

# Climate Ready Places

Creating strong and healthy places to live, work and play

## Information resource for teachers

The Adaptation Scotland programme is funded by the Scottish Government and delivered by sustainability charity Sniffer.



# Introduction

**This presentation is part of the Climate Ready Places teaching pack for primary school teachers.**

The presentation serves as background reading for teachers, to raise awareness of climate change and climate adaptation issues before running the suggested lesson plan in the classroom.

# What's the difference between weather and climate?

- **Weather** changes day by day, hour by hour and sometimes minute by minute!
- When we refer to weather we are normally talking about what's happening here and now – is it going to be raining, sunny, windy or snowing today or this week?
- **Climate** describes typical weather conditions over much longer periods of time – usually at least thirty years.

# How do we know that climate is changing?

Scientists measure climate by recording details of weather conditions over many years at weather stations such as this one at Blackford Hill in Edinburgh.



Detailed records allows us to spot long term changes in temperature, rainfall and sea level and accurately estimate how our climate is likely to change in the future.

# How do we know that climate is changing?

- Long term measurements tell us that Scotland's climate is already changing. Over the last century temperatures have increased, sea levels have risen and rainfall patterns have changed including more heavy downpours.
- These changes are expected to continue and increase over the coming decades. We can expect future changes in climate to be far greater than anything we have seen in the past.

# How has Scotland's climate changed already?

The last century has been a period of rapid climate change across Scotland.

Scientific records show that over the last few decades:

- Temperatures have increased - with the last decade the warmest ever recorded
- Rainfall patterns have changed - with increased rainfall and more heavy downpours
- Sea-level has risen around Scotland's coast
- There have been fewer days with frost and snow cover

# What changes are expected in the future?

Scientists expect that that the changes in climate recorded over the last century will continue and increase.

Key long-term climate change trends for Scotland are:

- Weather will remain variable, it may become more variable
- Typical summers will be hotter and drier
- Typical winter / autumn will be milder and wetter
- Sea level will continue to rise
- We can also expect to see:
  - Increases in summer heat waves, extreme temperatures and drought
  - Increases in heavy rainfall events
  - Less frost and snowfall



# Why is our climate changing?

Every day millions of tons of the greenhouse gases such as carbon dioxide are emitted into the atmosphere as we burn fossil fuels for energy, heat and transport.



These greenhouse gases trap heat inside the earth's atmosphere and are causing the planet to warm causing rising temperatures, sea level rise and changes in rainfall.



# Why is our climate changing?

We can limit the amount of future climate change by reducing our greenhouse gas emissions, however the greenhouse gases that are already in the atmosphere and those that we are emitting today mean that our climate will continue to change for many years to come.

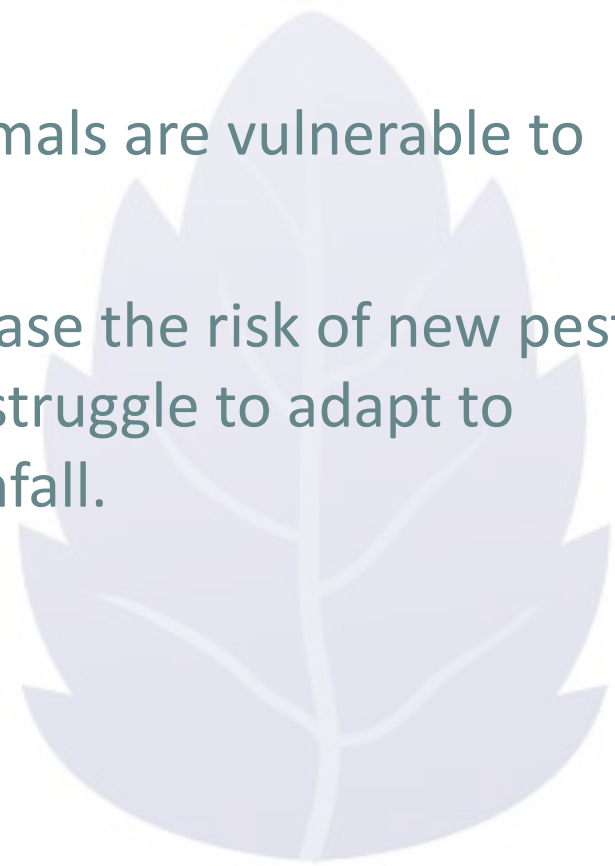
# How will climate change impact Scotland?

*The following slides give some examples – you can also find more here:*  
<http://www.sniffer.org.uk/climatereadyplaces/impacts/?v=5>

- Buildings are damaged by severe weather like high winds and heavy rain. This can cause water to leak in through broken gutters and cracks in walls resulting in damp, mould and condensation.
- Poor ventilation can also lead to buildings being too warm.
- Many buildings will need to be completely changed to help them to cope with increased rain and higher temperatures.



