

ESB Networks' Weather Watch Programme

Teacher Information

About the Programme

- ESB Networks' Weather Watch programme is an initiative to teach Junior Cycle and Transition Year Geography students about renewable energy generation and sustainability. This innovative programme is based on ESB Networks' 'Is This a Good Time?' initiative. This is the second year of this programme and this phase includes 180 schools throughout Ireland.
- Five lessons (PowerPoint presentation format) and supporting resources have been developed in line with the curriculum via co-creation with teachers across Ireland. The programme aims to empower students with the knowledge and skills to understand and engage with key environmental challenges.
- Each lesson is outlined below with and corresponding Junior Cycle Learning Outcomes and Key Learning Intentions for each.
- Your school weather station is an integral part of the programme as it adds an interactive, hands-on element to learning. Please share your school weather station data via <https://weathercloud.net/en> - see the instruction sheet for more details on this. We hope you and your students enjoy the programme!

Junior Cycle Framework Statements of Learning (SOL)

SOL 9: Understands the origins and impacts of social, economic, and environmental aspects of the world.

SOL 16: Describes, illustrates, interprets, predicts, and explains patterns and relationships.

SOL 18: Observes and evaluates empirical events and processes and draws valid deductions and conclusions.

Lesson One: Weather Forecasting and Electricity Usage

Links to Junior Cycle Learning Outcomes

- **1.8:** Gather, record, and interpret weather data.

Key Learning Intentions

By the end of this lesson, students will be able to:

Interpret weather maps and understand how weather patterns affect daily life.

Identify and describe anticyclones (high pressure) and depressions (low pressure) on a weather map.

Understand the difference between anticyclones and depressions.

Make connections between weather forecasts and conditions, electricity usage, and sustainability using ESB Networks' 'Is This a Good Time?' initiative as a guide.

Resources

- Access to digital weather maps showing anticyclones and depressions (**Met Éireann - The Irish Meteorological Service**)
- Synoptic chart worksheets (question and answer sheets available in resources).
- Data from the school's weather station.

Lesson Structure

Move through the context slides and ensure online pre-programme Teacher Survey and Student Surveys have been completed before continuing Lesson One content.

- Opportunity to ask the students about current weather and how it affects activities.
- Link to prior learning: Recap on renewable and non-renewable energy resources.
- Explain the objective of the lesson: Learning to read weather maps and connecting weather patterns to electricity usage.

Main Activity

Use PowerPoint to explain anticyclones (high pressure) and depressions (low pressure) and how they are depicted on weather maps, plus how weather behaves in anticyclones and depressions.

Class Activity:

Students analyse weather maps in groups/as a class (<https://www.met.ie/>), details below.

- Analysing weather maps: Divide students into small groups and provide a weather map/link to map that includes both an anticyclone and a depression. Each group will:
 - Identify the anticyclone and depression on the map.
 - Discuss the expected weather conditions in each region.
 - Predict the impact of these weather patterns on daily activities and energy usage (e.g., renewable energy potential, need for heating or cooling).
- ESB Networks' Connection: Each group should also consider the impact of the weather patterns on electricity consumption and decide if it would be a good time to use energy-intensive appliances based on the weather map (linking to the 'Is This a Good Time?' initiative).
- Groups can present their findings, highlighting the weather conditions, potential impacts, and electricity usage suggestions based on the forecast.

Class Activity or Homework option* (worksheet):

Students complete the synoptic chart worksheet (available in resources). Link to ESB Networks' 'Is This a Good Time?' initiative: Groups decide the best time to use energy-intensive appliances based on weather conditions.

Plenary

- Recap the differences between anticyclones and depressions.
- Q&A session on weather maps and their impact on electricity usage.
- Exit slip: Students share how they think weather patterns affect their own electricity usage at home.



Homework Options*

- Take Home Activity 1: Energy Tracker Challenge – details in PowerPoint.

