Planning a geographical enquiry, but not sure where to begin? Geographical Information Systems are a great source of secondary data to help find spots and places to investigate. No matter what your starting point, GIS can help you to focus your work on geographical topics and carry out contextualising research.

What is GIS? Geographical Information Systems (GIS) are designed to capture, store, manipulate, analyse and display spatial data.

An example of a site the geohive website named Oakwood Barton is shown in the figure above.

What feature do you notice?

What geographical questions could you ask?

What are the differences between GIS and Google Maps?

Using GIS

Conclusions

Geographical Introduction

You know the area you are visiting (e.g. destination, or you are doing fieldwork locally you have studied)

\( I \) know we are going here, and I want to investigate this topic

Methods and data collection

You have chosen a geographical topic and you have reached the next stage of planning. Using GIS to plan how you will collect data

Your teacher has given you a choice of fieldwork destination, or you are doing fieldwork locally

You know the area you are visiting (e.g. Grubbinston, but haven’t chosen the area) and your question will focus on it (e.g. North Street)

You need to identify a topic for your enquiry

You have an idea of a topic that your question will focus on (e.g. inequalities between places)

Your teacher has given you a free choice of fieldwork destination

You need to choose a fieldwork destination, and smaller areas to focus on your question on GIS gives access to data for many different topics.

\( I \) want to investigate this topic, but don’t know where to start?

You have an idea of a topic that your question will focus on

What question do you have?

You need to identify a topic for your enquiry

Locate your data collection area

General form of the data collection area

Collect data

Good fieldwork data collection is well planned. The special feature of GIS is that each piece of data is tied to a particular location. So GIS can help you choose both where you will collect data and how you will collect data. To get started with GIS, there is a few technical issues that it is useful to familiarise yourself with.

Data: Observations and recording

Location type in GIS each piece of data is tied to a particular location. There are three possible types of location: Point, area or area. Your data collection might use a combination of these.

Location format:

Details of the location type

Attribute type GIS software describes data formats. Integer, Float, String or Date

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You need to choose a fieldwork destination, or you are doing fieldwork locally you have studied

You have an idea of a topic that your question will focus on

Data: Observations and recording

Location type

GIS gives access to data for many different topics. You might have reached this point from one of the two other starting points.

Using GIS to carry out contextualising research using to your chosen topic and location. Research should help you understand the location in detail to generate scalable quantities (hypotheses), based on geographical theory and some degree understanding of what the location is like.

You have reached this point from one of the two other starting points.

Maps are a powerful medium for representing spatial relationships, but they can take a long time to draw by hand. GIS software can quickly draw a range of maps from your data, making it easy to pick the most appropriate map for your enquiry.

Using GIS to plan how you will collect data

Exercise 1

Task 1

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Planning a geographical enquiry, but not sure where to begin? Geographical Information Systems are a great source of secondary data to help find topics and places to investigate. No matter what your starting point, GIS can help you to choose locations and contexts, and carry out contextualising research.

### What is GIS?
Geographical Information Systems (GIS) are designed to capture, store, manipulate, analyze, manage, and display spatial data.

An example of a GIS is the location of a website like [www.datashine.org](http://www.datashine.org). The site shows 2011 census data for a rural settlement. The map shows 2011 census data, including which areas have more houses and which have more farms. You can see some relevant understanding of what the location is like.

### Using GIS
GIS gives access to maps and aerial photos at several scales and for many different topics. Start using GIS to quickly draw a range of maps from your data, making it easy to pick the most appropriate map for your question and the data type and location.

### Introduction and planning
Good fieldwork data collection is well planned. The special feature of GIS is that each piece of data is tied to a particular location. So GIS can help you plan both where you will collect data and how you will collect it.

### Data and methods collection
Using GIS to plan how you will collect data

### Data presentation
Maps are a powerful medium for representing spatial relationships, but they can take a long time to draw by hand. GIS software can quickly draw a range of maps from your data, making it easy to pick the most appropriate map for your question and the data type and location.
When drawing conclusions, you will need to look for links between different results of tests. This means looking for primary and secondary evidence together. GIS makes it much easier, allowing you to overlay data sets onto the same base map and explore relationships within and between the different layers.