- Fish, birds, trees, plants and animals are vulnerable to changes in climate.
- Warmer temperatures will increase the risk of new pests and diseases and species many struggle to adapt to changes in temperature and rainfall.



# Increased risk of flooding

- In many cases we have put hard surfaces and buildings next to rivers, meaning there is nowhere for rivers to flood safely when water levels are high.
- Increases in rainfall mean that rivers and streets are now more likely to flood so we need to create safe spaces for flood water in our towns and cities.



- Sea level rise will speed up coastal erosion and change the coast.
- Some areas of our coast may be lost and others will be more vulnerable to flooding.

- Roads, railways, stations and cycle paths can all be damaged by severe weather and sometimes have to be closed for repairs.
- Heavy rain can also lead to more landslides, disrupting roads and damaging other infrastructure.
- These impacts stop people from traveling to work and school and mean that businesses cannot deliver their products to customers.



# People will need extra help

- Our police, fire and health services face new challenges as a result of climate change. Increases in severe weather events and flooding will result in more requests for help to keep people and buildings safe.
- People and communities affected by flooding can experience long periods of stress and difficulties as they work to repair their homes and businesses. At times people will need extra help to cope.

# What can we do?

- We can play our part in reducing greenhouse gas emissions and limiting the amount of future climate change.
- We can build a climate ready future by taking action to make sure that our places and people are ready for the challenges of our changing climate.
- The good news is that many of the things that will help us cope with the impacts of climate change are good for people and will help improve communities and create new opportunities.

# What can we do?

**Adaptation Scotland**  
supporting climate change resilience

**Climate Ready Places**  
Info sheet 1: The City

The 'City' represents the urban city and town centres across Scotland. The varied mix of historic and new buildings displays a distinctly Scottish character. They are a focus of commercial activity, both offices and shopping, they host important transport hubs, and are home to much of the population. Our urban centres are already impacted by severe weather, especially flooding and storms – and increasingly from overheating. Disruption here often has consequences far beyond the local area. We can build climate resilience through increasing greenspace, improving flood management, retrofitting and maintaining our buildings, and securing our infrastructure.

**► Caring for buildings**  
Buildings are damaged by severe weather like high winds and heavy rain. This can cause water to leak in to buildings through broken gutters and cracks in walls resulting in damp, mould and condensation. Poor ventilation can also lead to buildings being too warm. Caring for buildings by repairing cracks in walls and joint work, removing plants that grow in gutters and opening up air vents to allow air to flow through buildings can help to make sure that buildings are not damaged by high winds and heavy rain and keep cool during warmer weather.

**► Changing buildings**  
Many buildings will need to be completely changed to help them to cope with increased rain and higher temperatures. Changes might include installing green roofs and walls that help buildings absorb rain water and also stay cool during warmer weather. Plug sockets and other electrical might also be moved from ground level to higher up walls so that they are not as badly damaged if buildings flood.

**► Replace hard surfaces**  
Large areas of car parks and town centres are covered in hard concrete and tarmac surfaces that trap water above ground increasing the risk of flooding. These hard surfaces also absorb heat causing cities and towns to be warmer than the

**► Resilient travel**  
Static roads, railways and cycle paths can all be damaged by severe weather and sometimes have to be closed for repairs. These closures stop people from travelling to work and school and mean that businesses cannot deliver their goods. Improving the design of roads and cycle paths can help with problems such as flooding by being more resilient by allowing travel during severe weather.

**► Help us to enjoy our towns and cities**  
It's time for us to enjoy, holding on with friends. Public spaces to include greenspace, street with green roofs and walls, good these changes benefit to hold on water and reduce cool shaded areas during

**Unadapted** **Adapting** **Maintain Buildings**  
Buildings are damaged by severe weather like high winds and

**Unadapted** **Adapting** **Use**  
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**Adaptation Scotland**  
www.adaptationscotland.org.uk

**City** **Unadapted**

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SCOTTISH GOVERNMENT  
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- Part of the suggested lesson plan encourages pupils to consider the actions that we can take to adapt to a changing climate.
- The activities using resource 5 and resource 6 bring tangible examples and ideas into the lesson for pupils.

# More information and resources

For more information about climate trends and projections for Scotland visit: <http://www.adaptationscotland.org.uk/why-adapt/climate-trends-and-projections>

Visit the interactive climate ready places website to find out how different places across Scotland can adapt to climate change:  
<http://www.sniffer.org.uk/climatereadypplaces/>

Find out more about how you can reduce greenhouse gas emissions and help limit future climate change:  
<http://www.greenerscotland.org/>

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