

# **GIS for EAL**

## **Enhancing Understanding & Progression in the Geography Classroom**

**Thomas Bever**

# Who am I?

## Using GIS to support EAL students' understanding and progress



- Post-graduate student at the University of Edinburgh, undertaking an MSc in Environmental Protection & Management
- Currently working on a research project using GIS with landslide-prone communities in Morocco, seeing how we can use it as a tool for landslide awareness
- Completed my PGCE last year at King's College London
- Returning to the classroom in September, starting my ECT at Oaks Park High School

# What will we cover?

Using GIS to support EAL students' understanding and progress

How was the scheme of work structured?

What might meaningful GIS integration look like?

What impact did GIS have on EAL (and all) students' progress

What might GIS integration look like in other schemes of work?

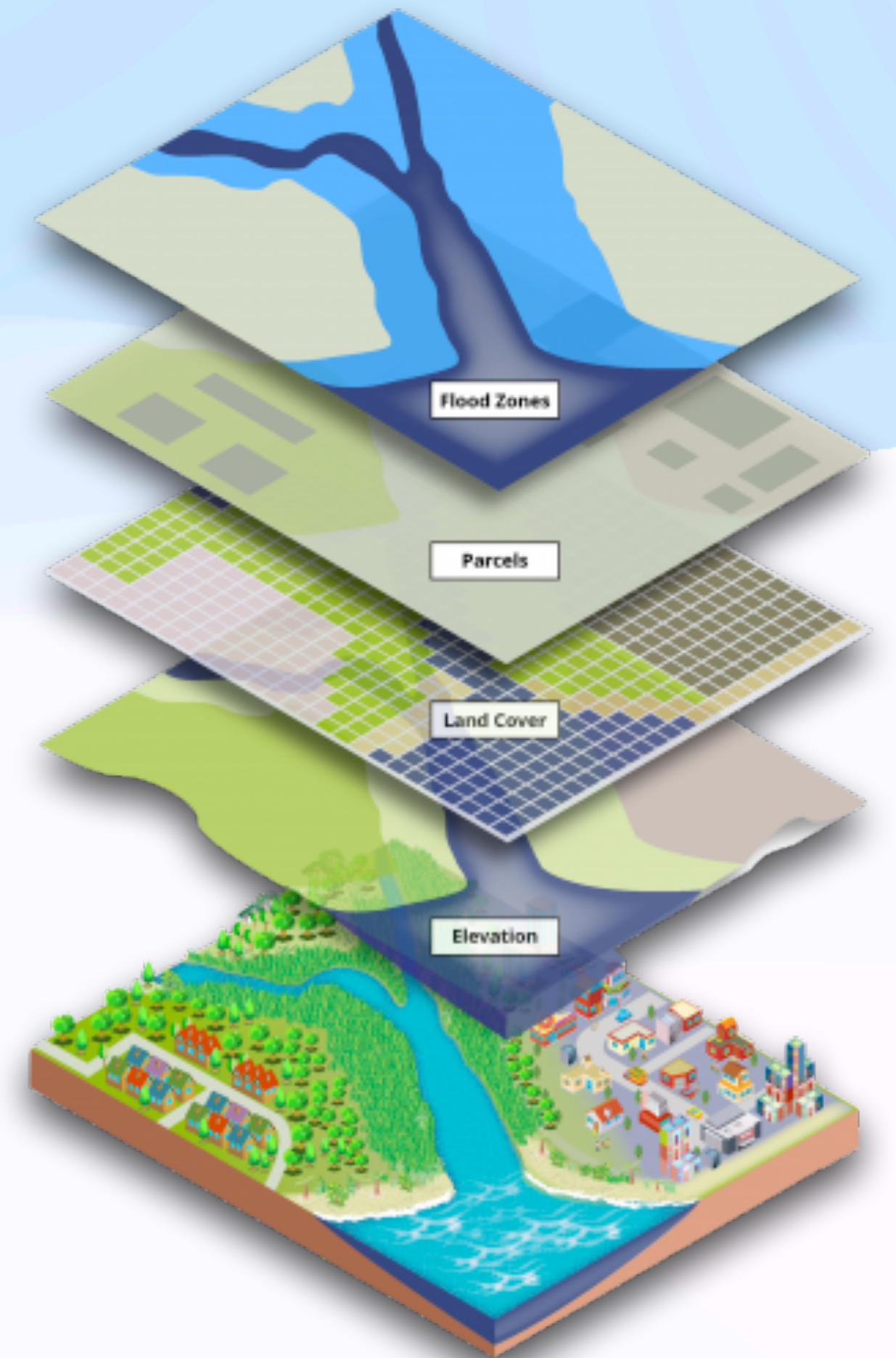
What did I learn from teaching with GIS?

Where could you start integrating GIS into schemes of work?

# What is GIS and how is it being used?

## Using GIS to support EAL students' understanding and progress

- Geographical information systems (GIS) are software used to create, manage, analyse, and visualise spatial data
- Student exposure to GIS has been mandated in the National Curriculum since September 2014 in KS3–5, with students using GIS to analyse places and geographical data from KS3, moving towards independent use of GIS by KS5
- Use of GIS in the classroom remains limited, and Ofsted found it was absent from most schools in their 2023 subject report
- Where GIS is taught in schools, it is often a bolt-on to existing schemes of work rather than a pedagogical tool in and of itself



# How can GIS help EAL learners?

## Using GIS to support EAL students' understanding and progress

- EAL learners comprise over 20% of the student population in England
- While EAL learners often share similar academic needs with their peers, learning through an additional language can pose unique challenges, particularly around language access and comprehension
- Research has shown that, when used effectively, maps can encourage a connectedness of understanding for students that language cannot bridge
- GIS provides near limitless opportunities for students to visualise and engage with the world, providing both immediacy and interactivity. However, GIS' potential as a resource for supporting EAL learners remains relatively untapped...

# Context

## Using GIS to support EAL students' understanding and progress

- Classroom-based research completed in April 2025 during my PGCE at King's College London
- Delivered in an all girls' single academy trust school in northeast London. 24% of the students on-roll were EAL
- The scheme of work was year 7's 'Fundamental Mapwork Skills' unit, which lent itself to GIS integration and was an opportunity to establish a firm foundation for students to use GIS in future units
- Had access to a computer suite that was relatively underused, so little to no timetable competition when adapting the scheme of work

# How was the scheme structured?

## Using GIS to support EAL students' understanding and progress

1	Compass Points	
2	Compass Points (Outdoors)	
3	4-Figure Grid References	
4	4-Figure Grid References with Maps	
5	6-Figure Grid References	
6	6-Figure Grid References with Maps	
7	Scale	Scale <i>What is scale?</i>
8	Scale using Maps	<b>Scale</b> <i>How do we use scale?</i>
9	Contours and Relief	Relief <i>How do we show height on maps?</i>
10	Relief using Maps	<b>Relief</b> <i>Are contour lines useful?</i>
11	Cross-sections	Group Oral Presentations (Week 1) <i>How would you plan a walk?</i>
12	<b>Digimap for Schools</b>	Group Oral Presentations (Week 2) <i>How would you plan a walk?</i>

First 6 lessons of the topic were delivered by the class teacher prior to my placement starting

The GIS-adapted SoW was delivered via a structure of alternating classroom and GIS teaching. GIS lessons are in red and build on the experience and understanding developed in the previous lesson

The sequence ended with two-weeks of groupwork. This used 'slip' in the schools' timetable to create an opportunity to observe how students interacted using the knowledge/skills/vocab they had developed

# How can GIS be meaningfully implemented?

## Using GIS to support EAL students' understanding and progress

- Using GIS as a pedagogical tool, adding value to schemes of work

Theme/Key Question	Setting	Lesson Objective(s)	Classwork Activities
<b>What is scale?</b>	Classroom	<ul style="list-style-type: none"><li>- To understand what scale means on a map.</li><li>- To convert between scale distance and map distance.</li><li>- To measure real-world distances using a scale.</li></ul>	<ul style="list-style-type: none"><li>- Students use a scale map of the UK to measure distances between cities, converting map distance to actual distance.</li></ul>
<b>How do we use scale?</b>	IT Suite	<ul style="list-style-type: none"><li>- To apply understanding of scale to digital maps using DfS.</li><li>- To navigate zoom functions and assess changes in scale using GIS.</li></ul>	<ul style="list-style-type: none"><li>- Getting to know DfS/GIS through teacher-led tutorial.</li><li>- Students create a presentation showing the location of School Z at local, national, and global scales.</li></ul>

