Summary

This workshop has been designed to use the Henley-on-Thames stretch of the River Thames as a case area to explore the importance of the River Thames to Henley, the causes and effects of recent flood events, and river management in general.

Workshop Contents

Workshops are flexible, and can be adapted to the needs of individual schools, however, it comprises of the following:

Education Centre (Museum Tutor led)

- Measuring surface runoff and throughflow
- Making a poster about the many roles of the Environment Agency
- Learning about the causes of recent floods in Henley
- Learning how rainwater travels through chalk hills, and experimenting with making flood defences
- Learning about the impacts of flooding on buildings and personal possessions

Fieldwork (Museum Tutor led) If you have previously booked a boat trip, it will replace this session.

We have worksheets to complete during the walk.

During the walk:

- students make a field sketch
- revise vocabulary
- mesure the height of the Museum's 2003 flood mark and floor level
- visit the lock and the weir
- learn about Henley's flood defences
- We will try to arrange for a lockkeeper to speak to your group, if requested.

Galleries (Teacher led)

- We have activity sheets for your students to complete in the galleries, which focus on managing the River Thames.

Plenary

Slideshow where we pull all of the main ideas from the day together.
**Learning Outcomes**

During the workshop, students will be:

- Conducting experiments
- Recording data
- Interpreting information
- Learning more about the causes and impacts of flooding, with a particular focus on Henley-on-Thames
- Experimenting with different flood defence schemes
- Conducting fieldwork, with a focus on key vocabulary, field sketching, mapping, and gaining a better understanding of the river landscape and the people / environment balance.
- Learning from displays in our Thames Gallery.
- Reviewing what flood defence schemes are used in Henley-on-Thames, and discussing potential options of other defences that could be used.

**GCSE Syllabuses**

This workshop has been designed to focus on rivers, flooding and flood management. If you would like to discuss any particular needs of your syllabus that you would like covered, please contact us.

**Equipment Provided by the Museum**

Clipboards

**Equipment to be brought by the School**

1 set of the enclosed worksheets per pupil
- Pencils
- Waterproof clothing and shoes for the fieldwork

**Pupil Preparation**

We recommend that the pupils have the following preparation:

- An understanding of river processes
- An awareness of flooding and what causes it
- Experience of constructing field sketches
- Please organise students into 5 groups before your arrival

**Resources** *(sheets to be photocopied by schools)*

- **Causes of Flooding**: for the Education Centre session (1 sheet per student)
- **Rainfall, Runoff & Hydrographs**: for the Education Centre session (1 sheet per student)
- **Thames Valley Management Techniques**: for the Education Centre session (1 sheet per student)
- **Impacts of Flooding**: for the Education Session (1 sheet per student)
- **The River Gallery**: for the Gallery (2 sheets per student)
- **Field Work**: for the field work (2 sheets per student)

Large print versions of all teachers' and pupils' material are available. Please ask for these when booking.

Copyright for any materials provided remains with the River & Rowing Museum.
Thames in Flood!
Causes of Flooding, and the Local Geology Activity:

1. Look at the map of the River Thames Drainage Basin, and locate Henley.
   a. Notice the size of the catchment area of the River Thames
2. Become more familiar with our local area by looking at the map and aerial photograph sheet.
   a. Look for the contour lines that show the hills surrounding Henley.
3. Read the information about the causes of floods in Henley. Write down 3 (or more) things that contributed to those floods, with an explanation as to why/how they did:

<table>
<thead>
<tr>
<th>Year</th>
<th>Summer (S) or Winter (W)</th>
<th>Cause of Flooding</th>
<th>How / why it caused flooding</th>
</tr>
</thead>
<tbody>
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4. Look at the diagram of the geology of this area, and sketch a cross-section of it where the town of Henley is located (using Fig 17b as an example). Do you see how Henley is on a clay valley with chalk hills north and south of it?
Thames in Flood!
Rainfall, Runoff and Hydrographs Activity:

1. Each watering can has 250ml of rainwater in it.
2. Every 30 seconds read how much water makes it to your river via throughflow and surface runoff, tip it out into the bowl, and put the beaker back under the tubes.
3. Then record how much water made it to your river via throughflow and surface runoff by making graphs.
4. Mark when the rainfall ends with a ‘*’. You can estimate how much rain has fallen as the rain falls at approx 150ml per 30 seconds.)

