seasons/during the passage of a storm?
- What factors affect surfing conditions in different areas?
- How do beach profiles vary between two places?
- How does sediment change up and along a beach?
- What has been the impact of the building of groynes/breakwater?
- How and why do coastal management strategies vary?
- What factors affect the development of a spit?
- How effective are the hard engineering and sustainable coastal management approaches at two contrasting stretches of coast?

Possible hypothesis

- Geology is an important factor in determining cliff height, shape, profile and gradient.
- Weather conditions and beach aspect influence variations in wave characteristics.
- Cliff profiles decrease in gradient with distance from headlands.
- Beach material will become smaller and rounder in the direction of longshore drift.
- Beach profiles vary in profile with larger material found at the backshore.
- Beach material is sorted along as well as up the beach.
- Longshore drift is an active/ongoing process.
- Groynes have no impact on beach profile or beach material.
- Coastal management strategies at X are successful in preventing erosion.

Possible data collection methods

- Cliff profiles, using clinometer and tape to work out height.
- Measurement of dimensions of caves, arches, stacks and wave-cut platforms, using clinometer and tape.

- Recording geological features: rock type and structure, resistance, direction of rocks, lithology, dip, presence of bedding planes and faults.
- Beach sediment measurement, e.g. size and shape using a meter rule or callipers, Cailleux Roundness Index and Powers' scale of roundness.
- Beach profile, e.g. a transect along the beach from sea level to the coastline (backshore/berm sea wall/dunes) to show the changing gradient and/or transects at intervals along the beach.
- Measurement of thickness of beach sediment along the profile.
- Quadrat analysis of beach material along a transect(s) or line/systematic sampling.
- Wave types, i.e. constructive or destructive. Wave measurements – height, frequency, swash time, wavelength. Prevailing wind direction.
- Wave approach information using a compass or Google Earth/aerial photos which will show the predominant wave direction.
- Longshore drift evidence, e.g. surface load information using painted corks.
- Groyne measurements, e.g. vertical height to the top of the groyne from the sand/pebbles on both the updrift and downdrift sides of the groyne.
- Field sketches and photos that can be labelled and annotated, e.g. coastal features, pictures of differing pebble sizes and shapes from different locations on the beach, the effect of groynes etc.
- Geological identification of pebbles to show source area.
- Mapping the existing coastal defences and assessing the effectiveness (possibly done by an index).
- Visual/environmental impact assessment of both the threat created by erosion and the approaches to coastal management.
- Questionnaire surveys to investigate resident/stakeholder perceptions of coastal erosion and/or the management of erosion.
- A land use survey of a coastal community at risk because of coastal retreat.

Glacial systems and landscapes fieldwork opportunities

Link with the specification

- Geomorphological processes:
    - weathering - frost action, nivation
    - ice movement - internal deformation, rotational, compressional, extensional and basal sliding
    - erosion - plucking, abrasion
    - transportation and deposition.
- Erosional and depositional landforms: corries, arêtes, glacial troughs, hanging valleys, truncated spurs, roche moutonnee, drumlins, erratics, moraines, till plains.
- Fluvioglacial processes: meltwater, erosion transportation and deposition.
- Fluvioglacial landforms of erosion and deposition: meltwater channels, kames, eskers, outwash plains. Characteristic fluvioglacial landscapes.
- Periglacial features: permafrost, active layer. Periglacial mass movement processes.
- Periglacial landforms: patterned ground, ice wedges, pingoes, blockfields, solifluction lobes, terracettes, thermokarst. Characteristic periglacial landscapes.

Investigation ideas

- Can we tell from glacial landforms what direction the ice flowed?
- What evidence is there that a valley was glaciated?
- How does corrie size, shape and orientation vary?
- Is there a relationship between corrie back wall height and altitude in area X?
- What evidence is there for glacial deposition in X region?
- How do glacial sediments differ from river sediments?
- How does the orientation of deposits vary between sediments sites A and B?
- What variations in size, shape, distribution, orientation and composition can be seen in drumlins in a particular area?
- What are the characteristics and patterns of the assemblage of landforms within the landscape?
- What were the transport pathways and ice-flow directions?
- What is the scope and scale of the glacial erosion in region X?

Possible hypothesis

- Aspect is a significant factor in determining the distribution of corries.
- A glacier flowed north-west to south-east along X valley.
- X valley was glacially abraded during the Last Glacial Maximum.
- Glacial sediments contain more angular rocks than river sediments.
- X region was a zone of glacial deposition during the Last Ice Age.
- Drumlin shape and orientation are strong indicators of ice movement.

Possible data collection methods

- Aspect is a significant factor in determining the distribution of corries.
- A glacier flowed north-west to south-east along X valley.
- Survey and sketch map of corries, including geology, length, width, height and aspect.

- Altitude: the height above sea level of the floor of the corrie could be measured using a GPS as well as secondary sources. The height of the backwall could be gathered in a range of ways ranging from the use of GPS at the base and the top or using a range finder and clinometer from the corrie floor as well as secondary sources from Ordinance Survey (OS) maps and Google Earth.
- Aspect: the orientation of the corrie could be measured using a compass and both northings and eastings could be recorded.
- Width and length: latitude and longitude points could be measured out in the field using specific apps and this could then be used in the classroom to work out the width and length from secondary sources.
- Field sketches and photographs: draw and annotate field sketches and photographs in the field to highlight the processes in action on the features.
- GPS log: the location of particular features or sample site could be logged.
- Field sketching and mapping roche moutonnees in a valley to understand whether the valley was glacially abraded during the last glaciation.
- Measuring pebble size and shape, and comparing between different sedimentary environments (e.g. glacial/fluvial/upland/lowland).
- Orientation: which way has a clast within till or a boulder on the surface been deposited by the glacier (particularly useful if it has an elongated shape). This could be measured using a compass.
- Size: this could be measured using callipers or rulers of varying length. A broad view of sustainability should be taken here in terms of removing clasts from till deposits and, where possible, size could be determined from material that has already fallen from the till to minimise group erosion of sites.
- Roundness could be measured on a scale, such as Power's scale of roundness, or by first measuring its size using the Callieux calculation.
- Shape could be categorised using Zingg shape classification.
- Dip: the angle of dip of clasts within till could be measured using a compass clinometer.
- Field sketches and photographs: you could draw and annotate field sketches and photographs in the field to highlight the processes in action on the features of deposition and cross-sections of deposited material.
- Geomorphological mapping to show the extent of the feature or deposit.
- Sketching and drawing glacial sediments exposed in river cuttings, quarries or coastal cliffs.
- Mapping glacial moraines using a combination of fieldwork, maps, GPS and satellite images (from Google Earth).
- Measuring drumlins and their orientation to work out ice flow direction.
- Cailleux Index: The raw data needed for each pebble are the length of the longest axis (l) and the radius of curvature of the sharpest angle (r). For each stone, calculate Cailleux Index as follows: Ci = (2r/l)x1000. Ci=100 for a perfectly spherical pebble. The lower Ci is then the more angular the pebble.
- Krumbein's Index of Sphericity: the raw data needed for each pebble are the lengths of the a, b and c axes. For each stone, calculate Krumbein's Index as follows: K = cube root of bc/a2 K = 1 for a perfectly spherical pebble. K must be between 0 and 1. The lower K is then the less spherical the pebble.