# How can GIS be meaningfully implemented?

## Using GIS to support EAL students' understanding and progress

- Using GIS as a pedagogical tool, adding value to schemes of work

<b>How do we show height on maps?</b>	Classroom	<ul style="list-style-type: none"><li>- To interpret the presentation of height data using OS maps.</li><li>- To make connections between written descriptions of landscapes and their visual representations.</li><li>- To estimate elevation values using spot heights and contour lines.</li></ul>	<ul style="list-style-type: none"><li>- Connect written descriptions of contour lines with the relief map they describe.</li><li>- Estimate spot heights using contour lines and place contour lines using spot height information.</li><li>- Perform feedback by sharing responses using an overhead projector (OHP).</li></ul>
<b>Are contour lines useful?</b>	IT Suite	<ul style="list-style-type: none"><li>- To explore how GIS displays elevation information compared to paper maps.</li><li>- To use drawing tools in DfS GIS.</li><li>- To describe patterns of elevation/relief using GIS.</li></ul>	<ul style="list-style-type: none"><li>- Locating the Three Peaks (Scafell Pike, Ben Nevis, and Mount Snowden) using DfS and completing a pro forma.</li><li>- Viewing contour line/elevation data inside a 'fingerprint'.</li><li>- Writing description of the landscape inside students' DfS 'fingerprint'.</li></ul>

# How was progress demonstrated?

## Using GIS to support EAL students' understanding and progress

- As this was a research study, understanding and progress was closely monitored, however, approaches used were no different to standard practice

### Classwork

Design of tasks to develop and apply key terms/skills in context, evidencing understanding

### Interactive AfL

RAG cards, mini-whiteboards, direct questioning

How was understanding and progress demonstrated?

### Planned AfL

Exit tickets to illicit thinking/inform lesson planning, low-stakes quizzes, plenary tasks and student reflection

# Lesson 8: How do we use scale?

## Using GIS to support EAL students' understanding and progress

- The GIS lesson on scale took students' understanding of scale using OS maps and how to convert between map and actual distance by asking them to evaluate the impact scale has on digital maps

What is scale?

14 ✓

2 ✗

3 ✗

0 ✗

Amount of detail a map has

Relationship between distance on a map and the real distance

Ratio between distance and the number of symbols

Size of the map

### How do we use scale?

Tasks:

- In Digimaps, search for 'Connaught School for Girls'
- Zoom **in** or **out** to get a local, national, or global scale view
- At each scale, take a screenshot and save this to a Google Slide
- Repeat this process to get all of the scales (three screenshots)
- ★ **Push yourself:** Can you add labels to your maps?
- Before the end of the lesson, submit your Google Slide to the assignment on the Google Classroom

### Plenary

Tasks:

- Write your name on a Post-it Note
- Place your name along the line below, in response to the question...

"Using computers has supported my understanding of scale in geography"

Emma, Ayanna, Veronika, Aqsa, Eshal, Saja, Anisa, Tasneem, Aia, Ishia, Mia, Mah, Asma, Isra, Kirsten, Arza, Zara, Nina, Sirine, Siema, Aisha, Laila, Lucita, Alesia, Shauma, Fatima, Zahab, Sarah

Strongly disagree

Quick-fire recall quiz on scale using Mentimeter (online)

Introduce what GIS is and model the task students will complete in Digimap for Schools

Students submit classwork to the Google Classroom and complete exit task on Post-it Notes

# How do we use scale?

The image shows a screenshot of the Digimap for Schools web application. The search bar at the top left contains the text "connaught school for girls". Below the search bar, a dropdown menu titled "Places (UK) (2)" is open, displaying two search results: "Connaught School for Girls (Greater London)" and "Connaught School for Girls Annexe (Greater London)". The main map area shows a topographic map of the United Kingdom. The interface includes a sidebar on the left with various tools like "Overlays", "Measurement Tools", "Add your own data", "Image Search", and "Map Information". The top right corner displays the "Digimap for Schools" logo and a dropdown arrow. The bottom right corner shows a "100 km" scale bar and a copyright notice: "© CollinsBartholomew Ltd (2023). | FOR SCHOOLS USE ONLY.".

# How do we use scale?

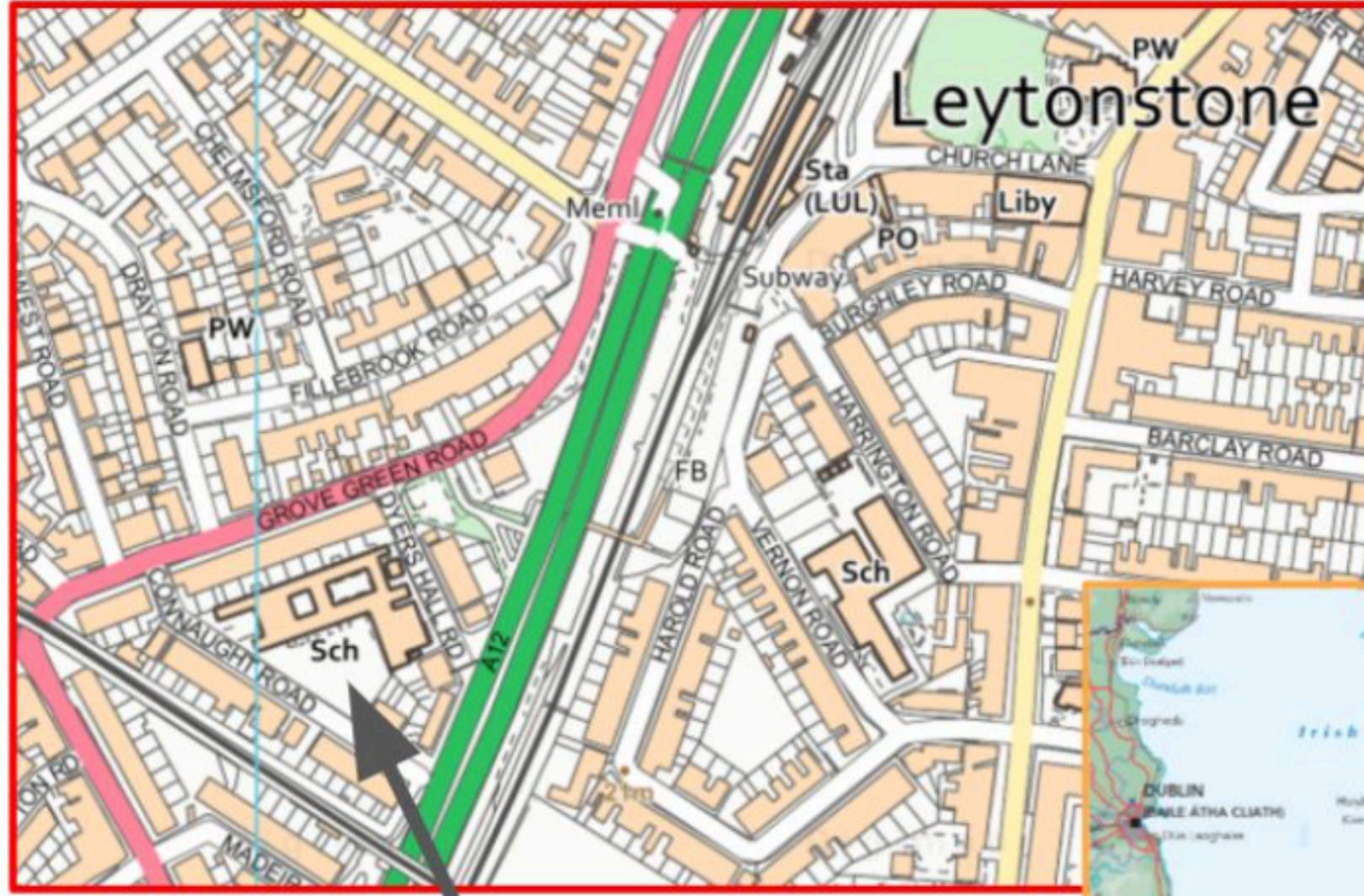
The image shows a screenshot of the Digimap for Schools web application. At the top, the search bar contains the text "connaught school for girls". Below the search bar, a dropdown menu titled "Places (UK) (2)" is open, showing two search results: "Connaught School for Girls (Greater London)" and "Connaught School for Girls Annexe (Greater London)". The main map area displays a detailed street map of Leytonstone, London, with a red pin marking a location near Leytonstone High Road Station. The map includes labels for "Leyton Midland Road Station", "Leytonstone", and "Libby". A sidebar on the left contains navigation and tool options: "Overlays", "Measurement Tools", "Add your own data", "Image Search", and "Map Information". At the bottom left, there is a "Collapse Sidebar" button. At the bottom right, a scale bar indicates 200 meters. The footer text reads: "© Crown Copyright and database rights 2025 Ordnance Survey (AC0000851941). | FOR SCHOOLS USE ONLY."

