LESSON 10: REDUCING FLOODING (PART 2)

Aim

- To understand how we can reduce flooding using natural flood management and by looking after watercourses.

Lesson Objectives

- Learn what natural flood management is.
- Learn the importance of looking after watercourses and drainage.

Assumed Prior Knowledge

- Who is responsible for different types of flooding.
- Items which shouldn't be flushed down the toilet and what fatbergs are.
- Rivers and sewers can cause flooding.

Resources

- Catchment Based Approach NFM video - https://catchmentbasedapproach.org/learn/what-is-natural-flood-management/. Lots of information, good for a quick overview, or pause the video after each type of NFM is mentioned and discuss it further with the class.
- NFM benefits image could be stuck into workbooks.
- NFM worksheet match up exercise.
- United Utilities what not to flush down the loo video - https://www.youtube.com/watch?v=2cR8yNlmqAM
- Reducing flooding through a catchment worksheet - mini quiz which can be done in class or as homework.
- Homework: Create a flood scheme activity.

Assessment

- Natural Flood Management match up worksheet.
- Newspaper article exercise.
- Reducing flooding through a catchment - quick test.
- Homework exercise - create a flood scheme exercise.

Lesson Outcomes

- To name at least 3 natural flood management measures.
- To understand the benefits to using natural flood management.
- To know what a fatberg is, how it is forms and be able to name the 3 p's.

Differentiation

- Class discussion
- Group work
- Individual work

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Skills For Life

- The importance of looking after watercourses and drainage.

Curriculum Links

- Geography
- Science
- Art

All the blank worksheets for this lesson can be found as a separate download within the Lesson 10 page of the Flood Hub KS2 learning section. The answers for the worksheets can be found at the end of this document.

Key words within the PowerPoint lesson are highlighted in orange and the definitions of these words can be found in the glossary, which is available to download off the homepage.

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Slide 1

- Slide containing the lesson aims and objectives.

Slide 2 – Recap: ways to reduce flooding

- Ask the class if they can remember what PFR and SuDS stand for and what they are. Ensure they all understand the 3 terms on the slide (including flood schemes) and write down in their workbooks again if they need to.

Slide 3 – Reducing flooding

- Explain which topics have already been covered and ask the class if they can think of any other ways to reduce flooding.

Slides 4 - 6 – Natural Flood Management (NFM)

- Play the video as an introduction to what NFM is. Explain that the main reasons for NFM are to slow the flow of water and to reduce flood risk to communities downstream.
- Link to YouTube video: https://catchmentbasedapproach.org/learn/what-is-natural-flood-management/
- Go through the different types of NFM and what they do. Pupils can copy these down into their workbooks.
- Explain that NFM has lots of other benefits including helping plants and animals and making nicer surroundings.

Slide 7 – Natural Flood Management match up

- The activity can be printed out for pupils to draw lines to match up or cut out and match up.

Slide 8 – Experiment (optional)

- Please see 'optional experiment 1' notes on page 5 of this document.

Slides 9 and 10 – Drains and sewers

- Ask pupils which objects belong down the drain then introduce these as the 3 P's.
- Play the United Utilities video to explain what happens if you flush wet wipes or anything else that doesn't belong in the sewers.

Slides 11 and 12 – Fatbergs

- Explain what a fatberg is and how they are caused.

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Slide 13 – Fatberg activity

Optional activity of writing a short newspaper article on the effects of fatbergs. Or it can be used as an extra homework, if so outcomes are below.

Outcomes from homework:

- **Why the fatberg happened:** Items were flushed down the toilet or poured down the drain that shouldn't have been. These built up in one big block and formed a fatberg.
- **What the fatberg is made up of:** Items from the toilet – wet wipes, nappies, cotton buds. Items from the sink: fats, oils & grease (FOGs), food scraps.
- **What happened because of the fatberg:** Build-up of items blocked the sewer, water couldn't flow through as normal, causes sewer flooding on road, homes or gardens.
- **Add a drawing:** This could be of a fatberg or the damage/flooding a fatberg caused.

Slide 14 – Experiment (optional)

- Please see 'optional experiment 2' notes on page 6 of this document.

Slide 15: Quick test

- This test can be used as an in class exercise or as a homework.

Slide 16: Lesson recap

- Prompt the pupils to finish each sentence with what they have learned. Pupils can write the recap down in their workbooks.

Slide 17: Homework - Create a flood scheme

- Pupils to use what they have learnt in lesson 10 parts 1 & 2 to create a flood scheme. They should have copied down all the different options for reducing flooding into their workbooks and use this to help them. They should use at least 4 types of flood protection, 1 from each type: PFR, SuDS, flood defences and NFM.
- Options to use the catchment template or draw it themselves and to either cut and stick options of flood defences from the worksheet, or a more difficult option to draw/write them on themselves without providing the worksheet.

Outcomes from homework:

- Show that they have remembered each type of flood protection.
- Show an understanding of flood protection if they put each option in the correct place in the catchment, and by explaining how each one helps to stop flooding.

OPTIONAL EXPERIMENT 1: SLOW THE FLOW

You will need

- Sand pit or a big box with sand in.
- Objects to use as barriers e.g. small twigs and branches, Lego, empty cartons.
- Sieve/colander.
- Two jugs of water.

Instructions

- Tilt the sand box slightly, divide into two sections and create two “river channels” using a big spoon or your hands.
- One channel should have bends in it to represent meanders in a river.
- One channel should be more straightened with no bends.
- Pour water from the top of the slope into each channel, one at a time – use a sieve/colander to make it fall like rain.
- Add objects to each channel to show how NFM and flood defences slow the flow of water or can be used to divert water.
- Small branches can represent leaky dams, a Lego wall can represent a flood wall/barrier.

Outcome

- Water in the straight channel will flow quickly.
- Water in the bendy channel will flow more slowly.
- Objects in the channel slow the flow of water, or divert it to a floodplain, which would help to reduce flooding to downstream communities.

Notes

- Instead of sand you could use potting soil and pat it down well.
- If sand is very dry, wet thoroughly with water first so that water doesn’t soak in straight away.
- If your box isn’t big enough, create one channel and experiment with water, then move the sand around to create the second channel shape.
- If you don’t have the time or equipment to do this experiment, show a video in class instead:
  - 1 min long: https://www.youtube.com/watch?v=cRoUnQjKZ5o
  - 6 mins long: https://www.youtube.com/watch?time_continue=378&v=ZC91dfr_OrA&feature=emb_title
- Water-free option - https://www.facebook.com/cumbriawildlifetrust/posts/10162722169570722

OPTIONAL EXPERIMENT 2: WET WIPES

You will need

- 2 water bottles or 2 bowls (or more if the whole class is taking part).
- Toilet paper.
- Wet wipes (any wet wipes, baby wipes or face wipes, can even try ones labelled ‘flushable’) .

Instructions

- Add a few pieces of toilet paper to one bottle.
- Add a wet wipe to the other bottle.
- Add water to both bottles.
- Shake each bottle one at a time.

Outcome

- The toilet paper should quickly and easily break down in to little pieces. The wet wipe shouldn’t break down at all. This demonstrates that it is not okay to put wet wipes down the toilet as they don’t break down and will cause blockages and add to fatbergs.

Notes

- Swap bottles for bowls, and use spoons to mix.
- This is a great experiment for the whole class to take part in with pupils working in pairs or small groups. Pupils could be asked to bring in their own water bottles (recycle old ones and clean out before using in experiment).
- No time or resources for the experiment? Show this short video to the class instead - https://www.youtube.com/watch?v=_sUovTFMGDY (United Utilities).

WORKSHEET: NATURAL FLOOD MANAGEMENT

Draw lines from the type of NFM to the correct description

Leaky woody dams	These hold back water but let it through small gaps to slow the flow of the stream
Tree planting	Catches some rain before it reaches the ground, and roots help to soak up water
Meandering rivers	Bendy streams and rivers slow the flow of water and can connect it to floodplains
Moorlands	Healthy peatland soaks up more water before it reaches streams
Farmland management	This will help to stop soil compaction so rain soaks into the ground more easily
Floodplains	Water flows out of a river onto empty land and is stored

WORKSHEET: REDUCING FLOODING THROUGH A CATCHMENT

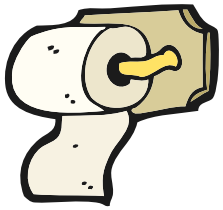
1 **What is the term used to describe the whole catchment system when thinking about how we can manage flooding?**

A. Sea to sun
B. Source to sea ✓
C. Source to surface

2 **What does NFM stand for?**

A. Normal flood movement
B. Nature flood management
C. Natural flood management ✓

3 **What are the 3 p's?**



A. Pee, paper & plastic
B. Paper, pee & poo ✓
C. Paper, paint & pee

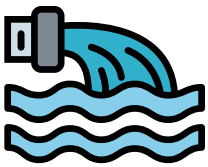
4 **What is the name for an area of land that leads all of the rainfall to rivers?**

A. Community
B. Climate
C. Catchment ✓

5 **Which of these is a benefit of NFM?**

A. Increases the risk of flooding
B. Creates more homes for animals ✓
C. Makes climate change worse

6 **Why do fatbergs cause flooding?**



A. They block sewer pipes ✓
B. They clear sewer pipes
C. They block rivers

THE FLOOD HUB

HOMEWORK: CREATE A FLOOD SCHEME

Tree Planting (NFM)

Image: The Flood Hub

Catches some rain before it reaches the ground, and roots help to soak up water

Leaky Dams (NFM)