Ecosystems under stress fieldwork opportunities

Link with the specification

- Nature of ecosystems: their structure, energy flows, trophic levels, food chains and food webs.
- Concepts of succession: seral stages, climatic climax, sub-climax and plagioclimax.
- The main characteristics of a distinctive local ecosystem such as an area of heathland, managed parkland, pond, dune system.
- Local factors in ecological development and change such as agriculture, urban change, the planned and unplanned introduction of new species.

Investigation ideas

- How is vegetation linked to soil type and gradient?
- How does microclimate vary within a woodland area?
- Are differences in vegetation linked to rock type?
- What is the link between vegetation type and variations in soil pH?
- How do different vegetation types affect organic matter content?
- How is vegetation influenced by aspect and height?
- How does position down a slope affect the type of vegetation?
- What is the effect of light on vegetation growth?
- How do deciduous and coniferous woodlands compare in age and density of vegetation, diversity of species, light intensity or soil type?
- Is there evidence of plant succession from mud flats to salt marsh (halosere) across a transect?
- How does plant species diversity across sand dunes change from shore to fixed dune?
- How does human activity affect plant cover and diversity in a sand dune environment?
- What effects do people have on a woodland area?
- What are the effects of trampling on plant species diversity?

Possible hypothesis

- Species diversity increases across sand dunes from the high water mark to the fixed dunes.
- There are significant differences in microclimate between coniferous and deciduous woodland.
- Slope, aspect and soil type influence the distribution of vegetation types.
- Changes in vegetation in a hydrosere are associated with changes in soil depth, organic matter and moisture content.
- Human activity in sand dune environments disrupts the natural process of plant succession.

Possible data collection methods

- Point sampling and belt transects.
- Quadrat sampling of vegetation types.
- Measurement of light intensity using a light meter.
- Soil sampling tests of soil acidity, texture and organic matter.
- Recording microclimatic data, including temperature, wind speed and relative humidity.

- measuring the height of species, including trees, using clinometer and tape.

Changing places fieldwork opportunities

Link with the specification

- The concept of place and the importance of place in human life and experience.
- Insider and outsider perspectives on place.
- Categories of place: near places, far places, experienced places and media places.
- Factors contributing to the character of places: endogenous (location, topography, physical geography, land use, built environment and infrastructure, demographic and economic characteristics), exogenous (relationships between places).
- The ways in which relationships and connections, meaning and representation affect continuity and change in the nature of places and our understanding of place.
- How humans perceive, engage with and form attachments to places and how they present and represent the world to others, including the way in which everyday place meanings are bound up with different identities, perspectives and experiences.
- How external agencies (including government, corporate bodies and community or local groups) make attempts to influence or create specific place meanings and thereby shape the actions and behaviours of individuals, groups, businesses and institutions.
- How places may be represented in a variety of different forms such as advertising copy, tourist agency material, local art exhibitions in diverse media (e.g. film, photography, art, story, song).
- Local place study exploring the developing character of a place local to the home or study centre. Contrasting place study exploring the developing character of a contrasting and distant place.
- People's lived experience of the place in the past and at present and either changing demographic and cultural characteristics or economic change and social inequalities.

Investigation ideas

- Changes in or characteristics of suburbanised villages: population size and structure, employment characteristics, housing etc.
- Impact of tourism on two different honey pot sites.
- Difference of insider and outsider perception of place.
- The effect of the building of new housing estate(s) on a chosen place.
- How the endogenous factors affect the character of two places.
- Investigation of land use patterns in contrasting places.
- How the built environment varies between two places.
- Assessment of the success of flagship projects, e.g. sports sites, tourism projects in an area of urban or rural rebranding etc.
- How sustainable is a regeneration project.
- The contrasts between media representation of place and local experience of place.
- The impact of the building of a by-pass on a chosen place.
- How change in a village/neighbourhood affects its residents.
- The effects of a regeneration project on the local community and economy of a place
- How retail changes affect the lives of people in a place.
- Differences in leisure provision in two contrasting places.
- The environmental, social and economic impacts of a single, large, tertiary employer, e.g. a hospital complex on a place.

- The conflicts associated with a major new development.
- Factors affecting house prices in two contrasting places.
- Clone town investigation, comparing two or more places.

Possible hypothesis

- The growth of second home ownership has major effects on tourist area X.
- Tourism in places X and Y has significantly changed the local environment.
- The presence of a football club has environmental and economic impacts on place X
- Place X is a typical suburbanised village.
- Places X and Y show significant differences in quality of life.
- Housing developments in place X have both positive and negative impacts on the local economy and environment.
- Variations in the incidence of crime and vandalism in place X are affected by environmental and social conditions.
- Service provision in different places depends on population size.
- The development of a new superstore/by-pass/factory estate causes local conflict between different interest groups.
- Local experience of people in place X is different from media representation of that place.
- Social and environmental factors influence house price variation in places X and Y.
- The layout and growth of place X is largely affected by physical factors.
- Place X is perceived very differently by different age groups/ethnic groups/income groups.

Possible data collection methods

- Aspect is a significant factor in determining the distribution of corries.
- Age of building surveys.
- Surveys of function of buildings.
- Environmental quality surveys.
- Housing condition surveys.
- Residents' perception surveys.
- Questionnaires.
- In-depth stakeholder interviews.
- Service count and surveys.
- Noise, litter and pollution surveys.
- Residents' quality of life survey.
- Crime risk assessment.
- House price surveys.

Contemporary urban environment fieldwork opportunities

Link with the specification

- Urban characteristics in contrasting settings. Physical and human factors in urban forms.
- Spatial patterns of land use, economic inequality, social segregation and cultural diversity in contrasting urban areas.
- The impact of urban forms and processes on local climate and weather.
- Urban precipitation, surfaces and catchment characteristics; impacts on drainage basin storage areas; urban water cycle - water movement through urban catchments as measured by hydrographs.
- Environmental problems in contrasting urban areas: atmospheric pollution, water pollution and dereliction. Strategies to manage these environmental problems.

Investigation ideas

- A comparison of the success and management of two contrasting urban regeneration projects.
- An assessment of 'green' transport strategies in a town as a part of managing urban development.
- A comparison of the quality of life between X and Y (two neighbouring wards or areas in different parts of the city).
- Why urban areas show differences in terms of their levels of deprivation.
- How and why quality of life changes with distance from the centre of city/town X.
- Analysis of land use patterns in the central part of an urban area.
- Analysis on patterns of crime and deprivation in an urban area, e.g. the level of crime is associated with the social, economic and environmental characteristics of an area.
- Comparative analysis of the socio-economic characteristics of different areas of a town
- A study of microclimate variations across an urban area.
- Investigation into the impact of traffic on air pollution in an urban area.
- Investigation of central areas of a city to look at variations in land use, quality of the environment, footfall and/or characteristics of cultural quarters.
- Investigation of the impact of pedestrianisation on CBD shopping quality.
- Investigation of changing retail provision and shopper behaviours.
- Investigation of planned housing developments and their potential impacts.
- Investigation of how the demands for good living spaces are being managed.
- A comparison of the facilities and attitudes towards recycling, in two contrasting urban areas.

Possible hypothesis

- There are distinct socio-economic patterns in urban area X.
- Levels of crime are related to the social, economic and environmental characteristics of an area.
- There are significant differences in environmental quality across an urban area.
- CBD and out of town retail centres show differences in type and volume of traffic flow, pedestrian density and shop sizes.

- Urban microclimates show distinct changes from the centre to the edge of a town.
- In city X the quality of life for young families is higher in inner urban areas than in suburban wards.
- There are marked differences in levels of deprivation between areas X and Y.
- X town centre is becoming a clone town.

Possible data collection methods

- Pedestrian flows/footfall surveys.
- Questionnaires of shoppers/retailers/residents.
- Bi-polar surveys to analyse quality of the urban/retail environment.
- Assessment of retail quality (range, diversity, types etc.).
- General environmental condition of the area (various environmental quality aspects).
- Resident versus visitor perception of parts of an urban area.
- Aesthetic quality surveys of the built environment, e.g. architecture and design.
- Housing quality surveys: size and upkeep etc.
- Quality of routeways and footpaths, including width and possibly accessibility for users who are partially sighted or in wheelchairs.
- Surveys of traffic/car parks/bus services to the town centre.
- Photographs/micro-field sketches of high street environments.
- Material deprivation and social deprivation indices.
- Noise surveys and pollution level surveys.

Population and the environment fieldwork opportunities

Link with the specification

- Characteristics and distribution of two key zonal soils to exemplify relationship between soils and human activities.
- Air quality and health. Water quality and health.
- Factors in natural population change: key vital rates, age–sex composition, cultural controls.
- Demographic, environmental, social, economic, health and political implications of migration.
- Case study of a specified local area to illustrate and analyse the relationship between place and health related to its physical environment, socio-economic character and the experience and attitudes of its populations.

Investigation ideas

- Scale and impacts of urban migration. The effect of inward migration in X village.
- Links between migration into urban areas and quality of life.
- Variations in ethnicity within an urban area.
- A comparative study of population characteristics in two contrasting wards or rural parishes.
- Whether village X is a growing or declining village.
- Comparison of population structures in growing and declining villages.
- Factors that influence the variation in soil types in a small area.
- The relationship between land use and nature of soil.
- How differences in moisture content, particle size and humus characteristics produce distinctive soil profiles.
- Assessing soil erosion risk in an area.
- The impact and significance of air pollution on people's health in area X.
- The impact of water pollution in a town.
- Differences in health in two areas.

Possible hypothesis

- Migration into settlement X has had positive and negative impacts on local services and quality of life.
- Settlement X displays the characteristics of a declining village.
- Recreational opportunities and job opportunities are the most important pull factors for people moving into X.
- Population characteristics differ between an inner city and outer suburban area.
- There are clear differences between the socio-economic characteristics of established residents and newcomers to a village.
- Soil type demonstrates considerable variation within a small area.
- There is a close relationship between soil type and land use.
- Air pollution has negative impacts on people's health in area X.
- Health differences between two areas are related to socio-economic conditions.

Possible data collection methods

- Pedestrian flows/footfall surveys.
- Questionnaires of residents.
- Housing condition surveys.
- Residents' perception surveys.
- Questionnaires.
- Bi-polar surveys to analyse quality of the environment.
- General environmental condition of the area (various environmental quality aspects).
- Photographs/micro-field sketches of environments.
- Material deprivation and social deprivation indices.
- Take soil samples to test for texture and moisture levels.
- Noise surveys and pollution level surveys.

Resource security fieldwork opportunities

Link with the specification

- Sustainable resource development. Environmental Impact Assessment (EIA) in relation to resource development projects.
- Sources of water, components of demand, water stress. Relationship of water supply (volume and quality) to key aspects of physical geography – climate, geology and drainage.
- Sustainability issues associated with water management: virtual water trade, conservation, recycling, 'greywater'.
- Sources of energy, both primary and secondary. Components of demand and energy mixes in contrasting settings. Relationship of energy supply (volume and quality) to key aspects of physical geography - climate, geology and drainage.
- Strategies to increase energy supply (oil and gas exploration, nuclear power and development of renewable sources). Strategies to manage energy consumption (including reducing demand). Sustainability issues associated with energy production.
- Environmental impacts of a major mineral resource extraction scheme and associated distribution networks. Sustainability issues associated with ore extraction, trade and processing.
- Case study of a specified place to illustrate and analyse how aspects of its physical environment affects the availability and cost of water or energy or mineral ore and the way in which water or energy is used.

Investigation ideas

- Assess the feasibility and impact of a proposed wind farm.
- Assess the impacts of an existing wind farm/solar farm on the surrounding landscape, people and economy.
- Investigate the impact of opencast mining on an area and evaluate management strategies.
- Assess the impact of former coal mining on a rural area.
- Assess the environmental impact of sand or hard rock quarries in area X.
- Investigate the impact of a disused lead mine on a river.
- Investigate the impact of a thermal power station on the environment and quality of life in location X.
- Assess the success/management problems of reservoir X.
- Assess attitudes to recycling and success of existing schemes.
- Investigate the impact and significance of pollution from a large working quarry.

Possible hypothesis

- The wind farm at X has significant effects on the surrounding environment and local economy.
- The nuclear power station at X has provided benefits to the local area.
- Quarrying in the X area creates more costs than benefits.
- Levels of water pollution in the X river are related to proximity to disused mines.
- The thermal power station at X has effects on the environment and quality of life of the local area.
- The solar farms in area X have both positive and negative impacts.

- Management of the X reservoir for different purposes creates conflicts of interest between user groups.

Possible data collection methods

- Environmental quality/impact, e.g. landscaping of the site and/or surrounding area. Visual assessments could be made from various locations throughout the area. Contrasts could be made between existing landscape and the impact of the development.
- Land-use mapping.
- Questionnaires generating data about different benefits/costs affecting stakeholder groups, e.g. spending opportunities, job opportunities, image of the area changed.
- Road infrastructure and congestion surveys.
- Aesthetic: bi-polar surveys/visual impact scores.
- Pollution: noise, air and dust. Decibel meters for noise, lichen surveys, damp cotton wool swaps for dust.
- Water quality: kick sampling for invertebrates.
- Ecological surveys using quadrats.
- Detailed interviews.
- Annotation of base maps of mine/quarry/reservoir/wind farms.
- Photographic evidence.
- Site observations and descriptions.
- House price surveys.

Sample investigations

A sample investigation is provided for each subject topic. Note that, as with the fieldwork opportunities, there are no sample investigations for the topics of 'Hot desert systems and their landscapes', 'Hazards' or 'Global systems and global governance' due to logistics and scale.

You can use the title links to jump directly to the different sections of this part of the Fieldwork Guide.

Sample investigation: Factors affecting infiltration rate

Background

Infiltration can be affected by a number of factors including preceding weather conditions, slope angle, slope position, geology, soil texture, vegetation type and land use.

Hypothesis

Infiltration rates are affected by soil type, slope angle and slope position.

Data collection

Equipment

- Small tubes made of plastic piping or cans with bottoms removed.
- Ruler, 20 metre tape.
- Stop watch.
- Trowel and mallet.
- Plastic bags for each site.
- Clinometer.
- (set of soil sieves).

Methods

Choose a slope which leads down to a river. Try to select a slope with uniform geology and vegetation unless testing the impact of these factors. Select three to five transects with ten equidistant sites on each. Include the base and summit of the slopes.

At each site:

- measure angle of slope using a clinometer
- take a sample of topsoil to test soil texture and moisture levels. Place in a polythene bag with a sealed top
- use a trowel to cut a circle in the ground and insert a home-made infiltration ring or infiltrometer, e.g. a tube of plastic piping. Hammer in to a depth of 10 cm. Ensure the tube is vertical. Try to disturb the soil and vegetation as little as possible
- pour in water with a jug up to the top of the tube and record how many millimetres the water has fallen after one minute. Fill up the tube and record the drop in the second minute etc. Record infiltration rates for at least 10 minutes
- record the position on the slope, mark on a map and record site details (vegetation type, land use, slope variation etc). Identify any site factors that may lead to anomalies.

Processing data

When all the recordings have been taken, calculate:

- total fall over 10 minutes
- mean fall (mm per minute). This is the infiltration rate
- infiltration capacity. When the fall has become constant the infiltration capacity has been reached
- put the soil sample through sieves and test for percentage sand, silt and clay. Sand consists of particles of over 0.2 mm.

Presentation of results and statistical analysis

- Measure angle of slope using a clinometer.
- Draw slope profiles for each transect. Underneath, draw located bars to show the infiltration rate and infiltration capacity.
- Draw scatter graphs or statistical correlation technique (Spearman's rank) to show the link between factors such as slope angle and infiltration rates, infiltration rates and infiltration capacity, position upslope and infiltration rates/capacity, infiltration rates and percentage sand.
- If the experiment has been carried out twice (e.g. once in dry conditions and the second time after rainfall), use the chi–square test. Set a null hypothesis: "There is no difference between infiltration rates after wet and dry weather". The Mann-Whitney test is also suitable as a test of difference between two sets of data.

Analysis

The graphs and statistical tests will help in either supporting or rejecting the hypothesis. Evidence may be inconclusive. There may be a positive correlation between slope angle and infiltration capacity. If there is little correlation between these variables, consider the extent to which slope position (or distance upslope) is more important than slope angle. How does soil texture affect infiltration rates/capacity? Is the finer material more concentrated at the base of the slope, leading to lower infiltration capacities?

Possible limitations

There is much scope for experimental error with the use of infiltrometers. It is difficult to keep a constant water supply, and sideways seepage at the bottom of the ring is often an issue. Faulty experimental technique may lead to a rejection of the hypothesis. Rates of infiltration are affected by many factors. It is difficult to isolate a few and assume that other variables are not affecting results.

Extending the study

- Before inserting the infiltration ring, undertake a soil moisture test at each site. Is there a correlation between percentage moisture and infiltration rates or capacity?
- Compare infiltration rates under different types of vegetation along the transect routes.
- Compare infiltration rates under different weather conditions. Remember however that very dry antecedent weather conditions can lead to low infiltration rates as the ground may be hard and compact.
- Record how different soil conditions affect infiltration. For example, compare compacted. soils where there has been heavy footpath use or cattle trampling with unaffected soils
- Compare infiltration rates under different geological conditions.

Sources of secondary data

- There are several useful sources of hydrological data for the UK. The National River Flow Archive (river level data) and the Environment Agency (river and sea level data) websites may be useful.

- It is also useful to obtain weather data for the weeks before starting the fieldwork. The Met Office archive is an excellent place to start. It provides monthly summaries back to 1998, with links to older station data as well.
- For more information about the rocks and other sediments in the drainage basin, the British Geological Survey's site Geology of Britain is a useful geographical information system.
- background information to water and carbon cycle fieldwork techniques and analysis (Field Studies Council)

Sample investigation: Coastal management schemes

Background

Breakwaters and large groynes are used to help retain beach material, and protect vulnerable cliffs. This type of interference with coastal systems can cause longer term problems downdrift (social, economic and environmental).

Hypothesis

Coastal management schemes at X have environmental and economic impacts.

Data collection

Equipment

- Tape measure.
- Clinometer.
- Compass.
- Float.

Methods

- Map location of sea defences, do simple measurements, e.g. of sea walls and groynes, later drawn to scale.
- Annotated field sketches of hard engineering coastal defences. Take photographs of schemes. Take photos to show scouring beyond groynes and other defences.
- Beach profiles at either end of beach.
- Measure wave frequency, height, type of wave.
- Measure sand height either side of groynes to relate to longshore drift.
- Make observations of the current situation along the coast-describe and sketch former and perhaps continued erosion, slumping, cracks in cliffs, rill patterns in the cliff face, undercutting by wave action etc.
- Mapping/short transect to show land uses and human activities.
- Measure speed and direction of longshore drift using float method or painted stones.
- Questionnaire surveys to establish perceived reasons for management. Interviews with tourists, locals, business owners about future risks, challenges and solutions.
- Perception surveys/environmental quality surveys/index of visual quality to assess attractiveness and effectiveness of coastal defences or recreational impact at visitor sites.
- Include secondary data, e.g. the use of old photographs and maps to compare past and present coastline positions, the use of local authority websites, Natural England, wildlife group sites.

Processing data

When all the recordings have been taken, calculate:

- total fall over 10 minutes
- mean fall (mm per minute). This is the infiltration rate
- infiltration capacity. When the fall has become constant the infiltration capacity has been reached

- put the soil sample through sieves and test for percentage sand, silt and clay. Sand consists of particles of over 0.2 mm.

Presentation of results and statistical analysis

- Annotated maps, sketches and photographs of different defence methods/designs, effects of scouring beyond last groyne.
- Located graphs to show variations in wave frequency and height.
- Tables and bar graphs to show the depth of sand/rocks on the updrift and downdrift sides of a groyne. These could be overlaid onto beach profiles to produce more complex techniques.
- Pie charts to show the size/shape of material in the quadrats along transects.
- Compass rose to show the direction of wave approach.
- Located proportional flows to show longshore drift rates.
- Land use map.
- Draw annotated beach profiles for both ends of the beach to scale.
- Calculate the index of visual quality (mean EQS scores) at various sites.
- Superimpose old photographs and maps on to present day to compare coastal position and shape.
- Tabulated results of questionnaire, with accompanying graphs to summarise data.

Analysis

What is the evidence for longshore drift and erosion along this coast? How does this affect beach profiles and sediment size? What are the benefits and costs of coastal management strategies? How does land use affect the strategies used? What have been the economic, environmental and social impacts of the strategies? Do the costs outweigh the benefits? What are people's attitudes to the defence strategy used? The effects of groynes and other sea defences may have brought security to many residents, but they may have damaged the environment in the longer term.

Possible limitations

Any evaluation will have to consider whether data collected over a short period is secure enough to make decisions on. Summer beaches and waves do not look or behave like those in winter or in stormy conditions. Longshore drift techniques are not very reliable. Secondary, even historical data will show how the defences evolved over time.

Much of the investigation is qualitative so there may be concerns over the subjectivity of some of the data.

Extending the study

- Consider comparing the effectiveness of hard and soft engineering strategies in two contrasting areas.
- Investigate the advantages and disadvantages of the scheme(s) for different groups of people.
- What has been the overall impact of the scheme over adjacent areas of coast? Has it been cost effective? Summarise with a cost benefit analysis.

Sources of secondary data

- Research information from the local council engineering departments regarding the costs of coastal management schemes and the predicted lifetime of the engineering works. Find out current planning restrictions for the coastal zone.
- Use evidence from local histories, old maps, old newspapers and photographs to determine how the coast used to look.
- Background information to coasts, fieldwork techniques and analysis (Field Studies Council)
- Maps and air photos using a postcode search using an online map
- Photos of every OS grid square using Geograph Britain and Ireland website
- Shoreline management plans (gov.uk website)

Sample investigation: Orientation of drumlins

Background

What variations in the size, shape, distribution, orientation and composition can be seen in the drumlins in an area?

Hypothesis

Drumlin orientation shows a clear pattern, indicating the direction of ice movement.

Data collection

Equipment

- Tape measure.
- Clinometer.
- Compass.
- Ranging poles.

Methods

- Use a tape measure to record the length of the long axis of the drumlin and the width at its widest point,
- Two components of the shape of the drumlin which are straightforward to measure are the angle of the stoss side (steep) and the angle of the lee side (less steep). Use two ranging poles, a clinometer and a tape measure to record data for either side. If feasible, do transects along the length of drumlins to show minute changes in slope angle.
- Use a compass to find the orientation of the longest axis of each drumlin. Record the results in degrees from 0–360.
- Draw annotated field sketches/profiles of various drumlins, highlighting slope variations and possible ice flow directions.
- Map the distribution of drumlins, using field observations and large scale maps.

Processing data

When all the recordings have been taken, calculate:

- elongation ratio (length to width ratio) for each drumlin
- average length, width and height of drumlins
- comparison angles of stoss and lee end of drumlins
- mean angle of orientation.

Presentation of results and statistical analysis

- Plot the distribution and orientation of drumlins on a map.
- Use a rose diagram to show orientation.
- Draw profiles of drumlins showing angles, height and length. Superimposed profiles will give visual information about the symmetry of each drumlin.
- Plot dimensions on dispersion graphs. Draw one set to show stoss slope angles and another to show leeward slope angles. Calculate the median values.
- Draw annotated field sketches.
- Work out standard deviation for dimensions of drumlins (for example, height, orientation).

Analysis

Is there a typical shape for the drumlins studied? Does this match the idealised shape proposed in most textbooks (asymmetrical, with steeper stoss end)? Is there a clear pattern of orientation for the drumlins observed? How much variation is shown? Can conclusions be drawn about the directions of movement of ice?

Possible limitations

Careful study of an OS map together with a relevant geology map showing surface deposits should help in selecting a suitable location. The area needs to be accessible. Do not trespass. Farmers are likely to be supportive if they know what you are doing.

Extending the study

Study the composition of materials on the surface of the drumlins observed-consider feasibility of exposures in cuttings, quarries, river banks etc. Collect a trowel sample of deposit. Dry the sample and conduct a sieve analysis.

Sources of secondary data

- Many glaciated areas have detailed geomorphological reports which outline landforms in terms of orientation and origin. The may support any conclusions you reach.
- Use large scale OS maps to reveal contour patterns suggesting drumlin fields.
- Background information to glacier fieldwork techniques and analysis (Field Studies Council)
- The BRITICE database has a downloadable PDF map that shows all the glacial landforms mapped around Britain

Sample investigation: Sand dune ecosystem

Background

Areas of consideration for interactions between the physical environment and the ecosystem could be height of dunes, gradient, aspect, soil depth and pH, salt content, moisture content, vegetation cover and microclimate features such as temperature and wind speed.

Areas for consideration for people and ecosystems could be the impacts of tourism, both positive and negative, or the management strategies employed in the dunes and their effectiveness.

Coastal sand dunes usually consist of dunes of differing ages, and a study of plant distribution on the dunes will therefore show vegetation change over time and space. The aim of the study is to examine the composition of vegetation species which exists in a sand dune ecosystem and to investigate how this changes across a psammosere from the fore dunes through to the climax community.

Hypothesis

Changes in vegetation across a sand dune from shore to fixed dune are associated with increased soil depth and moisture content.

Data collection

Equipment

- 30 metre tape.
- Compass.
- Clinometer.
- (Ranging poles).
- Quadrat.
- Trowel.
- Labelled plastic bags for samples.
- Plant identification sheet.
- (Moisture meter).
- (Thermometer, hygrometer, anemometer).

Methods

- Use a tape measure to record the length of the long axis of the drumlin and the width at its widest point.
- Transects from the embryo dunes to fixed dunes or woodland, using tapes, ranging poles and clinometers.
- Sampling of vegetation cover using quadrats to identify percentage cover and the presence of specific species or total number of species. Sampling could be systematic at equal distances from the beginning of the transect, or stratified (for example in each dune slack) or on each ridge or slope to allow coverage of different environments and microclimates.
- At each sampling point the following could also be measured: soil depth, soil colour, (an indication of organic matter), vegetation height, soil pH, wind speed and temperature. Soil

samples could be collected to be analysed later to calculate the moisture/salt content. Use sieves to see if shell content of the sand changes inland.

- Record microclimatic data. Light levels can be monitored with a lux-meter to record the amount of light reaching the vegetation canopy or the soil surface. Wind direction can be determined with a compass, and wind speed recorded with an anemometer. Humidity can be monitored with the use of a whirling hygrometer or digital probes.
- Plant identification charts can be used to determine which species are present at specific points along the transect.
- Photographic evidence or field sketches to show changes along a transect in vegetation type, evidence of erosion from wind (blowouts, for example) or footpaths and management techniques.
- Sketch map of the dune system, annotated with information including natural features, evidence of management and human impact and transect lines

Processing data

To work out soil moisture, weigh a soil sample, dry in an oven for 12 hours and then weigh again. To find the weight of organic matter, place the dried sample in an oven at 500 degrees centigrade for two hours. Calculate the percentage of vegetation cover and type from quadrat data.

Presentation of results and statistical analysis

- Annotated dune transect profiles, showing changes in slope shape and vegetation type.
- Tables to show slope and vegetation recordings along the transect(s).
- Located bar/pie charts showing vegetation cover or type#.
- Kite diagrams showing species distribution.
- Tables and bar graphs to show the depth soil/soil pH/wind speed/temperature/moisture/shell/salt content as it changes along the transect.
- Scattergraphs to show link between variables, e.g. distance inland vs number of plant species.
- Spearman rank correlation test to show association between selected variables, for example distance from the sea and organic content, or height of vegetation, or depth of soil.
- Use the Mann-Whitney U test and Chi-squared tests to compare two or more different areas of the dunes, e.g. comparing embryo with fixed dunes.
- Annotated or overlaid sketches and photographs.

Analysis

Moving inland, you might expect to find greater vegetation cover, deeper soil, higher soil moisture content and lower soil pH.

Does the type and amount of vegetation change inland? Is there a significant difference in the species diversity and composition at different areas of the dunes? Suggest possible explanations. How did the shape of the dunes change inland? Can this be linked to vegetation type? How did soil conditions and microclimate vary with vegetation across the dunes? Is there evidence of plant succession (disappearance of certain species, appearance of others)? How did other factors such as human activity affect the vegetation? Is it possible to describe the stages in the succession on the dunes?

Possible limitations

It is important to keep the transect on a straight line across the sand dune system and to take a number of profiles across the width of the dunes for comparative purposes. The presence of some plant species may be dependent upon the season, and, as a result, the outcomes of the investigation may vary depending on the time of year. Human impact can considerably alter the features of the dune transect.

Extending the study

Use Simpson's Diversity Index, which is a measure both of species richness (i.e. the number of different species present) and species evenness (i.e. how evenly distributed each species is).

$D = N(N-1) / \Sigma n(n-1)$ where D = Simpson's Diversity Index n = the number of individuals of each species N = the total number of individuals.

Investigate changes in dune shape with distance from the sea. Is there a correlation between slope angle and percentage plant cover? Focus on the effects of human activity on the dune, recording the impacts of footpath erosion and reduced vegetation cover caused by trampling. Comparisons could be made of intensively managed and relatively unmanaged areas.

In this type of study, there is scope for many alternative investigations on the same theme. These can be carried out individually or extracted from the larger database collected by the group, such as:

- what effects do wind speed and humidity have on sand dunes and their vegetation?
- how do soil depth/moisture/humus vary across sand dunes?
- what soil and environmental factors influence dune vegetation type?
- do psammosere show clear ecological succession?
- what arresting factors prevent psammosere reaching their climax community?
- an analysis of trampling and blowouts in sand dunes
- a comparison between grazed and ungrazed areas of sand dunes
- what has been the effect of planting woodland on the leeward side of dunes?

Sources of secondary data

- Use of aerial photos or Google Earth which can also be annotated for the purpose of the study.
- Use of old maps/photographs to compare past and present location of sand dunes and the nature of human activity.
- Information on sand dune fieldwork (Field Studies Council)
- Sand dune fieldwork techniques (Royal Geographical Society)
- Photos of every OS grid square using Geograph Britain and Ireland website
- Natural England, the National Trust and English Nature all have useful resources on specific dune systems.

Sample investigation: Social and environmental impact of a by-pass on a place

Background

There are two possible approaches to this type of investigation: the potential impact of a proposed by-pass or the impact of a by-pass after its completion. It may be possible to compare two places: one where a by-pass has been constructed and another where one is proposed. By-pass development involves a balance between costs and benefits, and almost inevitably leads to conflicts of interest affecting different groups of people.

Similar types of work could be carried out in relation to other new developments such as a new superstore, housing estate, industrial site or incinerator. In all cases, the subject is likely to be emotive, with strong views and perceptions exhibited by different interest groups. The link to the specification on changing places is how external agencies, including government, corporate bodies and community or local groups make attempts to influence change in places.

Hypothesis

The proposed by-pass will have significant environmental impact along the new route but will improve social and environmental quality in place X.
Or
The economic, environmental and social advantages of the by-pass around place X outweigh its disadvantages.

Data collection

Equipment

- Noise DB meters.
- Traffic counters and tally sheets.
- Base maps, cameras and sketching materials.

Methods

- Traffic surveys at regular intervals during week/day. Note type and volume of vehicles. Convert to passenger car units (PCU).
- Work out speed of selected passing vehicles by using two fixed points and convert timing to speed.
- Measure noise levels during each traffic count and streets 300–500 metres from main road.
- Estimate pollution levels using baby wipes around lamp posts at each study site. Leave for a week and compare dirt accumulations.
- Conduct questionnaires of people living, working and walking along main routes and also those affected by new building, assessing local views about the proposal (or completed route). Use stratified sample to cover residents, shopkeepers, pedestrians, drivers.
- Consider carrying out some in-depth interviews of people affected by the proposed scheme/completed by-pass.

- In congestion hot-spots, try to find out when and why congestion takes place, the length of queues and the length of delay.
- Draw detailed map of proposed or completed by-pass route(s). Identify land uses and measure number of/length of woodland areas and hedgerows affected.
- Carry out EQS of the existing roads. Note congestion problems, safety issues.
- Conduct an environmental impact assessment along planned/completed route. Stop at a number of key points.
- Take photographs and draw field sketches to illustrate the EQA values. Consider noise, smell, air pollution, vibration, traffic congestion, public safety etc.
- Time how long it takes to go through the town at different times on various routes. What is the average congestion time?
- Map the main through routes. Identify major bottlenecks, places with most congestion, road obstructions, traffic lights and pedestrian crossings, traffic calming, on-street parking, resurfacing. Label factors that reduce traffic flow rates.
- Interview local farmers/landowners to assess their views about the by-pass.

Presentation of results and statistical analysis

- Draw flow line maps of traffic at different times. Incorporate types of traffic.
- Graph EQA responses, perhaps as located proportional symbols.
- Annotate photographs of different locations. Use Google Street View image with sketches superimposed.
- Graph questionnaire responses.
- Tabulate summary of local press reports.
- Draw detailed annotated land use map of the by-pass proposal/completed route.
- Draw located graphs to show noise and pollution levels and compare main road with more distant sampling sites.
- Word cloud based on results of in-depth interviews.

Analysis

Work out mean, median, mode or traffic statistics. Analyse patterns and trends. Compare traffic flows before and after by-pass completion. Apply chi-squared to test for significant difference between traffic volumes before and after road was built. Using results of in-depth interviews, summarise the views of different interest groups and their attitudes to changes in place X. Using cost benefit analysis and EQA, discuss whether the proposed route is appropriate. Are the benefits worth the costs? Consider all aspects – social, economic and environmental impacts.

Possible limitations

Large-scale studies of traffic issues can be time and labour intensive. Traffic counts in busy places will be very hard to achieve successfully by one person. Keep the investigation to an achievable scale and maintain the focus.

It may prove difficult to obtain secondary data, for example the volumes of traffic before a development (needed for comparison). However, the local council will be a good starting point, as a detailed investigation will need to have been undertaken before the development was started.

Remember the good points! New developments often bring positive impacts in terms of employment and economy, local industry and property prices.

Extending the study

As only a selection of methods would be used, other methods could be explored to further extend the study.

Sources of secondary data

- Planning documents and reports of consultation meetings.
- Local structure plan.
- Highways Agency – statistics department.
- County highways department.
- Department for Transport statistics
- Websites opposed to/in favour of new scheme.
- Local press reports.
- Old land use/OS maps of the area.
- background information to place fieldwork techniques and analysis (Field Studies Council)

Sample investigation: Quality of life changes with distance from the centre of a city

Background

Quality of life represents a multiple index of different criteria that reflects residents' housing standards and the environmental conditions in which they live. Aspects of quality of life include built environment, access to service provision, crime and safety, physical and mental health, traffic noise and safety, recreation, social belonging and community cohesion, as well as standards of income. These aspects will be different for different groups of people.
The boundaries of the sampling areas should ideally be defined according to Census output areas so that geodemographic data can be easily compared with primary field data. This would be very important in the context of multiple deprivation data for instance.

Hypothesis

Levels of deprivation and quality of life change from the inner-city to the suburbs.

Data collection

Equipment

- Large scale maps.
- Recording sheets.
- Camera.
- Decibel meter.

