

SDG13 Climate Change Engage Game Design



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Lesson 12: Climate Change and the Built Environment (Part 1)

Subjects: Design, Environmental Science, Game Design, Geography, Science, Technology

Lesson Title and Summary: Climate Change and the Built Environment (Part 1)

The aim of this lesson is to highlight why we need to adapt the way we plan and build our cities and towns in the future. The lesson begins by looking at the challenges of existing low-density settlements and then goes on to look at how this might be changed. This includes how we adapt our settlements by increasing density, building in the existing built-up area of cities and towns, and reusing existing buildings. Learners develop understanding of the impact of higher density urban settlements, how this can help mitigate climate change by protecting green spaces and reduce the distances people have to travel.

Vocabulary: Compact Development; Density; Urban Sprawl

In this lesson, the learner will:

- Learn why existing settlement patterns are negative from a climate perspective
- Develop an understanding of why we need to adapt existing living environments
- Understand why using less land is more efficient
- Understand some of the ways we can build in a more compact way

Materials

- Video: 'Climate change and the Built Environment'
- Worksheet: Active Listening Task
- Worksheet and Guide: Using AIRO maps and activity worksheet
- Paper and pens
- Access to Internet on tablets, computers or phones (for the AIRO maps; tablets or computer will be best)

4 QUALITY EDUCATION



9 INDUSTRY, INNOVATION AND INFRASTRUCTURE



11 SUSTAINABLE CITIES AND COMMUNITIES



12 RESPONSIBLE CONSUMPTION AND PRODUCTION



SDG13 Climate Change Engage Game Design

L12: Climate Change and the Built Environment (Part 1)



Activity Instructions

Activity 1 Climate Change and the Built Environment Active Listening Task (30 mins)

1. In pairs, read through the questions on Worksheet: 12.1.1 Active Listening Task. Underline the keywords in each question and clarify any unknown vocabulary by checking a dictionary or asking a peer.
2. Answer the questions while watching the Video: 'Climate Change and the Built Environment'
3. Discuss answers in pairs and then share ideas as a whole class.

Activity 2: Population Growth in Ireland (20 minutes)

1. Working in pairs, use the Guide (using AIRO maps and activity worksheet) to discover population growth in Ireland.

Learners will examine population change in Ireland and where this has occurred over time.

<https://airomaps.nuim.ie/id/Census2016/>

2. Ask each pair to select a city or town and look at population change between 2011-2016.
3. Using worksheet 12.1.2 learners will
 - o identify the location where the population has grown the most (darker blue).
 - o write down the name of the location, broadly where it is, the name of the electoral division (ED) and the population change between 2011 and 2016.
 - o determine and record the population in 2011, the population in 2016, the overall change in population and the percentage change.
 - o identify and write down if the growth is occurring in the centre of the town or on the edge.
4. Do a quick tour of the room to identify where each of the groups have identified population change occurring. Is there evidence of any patterns?

REFLECTIVE EXERCISE: 3-2-1 (10 mins)

- Three things they feel they have learnt from the tasks
- Two things they found most interesting and would like to explore more
- One opinion they have about the activities, what did they like or how they would improve them

Use Post-its or a mentimeter survey - www.mentimeter.com to gather reflections

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EXTENSION / REDUCTION ACTIVITIES

Reduction: For a shorter lesson, skip Activity 2 and spend longer on Activity 1, by adding a feedback and discussion session on what the students have learned from the video.

Extension: For a longer lesson, watch the Eco Eye video as a class (see Media Box) from 5.31-20:00mins. Ask learners to reflect on building more densely and the challenges associated with this. Discuss some of the challenges that come from building more densely – what do the learners think of the arguments of local residents? Do they agree or disagree?

Flipped Classroom: Learners watch the full Eco Eye video before the lesson. In addition to Activity 1, discuss what they learned from the Eco Eye programme in their pairs and share the learning from both activities with the rest of the class following the discussion.

MEDIA BOX: (materials, online video links, extra resources, case studies etc)

'Climate Change and the Built Environment' <https://youtu.be/VzXFfKXzJ18>

Eco Eye Programme Higher Density vs Urban Sprawl (Episode 8, Season 20, 2021).

<https://www.youtube.com/watch?v=u2OOzj5ZfYI>

Department of the Environment Heritage and Local Government (DHELG, 2009) Urban Design Manual: A best practice guide, Dublin, DHELG. [Part 1](#) and [Part 2](#)

EPA Greenhouse Gas Emissions latest data <https://www.epa.ie/our-services/monitoring--assessment/climate-change/ghg/latest-emissions-data/>

Marmalade Lane: <http://www.marmaladelane.co.uk/>

Local Trip / Expertise / Additional Work and Assessments

Students can walk around a local town or village to identify and map:

- Any development that is occurring at the edges of the village or town.
- Unused (vacant), underused (where only a ground floor is used), or derelict buildings. Ask students to think about what potential uses could be made of the buildings in the future.