West Cumbria Rivers Trust

Hold back some water but let it through small gaps to slow the flow of the stream

Farmland Management (NFM)

© Roger Goodwin / Alamy Stock Photo

This will help to stop soil compaction so rain soaks into the ground more easily

Waterbutt (SuDS)

Image: The Flood Hub

Collects rainfall and stores it so that less water falls on the ground and into sewers

Rain Garden (SuDS)

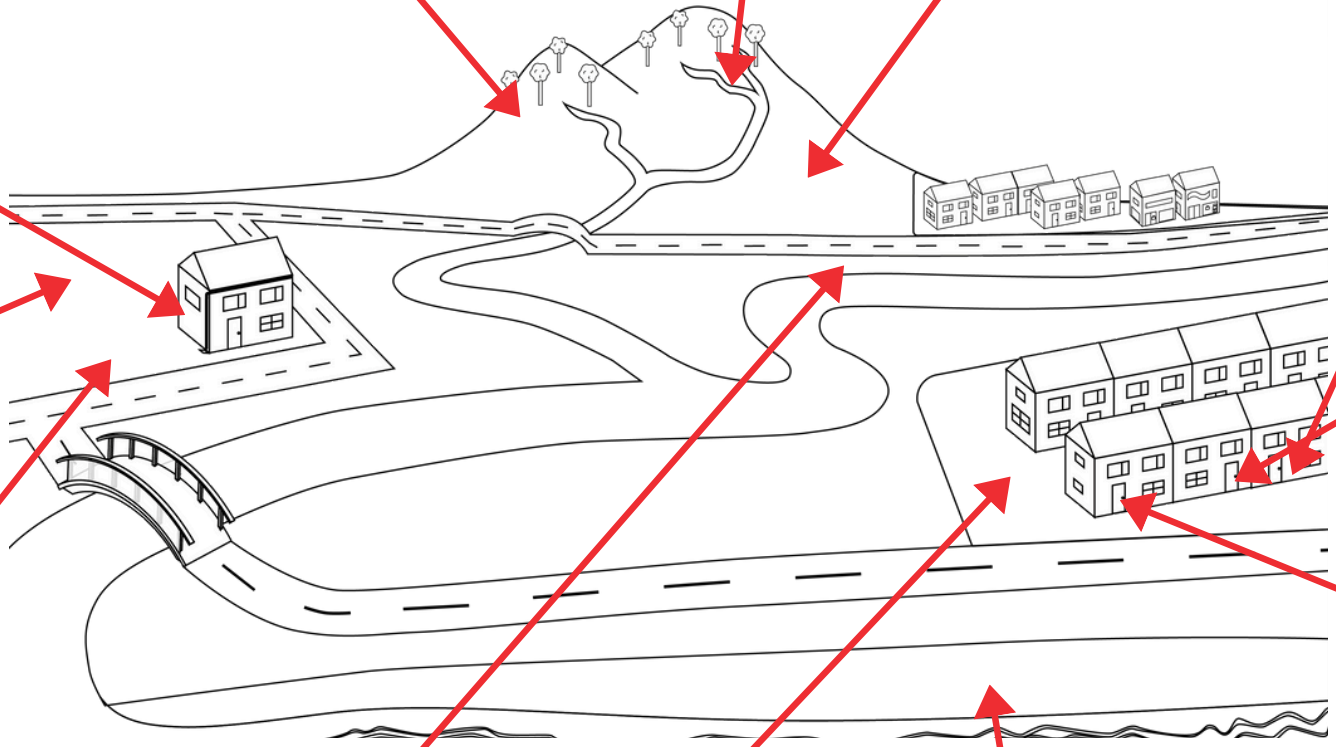
Image: RBC Rain Garden at the London Wetland Centre - cc-by-sa/2.0 - © Marathon - geograph.org.uk/p/2647365

Stores water which can then drain naturally into the ground or evaporate

Permeable Driveway (SuDS)

Image: The Flood Hub

Allows water to drip through to the space below where it can soak away naturally



Air Brick (PFR)

Image: The Flood Hub

The holes close when it floods to stop flood water from coming through into the property

Flood Barrier (PFR)

Image:The Flood Hub

Creates a water tight seal around doors and other openings to stop water from entering

Flood Door (PFR)

Image:The Flood Hub

Looks like a regular door but creates a water tight seal to stop water from entering

Flood Wall (Flood Defence)

Image: Flood wall in Keswick - cc-by-sa/2.0 - © DS Pugh - geograph.org.uk/p/4804404

Built along the river to stop floodwater overflowing and reaching buildings

Temporary Flood Barrier (Flood Defence)

Image: The Flood Hub

Put up in communities before flooding happens to stop floodwater reaching houses

Coastal Defences (Flood Defence)

Image: The Flood Hub

This can be sea walls or changes to the beach to protect it from waves and high tides