Flood Risk in Sports Turf Level 3
Climate change adaptation (measures) and mitigation (action)

Level 3 Advanced Sports Turf Technician

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Specialist knowledge for teachers

According to the **Climate Change Committee**, flooding is one of the most critical climate risks for the UK. Approximately 1.9 million people live in areas at risk of flooding, and this number could double as soon as the 2050s. Across the UK, the annual costs of flooding average 2.1 billion pounds (although some years may experience much more, or less flooding than this).

These costs will continue to rise because of climate change caused by human activities that are heating the planet. By the end of the century, the average annual economic costs from flooding could increase to £3bn if global temperatures are limited to a 2°C rise relative to levels before industrialisation, or nearly £4bn if temperatures rise by 4 degrees. Already, the global temperature increase over a whole year has reached 1.5 degrees for the first time.

There are three main types of flood risk: flooding from the sea, from rivers and from "surface water", where rainfall, often in intense storms, can cause localised flooding even without rivers overflowing. Whilst flood risks are increasing across all three types, the proportional increases are particularly significant for the surface water type, which is also hard to predict and model because it is so localised (you can read more in the reports from the **National Infrastructure Commission**).

Recent advances in **research** and modelling have enabled scientists to produce regional and local scale projections for future rain-storm intensities, showing the north and west of the UK to be areas where some of the strongest increases will happen.

The surface water risks impact not only on people's homes, but on infrastructure, businesses and amenities, including facilities such as the golf course at Myerscough. The sequences of rain storms during the winter of 2023-24 highlighted the impacts of flooding, even without the local rivers overflowing, preventing use of the course.

A **study** published in May 2024 showed that because of human induced climate change, precipitation over the UK on the stormy days from October 2023 to March 2024 was 20% more than it would have been in a "natural" climate (or, equivalently, the amount of rain that fell was about 10 times more likely than it would have been without the influence of human climate change). Looking ahead, if global temperatures increase to 2°C more than the pre-industrial, then rainfall amounts as high as the 2023-24 winter season will be about 50% likely to happen.

With flood risk set to get worse over the coming decades as the climate continues to change, people and businesses will need to adapt so as to become more resilient. The concept of building resilience is now being recommended by the government's advisors as a general principle to respond to increasing flood risk. Resilience, which is explained in a JBA Trust **video**, means being aware of the risk, having information to plan to adapt, taking measures to help "flood-proof" properties or assets when they do flood, and improving the capacity to recover or "bounce back".

Whilst the picture of increasing risk is a cause for concern, there are many ways in which organisations, communities and even individuals can take steps to improve flood resilience, as demonstrated via the **Flood Hub**.

The following teaching and learning resource aims to guide Sports Turf students through risks associated with flooding and climate change. It seeks to improve both teachers' and learners' resilience to climate change by:

- Emphasising the use of local data on flooding and rainfall
- Guiding learners through flooding scenarios by applying knowledge of local golf courses to the physical models of rivers and culverts
- Presenting real life experiences through discussion or case studies alongside digestible chunks of data with relatable explanations. (e.g. second wettest winter)
- Using risk assessments to think about climate change adaptation
- Considering nature-based solutions to flooding of the land
- Providing teachers with a glossary of terms relating to climate change

Delivery of this resource will require some fundamental knowledge about the issues relating to climate change and so in addition to reading and understanding the terms in the glossary, some CPD on climate change/ carbon literacy would also be beneficial.

JBA Trust's expert research and models should also be used to support the delivery of these resources. One example is their publication focused on the **British Chronology of Floods**, which enables students to explore specific locations in order to assess risk. Understanding a chronology which dates back more than 200 years provides a sound scientific basis for judging the probability of flash floods and the database provides sets of information on regions across the North of England.

To contextualise their learning, students can draw on their real-life experience of the recent winter floods and compare their own observations (for example, the sports turf at Myerscough is unable to be managed and played on due to persistent heavy winter rainfall) with their developing knowledge of climate change science. Resources on the MBC Moodle outline details around the second wettest winter on record. In the resource, students are asked to start to think about implications for their own land-based work. This helps them to apply their knowledge in a real-life scenario which they may encounter in their future employment.

One specific example students could draw upon is the repeated flooding on Meathop Road. This was reported locally by **The Mail** and has had a detrimental impact on Grange Golf Club.

The images (overleaf) show the devastation across the course, with the consequence being that it may become uneconomic for the club to function in the future, if it cannot guarantee that members can play.

Teachers are encouraged to explore the specialist knowledge presented in the resource which includes:

- A familiarity with the terms in the glossary taken from **Flood Hub**
- An understanding of the risk assessment process
- Knowledge of what a Climate Change Adaptation Action Plan could look like
- An understanding of JBA's Glossary of Terms (see online resources)
- Ideally the teacher would also have attended climate change CPD training

Examples in practice

CORE ACTIVITY - What is Climate Change Adaptation?