# How do we use scale?

The image shows the Digimap for Schools web application interface. At the top, a search bar contains the text "connaught school for girls". To the right of the search bar are icons for search, location, print, refresh, and help. The top right corner displays the text "Digimap for Schools" with a dropdown arrow. Below the search bar, a dropdown menu titled "Places (UK) (2)" is open, showing two results: "Connaught School for Girls (Greater London)" and "Connaught School for Girls Annexe (Greater London)". On the left side, there is a sidebar with several tool categories: "Overlays", "Measurement Tools", "Add your own data", "Image Search", and "Map Information". The main area of the interface is a map of Europe, with a red location pin placed over the United Kingdom. The map includes a scale bar at the bottom right indicating "1000 km". At the bottom left, there is a button labeled "Collapse Sidebar". At the bottom right, there is a copyright notice: "© CollinsBartholomew Ltd (2023). | FOR SCHOOLS USE ONLY."

# How do we use scale?

## Connaught School for Girls



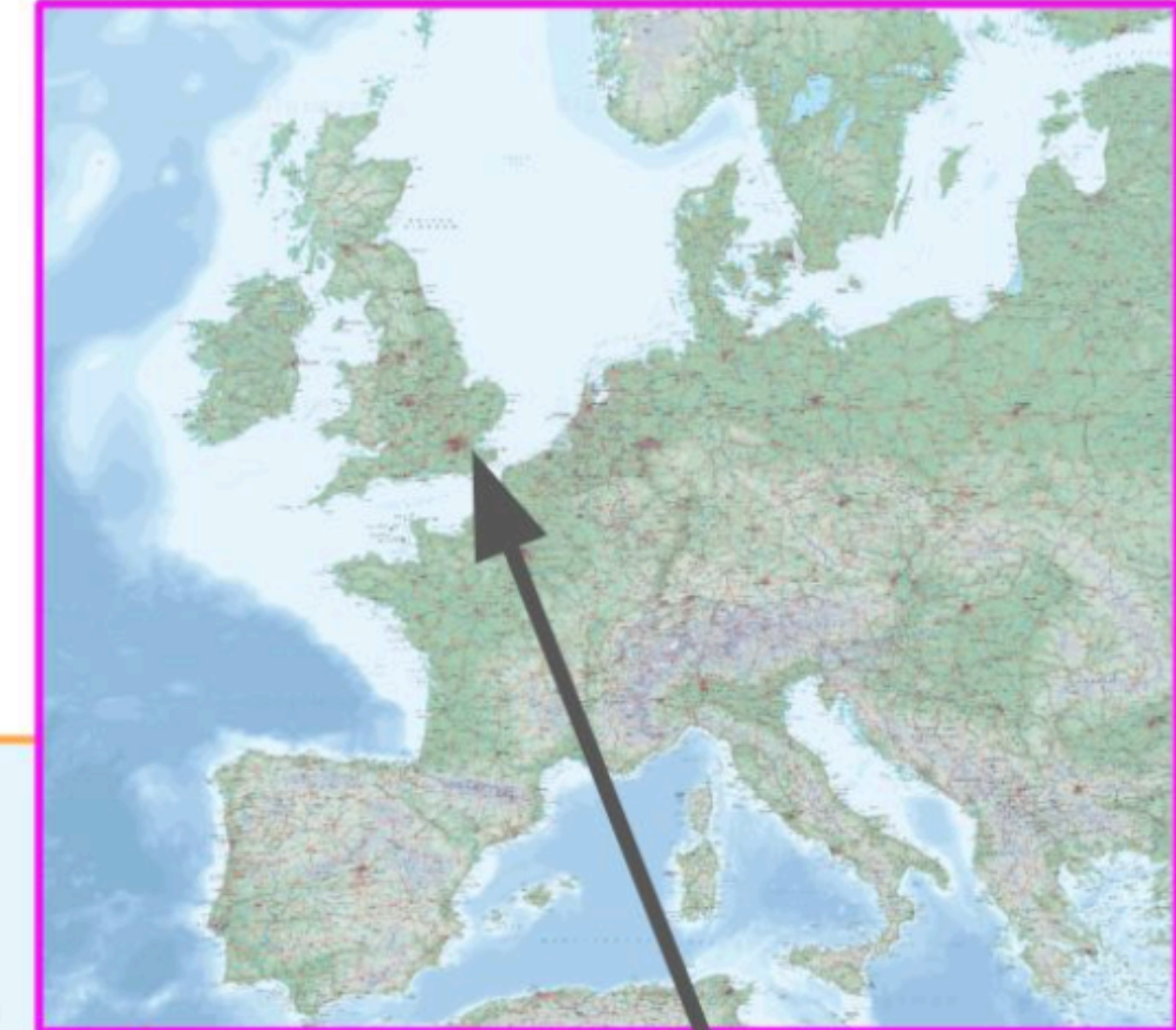
### Local scale

This map is large scale because it shows detail of buildings in the local area. You can see the school building.



### National scale

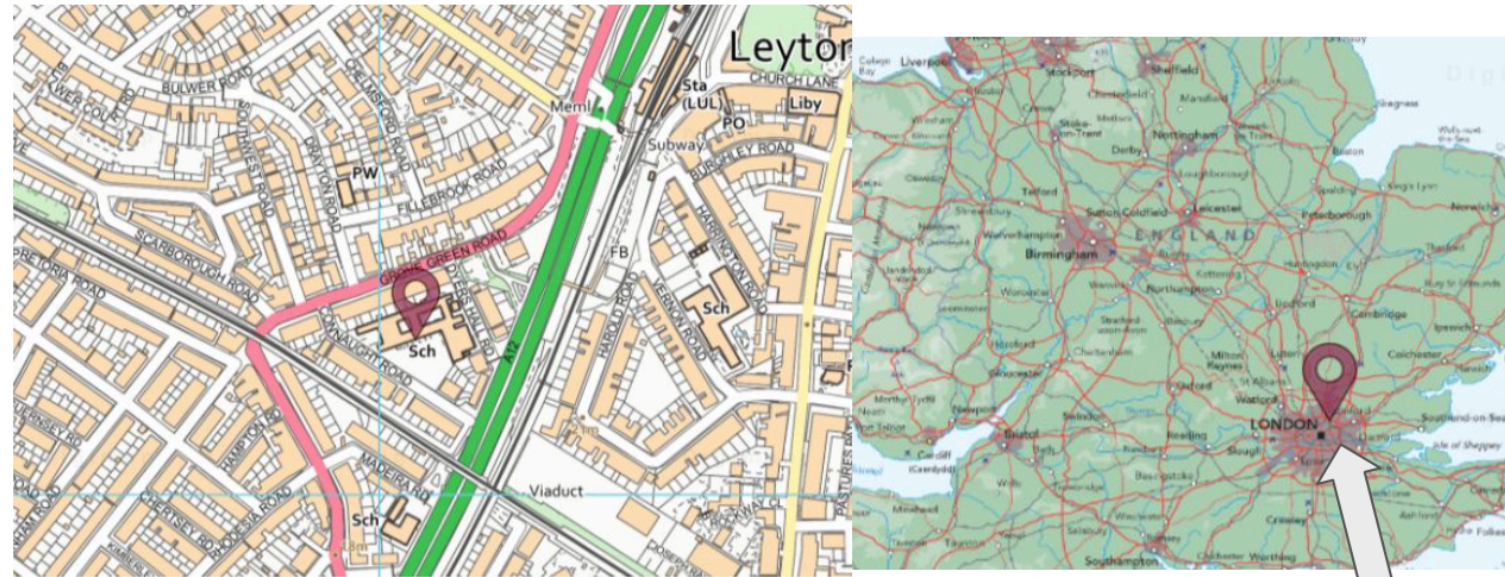
This map shows the position of Connaught School for Girls, in London, in the UK.