Methods

- Land use survey: record land use of each area on a large scale base map (1:2500 or 1:1250). Categories may include industry, retail, offices, housing, open space. Some might be subdivided, e.g. housing type (terraced, semi-detached, detached, flats, bungalow etc.) and age.
- General landscape evaluation: based on subjective observation, for example boring versus stimulating, ugly versus attractive, crowded versus peaceful, threatening versus welcoming, drab versus colourful. An EQS can be used with indices or bi-polar scores. Students could combine this with photos that they take of the worst and the best images in each category. Include aesthetic quality of the built environment, for example architecture and design aspects.
- Scale of visual pollution: scores from zero to three: no pollution – badly polluted. Criteria might include obviousness of pollution, litter, smalls, state of buildings, impact on surrounding area.
- Index of burglary: based on penalty points. Absence of burglar alarm, security cameras, metal bars on windows, metal shutters, neighbourhood watch sticker etc.
- Physical condition of buildings/index of decay. Range of options: none, little, some, much. Criteria: deterioration of walls, peeling paint, slipped tiles, broken glass, broken gutters, etc.
- Shopping survey: looks at shopping quality and street appearance. Quality of shops: type, other land use, quality of goods, number of vacant units, etc. Street appearance: safety for pedestrians, crowdedness, street cleanliness, etc.

- Crime perception: surveys, questionnaires or indices, e.g. a questionnaire for residents or observations in different urban areas of the burglar alarms, anti-crime features. This could be combined with some secondary crime data into an index for each output area.
- Questionnaires: could collect data about different aspects of quality of life or from different stakeholder groups, e.g. views on community cohesion, do people eat 5-a-day, safety perception crime/traffic/pollution etc.
- Services surveys, e.g. libraries, post-offices, pubs, doctors' surgeries etc.
- Transport index: create an index which combines the frequency, length and cost of public transport to main service provision. Record transport ease/variety/quality.
- Car age survey: for each of the cars parked in a survey area, record its age by taking a mean - the average age of the cars in an area can be worked out.
- Noise surveys might give additional information on environmental conditions. Using an app such as Sound Meter or Decibel 10th, measure the sound level within each area in dB.
- Vandalism audit: subdivide vandalism into different types, e.g. graffiti, damage to bus shelters, dumped litter etc then map locations in which these were found, as well as an assessment of the severity of the vandalism.
- Extended interviews: For example, with groups who might have set up renewal projects, youth projects, sports facilities etc.
- Photographic evidence: Photos could be taken of the various areas within the region and annotated to take note of the building/environment/traffic/people/services/renewal schemes/upkeep etc. Or perhaps a photo that students think sums up the area, socially or economically.
- Green space survey: This could include mapping the green spaces available, as well as assessing their accessibility, economically or perhaps socially.
- Food availability audit: within a given area, locations of shops selling fresh and healthy foods could be mapped, together with an estimation of the cost of a 'standard grocery' list.

Presentation of results and statistical analysis

- Land use data: transfer the data onto another base map for each area, using colours/shading.
- Housing condition survey: mapping the features that have been collected in each area, shading in using a key. Decide on the categories to include on the base map and construct a key. The categories are likely to arise from the combination of the condition of brickwork, roofs, paintwork etc. For example, black for 'in very poor repair and condition' to light grey for 'in a good standard of maintenance'. Garden size could be represented by located pictograms along the transect on the base map. Housing density could be represented on a scatter graph. Distance along the transect on the *x*-axis and housing density per km^2 on the *y*-axis.
- Calculate total street environmental quality score for each street. Map results onto a base map using proportional symbols.
- Different indicators could be combined and mapped using radar plot diagrams located onto base maps.
- Visual quality data could be used to draw rose diagrams located at each survey point on a base map of the area.
- Green space survey: depending on the area covered, this may be represented as a dot map, showing point locations of the green spaces. A colour key could be used to

distinguish between different types of green space, or perhaps the economic accessibility of each green space, e.g. free or fee-paying. Basic mapping of the green space features on a base map may also be appropriate. If an index has been devised then a choropleth may be appropriate.
- Census data: this is likely to be a choropleth map for the main variable, e.g. household car ownership. This could be combined with a proportional symbols map for the average age of the cars on the area from the car age survey.
- Photographic analysis: displaying this data could range from annotating a series of photographs with descriptions of the various aspects. It would also be possible to construct an analytical table to tally the frequency of different aspects and behaviours. For example, people under 12, under 21, over 50; People individually or in pairs or groups; People smoking, sitting, climbing on street furniture; walking through an area etc.
- Questionnaires: usually displayed using a selection of pie graph, bar charts and pictograms.
- Extended interviews: data coding is the process of examining data for themes, categories and key words. Students mark the text or chunks of text, so they can be compared and collated.
- Noise surveys: an isoline map could be used to represent this data. The points at which the noise level was recorded would be chosen either randomly or at regular intervals, these are plotted onto a base map. Lines of equal measurement are then drawn.

Analysis

Describe and analyse each set of data. Summarise the data using measures of central tendency (mean, median and mode) and dispersion (standard deviation). Use other refining activities that may be relevant such as scaling, ranking and weighting.

Look for relationships between the data shown on the graphs and where appropriate use correlation.

Spearman's Rank can be used to analyse some of this data: to test for the degree of relationship between a variable and the distance from the city centre. For example, a null hypothesis might be 'There is no significant correlation between housing condition and distance from the city centre.' Alternatively, students could combine the different data they have collected into a material and/or social deprivation index. For example, a material index might include housing density and households with no car, housing condition. An index for each area can be calculated by ranking each survey area, (with 1 being the best) for each indicator and taking an average over several indicators. This index can then be used in a Spearman's rank test for example: 'There is no significant correlation between the calculated material deprivation index and distance from the city centre.' The same principle can be used for social deprivation factors.

Using all maps, graphs and calculated indices, describe patterns of quality of life within the study area. Try to explain trends and anomalous locations. Do inner city wards (or those close to a main road, factory) have lower environmental and housing conditions than areas towards the periphery of the town?

Summarise key patterns of environmental and housing quality-highlight reasons for these patterns. Comment on recent developments that may have changed environmental or housing quality and overall quality of life.

Possible limitations

Quality of primary data collection and accuracy of scoring of various elements of housing, environmental quality etc. and its subjective nature.

Coverage of sample points across chosen study areas and whether it gives a representative picture.

Age of secondary data. For example, the last census data was collected in 2021.

Response rate and balance of different age groups for the questionnaire data.

Candidates should reflect critically on every stage of their investigation in order to appreciate its strengths and weaknesses. They should also comment on the level of accuracy and degree of reliability of data as these will have a significant impact on their findings and the conclusions drawn.

Extending the study

As only a selection of methods would be used, other methods could be explored to further extend the study.

Consider to what extent perceptions of deprivation vary within a given area, depending on age, social class etc. (comparing, for example, perceptions of teenagers and over 60s).

Further research may involve extending the spatial and/or temporal scale of the study, conducting similar research in a different location(s) or creating further sub-questions that could be investigated.

Sources of secondary data

- Secondary data, such as National Census data, should be used to support the task. This will allow the students to explore important aspects of quality of life, not possible to observe through primary fieldwork. This might include education provision, crime and safety issues, access to work opportunities and levels of income.
- The Index of Multiple Deprivation (Consumer Data Research Centre) (IMD) is a government measure of how deprived every part of the country is. It is a composite index which brings together measurements in seven different domains.
- Census data is a useful source of secondary data on population structure. This includes quality of life indicators and multiple deprivation indices such as socio-economic class, health data, education levels.
- Neighbourhood statistics from the Office for National Statistics for each postcode.
- House price information on Zoopla is available for the whole of the UK. Identify house value index for each ward by calculating average house price. Take an average value from five detached and five terraced houses.
- Crime data (Police.uk)

Sample investigation: Comparison of population characteristic in two contrasting areas

Background

Population structures allow comparisons between different areas of a town as well as local and regional migration trends. Suitable contrasting areas for study should be identified such as inner city/suburb, area undergoing redevelopment or gentrification/one that has not, two villages in rural or urban fringe areas, perhaps one that has expanded recently and another suffering decline.