Extension Activity

Predicting Electricity Usage: Divide the class into small groups and give each group a fictional weather forecast for the next 5 days. Each group will:

Analyse the forecast for key weather conditions (temperature, wind, precipitation).

Predict how these weather patterns will affect electricity demand (e.g., higher energy demand on colder days).

Recommend when it is the best time to use electricity based on the forecast, considering ESB Networks' 'Is This a Good Time?' initiative.



Lesson Two: Weather and Weather Instruments

Links to Junior Cycle Learning Outcomes

- 1.8: Gather, record, and interpret weather data.

Key Learning Intentions

By the end of this lesson, students will be able to:

Understand different weather instruments, their functions, and how they contribute to weather forecasting

Appreciate the significance of weather forecasting and the importance of accurate weather data in daily life, including its link to electricity usage

Identify and describe the functions of key weather

Identify weather conditions on a weather map – synoptic charts

Resources

- Worksheets on weather instruments (question and answers sheet available in resources)
- School Weather Station data

Lesson Structure

Begin by asking students, “Why is the weather important in our daily lives?” (expected responses: planning activities, farming, safety, travel, etc)

Link to prior learning: ask students if they know how the weather is predicted. Encourage responses like weather forecasts, meteorologists, or TV/radio reports.

Explain the objective of the lesson: Tell students that today they will learn about the different instruments used to measure various aspects of the weather and understand weather maps.

Main Activity

Introduce the main weather instruments, one at a time.

Stevenson screen (not an instrument, but students need to know it)

For each instrument, provide:

- Name of the instrument
- Purpose
- unit of measurement
- how it works
- weather conditions it measures.



Student Activity:

Students complete the weather instruments worksheet adding name of instrument to picture of each and listing the element of weather it measures.

Plenary

- Recap each weather instrument by calling on different students to name and explain the instruments discussed.
- Q&A session allowing students to ask any final questions about weather instruments or how they work. Address any confusion.
- Exit Slip: "Name one weather instrument and explain how it helps predict the weather."

Homework Options*

DIY Weather Forecast:

- Access weather data online (use your school's weather station link via Weather Cloud or met.ie).
- With your guardian, record the weather conditions for a day and create a mini weather report.
- Use the prompts in the table to guide your observations.

Extension Activity

Weather station simulation: Divide the students into small groups and assign each a weather instrument. Give each group a scenario (e.g. a storm is coming, a sunny day etc). They must explain how their assigned weather instrument would be used in this scenario. Present their findings to the class, showing how their instrument contributes to forecasting the scenario.

Extension Activities

Review data from the weather station. Identify weather data produced by the weather station, units of measurement etc. Discussion about live data versus traditional methods. Compare data in different locations.

Students can use live weather data at a particular time throughout the week, and access data available from other schools via Weather Cloud to compare data in different locations.

Ask students to watch a weather report on TV or online and note down any mention of weather instruments/conditions. (e.g. pressure is dropping, winds from the north). The students should bring their findings for discussion in the next class.

Lesson Three: Wind Energy

Links to Junior Cycle Learning Outcomes

- **1.9** Differentiate between the types of energy resources produced by the physical world
- **2.2** Evaluate the environmental, economic, and social consequences of rock exploitation and energy resources
- **2.3** Identify how the physical landscape influences the development of primary activities

Key Learning Intentions

By the end of this lesson, students will be able to:

Discuss the advantages of renewable energy vs non-renewable energy. Discuss how renewable energy is linked to the weather and electricity generation.

Identify the benefits and challenges of wind energy.

Describe the generation and use of wind energy in Ireland, making a link between the physical landscape and the placement of wind turbines.

Resources

- Eirgrid data on energy usage in Ireland: **Visit Eirgrid**
- Scoilnet Maps: **View Scoilnet Maps**
- Additional video links/interactive map links are included within the PowerPoint.
- Worksheet on wind energy (question and answers sheet available in resources)

Lesson Structure

Context to electricity production overview and ESB Networks role. Discussion - Current data from Eirgrid regarding Ireland's energy use should be projected onto the board, and discussion should be encouraged.

Suggested questions:

- What percentage of our energy came from renewables in 2005, and how would you compare it to 2020?
- What type of renewable energy sources do you think are being suggested on the graph?

Think-Pair-Share Activity

Use the slide on the PowerPoint with GIFs featuring various impacts of climate change (Slide 8), which can prompt the topic of impacts of climate change that are in part caused by the use of burning fossil fuels. NB: Teachers should ensure that the PowerPoint is shown in presentation mode for the GIFs to work fully. Suggested questions for Think-Pair-Share:

- What is the impact of using non-renewable energies on our environment, society, and economy?
- What are the advantages of using wind energy over non-renewable energy?

Main Activity

True or False? The Wind Energy Edition

Identify which statements on the activity sheet are true or false. Think of reasons to justify each answer. Compare and discuss answers with another student.

The Climate Connection

On the activity sheet, read each of the causes and match them with an effect. Write the number for each effect under the corresponding letter for each cause in the table.

Discussion

Look at physical factors and human factors for the location of wind farms (Slide 14 - 18). To give a balanced view of wind farms, there are two slides listing benefits (Slide 19) and challenges (Slide 20). Teachers could introduce topics such as spin-off business, multiplier effect, NIMBYism, etc.

Student Activity

In pairs or small groups, students are asked to imagine they have to choose a suitable location for a wind farm in your county and create a short presentation/report with their findings based on all relevant considerations. (Slide 22)

Plenary

- Recap advantages of renewable energy vs non-renewable energy.
- Q&A session on wind farm benefits/challenges.
- Exit slip: Students share how they think windy weather affects their own electricity usage at home.

Homework Options

Create a poster aimed at students about how they can reduce their impact on energy use. Give some tips on how they can use energy more sustainably.

Extension Activity

Write a letter to the principal of your school outlining why you think the school should consider installing solar panels. In the letter, outline the benefits that renewable energies can have for the school, the local community and Ireland

Lesson Four: Climate Change and You

Links to Junior Cycle Learning Outcomes

- 2.2 evaluate the environmental, economic, and social consequences of rock exploitation and energy resources
- 2.6 examine the causes and implications of climate change
- 3.6 identify global patterns of economic development

Key Learning Intentions

By the end of this lesson, students will be able to:

Explain the difference between weather and climate.

Discuss global, national and local efforts that are/should be made to positively impact climate change.

Identify ways that they and their family can facilitate Ireland's efforts to impact climate change positively.

Resources

- Two videos of ads that illustrate flexibility:

Video 1

Video 2

- ESB Networks' website has up-to-date data on Ireland's energy usage and response to flexibility **at this link**.
- Worksheet on climate change (question and answers sheet available in resources)

Lesson Structure

Students should be asked about the difference between weather and climate.

Suggested questions:

- Why is climate change happening?
- Who is responsible?

Main Activities

Weather V Climate

Read the statements on the activity sheet and decide whether they relate to Weather or Climate.

Real time weather statements

Look at information from the schools' weather station and come up with your own weather statements for that week.



Linking Weather and Climate

Use the story map or a report that your teacher gives you to look at the average temperatures in Ireland over a thirty year period. This represents climate data. Compare averages that your weather station has gathered for this month or this year to the averages provided by Met Eireann.

Story map available here: <https://storymaps.arcgis.com/stories/93cbad5530054f58a6246a44920aa3f3>

Global efforts against Climate

On the activity sheet, fill in the blanks to complete the sentences.

Think-Pair-Share

Teachers can ask students to work in pairs or groups to brainstorm some ideas about how the world can start to slow down climate change.

The class can discuss some of the ideas from the brainstorming session.

Teachers can now introduce what is happening on a global scale to slow climate change (Slide 6). Over several slides (Slide 7 - 8), teachers will introduce students to The UN's Conference of Parties (COP) conferences and the different policies that came from some of them. To give context students are first shown the Kyoto Protocol.

Suggested discussion questions:

- What year was the Kyoto Protocol Treaty signed?
- Are students surprised by this date and why?
- Which countries did not take part in the Protocol?

Move on to the Paris Agreement (Slide 9 - 10). Another infographic shows the goals of this agreement. Students should be reminded these are the goals the globe is working towards.

Suggested questions using the Paris Agreement Infographic

- How many countries have signed up?
- Do students think/ know if it is more or less than signed the Kyoto Protocol?
- What goals stand out to them from the Infographic?
- What do they think about rich countries financing developing countries?

Video Activity

Teachers should play the video from the UN explaining the Paris Agreement further (Slide 10). Students should answer the questions that are on the slide beside the video.



Additional Suggested Questions

- Do you think the image that was painted at the start of the video is possible to achieve?
- What are net zero emissions?
- What links between climate change action and economic booms were made in the video?
- The video suggests that we too can make a change, what changes do you think we could make?
- Looking at how the world is currently doing, discussion.
- Teachers will now show another infographic showing how each country is doing in terms of working towards the Paris Agreement Goals (Slide 11).

Suggested Questions

- Which countries are taking action, and which are not?
- Which continent is doing the best?
- What image do we have of the best-performing countries, do any surprise us?
- Which countries do we think are impacted most by climate change?
- How is Ireland doing according to the graphic, are you surprised with this?

How is Ireland doing? Discussion

Teachers will now scale back the global view of Ireland's actions slides, outlining the amount of investment from the government (Slide 12) then focuses on energy and the increase in renewable energy sources (Slide 13). Some of the information might be complicated but teachers should bring students attention to the most relevant areas.

Demand Side Flexibility (Slide 14 + 15)

There are slides included to explain this term and how it relates to us.

Teachers should make the point that flexibility links all of us to the climate action plan, this is where we can take personal responsibility.

Student Activity - Beat the Peak Game (Slide 19)

End the lessons on the Beat the Peak game "designed to help you understand peak electricity hours (5-7pm) and identify which appliances consume the most electricity" The students can play at home with family or in class if this option is available/suitable.

Plenary

- Recap main learning on climate issues.
- Q&A on ways individuals and families can make positive changes.
- Exit Slip: Students share their understanding of demand side flexibility.

Complete post-programme surveys

Please complete the online post-programme Teacher Survey and Student Surveys shortly after completing lesson four.

Homework or Extension Activity Options

Activity One: Linked to Policy

Write 4–6 sentences on one of the following options:

Option A:

- Which agreement, Kyoto or Paris, do you think is more effective? Give two reasons.

Option B:

- If you attended COP as a youth representative from Ireland, what climate action would you push for and why?

Option C:

- Explain how renewable energy (like wind or solar) helps countries meet their Paris Agreement goals.

Activity Two: Linked to Weather

- Use available weather data from your school weather station to graph the following data gathered over a week.
- Wind Speed
- Rainfall
- Temperature
- Atmospheric Pressure
- Use the graph to create an infographic about the weather in your local area.

Lesson Five: Mapping Wind Energy: Exploring Ireland's Wind Farms

Target Group

- Junior Cycle Geography students and TY

Curriculum Links for Junior Cycle Geography

Strand 1: Exploring the Physical World

Investigate how physical processes and landforms influence human activity.

Strand 2: Exploring How We Interact with the World

Examine the impact of human activity on the environment and explore sustainable solutions.

Strand 3: Exploring People, Place and Space

Use maps and aerial photographs to describe spatial patterns and relationships.

Evaluate the interdependence between people and the environment.

Key Learning Intentions

By the end of this lesson, students will be able to:

Use Ordnance Survey maps and aerial photos to identify physical and human features of a wind farm site.