### Global scale

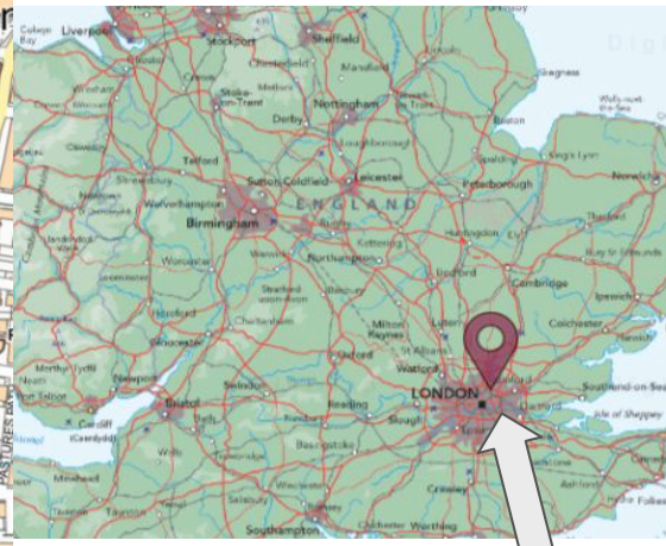
This map shows Connaught School for Girls' position in Europe

## Local, national, and global of connaught school for girls



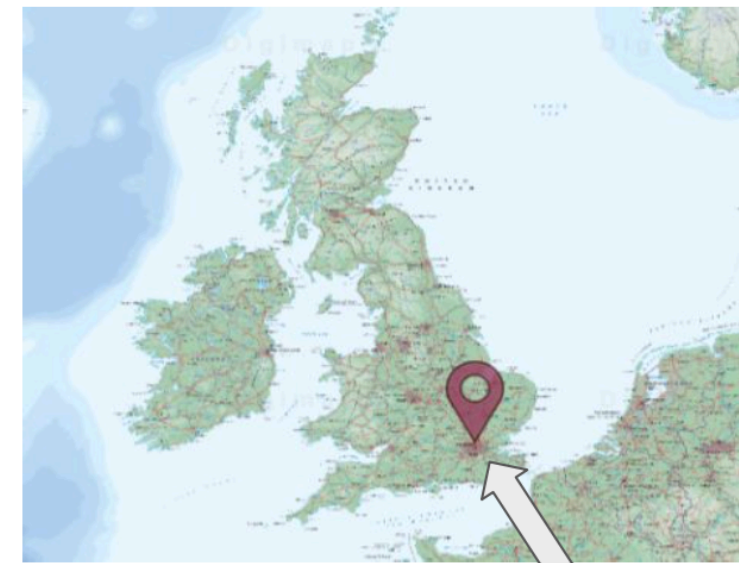
Local scale view

Is like your near you like your neighborhood.



national scale view

the area you live.

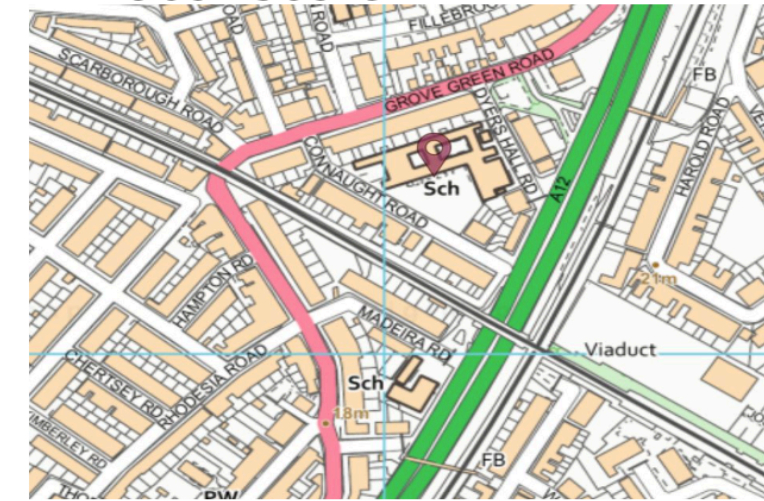


global scale view

The country you live in.

## Connaught school for girls

Local scale

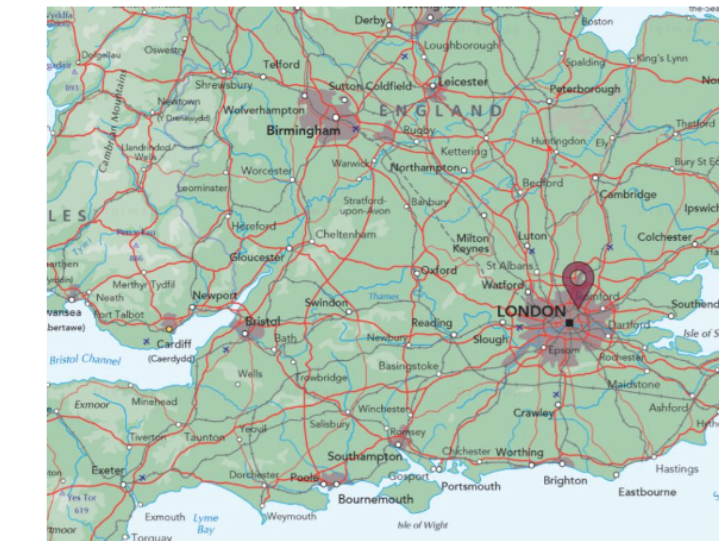


This shows connaught school for girls in a local scale near grave green road in london, leytonstone. It is very zoomed in and you can see the school



This shows connaught school in london in a national scale. As you can see it's more zoomed out than the local scale.

National scale



Global scale

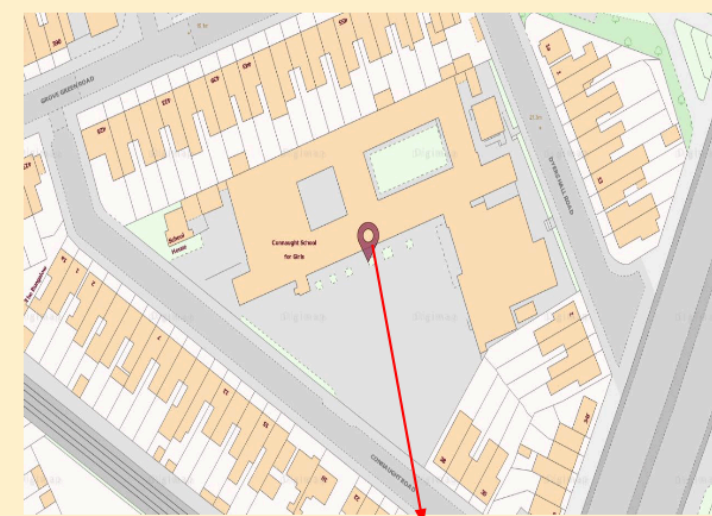


This shows connaught in a global scale. It is very zoomed out and you can even see france!

Classwork was reviewed looking at how understanding had been demonstrated and GIS engaged with

### Local!

### Connaught School for Girls: On different scales!



Local scale maps is how the place looks and is locally on a map. The picture above is the local scale map for Connaught School for Girls so it is how it looks on a map locally. They can be used to find a place within your local area.



National scale maps is how the place looks nationally so where the place is in the country. The picture above is a national scale map for Connaught School for Girls. They can be used to find a place throughout a whole country.



Global scale maps is how the place looks globally. The picture above is Connaught School for Girls globally. This can be used to find a place globally.

There is limited scaling on Digimaps for a global view, but students were encouraged to explore the interactive map

# Lesson 10: Are contour lines useful?

## Using GIS to support EAL students' understanding and progress

- This GIS lesson on contour lines took students' understanding of how contour lines describe a landscape and asked them to find the UK's three tallest peaks and describe their relief inside a 'fingerprint' area

### Knowledge quiz!

In our Google Classroom, you have been set a quiz to see what you can remember from our previous lessons. Next week, we will begin to combine everything we have learned during group work, so it's important we keep this knowledge fresh!

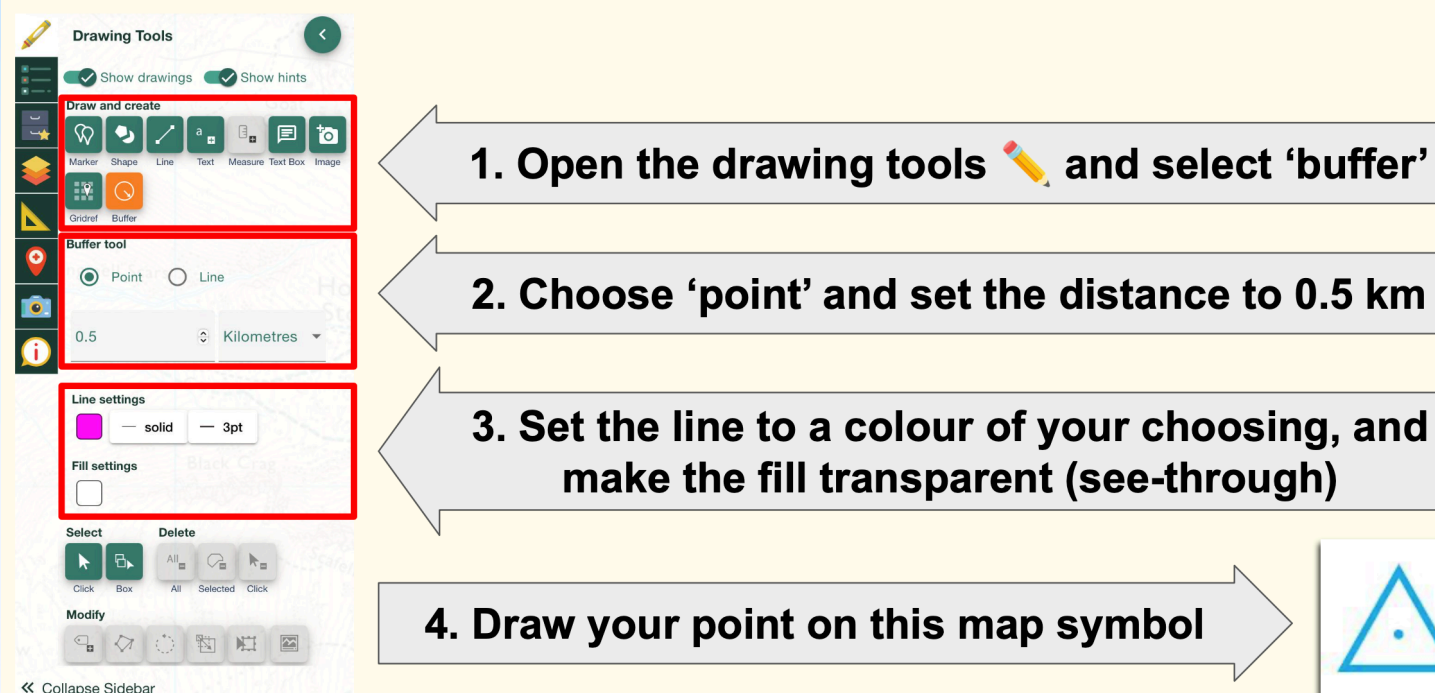
#### Task:

- Open the Google Form that is linked in our Google Classroom
- Complete the knowledge quiz independently



7:00

### How do I use the buffer tool?



- Open the drawing tools and select 'buffer'
- Choose 'point' and set the distance to 0.5 km
- Set the line to a colour of your choosing, and make the fill transparent (see-through)
- Draw your point on this map symbol

Name: \_\_\_\_\_

Scale Exit Ticket

Review questions:

- Why do we use different scales on maps?  
Because we need to find localish from where you want to go.
- Why is it important for maps to have a scale?  
To know exact location from where you go and where those places are located.

Self-reflection:

- Circle the emoji that reflects how you feel about today's lesson

🤔 😊 😄 😁 😎 😍

- Why did you circle this emoji?  
Because I feel pretty confident and know what to do

Name: \_\_\_\_\_

Scale Exit Ticket

Review questions:

- Why do we use different scales on maps?  
So we can measure the distance or ratio to tell the difference between the 2 points.
- Why is it important for maps to have a scale?  
So we know the distance and where those places are located.

Self-reflection:

- Circle the emoji that reflects how you feel about today's lesson

🤔 😊 😄 😁 😎 😍

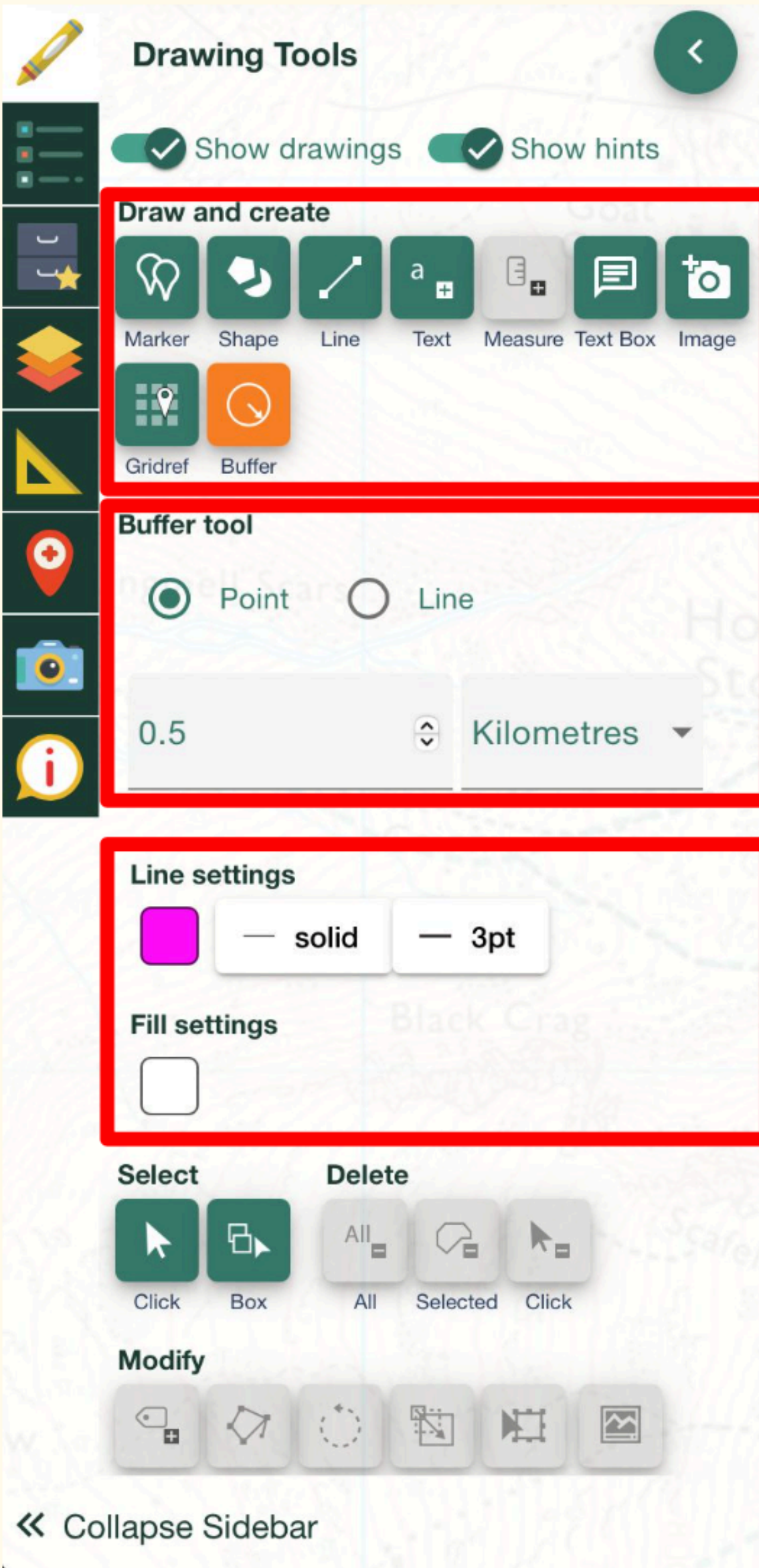
- Why did you circle this emoji?  
I chose this emoji as I understood this lesson however I would use to know a bit more about the scale.