Students will determine the risks associated with climate change in adapting to flooding through the familiar use of a risk assessment with guidance from a flow chart (see online resources).

Activity: Students asked to list what you could do to reduce the effects of flooding on the golf course

Potential answers:

- More drainage
- Dredge
- Check and clear culverts
- Plant more trees (mitigation)
- Different grass
- Lighter machinery (mitigation and adaptation because of electric)
- Look upstream and downstream
- Work with community and local partners

The MBC Moodle contains case studies which can support the students' responses, for example: the **BIGGA** "Why our golf course is closed" article.

Completing the risk assessment

Sea level rises are a result of the global warming of the ice caps and will take a successfully multinational approach at government level to reverse. Inland however, there are strategies we can be taking to reduce the impact of increased rainfall. Completing the risk assessment is a way students can start to take action.

Making use of the flow chart (see MBC Moodle), students can start to use planning tools to work out if flooding is likely in their context. They can link to the real-life experience of what it is like to be caught in a flood (supported by slides 4-8). They can also explore further case studies and risk assessments to understand this from multiple perspectives and with real-life data.

Using a blank risk assessment that students are familiar with, they should be able to consider the implications of rainfall and flooding on the golf course and suggest ways to adapt in the future. They can also consider what temporary measures might need to be employed to keep staff, players, public and the wider community safe.

Thinking about the future

Students can begin to put their work into context by thinking about actions to mitigate against the worst effects of climate change. The ultimate aim is to limit warming to 1.5 degrees and not exceed 2 degrees, in line with the **Paris 2015 Climate Change Accord**. However, they can take action on a local level and can question what they will need to do in the future to prevent the worst effects of global warming and flooding.

Learning can be extended by exploring issues around climate change, sustainability and biodiversity, making links between cause and effect and developing their own innovative mitigation strategies against climate change.

Curriculum aims and objectives

In this sequence of learning, students will complete a risk assessment that considers the adaptations required in sports turf management in relation to climate change. They will explore what has happened recently in their locality and learn about climate change predictions and case studies.

Level 3 Sports Turf Further Education students engage in problem-focused tasks which draw on:

Head

Students will understand why sport is being impacted by climate change in relation to changes in long-term weather patterns. Local and subject specific problems can be used to enable learners to embed and comprehend what is happening to the climate and how this can impact their lives. **JBA's resources** and research provide expert knowledge and datasets to increase their understanding and support student-led research and investigation.

Heart

Students undertaking this course feel a strong sense of personal connection to their sport, this work encourages them to develop values which consider the impact of their chosen sport and how it may affect other people and the environment.

Hands

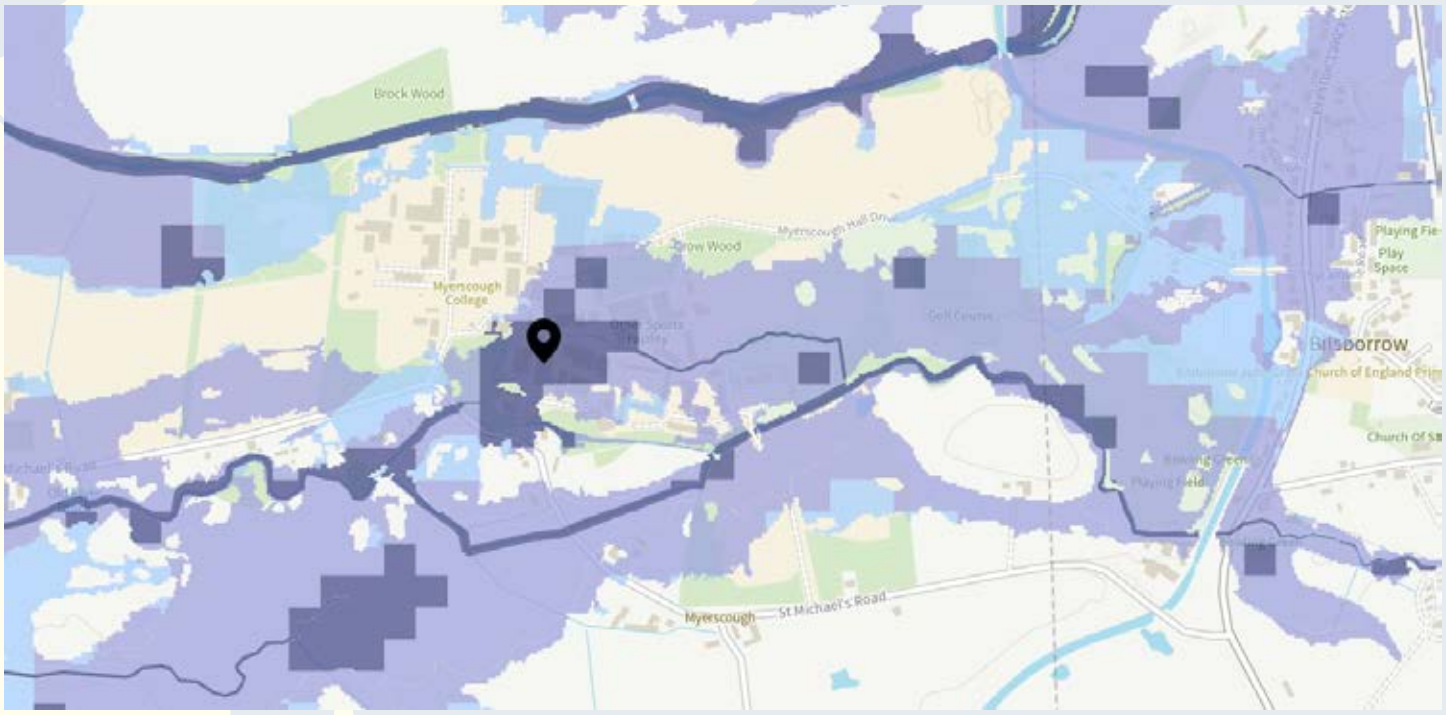
Students will create risk assessments linked to the hazards and risks associated with climate change. This is a practical approach to the challenges of climate change which involves anticipating risks and ultimately being solution focussed and thinking creatively.





Images: Leslie Micklethwaite, David Lawrence, Paul Edmondson

Risk of river flooding at Myerscough



Extent

High risk More than 3.3% chance each year

Medium risk Between 1% and 3.3% chance each year

Low risk Between 0.1% and 1% chance each year

Very low risk Less than 0.1% chance each year

Adaptations to extend impact

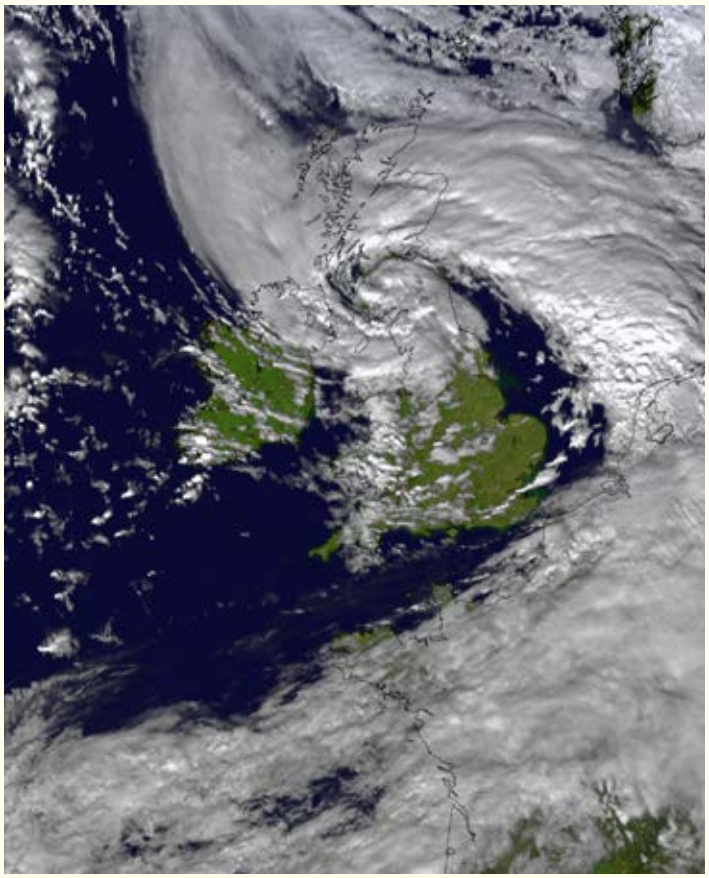
The terms upstream and downstream are used when measuring our purchasing decisions. This is an interesting metephor to pursue. You can further explore this by using the physical representation of a river and its influence throughout its journey. Rivers can be developed as a topic as learners can study their influence on people, animals and land.

Knowing about culverts and hidden rivers throughout the Bay helps us think critically about what else is hidden: what else can we find out about that has a heavy influence on our lives but is hidden away from us? Why is it hidden? Can it now be opened up?

Transferability - The Consequences of our actions

It would be possible to to transfer this approach to:

- Different sports settings e.g. cricket, football, rugby
- Different land-based sectors, e.g. farming, horticulture, agriculture, equine
- Other sectors e.g. construction, sport coaching, school grounds, management and business studies



Storm Debi - Image: © Crown copyright, Met Office, Satellite data: EUMETSAT, Background data: NASA Earth Observatory

Golf course at Myerscough