Coastal Communities 2150

shaping our future by the coast

Primary School Resource Pack

Produced by
CAG Consultants

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CONTENTS

Introduction

For coastal communities around the world, climate change over the next century will lead to new localised risks and opportunities as natural processes accelerate and traditional weather patterns become less reliable. The Kent Coastal Communities 2150 programme aims to address these potential changes through engaging communities or sectors at long-term risk and supporting locally developed responses. As part of the project, this pack of resources has been produced, designed for use with upper Key Stage 2 school children (Years 5 and 6).

The pack contains suggestions for different activities that can be carried out with children, designed to increase knowledge about climate change and how we can adapt to it. Links to the national curriculum (maths, English, history, geography, art and design) are listed for each activity.

- The **numeracy activities** involve children drawing bar charts of rainfall and temperature and these have changed, and are likely to continue changing, over time.

- The **literacy activities** involve children finding out about whether climate change has affected people they know, writing letters to themselves from the future, and describing how they imagine a well-adapted future will look.

- The **art activity** involves designing a poster to launch the CC2150 initiatives.

It also includes a fun boardgame, which can be printed out onto A3 (or larger) paper and used to promote group discussion. In addition, a powerpoint presentation is attached to this pack which can be used to introduce the topic. This can also be accessed from the CC2150 website: http://www.kentcoastalcommunities2150.org.uk/downloads/.

Further information on the Kent Coastal Communities 2150 programme can be found at http://kentcc2150.org.uk

CC2150

Numeracy activity: Bar charts of average rainfall and temperature plus percentage changes

Curriculum links
KS2 Maths

- Processing, representing and interpreting data
- Drawing inferences from data in practical activities

KS2 Geography:

- Knowledge and understanding of environmental change and sustainable development

You will need

- CC2150 introductory presentation
- Handouts of the sheets below. (Please note that this data is illustrative only. The 1970s data is based on historic average figures for Kent from 1960-1990. The 2010s data is an estimate. The 2050s and 2080s data is taken from UKCIP's forecasts for Kent, based on a high carbon emissions scenario.)
- Pencils

Learning objective
To raise awareness about how the climate change is changing

What to do
Give children a copy of the following information.

PLOTTING BAR CHARTS

Total amounts of precipitation (rain, snow, sleet and hail) every year are not expected to change over the next 70 years. However, the amount that falls in Kent during the summer and winter is expected to change, as a result of climate change, as the following table shows.

1. Precipitation in Kent (rain, snow and hail)

	Average daily precipitation (rain, snow and hail), mm		
	Annual	Summer	Winter
1970s	1.8	1.6	1.8
2010s	1.8	1.5	1.9
2050s	1.8	1.3	2.2
2080s	1.8	1.1	2.3

a: Use the data in the table above to complete the bar chart on the next page, showing how the summer and winter amounts will vary. Colour the annual bars in blue, the summer bars in red and the winter bars in green.

b. What does your graph show us? Write a few sentences about how you think summers and winters will be different by 2080.

For younger age groups, you could ask them to produce a bar chart using just one set of data (e.g. summer precipitation).

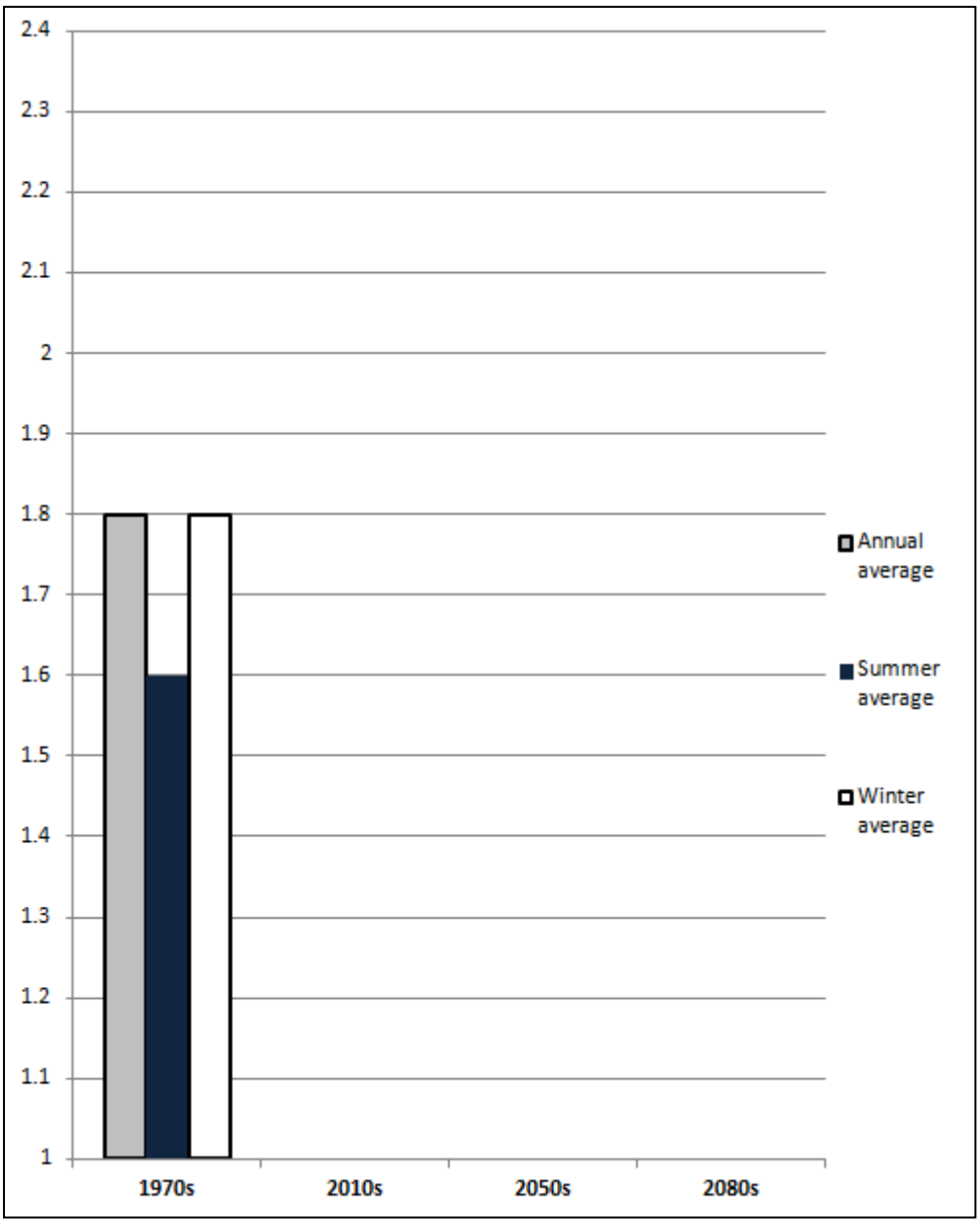
Option:

Calculate the percentage change in:

- Mean daily winter precipitation between 2010 and 2050

- Mean daily summer precipitation between 2010 and 2080

Mean precipitation (mm/day)



2. Temperature

	Average temperature in Kent, °C		
	Annual average daily temperature	Summer – average of daily peak temperature	Winter – average of daily minimum temperature
1970s	10	20	2
2010s	11	21	3
2050s	13	24	5
2080s	14	26	6

a: Use the same table above to complete the bar chart below. Colour the annual bars in blue, the summer bars in red and the winter bars in green.

b. What does your graph shows us? Write a few sentences about how you think summers and winters in Kent will be different by 2080.

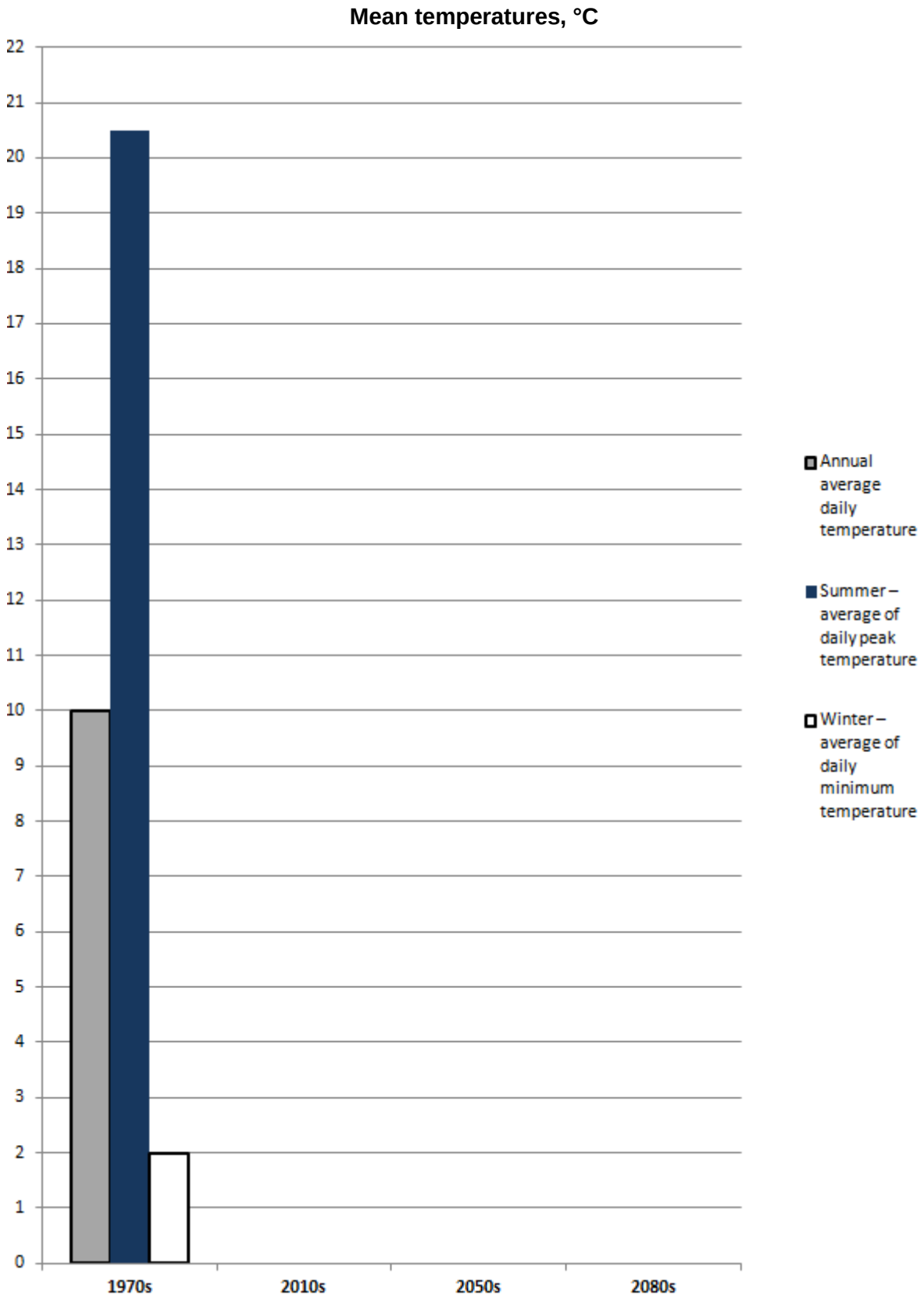
c. (Optional)
Calculate the percentage change in:

- Mean summer peak temperature between the 2010s and 2080s

- Mean winter minimum temperatures between 2010s and 2080s

d. (Optional extension)
How will we need to change the way we live to cope with these changes?

Younger age groups could be asked to produce a bar chart using just one set of data (e.g. summer maximum temperatures).


Mean temperatures, °C
22
21
20
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1970s
2010s
2050s
2080s
Annual average daily temperature
Summer – average of daily peak temperature
Winter – average of daily minimum temperature

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Literacy activity 1: Has climate change or extreme weather events affected people I know?

Curriculum links

KS2 English:

- Speaking and listening, including group discussion and interaction
- Writing

KS2 Geography:

- Geographical enquiry and skills
- Knowledge and understanding of places
- Knowledge and understanding of environmental change and sustainable development

KS2 History

- Knowledge and understanding of events, people and changes in the past

You will need

- CC2150 introductory presentation
- CC2150 handout of facts and figures about climate change
- Writing paper and pencils
- Board or flipchart
- You could also use the climate impacts boardgame (after showing the introductory presentation) to increase understanding and stimulate discussion.

Learning objective

To raise awareness that climate change is already affecting the climate and people the pupils know.

What to do

- Tell pupils that they are going to prepare to interview older relatives and friends about:
    - Whether the climate has changed since they were children.
    - Whether they have experienced any severe weather events (storms, flooding, drought etc)
- Ask them to write down interview questions. Suggest that they are more likely to get useful information and to trigger people's memories if they ask specific questions. (E.g. When you were younger, were the winters very cold? Did you have a lot of snow? How long did it last?), rather than just asking 'Has the weather changed?' They should write their questions down individually or in pairs.
- Ask pupils to share some of their questions and write them up on a board or flipchart. Once you have a few, ask if there are any questions that have not yet been suggested. Try to make sure that there are questions about cold and hot weather, rain, wind, droughts and floods.

- They can then add to or change their own list of questions if they want to – or the class could come up with a standardised list of question they could all use.
- Ask them to take their list of questions home and interview an older family member or friend, that night if possible. They should make a note of the answers and bring the completed interviews back to school tomorrow.

Note: An alternative would be to interview older staff members. This could be done as a class or in groups.

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Literacy activity 2: Letters from the future

Curriculum links
KS2 English:

- Writing; creating imaginary worlds

KS2 Geography:

- Geographical enquiry and skills
- Knowledge and understanding of places
- Knowledge and understanding of environmental change and sustainable development

You will need

- CC2150 introductory presentation
- CC2150 handout of facts and figures about climate change
- Writing paper and pencils

Learning objective
To raise awareness that the impact of climate change will increase in the future.

What to do

- Ask the children to imagine what life might be like in the UK in 50 years time, when they might have a grandchild the age they are now. They can imagine how the climate is likely to change and how their grandchild's way of living might adapt to those changes.
- Ask them to think about how their grandchild's life might be different. For example:
    - What is their home town or area like? How is it different from today?
    - What do they like doing in their spare time?
    - What are their favourite foods?
    - What is their house and their bedroom like?
    - Where do they go on holiday and what they do when they are there?
    - What does their garden looks like?
- They should write a story or poem about what life might be like for their grandchild. They should make use of the CC2150 handout of facts and figures to inform their story or poem.
- They could also illustrate this with a picture of how they think the area might look in the future.

CC2150

Literacy activity 3: My vision of a well-adapted future in 2070

Curriculum links
KS2 English:

- Writing; creating imaginary worlds

KS2 Geography:

- Geographical enquiry and skills
- Knowledge and understanding of places
- Knowledge and understanding of environmental change and sustainable development

You will need

- CC2150 Introductory presentation
- CC2150 handout of facts and figures about climate change
- Writing paper and pencils

Learning objective
To raise awareness that the impact of climate change will increase in the future.

What to do
Ask children to think ahead to 2070, when their grandchildren might be at primary school. Ask them to imagine how they would like the world to look in the future. How would their home, their school and their community look, if everything has been well adapted to suit the future climate?

Show them the slides in the presentation that give some ideas of how a home and a coastal community could adapt to the changing climate. Ask them to choose one of the following:

- Their home
- Their school
- Their town or community

For whichever they have chosen, they should write about how it is different from today. What changes have been made and why? How would it be different to live in that home/community or go to that school? They could illustrate this with a picture as well.

CC2150

Art activity 1: My vision of a well-adapted future in 2070

Curriculum links
KS2 Art and design:

- Knowledge, skills and understanding - exploring and developing ideas

KS2 English:

- Writing; creating imaginary worlds

KS2 Geography:

- Knowledge and understanding of environmental change and sustainable development

You will need

- CC2150 introductory presentation
- CC2150 handout of facts and figures about climate change
- Paper and pencils or paints

Learning objective
To raise awareness that the impact of climate change will increase in the future.

What to do

- Explain to children that the CC2150 programme is being launched in Margate/Sheppey/Romney Marsh in January 2014. Invite children to design a poster to advertise the CC2150 launch in your area. The poster should encourage people to visit the CC2150 website to access information about the project.
- When designing the poster, children should think about communicating:
    - How the climate is likely to change
    - What this might mean

CC2150

Climate change facts and figures for Kent

Rising temperatures

- Average annual temperatures in Kent are likely to increase from 11°C now to:
  - 12.5°C in the 2050s
  - 13.5-14.5°C in the 2080s
- By the end of the century, this area might feel like the South of France or Northern Spain

Summers – hotter and drier

- Average daily maximum summer temperature likely to increase:
  - 21.3°C now
  - 24°C in the 2050s
  - 25.5°C by the 2080s
- Summer rainfall likely to decrease:
  - 45 mm per month now
  - 39mm per month by the 2050s
  - 34mm per month by the 2080s
- Heatwaves and drought more likely – we'll have to be very careful how we use water

Winters – milder and wetter

- Winters are expected to get warmer too
- Winter rainfall is likely to increase:
  - 57 mm per month now
  - 60-75 mm per month by the 2050s
  - 63-78 mm per month by 2080s.
- More of this rain is likely to fall in heavy downpours, increasing flooding risks

Rising sea levels

- The Kent coast is continually changing, because of erosion and rising sea levels
- In addition, the South of Britain has been slowly sinking for thousands of years, because Scotland is still bouncing back from the last Ice Age!
- Climate change will increase this further:
  - By 2050, sea level is likely to have risen 21cm
  - By 2080, sea level is likely to have risen 37cm

More extreme weather

- As the climate gets warmer, scientists expect there to be more extreme weather events
- This may mean heavy and prolonged downpours, storms, cold snaps or heatwaves
- On the Kent coast, this may be combined with high tides or storm surges
- We need to be better prepared for extreme weather events

Climate Impacts boardgame

A simple game to promote group discussion about the possible impacts of, and adaptation solutions to, different climate changes for different every day activities. ('Adaptation' means dealing with the consequences of climate change, for example modifying our buildings so they remain cool during the hotter summers that climate change will bring.)

- 1 playing board to be colour printed in large format (A3 or bigger)
- 5 sets of 6 cards colour printed, double sided and cut out. You may want to laminate the cards to make them last longer.

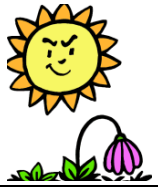
Game rules:

Best played in a group of between 4 and 10. Deal out the 30 cards randomly or in themed groups as you wish. Each person takes it in turn to cover each square describing a climate change with one of their cards, and then they tell the rest of the group what possible impact there will be, relating to the activity written on the coloured side of the card, and what possible adaptation could take place.

A sheet listing potential consequences/actions linked to each of the cards is also provided at the end of this document – this can be used by a teacher or group moderator to help prompt suggestions and discussion where necessary.

(Please note: no-one is the 'winner'; this activity is simply designed to prompt discussion.)

CLIMATE IMPACTS BOARDGAME

An increase in daily temperature variability	Stronger wind storms 	An increase in carbon dioxide concentration	Drier summers 	Shorter winters
More summer heatwaves 	An increase in warm extremes	An increase in the number of storms 	Sea level rise	Longer summers 
Less winter precipitation falling as snow	Earlier springs 	An increase in the number of very hot days	An increase in the intensity of rain storms 	Warmer summer nights
More winter rainy days 	Generally warmer winters	Shorter winters 	More sea storm surges	Earlier springs 
Stronger windstorms	Drier summers 	An increase in warm extremes	More windy days 	An increase in the number of storms
Sea level rise 	Longer summers	More droughts 	An increase in the number of very hot summer days	More sea storm surges 

FARMING AND LAND USE - FRONT

Farming and land use

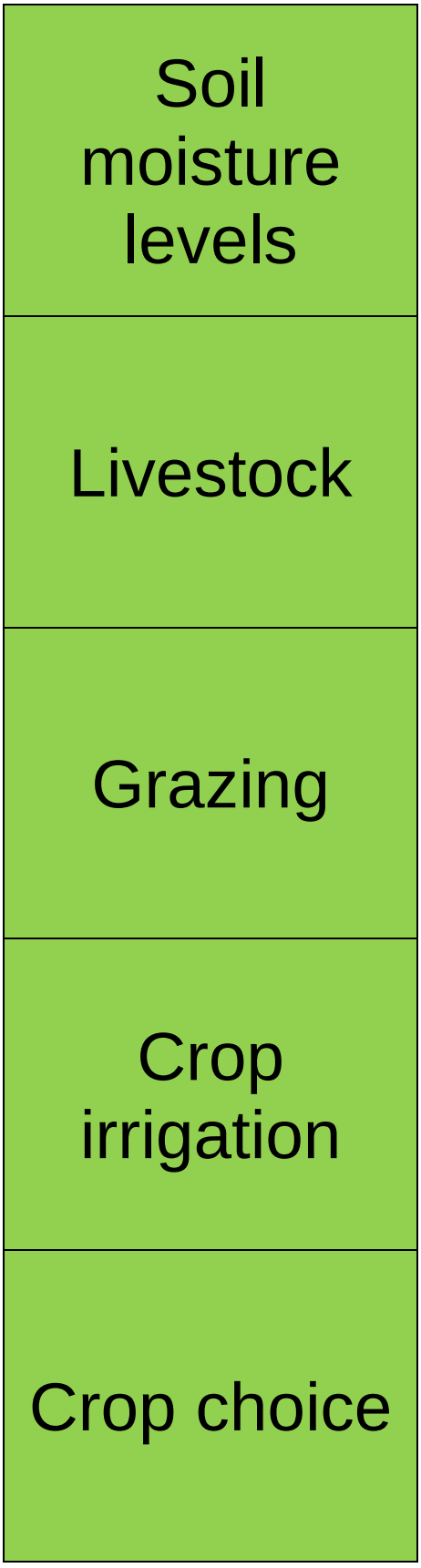
Farming and land use

Farming and land use

Farming and land use

Farming and land use

FARMING AND LAND USE - BACK



HUMAN HEALTH AND QUALITY OF LIFE - FRONT

Health and quality of life

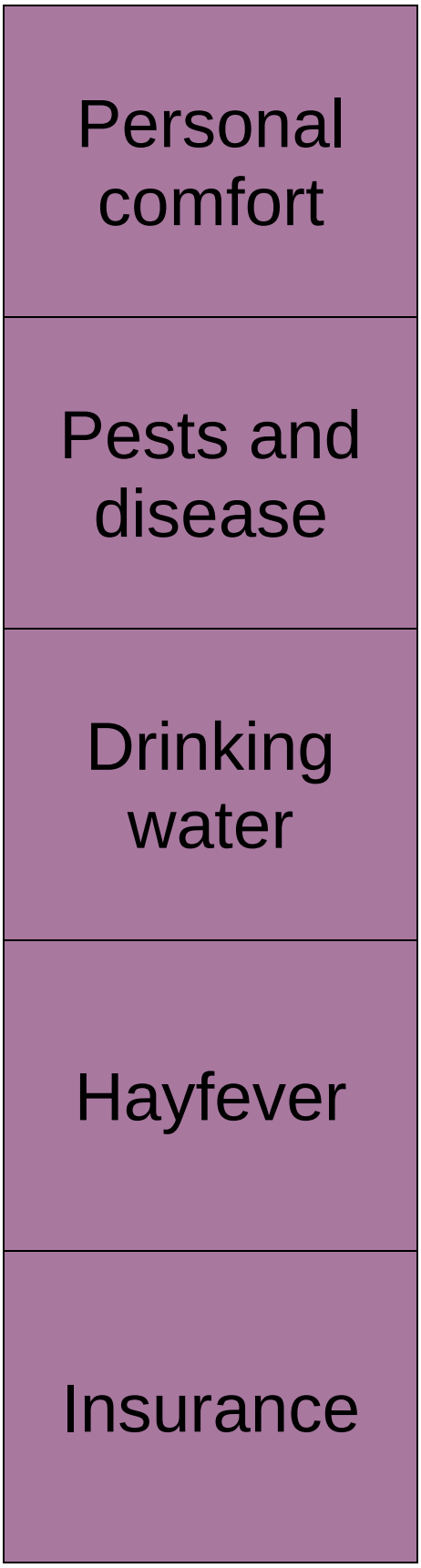
Health and quality of life

Health and quality of life

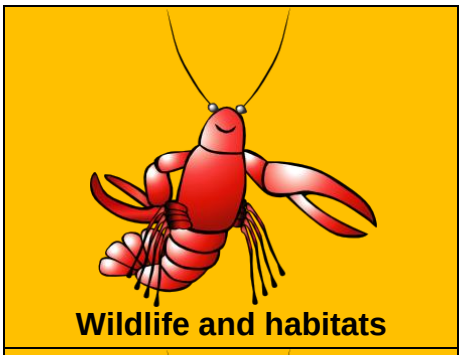
Health and quality of life

Health and quality of life

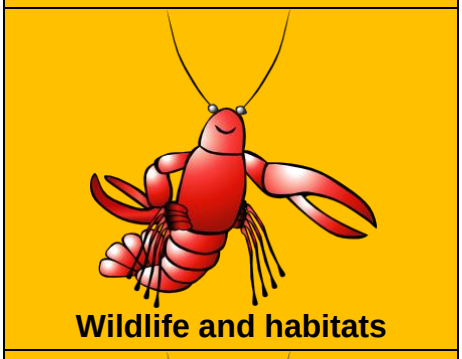
HUMAN HEALTH AND QUALITY OF LIFE - BACK



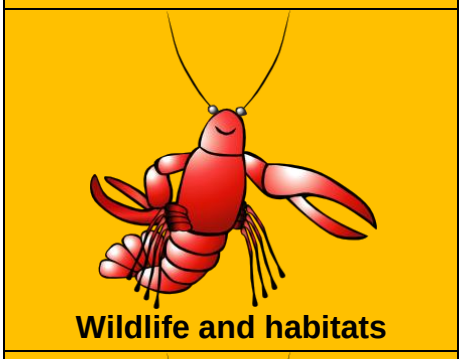
WILDLIFE AND HABITATS - FRONT



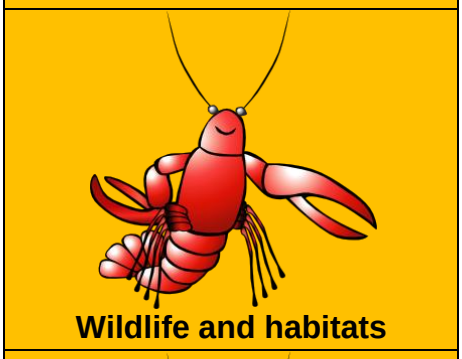
Wildlife and habitats



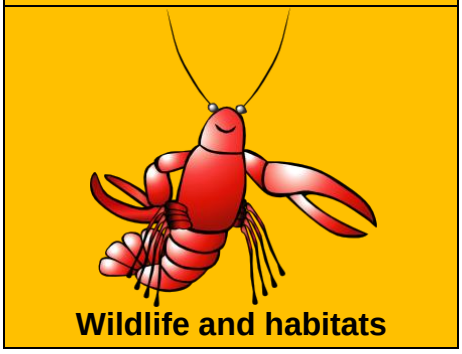
Wildlife and habitats



Wildlife and habitats

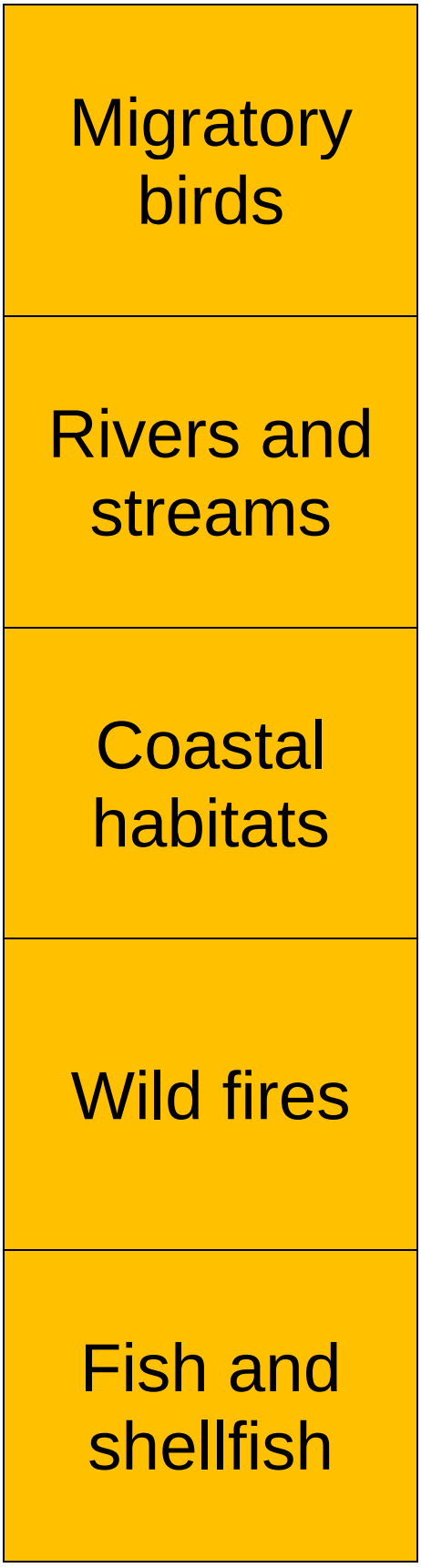


Wildlife and habitats



Wildlife and habitats

WILDLIFE AND HABITATS - BACK



TOURISM AND RECREATION - FRONT

Tourism and recreation

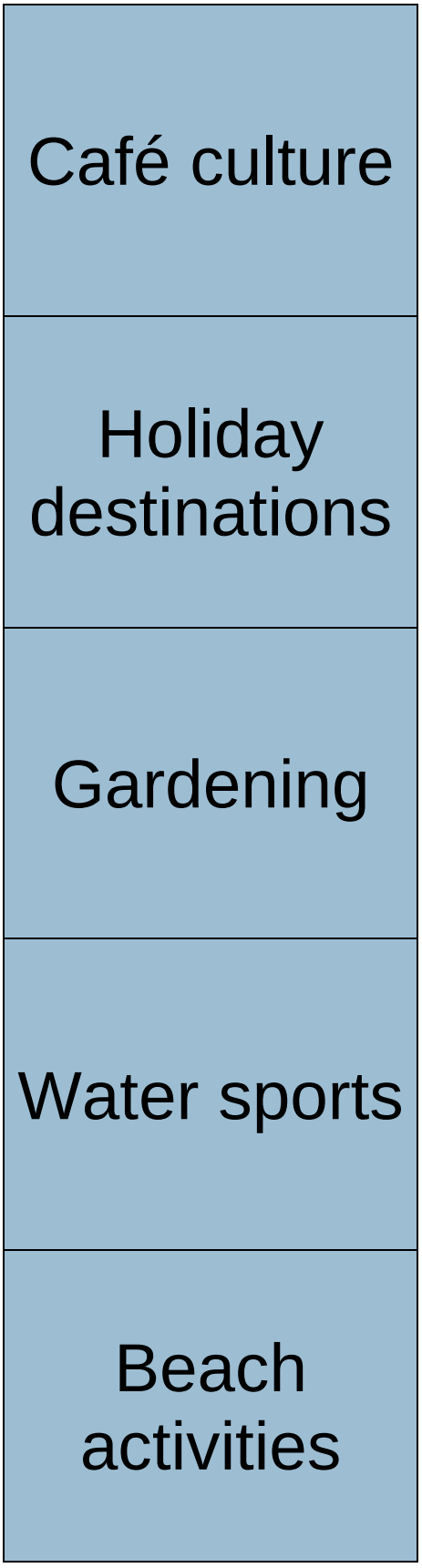
Tourism and recreation

Tourism and recreation

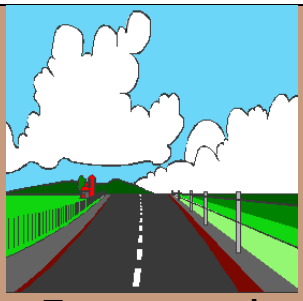
Tourism and recreation

Tourism and recreation

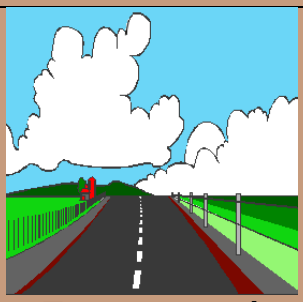
TOURISM AND RECREATION - BACK



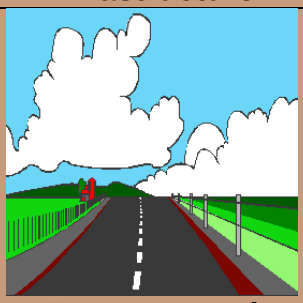
TRANSPORT AND INFRASTRUCTURE - FRONT



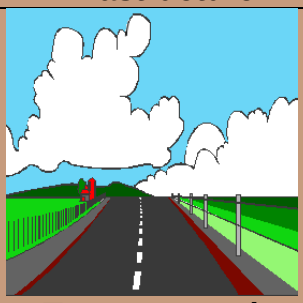
Transport and infrastructure



Transport and infrastructure



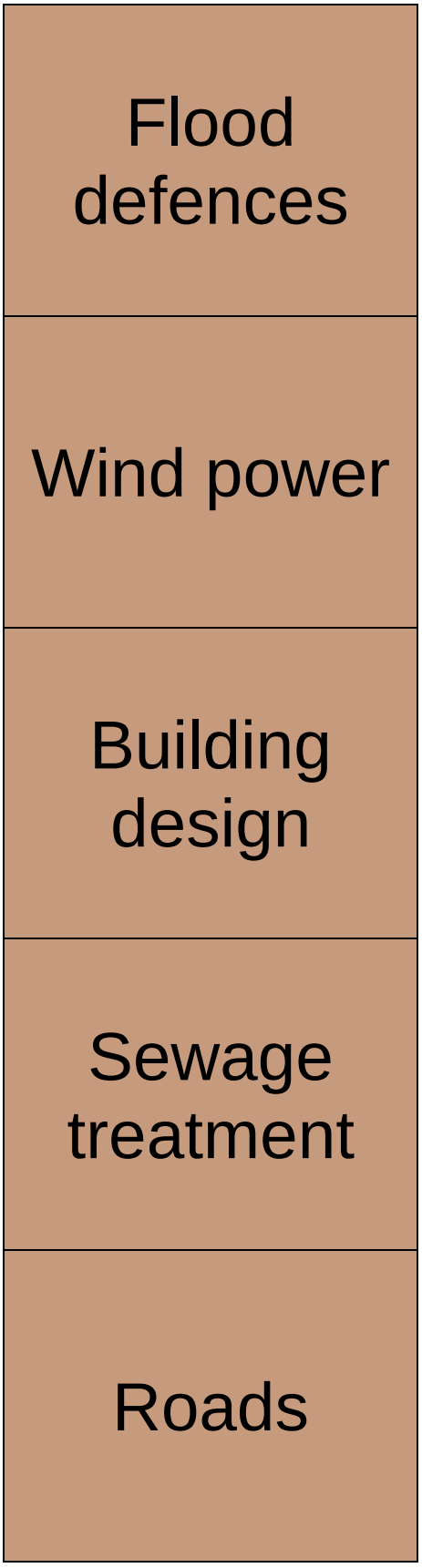
Transport and infrastructure



Transport and infrastructure

Transport and infrastructure

TRANSPORT AND INFRASTRUCTURE - BACK



Potential adaptive actions

(To be used to help stimulate suggestions/discussion, as necessary.)

	Examples of potential consequences/actions to adapt to a changing climate
Farming and land use	
Soil moisture levels	Increased irrigation required in summer and better drainage to avoid water logging in winter
Livestock	Possibilities of introducing new species e.g. llamas
Grazing	Summer dryness reduces grazing potential; possible shift from livestock to arable owing to decrease in grazing
Crop irrigation	Increased irrigation required in the summer, though water scarcity may make this impossible, requiring good water management plans - and choice of drought-resistant crops
Crop choice	New crops and tree species may be able to enter production such as vines, soya, almonds and apricots, due to warmer conditions
Human health and quality of life	
Personal comfort	Decreased levels of discomfort and ill health because homes keep warmer in winter. Improved physical and mental health from greater time spent outdoors and increased vitamin D levels.
Health	Increased temperatures combined with increased periods of time spent outdoors may lead to an increased risk of the number of skin cancer cases and deaths. Reduced deaths from cold weather. More risk of food poisoning and infections in hot weather.
Drinking water	Water restrictions on wastage of water; more risk of stomach upsets owing to insanitary water in hot weather.
Hayfever	Increased use of medicines to combat hayfever
Insurance	Increased insurance premiums due to increased risk of flooding
Wildlife and habitats	
Migratory birds	Protect and enhance habitats suitable for new species of migratory bird attracted by milder winters and warmer