Ask a local planner to visit and talk about how they are encouraging more sustainable compact and mixed-use development in neighbourhoods, towns, and villages of the area where the school is based. The planner could provide an overview of local policy and explain the challenges of accommodating growth in a sustainable manner. It would be particularly interesting if there is a local plan in place or a regeneration/building project that is close to the school, that the planner could use to illustrate how policy is being implemented.

CCE L12WS ACTIVE LISTENING TASK



- A. Read through the questions and underline the key words.**
B. Watch the video 'Climate change and the Built Environment' - <https://youtu.be/VzXFfKXzJ18> and answer the questions

1. What three sectors produce most of Ireland's Greenhouse Gases?
I. _____
II. _____
III. _____

(Note: The Data in the presentation come from the Irish Environmental Protection Agency, EPA update these figures with new data as it becomes available – check out the Latest EPA Greenhouse Gas Emissions Data [here](#))

2. Why are many Irish suburban developments bad for the environment and contributing to Greenhouse Gas Emissions?

3. What is meant by the term 'urban sprawl? Use your own words to define it.

4. What are the disadvantages of urban sprawl?

- i. _____
II. _____
III. _____
iv. _____

5. What is meant by the term 'compact development'? Use your own words to define it.

CCE L12WS ACTIVE LISTENING TASK



6. What three things about settlement planning do we need to consider and change in order to bring about a greener future?

I. _____

II. _____

III. _____

7. Describe two things that can be done that would increase the density of development.

I. _____

II. _____

8. Name two environmental advantages of reusing older buildings in towns and cities.

I. _____

II. _____

CCE L12WS: AIRO INTERACTIVE TASK

13 CLIMATE ACTION

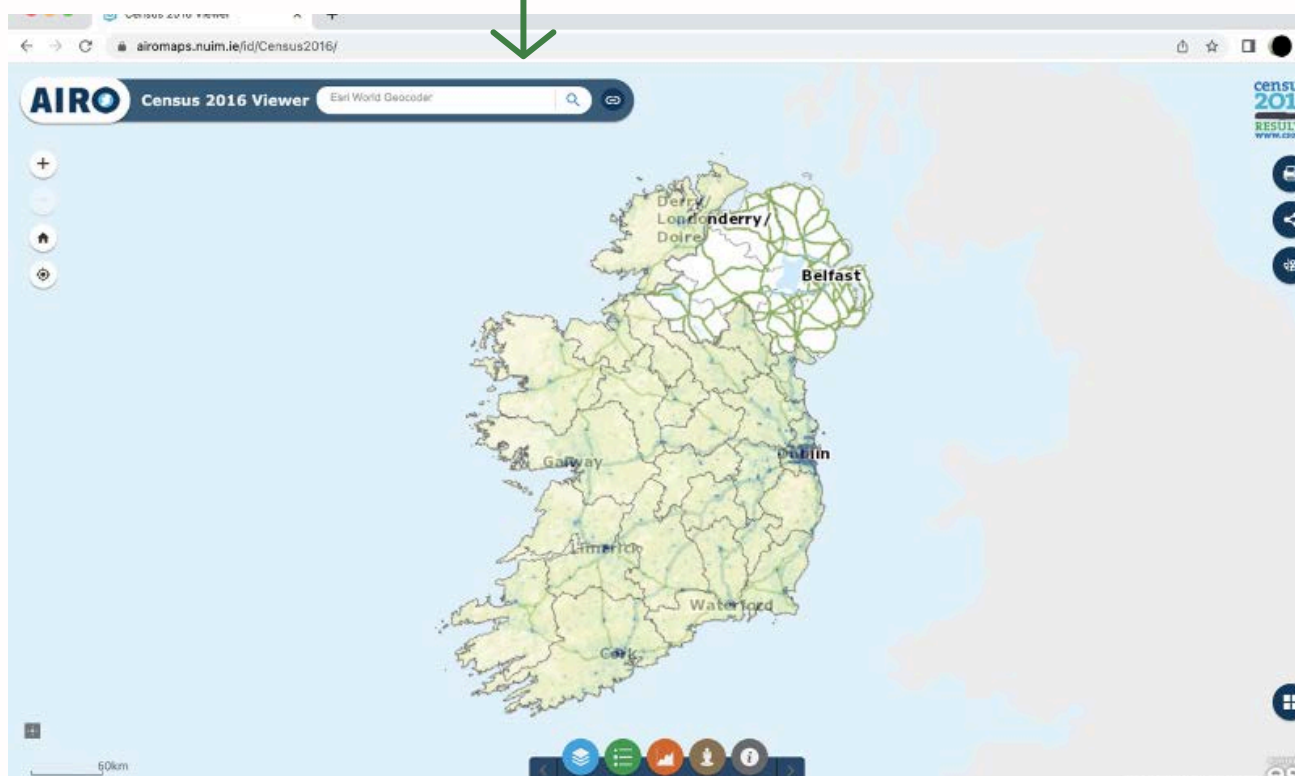


Use this instruction sheet to explore AIRO Census mapping and complete the worksheet on page 7.