Explain how physical geography (relief, land use, access, settlement patterns) influences the choice of site.

Describe the benefits and challenges of wind energy development for people and the environment.

Appreciate the role of renewable energy in Ireland's sustainable future.

Resources

- OS maps for each wind farm area or use of Scoilnetmaps if an ipad/chromebook school
- Aerial photographs of each wind farm or use of google maps earth view if an ipad/chromebook school
- Fact Sheet for each wind farm: name, county, capacity, year completed, number of turbines, etc.
- ESB Networks short video <https://www.youtube.com/watch?v=Hyyh5UD36P8>
- Projector or whiteboard
- Coloured pencils, rulers, tracing paper (optional)
- ipad or chrome book if available

Lesson Plan

1. Introduction

- Begin with a short discussion and visual prompting prior learning from previous lessons: “What is renewable energy?” “Why is Ireland suitable for wind power?” “Why is renewable energy use in Ireland so important?”
- Show a short ESN video about renewable energy in Ireland. <https://www.youtube.com/watch?v=Hyyh5UD36P8>
- Explain: “Today, we’ll be geographers investigating real sites where Ireland’s wind energy is produced.”
- Display one sample aerial photo and OS map of Oweninny wind farm to introduce important symbols and contour lines.
- Explain factors that influence the position of windfarms. Oweninny is used as an example and shows students what they need to consider for the upcoming group activity.

2. Group Investigation: Exploring a Wind Farm Area

Divide students into groups – each group receives one wind farm case study (six case studies available)

Each group uses:

- 1 ordnance survey map extract
- 1 aerial photo of the same area
- 1 info card with site details
- Students can use google maps and scoilnet maps if technology is available, links and grid references to the relevant map and photo is available on the “find it” box on each fact sheet.

Short task as a class before group work

Each group to mark their windfarm on a map of Ireland that is projected on the board

Class discussion on the distribution of the seven windfarms

Teacher to explain link to the wind farms and the prevailing wind in Ireland

Student Task Sheet Prompts:

1. Locate and Describe:

- Identify the wind farm site on the OS map.
- Describe the surrounding landscape (upland/lowland, vegetation, drainage, land use).
- Identify access routes and nearby settlements.

2. Compare Map & Aerial Photo:

- Use the aerial photo to confirm what you saw on the OS map.
- Identify visible features of the wind farm (turbine layout, access roads, substations).

3. Analyse:

- Why might this location have been chosen for a wind farm?
- What evidence of human activity or land use changes can you see?

4. Reflect:

- What are the possible benefits and challenges for people living nearby?

Skills developed:

- Map reading (scale, grid references, height, symbols)
- Interpreting aerial photos (students can be encouraged to use the naming system for Aerial photos)

Groupwork

3. Group Sharing & Discussion

Each group presents a short summary of their wind farm:

- Where is it located?
- What physical features influenced the site choice?
- What are the local benefits/challenges?

The teacher facilitates a comparison discussion between sites:

“Do all wind farms share similar physical characteristics?”

“Are they in upland, exposed, or coastal locations?”

4. Reflection & Optional additional task

Students individually or in pairs create a mini poster or map annotation titled “How Geography Shapes Wind Energy in Ireland.”

Include:

- A sketch map or traced outline of the wind farm area
- Key physical/human features
- A short note on sustainability and renewable energy

5. Assessment

- Quick quiz or recap:
 - » What map evidence suggests a good wind farm location?
 - » How does renewable energy benefit Ireland?
- Collect student worksheets/posters as formative assessment.

Differentiation

- **Support:** Assign roles in each group based on ability.
- **Challenge:** Ask advanced groups to compare two wind farm areas and evaluate which is better suited geographically.

Extension / Follow-Up

- Fieldwork simulation: "If we were planning a new wind farm, what site factors would we consider?"