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**Trends and patterns can be difficult to spot, especially when a large number of data points are presented.**

**Travel Time Area results** can calculate distance or travel times on flow maps, and help find the sphere of influence. Joining multiple points to a single destination. They can also create new areas based on distances or travel times. Proximity tools (like)** or**|**|**|

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**After using Summarise Nearby tool** can help you to explore patterns you may have noticed by only showing certain values e.g. by picking up all locations where infiltration rate was more than 150 mm per hour.

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Summarise Nearby and Summarise Within tools reduce the number of data points into areas or fewer points. These tools include tools to summarise raw data, carry out calculations and find spheres of influence. To help make sense of the information that you have collected, GIS software offers a range of tools to join multiple points to a single destination. They can also create new areas based on distances or travel times.

Before using Summarise Nearby tool:

- How do you know you have collected enough data and diverse enough locations?
- To what extent are the two match?
- To what extent are the two different?
- Why might there be two different?
- Could you reduce the number of data points into areas or fewer points?

After using Summarise Within tool:

- Individual house prices
- Mean house price by LSOA

Travel Time Area results: 2, 3, 4 and 5 hour drive time to Betws-y-coed overlaid on secondary data mapped by a student – the trend is not obvious (see inset)

Connect origin to destination results:

- Visitor home locations by postcode
- 2010 sales

Filter tools help you to explore patterns you may have noticed by only showing certain values e.g. all locations where infiltration rate was shown only show quadrats where marram grass is present

Find, Derive or Overlay tools

- show all locations where the soil texture was
- show all areas where the environmental impact is greater than the economic impact
- show only trees containing more than one
- have noticed by only showing certain values e.g.
- show all locations where the flood severity impact scores (Layer A) are highly likely to flood?
- show all locations where the flood likelihood (Layer B) and flood severity impact scores (Layer B) are highly likely to flood?
- show all locations where the flood likelihood (Layer B) impacts if flooded OR are
- show only locations where the soil texture was show all areas where the environmental impact is greater than the economic impact
- show all locations where the flood severity impact scores (Layer A) are highly likely to flood?

Filter tools in action:

1. Environment Agency flood likelihood (Layer B)
2. FSC’s Young Daniel Scholarship. You can find out more about these opportunities by visiting www.field-studies-council.org/young people.

For teachers – new directions in fieldwork

GIS can help put you in touch with your students and offer you new perspectives on data collection and analysis. FSC recognises the potential benefits that GIS can have to the study of Geography and has worked with the Geographical Association and ESRIUK, an international supplier of GIS software, to develop new ways to use GIS into fieldwork. GIS makes it much easier to overlay primary and secondary evidence together. GIS makes this much easier, allowing you to overlay data sets onto the same base map and explore relationships within and between the different layers.

Maps should be as easy to interpret as possible. Using GIS to make meaningful maps

- Show on map:
- Plot points
- Show only areas
- Change the colour
- Show the size
- Show the shape

The colours you use in mapping have a big impact on how your map can be interpreted. Categorical data: use colours that make sense, e.g. grey for artificial land, light green for woodland, dark green for built-up areas. Ordinal or numerical data: for single scales use a High to Low scale, where the darkest shades represent the highest values. For an uneven and below scale to highlight positive and negative scores, to focus on the higher and lowest values within a range (e.g. top 10% and bottom 10%) or values above and below the mean.

For students – further opportunities with FSC

The Geographical Association is the leading subject association for all teachers of geography. Our challenge to you this year is to find out more about GIS and how it can be incorporated into GIS teaching in the most positive way possible.

For further information, please contact:

Field Studies Council
Head Office: Commercial, Shrewsbury, SY4 1HW
01743 852100
schools@field-studies-council.org
www.field-studies-council.org

Field Studies Council (FSC) is an environmental education charity providing information and enjoyable and educational experiences in the environment. As an independent environmentalist, FSC experiments and learns by doing and we use this experience to influence national and international policies and standards in the environment. As an independent environmentalist, FSC experiments and learns by doing and we use this experience to influence national and international policies and standards in the environment.

Evaluation

Geographical Association
An international supplier of geographic information systems, including ArcGIS, a cloud-based mapping platform that makes teaching and learning GIS at school even easier. FSC worked with ArcGIS Online to design this unique tool.

FSC and Geographical Association/ESRI UK partnership


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