	summers
Rivers and streams	Manage catchments to minimise flood risks
Coastal habitats	Coastal change, water availability and quality changes and species' inability to follow range shifts: Coastal zones, uplands, semi-natural grasslands, wetlands and freshwater are particularly vulnerable.
Wild fires	Emergency plans in place to deal with summer wildfires
Fish and shellfish	New fish and shellfish species found locally; served by restaurants. Restaurants serve new types of fish and shellfish as locally available species change
Tourism and recreation	
Café culture	Pavements widened to accommodate greater number of outdoor chairs and tables to enable al fresco eating
Holiday destinations	Increased tourist infrastructure (hotels, leisure facilities) in Kent as more people choose to holiday in the UK
Gardening	Drought resistant plants chosen by gardeners capable of thriving through more regular summer hosepipe bans
Water sports	Increased number of water sport facilities along the coast, open year round
Transport and infrastructure	
Flood defenses	Targeted investment in flood risk management to reduce risks in key economic growth and population areas.
Wind power	Increased potential to generate energy from wind with increased wind speed
Building design	Design new houses and offices to avoid overheating on hot sunny days, (e.g. with shutters that can closed over south facing windows). Also with efficient showers and taps and 'greywater' systems to minimise water use. Solar panels more cost effective as a result of higher yields from increased sunshine
Sewage treatment	Increased capacity to avoid discharge caused by increased winter rainfall.
Roads	Councils needs to invest less in gritting and salting the roads in winter (but may need plans to cope with road surfaces partially melting in the summer).

Coastal Communities 2150 (CC2150) is a project part-funded through the INTERREG IV A 2 Seas Programme and the Big Lottery Fund's Communities Living Sustainably fun developed to address coastal change through engaging communities or sectors at long-term risk and supporting locally developed responses. CC2150 unites people and organisations across the UK, Belgium and the Netherlands with the aim of helping communities develop local visions and action plans to decrease their vulnerability and increase resilience to future climate and coastal change.

Why 2150? Why communities? By working to a long-term time frame, we aim to see the wider implications of coastal change, rather than seeing only the immediate concerns. Effects of climate and coastal change are already being felt by residents around our coastlines and this project aims to help communities maximise the opportunities and minimise any risks associated with these impacts. We know that the social, economical and environmental costs of acting now to address change are far less than if we take a purely reactive position.

LOTTERY FUNDED

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Crossborder cooperation programme
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(European Regional Development Fund)

With Thanks to our Partners:

This pack was produced by CAG Consultants for Kent County Council:

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