TASK 1: EXPLORING THE AIRO MAP

1. Go To AIRO Census 2016 Mapping:
<https://airomaps.nuim.ie/id/Census2016/>

It will bring you to this screen



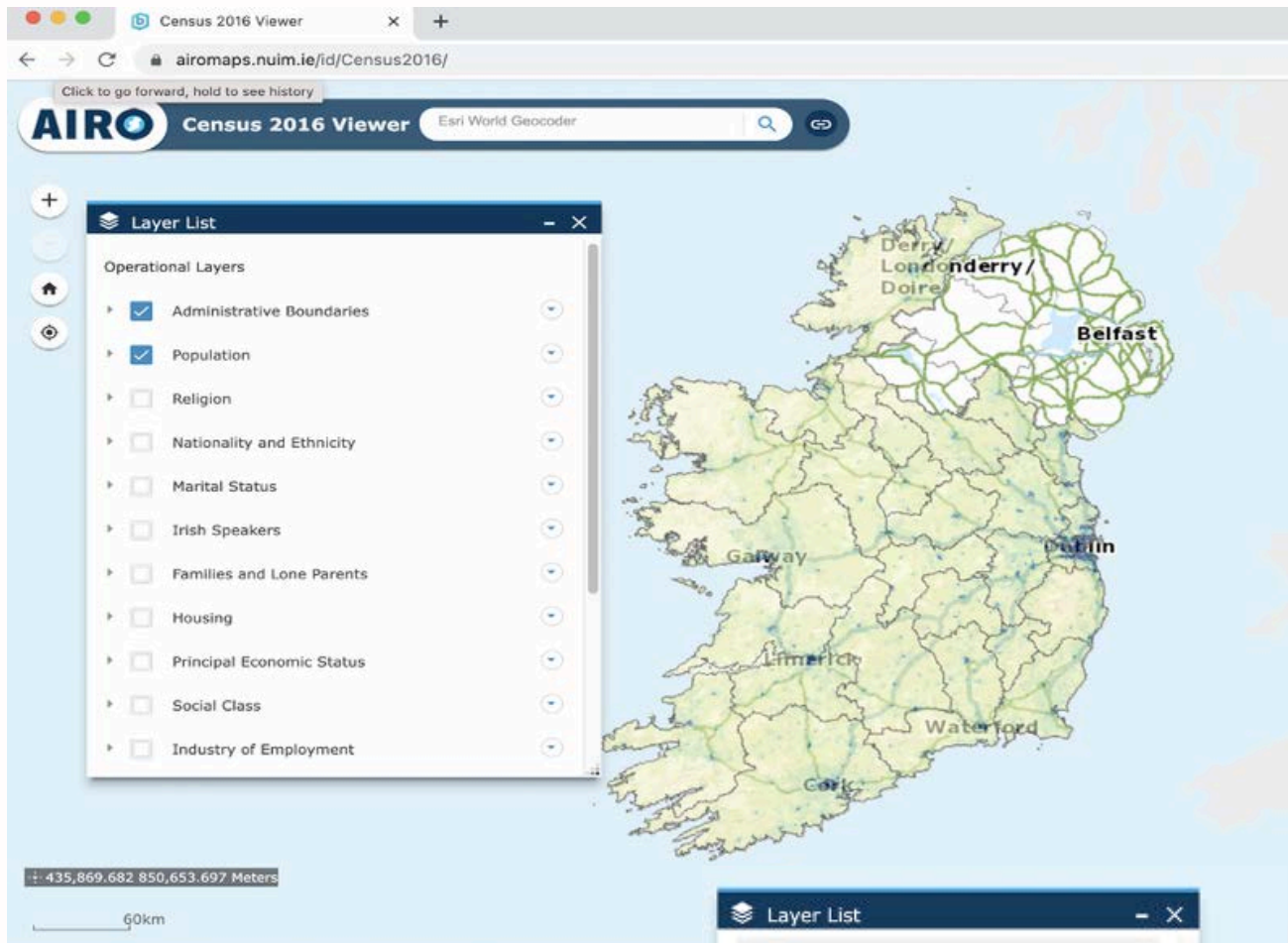
2. To get the population view in a format that is easy to search,
 - go to the layers button, the blue stack button on the bottom menu.