'Do now' task is a 7-minute mapwork recall quiz on the unit to-date

'I do, we do, you do' modelled introductions for the task in Digimap for Schools

Students submit classwork to the Google Classroom and complete an exit ticket and self-reflection

# How do I use the buffer tool?



1. Open the drawing tools  and select 'buffer'

2. Choose 'point' and set the distance to 0.5 km

3. Set the line to a colour of your choosing, and make the fill transparent (see-through)

4. Draw your point on this map symbol



# How do I use the buffer tool?

**Drawing Tools**

Show drawings  Show hints

**Draw and create**

- Marker
- Shape
- Line
- Text
- Measure
- Text Box
- Image
- Gridref
- Buffer

**Buffer tool**

Point  Line

0.5 Kilometres

**Line settings**

solid 3pt

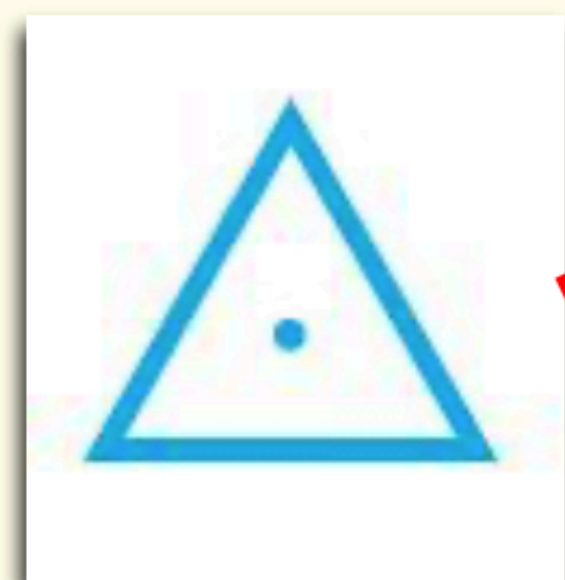
**Fill settings**

**Select**

- Click
- Box
- All
- Selected
- Click

**Modify**

« Collapse Sidebar



Map Selector

Map features: Lingmell Col, Fords, Broad Crag, Dropping Crag, Green Crag, Ill Crag, Pikes Crag, Cairns, Chambers Crag, Pulpit Rock, Scafell Pike, Broad Stand, Broadcrag Tarn, Rough Crag, Little Narrowcove, Yorkshire Crags, Pen, Dow.

Buffer zone: A magenta circle centered on Scafell Pike (977/978).

Red fingerprint: A red fingerprint-like pattern on the right side of the map.

Scale: 200 m

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Click to select and move feature, hold shift to select multiple features

# Are contour lines useful?

**Task:** Complete the template on the Google Classroom for each of the three peaks.

## Scafell Pike – England

Scafell Pike is \_\_\_ m high.

### Description of feature:

*You might want to include the height, shape, or slope in your description*

Name:

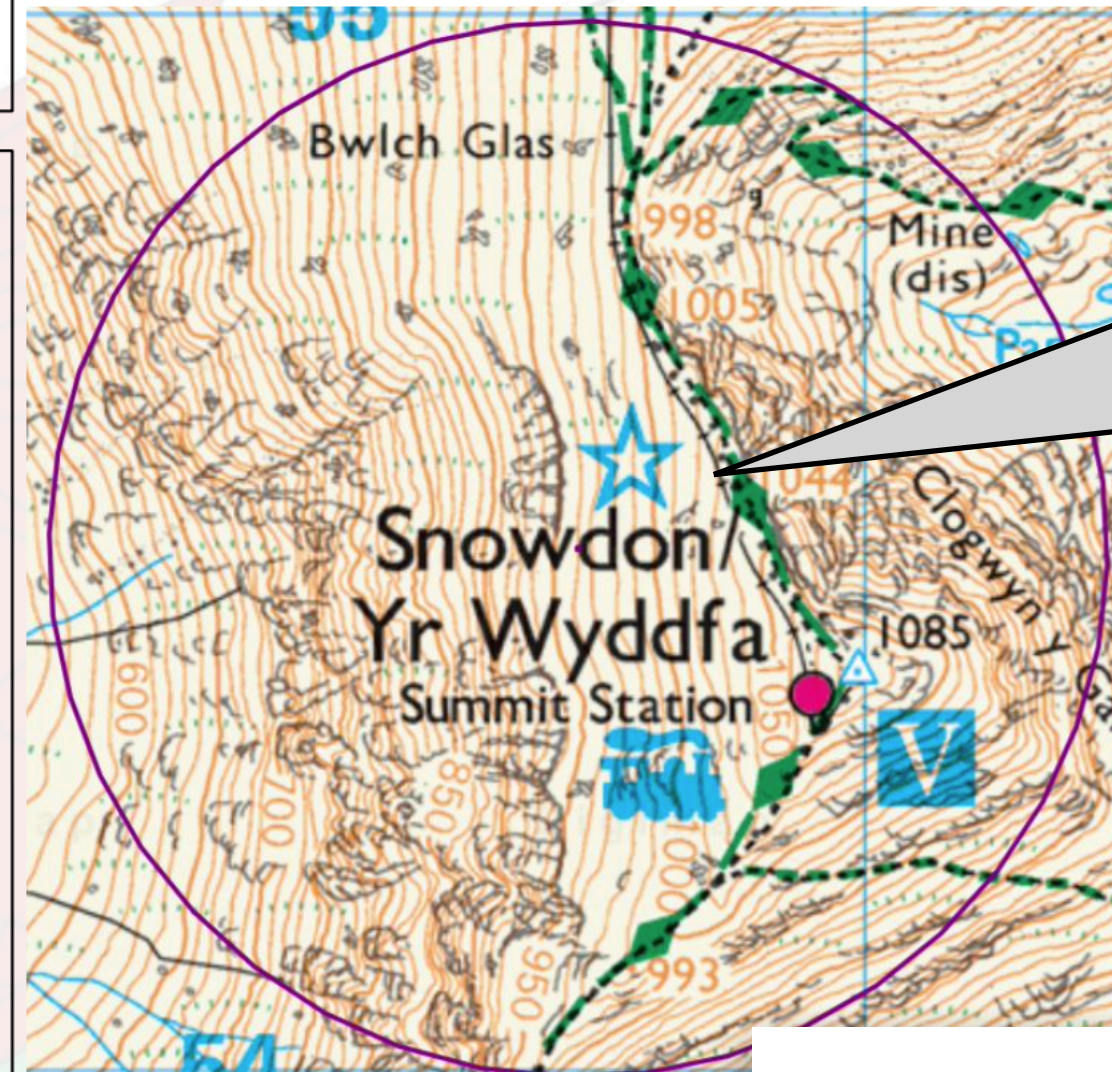
Paste screen capture here

## Snowdon – Wales

Snowdon is 1085m high.