Hypothesis

Population characteristics differ between an inner city and outer suburban area.

Data collection

Equipment

- Large scale maps.
- Recording sheets.
- Camera.

Methods

- On base maps of the two study areas, record land use, housing type and age, services and facilities.
- Bi-polar assessments of the housing condition of 30–40 properties in each study area and environmental quality of streets within each area.
- Observer survey: at public space locations throughout both areas, log the numbers and ‘type’ of people in the areas.
- Obtain house prices and housing details for a range of residential properties in the two areas (estate agencies, online) .
- Conduct questionnaire of local residents, focusing on length of residence, good and bad aspects of the area, why and when they moved, number, ages and jobs of people in the property, use of local facilities.
- Numerical attitude survey designed to ascertain people's attitudes, e.g. why they have moved into the area or what might be the services on offer in that area. This could be done by a scale which assesses the strength and direction of someone’s opinion of a series of statements.
- Services audit: this could be a combination of the range, diversity and types of services available, the catchment area of the services, how frequently they are available, if they offer specific services for particular user groups such as disability access, schooling for special needs, youth discounts at sports centres.

Presentation of results and statistical analysis

- Use proportional symbols to map environmental, housing quality data, house prices and primary data from resident surveys.
- Produce land use maps for the study areas.
- Use located bar graphs to display family size and other population characteristics. Alternatively, use overlays to correlate with land use or housing type
- Use census data to draw population pyramids for study areas.
- Map and graph the census and deprivation data for the wards.
- Repeat technique to display distribution of certain groups, for example, pensioners, ethnic groups.

Analysis

Calculate mean and mode for indicators in wards or enumeration districts. For example, age of resident, housing type and tenure, environmental quality, house price, family size, land use, housing condition.

Describe patterns produced between areas, within areas and over time. Explain these and identify factors which affect differences in population characteristics of the city areas. Graph indicators against each other to see if there is a correlation. Statistical analysis using Spearman Rank or Chi-squared tests will give more precise value for any patterns or correlations.

Use test of difference (Mann-Whitney or t-test) to determine whether there is a statistical difference between key data sets for the two areas in question.

Use census data to show differences over time, e.g. population pyramids, changing population density, changing land use and services over time, population indicators (sex ratio, age ratio, index of ageing, index of fertility, dependency ratio).

Possible limitations

Quality of primary data collection and accuracy of scoring of various elements of housing and environmental quality.

Coverage of sample points across study areas.

Age of secondary data.

Response rate and balance of different age groups for questionnaires.

Extending the study

As only a selection of methods would be used, other methods could be explored to further extend the study.

Sources of secondary data

- Secondary data, such as National Census data, should be used to support the task. This will allow the students to explore important aspects of population structure, migration, and levels of unemployment. Data might include total population, age and sex composition, marital status and family size, ethnic proportions and religious allegiance, housing type, tenure and household facilities, living density, education, employment categories, degree of morbidity (ill health), car ownership.
- Index of Multiple Deprivation (Consumer Data Research Centre) map by postcode.
- Local area migration statistics (Office for National Statistics)
- Local area profiles from across the UK.
- Neighbourhood statistics (ONS) for each postcode.
- House price information on Zoopla is available for the whole of the UK. Identify house value index for each ward by calculating average house price. Take an average value from five detached and five terraced houses.
- Crime data (Police.uk)

Sample investigation: Impacts of wind farming on the surrounding landscape

Background

Wind energy development environmental concerns include noise, visual impacts, and avian and bat mortality. Wind farms can be cost effective and provide or support some local employment in rural areas. Studies might focus on feasibility and impact of proposed farms or may assess the impacts of existing farms on environment and local community. A similar approach might be taken with solar farms.

Hypothesis

Wind farms at X have both positive and negative impacts on the surrounding environment and local community.

Data collection

Equipment

- Decibel meter.
- Large scale base maps.
- Recording sheets.
- Camera.

Methods

- Base map of area labelled to show key land uses, distribution of turbines, access routes
- Environmental evaluation. Carry out visibility survey at set points from turbines in series of transects along routes.
- Landscape evaluation (EQS) based on visual intrusiveness, landscape quality, attractiveness, agricultural land quality.
- Species diversity.
- Noise survey – use decibel meter at points radiating out from wind farm to create sound map.
- Questionnaires aimed at local households – degree of support for wind farms, rating intrusiveness, noise, wildlife.
- Interview with farmer/landowner to find out reasons for scheme, subsidies, opposition and support.
- Local house price survey.
- Site descriptions of wind farm locations.
- Record wind speeds over a set period to show variability. Compare with published statistics.

Presentation of results and statistical analysis

- Plot the distribution and orientation of drumlins on a map.
- Plot data of the summary number from results of questionnaires with increasing distance away from the wind farm on scatter graphs.
- Plot separate graphs for isolines for visibility and noise.

- Draw annotated maps of wind farm sites, land uses, centres of population.
- Draw graphs to show results from questionnaire.
- Line graph to show wind speed variability.
- Map visibility – shade the areas affected.
- Located symbols to show overall EQS results in different locations or house price variation.

Analysis

Use distance and questionnaire data to carry out Spearman rank test on the link between distance from the site and degree of support. Null hypothesis: There is no difference in the response scores at different distances from the wind farm. Alternative: People are less tolerant of the wind farm the closer they are to it.

Discuss the visibility of the wind farm from different compass directions. Analyse whether this is reflected in the questionnaire responses. Analyse the effect on species diversity.

Analyse questionnaire results and compare with national trends. Review attitudes over time, compare different age groups.

Analyse wind patterns over time and comment on efficiency of wind farm.

Possible limitations

Noise is difficult to measure accurately and may be more to do with traffic and extraneous sources.

Employment stats may difficult to obtain.

Reluctance by locals to answer questions.

Access and permission issues on local farmland.

Wind farms are variable in size, site, nature and character. A study of a single wind farm is unlikely to produce a convincing case based on the limited sample. Most large schemes are now located offshore.

Extending the study

As only a selection of methods would be used, other methods could be explored to further extend the study.

Sources of secondary data

- Planning decisions – research planning documents, record of objections to schemes, environmental considerations.
- Local council policies on renewable energy. Their plans and targets.
- Obtain power output statistics for the windfarms studied, highlighting variation and efficiency.
- Renewable energy trends and statistics for the UK.

- Digest of UK energy statistics contains detailed breakdown over last four years.
- Interactive map of renewable energy schemes in the UK
- Map of UK renewable electricity sites
- Map of how electricity is generated across the UK

Further support and guidance

Contact the team

8am–5pm Monday to Friday

Tel: 01483 477 791

Email: geography@aqa.org.uk

NEA Advisors

All A-level AQA Geography schools and colleges have an assigned geography specialist as a dedicated NEA advisor that can be contacted via email. Exams officers are informed of their contact details each academic year. Contact us if you do not have access to these details.

Field Studies Council

Directory of secondary school fieldwork courses

Geographical Association

Information on fieldwork within the geography curriculum

Royal Geographical Society with IBG

Information on fieldwork in schools