CCE L12WS: AIRO INTERACTIVE TASK

13 CLIMATE ACTION



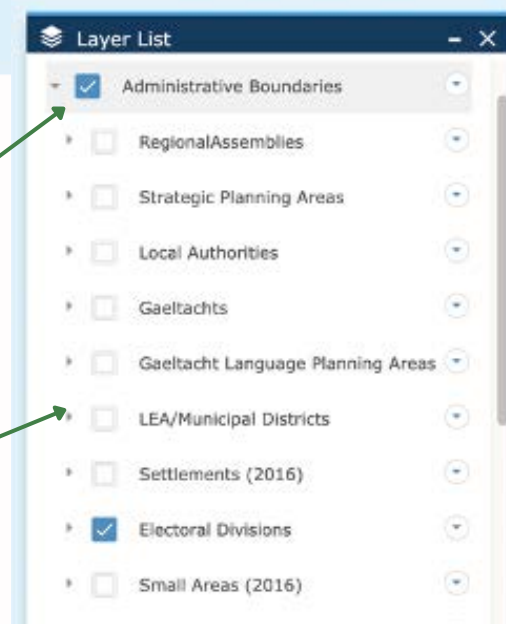
- By clicking this you will open the layers menu (see screen shot below), here you can select lots of different data from the 2016 census for display.
- For this exercise you need to select the first two items listed:
Administrative Boundaries
Population
To select them, click the relevant left-hand boxes.



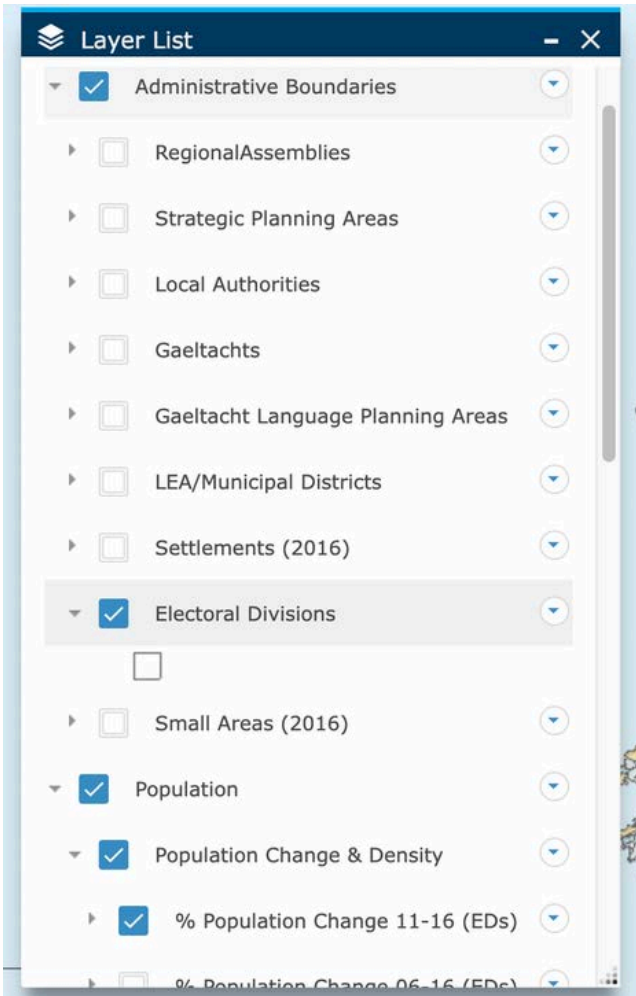
To see the different types of administrative boundaries and the different population data available, you will need to double click on both of these topics in turn to see the drop-down submenus.

- Double click on the administrative boundaries, this will give you access to lots of potential administrative units with different boundaries.

You can view the local authority boundaries, regional assemblies, etc. but if you want to select the *Electoral Divisions* (see the layer list), this will allow you to view population change in smaller areas.



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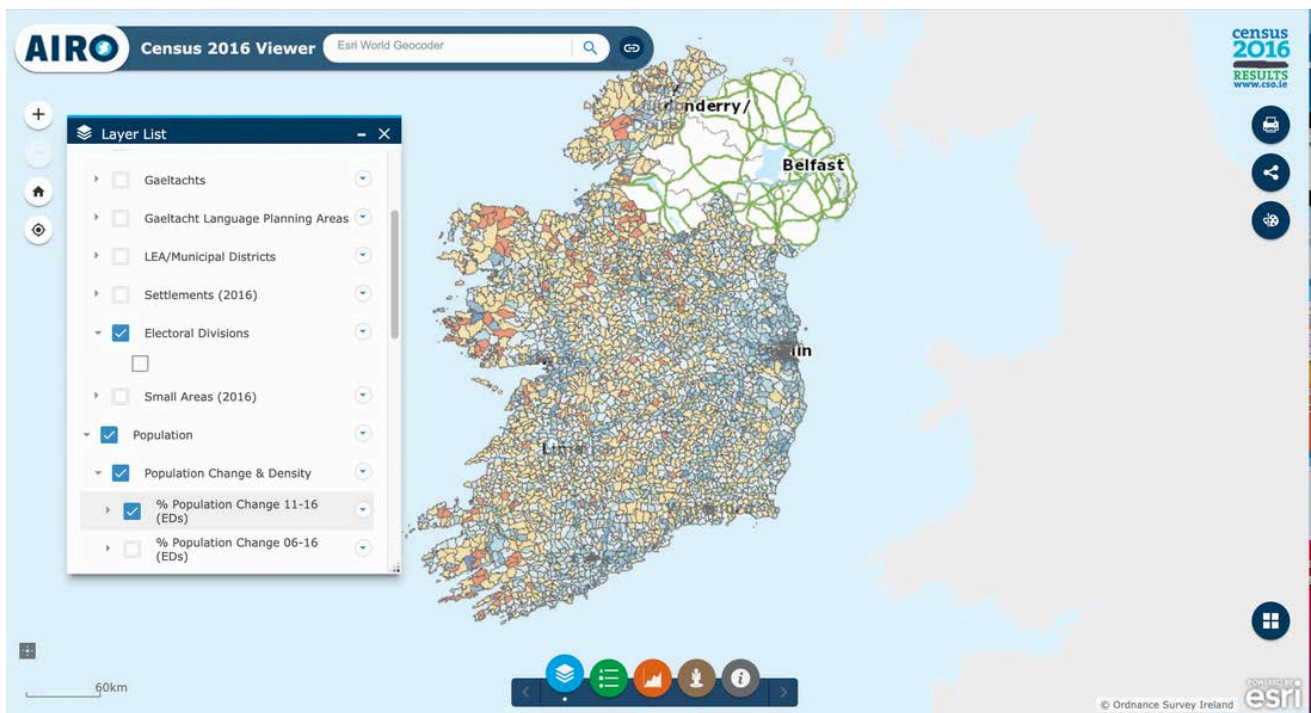


6. You will also need to double click on population so that you see the drop-down menu.

7. Double click on Population Change and Density, then from the second drop-down menu select % Population Change 11-16 (EDs).

The map (see below) will now show the electoral divisions across the country and you can zoom in using the + symbol to look at a specific area.

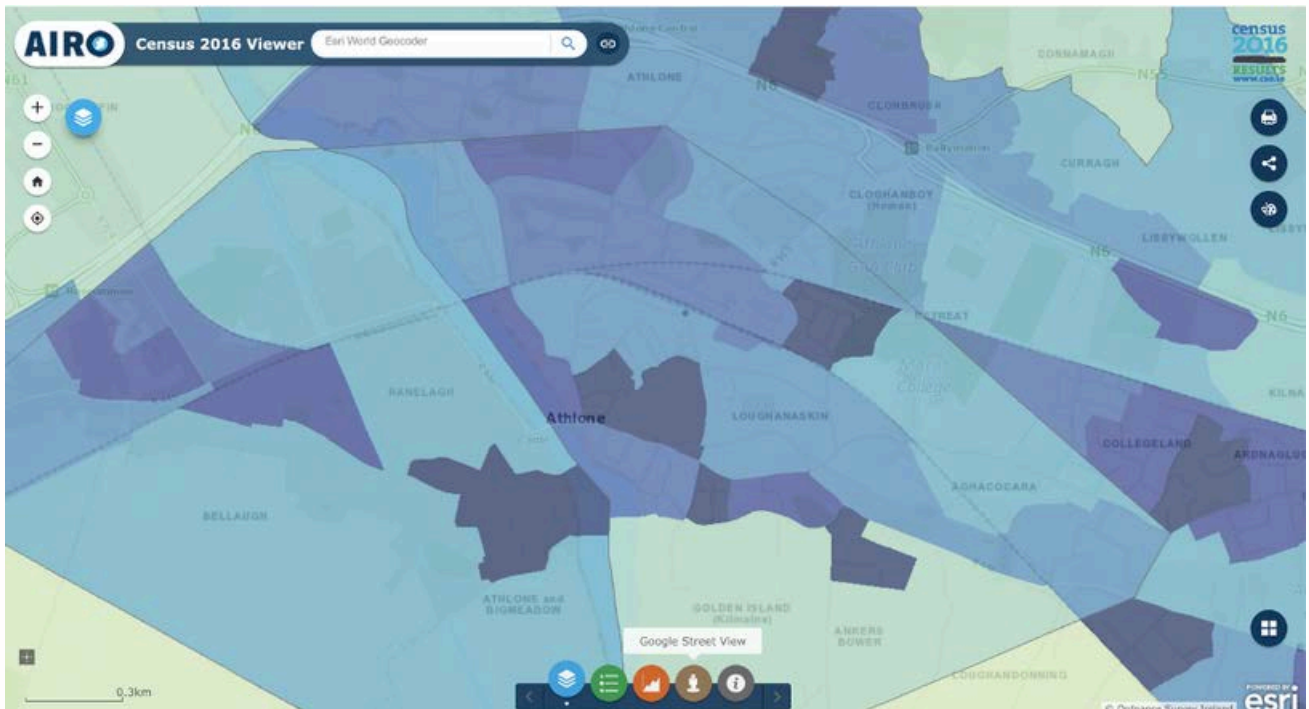
The example below is zoomed in to look at the town of Athlone.



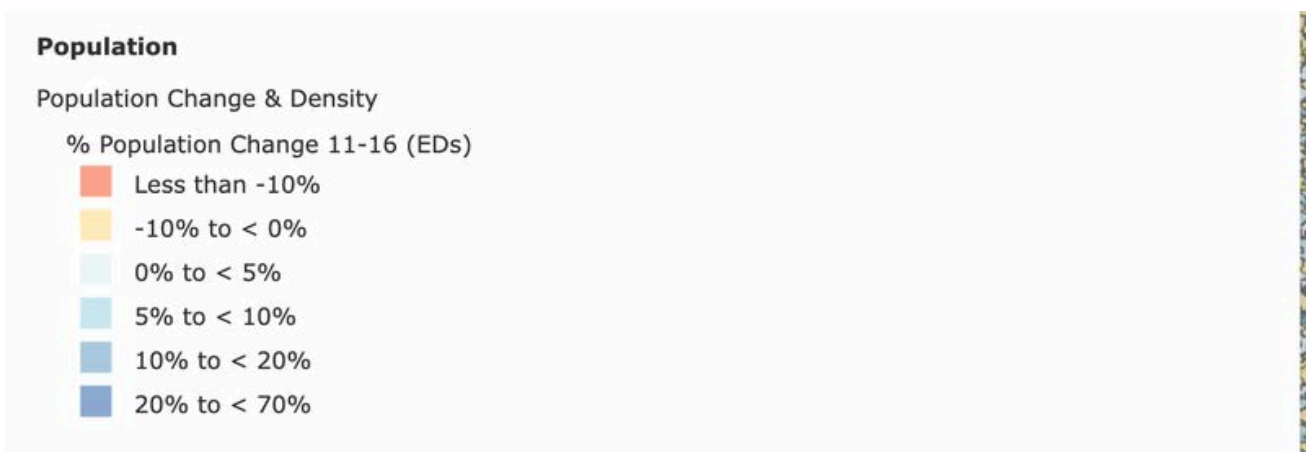
CCE L12WS: AIRO INTERACTIVE TASK



8. You can now click on each highlighted electoral division and view the population change that has occurred between the 2011 Census and the 2016 Census of Population.



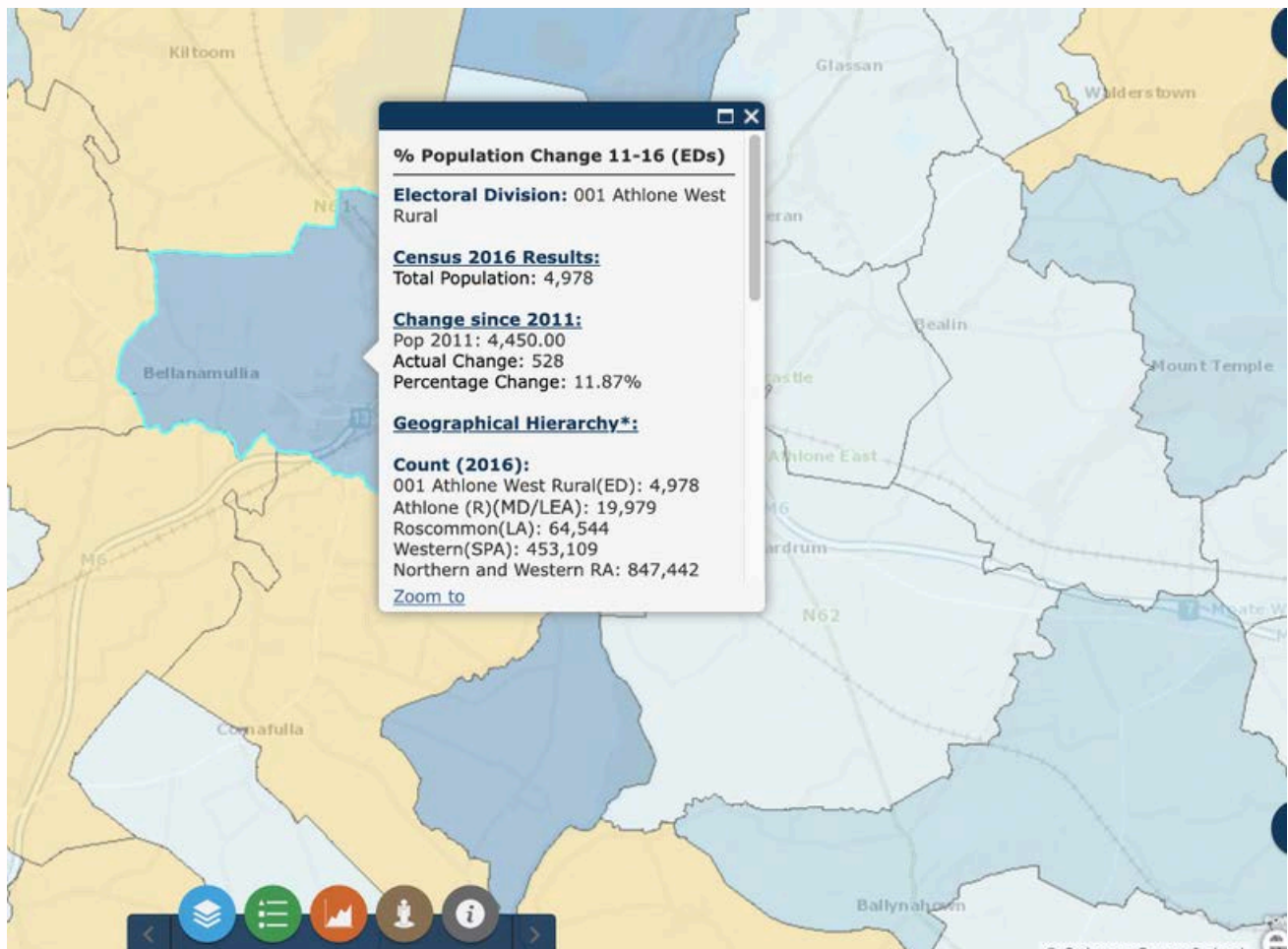
The yellow and orange colours show declining population, while the blue colours show increases, the darker the blue the greater the population increases. See the legend below.



CCE L12WS: AIRO INTERACTIVE TASK



When you click on an Electoral Division, a table appears with the detailed information on the change in % population between 2011 and 2016. This includes the exact % change in population and the actual increase in numbers.



This is very useful for getting detailed information about population change.

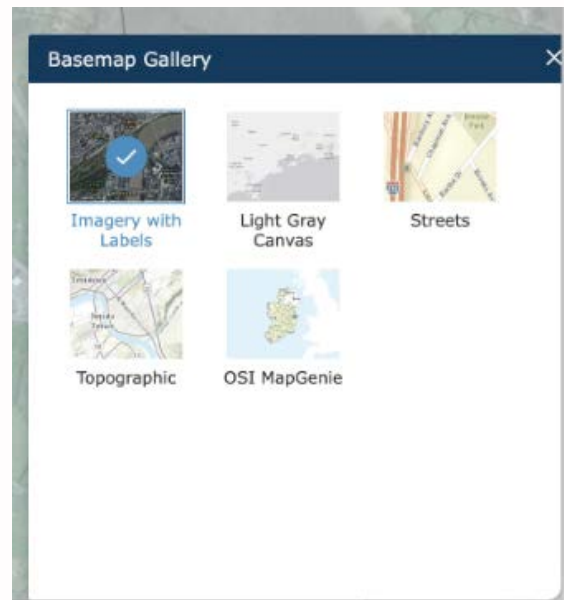
For example in the Electoral District on the edge of Athlone that is highlighted, you can see that there has been a growth in the population of this area of 11.87% between 2011 and 2016, and this was an increase of 528 people.

To see the nature of development in the area you can change the base map to an aerial photo. To do this click the Base Map viewer and change to the 'imagery with labels' option.

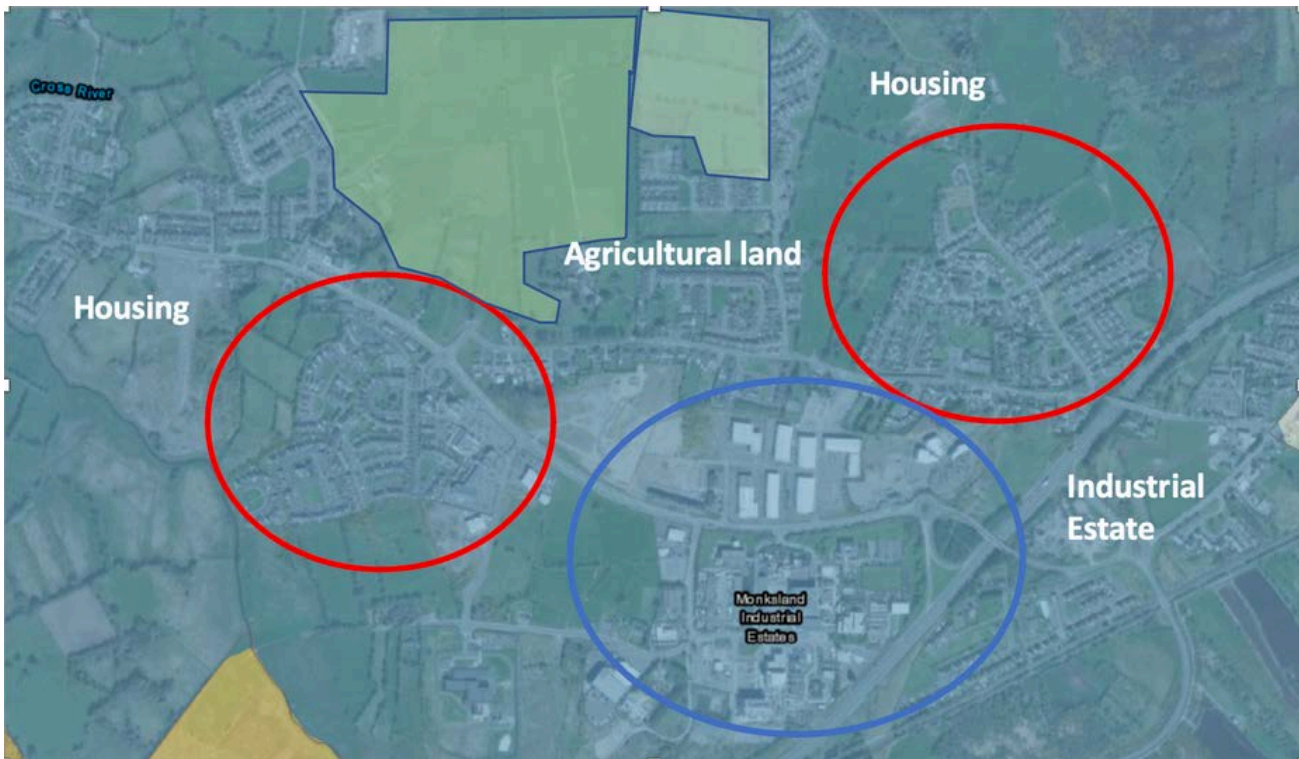
CCE L12WS: AIRO INTERACTIVE TASK



This allows you to see that this Electoral Division is largely an edge of town area (see map below) as it shows a mix of rural agricultural land, an industrial estate and a number of housing estates.



Notice the layout of the housing estates are relatively low density.



You can explore other aspects of population growth and other census information. You can see the amount of growth in areas over a longer period from 2006 -2016 by going back and ticking this layer in the layer options. Using this tool and the attached task sheet explore population change and where this population change is occurring in different towns and cities in Ireland.

CCE L12WS: AIRO INTERACTIVE TASK



TASK 2: EXPLORING IRISH TOWNS AND CITIES

In your group pick an Irish town or city to explore.

1. Name of Town or City: _____

Using the AIRO Census mapping tool provide the following information:

2. In your chosen town or city, identify the location where the most growth has occurred. Name the Electoral Division or number of Electoral Divisions where this growth has occurred.

From the data and map, provide the following information:

3. In the Electoral Division or number of Electoral Divisions with the greatest growth, what was the population in the Electoral Division(s) in 2011?

4. What was the population in the Electoral Division(s) in 2016?

5. What was, the overall change in population numbers in the Electoral Division(s) between 2011 and 2016?

6. What was the percentage change in population between 2011 and 2016?

7. Describe spatially where most growth is occurring (e.g in the city centre, suburbs, edge of the built-up area).