### Description of feature:

*Snowdon is the highest mountain in Wales. Snowdon is 1085 metres high. It has hike paths but they are very clumpy and stumpy for people to hike on and that's why you should be careful when hiking*



Students received feedback on their classwork submissions and were given an opportunity to respond, addressing misconceptions

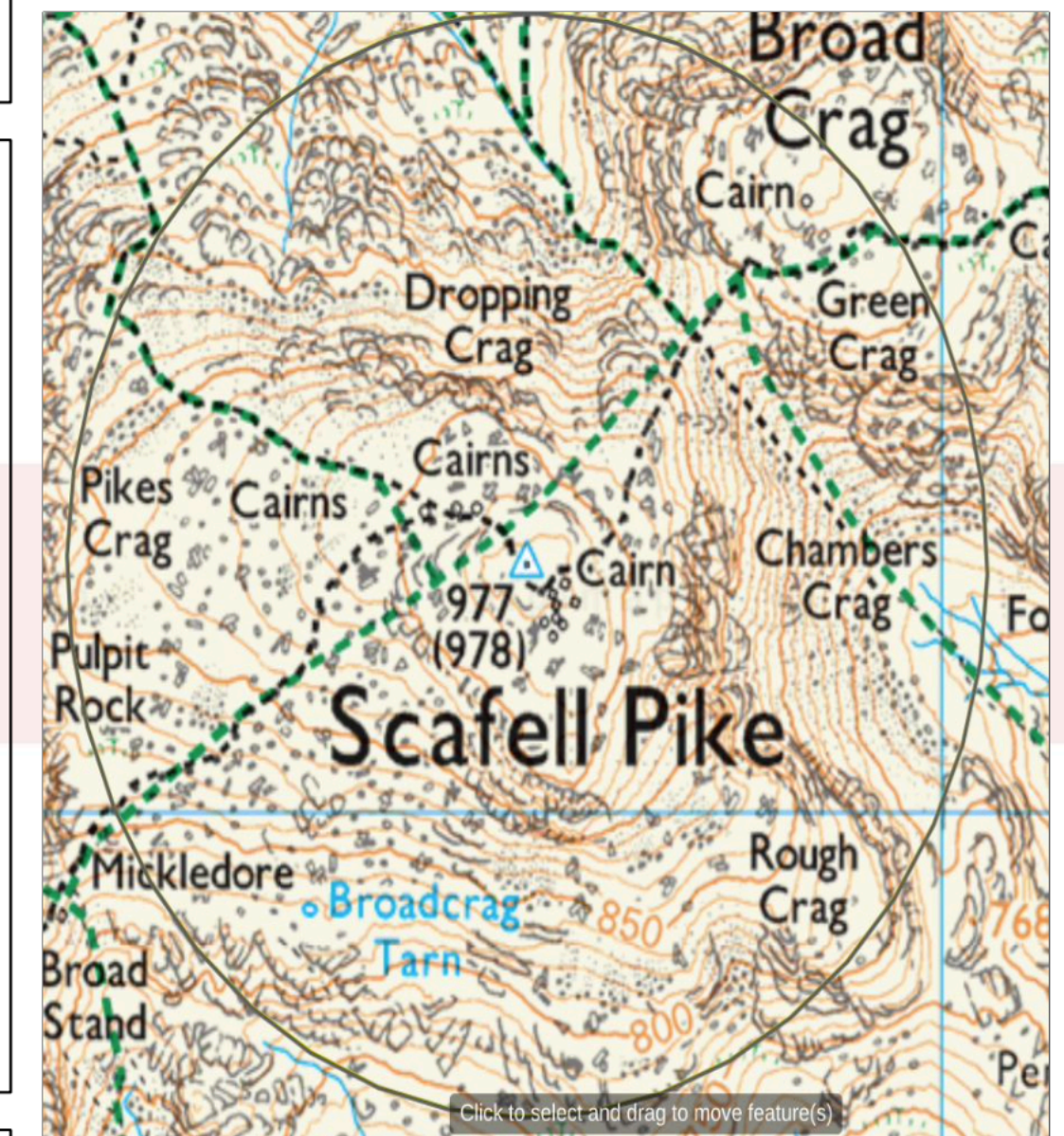
Name:

## Scafell Pike – England

Scafell Pike is 977m high.

### Description of feature:

*Scafell Pike's highest point is 977-978, it's one of the highest mountains in England which is located on the west side. The mountain itself is very steep and rocky.*



Name:

With the second GIS lesson in the scheme, written communication improved. EAL students evidenced connection-building between lessons, which would not have been made if GIS had not been integrated into the scheme

# What did I learn?

## Using GIS to support EAL students' understanding and progress

- Having taught a GIS-enhanced scheme of work, what would be my guiding principles for facilitating GIS use in the classroom?

### Embed GIS...

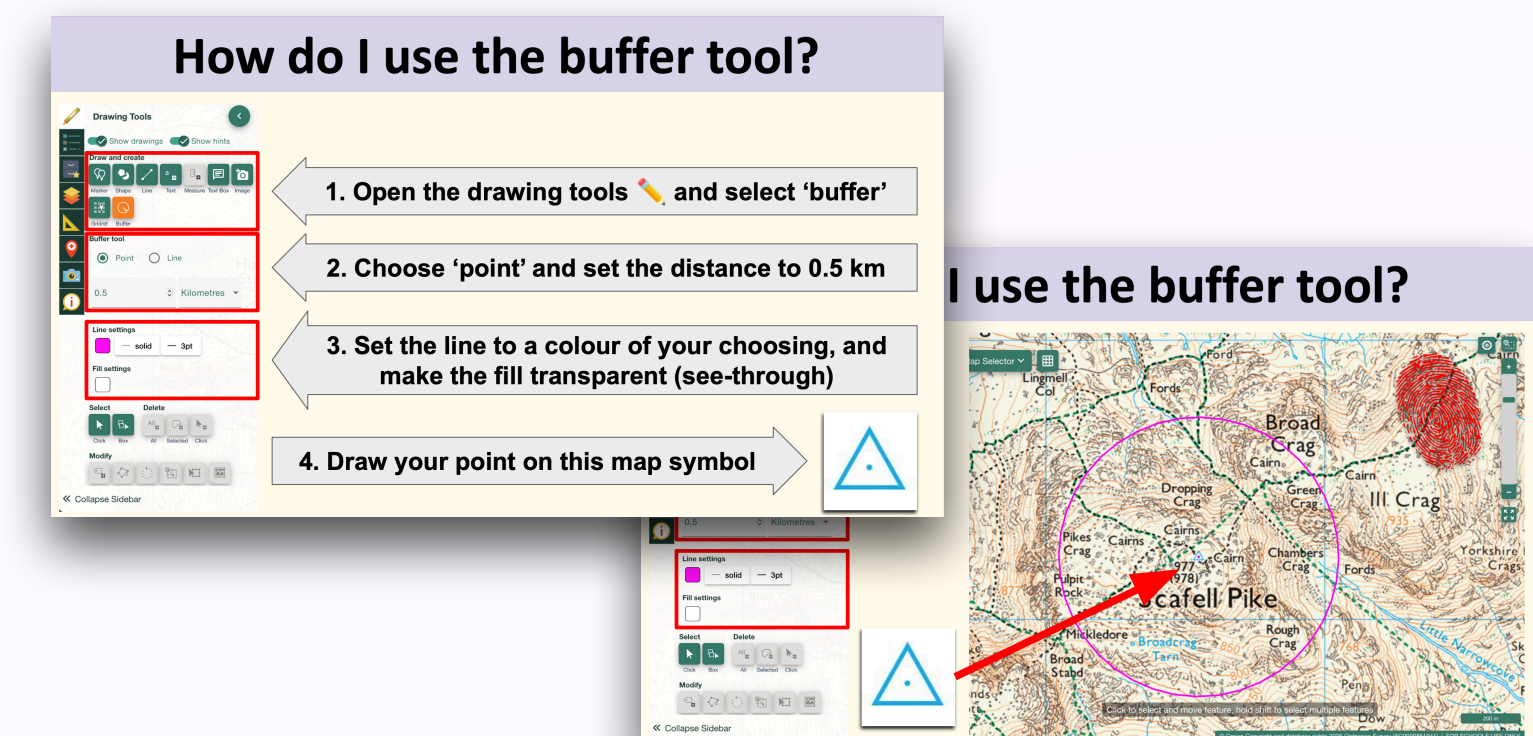
Teaching students GIS with a purpose is much easier than trying to expose students to it without an objective. This allows GIS to become second nature and not a stand-alone topic

### Ask a lot about a little...

Rather than increasing the number of moving parts, spend more time encouraging students to be critical and analytical about what they have produced

### Use message abundance...

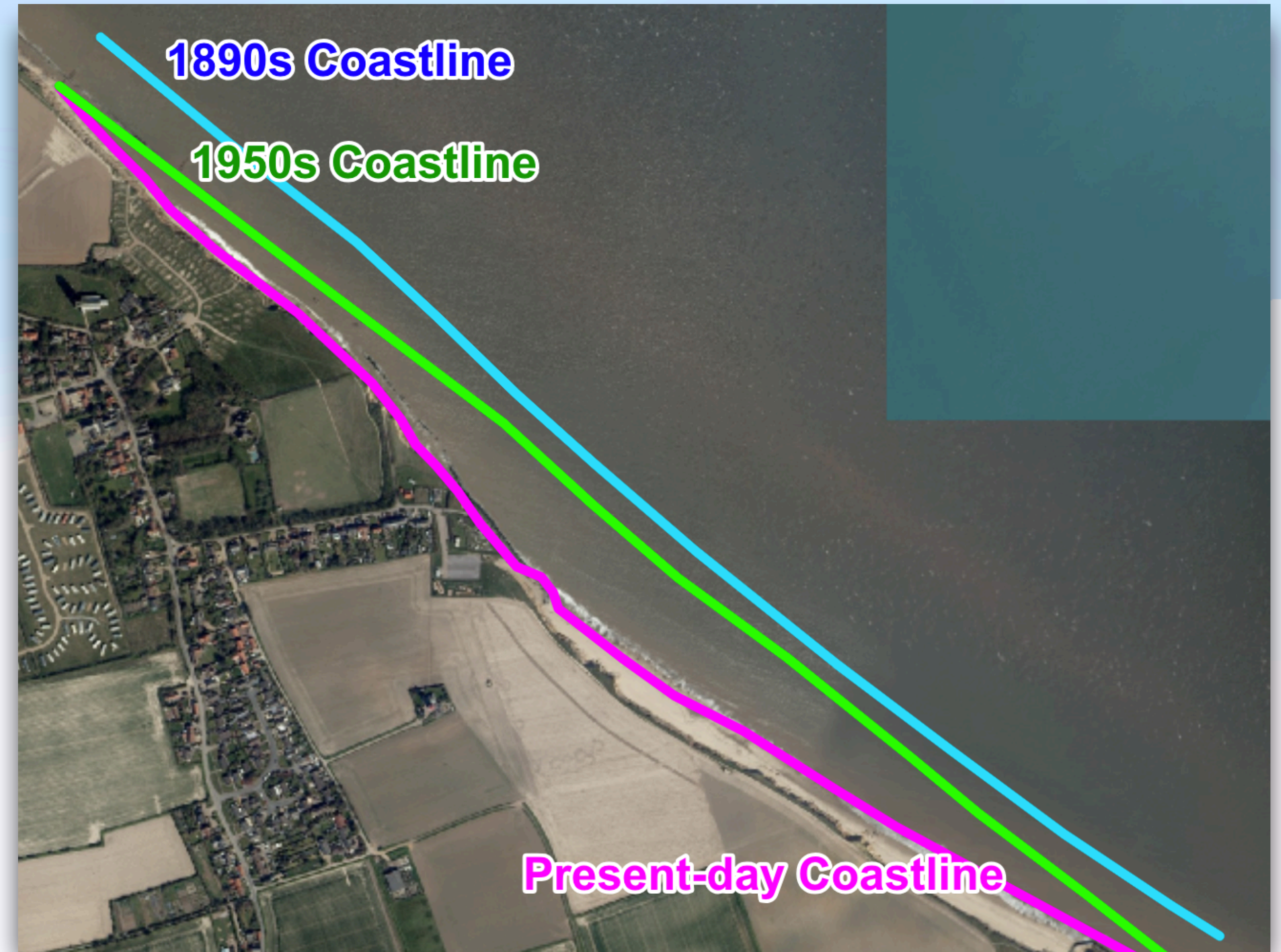
Use the same terminology consistently across multiple mediums – during the demonstration, on the slides, as a crib sheet, and when asking questions. This is a form of message abundance, a strategy frequently used to support EAL learners but that benefits all students



# How could this apply to other schemes?

Using GIS to support EAL students' understanding and progress

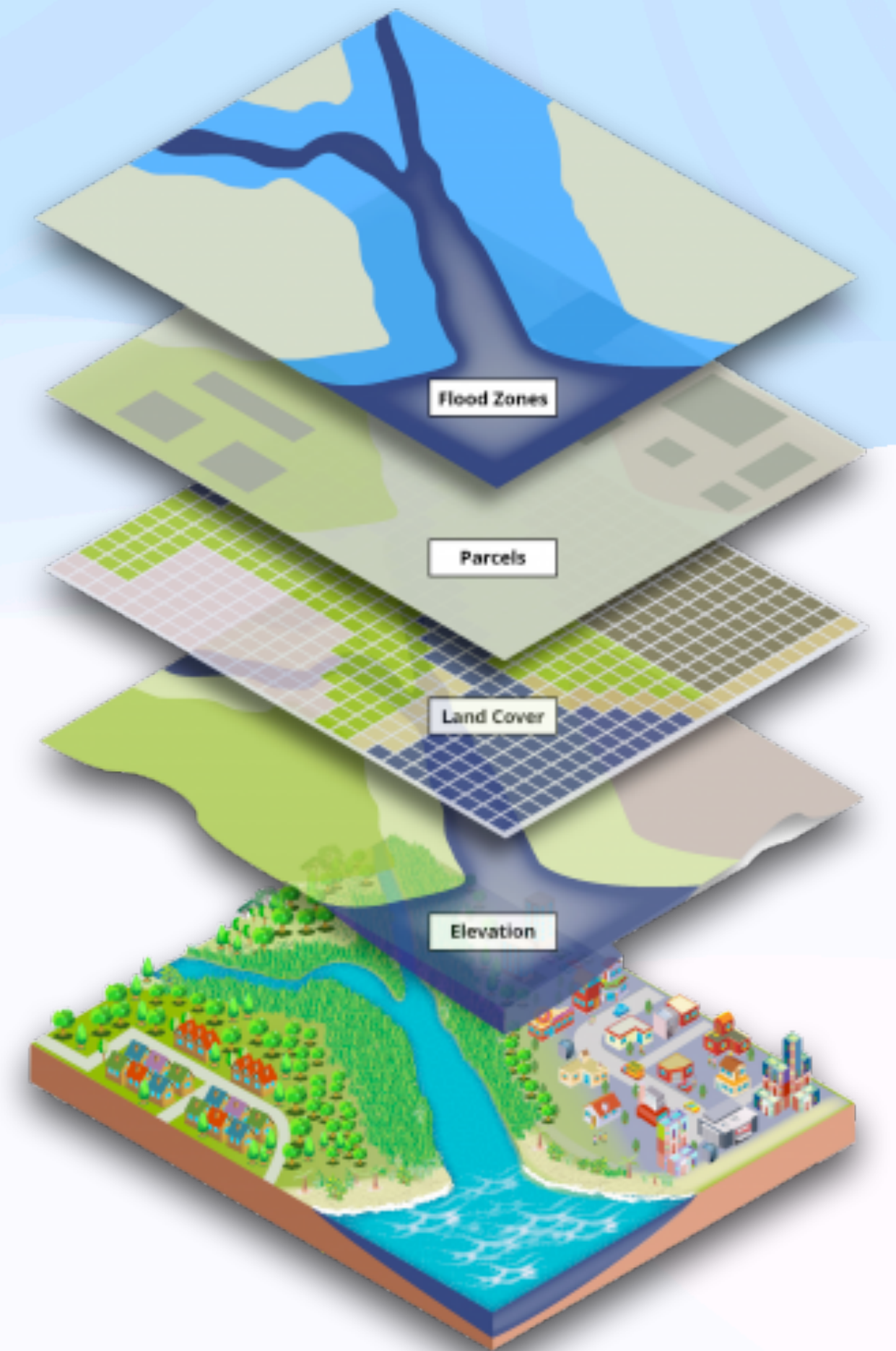
- Measuring coastal retreat at Happisburgh using GIS with year 10
- GIS was embedded into the scheme of work, students had just covered types of coastal management and went on cover human activity at the coast
- Most profoundly positive impact of using GIS on understanding was observed amongst EAL and LPA students



# Conclusion

## Using GIS to support EAL students' understanding and progress

- When embedded meaningfully into a well-sequenced curriculum, GIS can provide valuable visual and interactive opportunities for EAL learners to develop subject-specific vocabulary, interpret spatial information, and apply geographical concepts
- EAL students evidenced strong progress in their written and oral communication, with greater confidence using topic-specific terminology
- Progressive exposure to GIS throughout the curriculum increases the likelihood of its continued use and develops cognitive associations between new and existing knowledge



**Thank you for listening!**