Questions:
1. Using the words runoff, infiltration, and throughflow, describe how the two surfaces responded to the rain:
   a. Clay over sand:
   b. Sand and trees over clay:

2. Look at each of the hydrographs on the table, and write down (using words such as ‘lag-time’ and ‘rising and recession limbs’) how the discharge of rivers is affected by the following:

<table>
<thead>
<tr>
<th></th>
<th>Throughflow</th>
<th>Surface</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Surface:</strong> Clay over Sand</td>
<td>Throughflow</td>
<td>Surface</td>
</tr>
<tr>
<td><strong>Surface:</strong> Sand and trees over clay</td>
<td>Throughflow</td>
<td>Surface</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>The Weather</th>
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</thead>
<tbody>
<tr>
<td>Land Use</td>
<td></td>
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<tr>
<td>River Management – impacts of weirs on rivers</td>
<td></td>
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<tr>
<td>Nature of the Catchment Area</td>
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</tbody>
</table>
Thames in Flood!
Thames Valley Management Techniques Activity:

1. Pour the water (rain) on the chalk hills to see how the system works naturally. How does the precipitation travel from the top of the chalk hills to the river?
   a. Notice that the water infiltrates and percolates through the chalk to the clay – making its way to the River Thames via springs. Do you see the springs on top of the clay?
   b. Add soil (brown sponges) and vegetation (yellow / green sponges) to the model. How do they affect the rate in which the rainfall makes it to the river? (Is it faster or slower?)
   c. Build a road on the chalk hills (laminated road). How does this affect the rate in which the rainfall makes it to the river? (Is it faster or slower?)

2. Management Options
   a. Add some bushes/trees to the model. Pour rain on top of them, and observe how they affect the rate in which the rainfall travels to the river. Does it speed up or slow down the water cycle?
   b. Go back to the table to work with the two water tanks, to experiment with protecting the village.
   c. In the first tank, protect your village with sandbags. Then pour the water into the river part of the tank to see how effective they are. How well would they work? What do they look like?
   d. In the second tank, protect your village with the plasticine (moulded into a flood barrier). Then pour the water in to the river part of the tank to see how effective it is. How well would it work? How would it look to you if you lived in the village?

3. What are the advantages and disadvantages of protecting your village with each of these defences?

Extension: If you have time read about the Jubilee River, and describe how they work to protect settlements in the River Thames valley from flooding.
Thames in Flood!
Impacts of Flooding Activity:

1. Look through the papers about flooding in Henley, then list 4 ways in which the people of and businesses in Henley were directly affected by the 1947, 2003 and/or 2007 floods:

   1.
   2.
   3.
   4.

2. Look through the grab bag full of props and materials. Imagine they are from a house in Henley that you lived in, and how you would be affected. Then pick the four that you find most interesting, and complete the grid below. Continue your grid on the back, for more objects, if you have more time.

<table>
<thead>
<tr>
<th>Object</th>
<th>How it would be affected by flood water?</th>
<th>What would have to be done to 'fix' it after it was in a flood (e.g. cleaned up, cut out and replaced)?</th>
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'The Making of the River'
1. Why was there a need to regulate the river?
2. How was it regulated?
3. Who managed the river between 1856-1974?
4. Who manages it today?
5. What are some of the Environment Agency’s responsibilities?
   a.
   b.
   c.

Managed Lakes of the Middle Thames
1. How is the middle Thames controlled?
2. How does the management of The Thames impact on local ecology?
3. How does the management of The Thames affect the sediment in the river bed?

Thames in Flood!
The River Gallery

The Maidenhead and Windsor Flood Alleviation Scheme (Jubilee River)
1. Why was this scheme built?
2. What does it consist of?
3. Make a sketch of the man-made river:
4. What was introduced to enhance the local environment and quality of life?
The Thames Barrier

Where is the Thames Barrier?

Why is the barrier needed?

How does it operate?

With your spare time, sketch pictures and make notes on the things that have made the River Thames so important to people, and the environment, from pre-historic times to today. (e.g. power for mills, leisure, animals, etc.).

Then also write down how they would be affected by flooding.
<table>
<thead>
<tr>
<th>Museum</th>
<th>Key Words</th>
<th>Field Sketch</th>
<th>The Weir</th>
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<tbody>
<tr>
<td>1. What part of the river valley is the museum built on?</td>
<td>Draw and label a sketch of the river, a house on Rod Eyot island, and the land in the distance. Annotate your sketch to include key words, plants, animals, and the reinforced embankment.</td>
<td>1. How does the weir control the level of the River Thames?</td>
<td></td>
</tr>
<tr>
<td>2. What is unusual about the museum’s architecture? Why has it been built this way?</td>
<td></td>
<td>2. Why doesn’t the Environment Agency leave the sluice gates fully open all of the time?</td>
<td></td>
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<tr>
<td>3. Why did the planners insist on a permeable car park?</td>
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</tr>
</tbody>
</table>
Key of features to add to your map:

<table>
<thead>
<tr>
<th>Feature</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Direction of Henley</td>
<td>≈≈≈≈ Cold Bath Stream</td>
</tr>
<tr>
<td>Drainage Ditch Bridge</td>
<td>Shade in floodplain and low level land likely to flood</td>
</tr>
<tr>
<td>** Location of Peach House with flood gates</td>
<td>Water level monitor</td>
</tr>
</tbody>
</table>

Make any additional notes / sketches here: