RIVER CATCHMENTS

SUPPORT MATERIALS

INSIDE // RIVERSIDE

This workshop uses images and slides to explore our rivers and aspects within our landscapes that can have an impact on our rivers, both good and bad. We encourage conversations on what exists in your own river catchment!

OVERVIEW

Learners start to look beyond the immediate river, as we explore everything within a river catchment. When looking to protect our rivers, it's important to consider every aspect. This workshop has both slide-based visual learning and a practical that encourages creativity whilst putting learning into action.

Subjects: Science, Geography
Age Range: 7-11 years
Location: Classroom
Time required: 1 hour

KIT LIST

For **Option 1** - Crafting your catchment

- Tissue paper
- Cardboard
- Coloured card
- Recycled materials
- Scissors
- Glue

For **Option 2** - Exploring your catchment

- Risk Assessment
- Outdoor clothing
- Wellies
- Paper
- Pen
- Clipboards

PREP

Inside Prep:
Gather all your crafting materials ready before the workshop. The more varied the textures in materials, the better.
Find your local river on Google Maps and define your river catchment area. Or pick one tributary of your river to zoom in on for a more focused look.
Riverside prep:
This workshop has the option to take your leaners out to your local river catchment. Usual field trip preparations will need to take place alongside finding an accessible site.

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1 SLIDES - What is a river catchment?

Setting the scene: Explain to learners that for this session, we will be exploring what a river catchment is, what exists in our river catchment and how these elements impact our river. So, what is a river catchment?

Slide 1: We have our river...
Where is your local river? What is it called?
Slide 2: When it rains, if that rainwater eventually ends up in our river, the ground where the rain falls is within our river catchment. This action of collecting the water over a natural drainage area is a river catchment.
Slide 3: Any area where water that flows into a different river is not in our river catchment. The green area is our catchment for this exercise.

SLIDES - What's in our river catchment?

Slide 4: We have our urban areas that include our schools, doctors, shops and homes.
Slide 5: That also includes our other infrastructure, like roads, bridges and our vehicles.
Slide 6: We need our water treatment works to bring us fresh drinking water and remove our wastewater.
Slide 7: Agriculture, our animal and crop farms are required to grow our food
Slide 8: Industry, our factories and workshops exist to make us things.
Slide 9: Which all sits alongside nature that brings us enjoyment, and keeps our environment healthy.

SLIDES - What happens when it rains?

Slide 10: Ask the learners what they think happens when it rains. As rain falls and travels to the river, it picks up nutrients, dirt, rubbish and anything else it can with it.
Slide 11: **Rural areas:** In rural areas, when rain falls on the roofs of our houses, driveways and roads, it picks up any waste with it, including oils, leaves, debris and detergents.

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1 SLIDES - What is a river catchment?

Slide 12: Water treatment works: When we have high rainfall, our water treatment works storage containers overflow into our waterways. This can cause untreated water (sewage) to enter our rivers. The more urban development we have, the bigger the treatment works need to be to cope with the additional drinking water and waste removal needs.

Slide 13: Agriculture: We need fertilisers to help our crops grow; however, they can be damaging at high levels to our rivers. Soils also contain lots of nutrients, which can throw off the balance of our river ecosystem. Animals also create a lot of slurry (poo!), which needs to be correctly stored and managed which can be a timely and costly system.

Slide 14: Industry: Sometimes factories dispose of their waste incorrectly, pouring harmful substances down drains or directly into our waterways, resulting in it ending up in our rivers. Specific waste removal is useually required at a cost to the industry.

Slide 15: Nature: Our natural environment, such as our trees and wetlands, absorbs a lot of the excess nutrients (harmful things) created by humans that might end up in the river. They also act as natural flood management systems as they slow the flow of rainwater, preventing a surge of water hitting the water, and potentially urban areas at once. Wetlands, especially, are like natural, giant sponges soaking them all up!

Slide 16: Whole Catchment: Therefore, when we are looking to protect our river, it's important we look at the whole catchment and everything that is within it.

2 ACTIVITY- Bring your river catchment to life

This activity aims to reinforce what has been discussed in part 1, through exploring your local area and river catchment and creating your own river catchment map. There is an indoor or riverside option for how you may progress with this activity.

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2 ACTIVITY- Bring your river catchment to life

OPTION 1 - Craft your river catchment

INSIDE

Gather all your crafting materials: tissue paper, scissors, glue, cardboard (the more different textures the better), as we look to create our own river catchment. You may split the learners into smaller groups, or tackle this all together. Use these materials to map your local river and all the elements discussed within your catchment. Prompts to help keep learners to include categories discussed above.

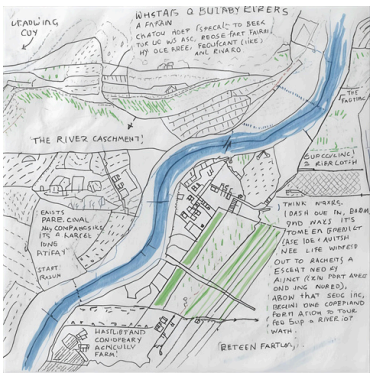
For further assistance, bring your location and river catchment on Google Maps and explore your local river from a bird's-eye view with the learners before delving into crafting. Point out key elements such as industry, houses, farms, bridges etc.

OPTION 2 - Explore your river catchment

RIVERSIDE

If resources and time allow, it would be fantastic to get outside and explore your local river and the surrounding river catchment. Provide each of your learners with a clipboard, pencil and paper and guide your learners around the area, noting their surroundings. Instruct learners that their task is to map their river catchment, so it's important that as they explore, they will need to take note of any buildings, agriculture, factories etc. covered in Part 1.

Depending on your local area, this may be more suitable to find an accessible area of your river and focus on one tributary of the river. If manageable, learners can be drawing their river catchment map as they go. Alternatively, learners can take notes while exploring ready to draw their map afterwards.



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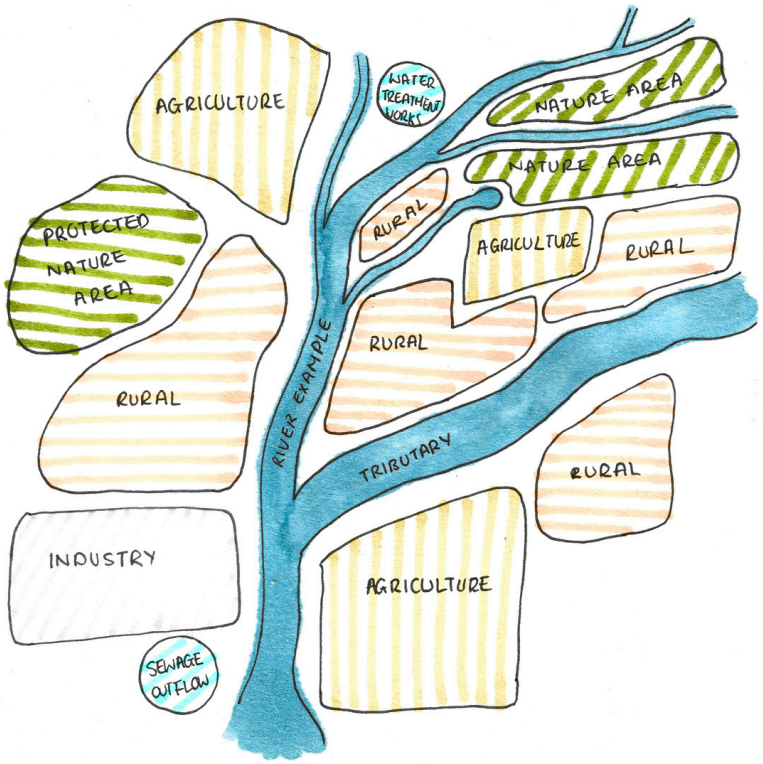
OPTION 3 - Stretch Activity - Research your catchment

If you'd like to set your learners some more independant learning, this task is a great way to get them researching and thinking for themselves. Supply the learners with links to the maps on the worksheet on the next page. Give them time to to research the land use, river flow, storm overflow and protected nature areas in their local catchment.

To compile their research, instruct the learners to create a simplified diagram of their catchment as the example shown here:



Make it clear that they are to categorise their findings into the following areas: Agriculture, Rural, Industrial, Protected areas/nature and add any water treatment works noticed to keep it simple. Instructions for using the maps are on the worksheet below.

After mapping their catchment, there is opportunity here to discuss their findings.

- Are there any areas that seem problematic for river health?
- If you were to make your perfect river catchment, what changes might you make?

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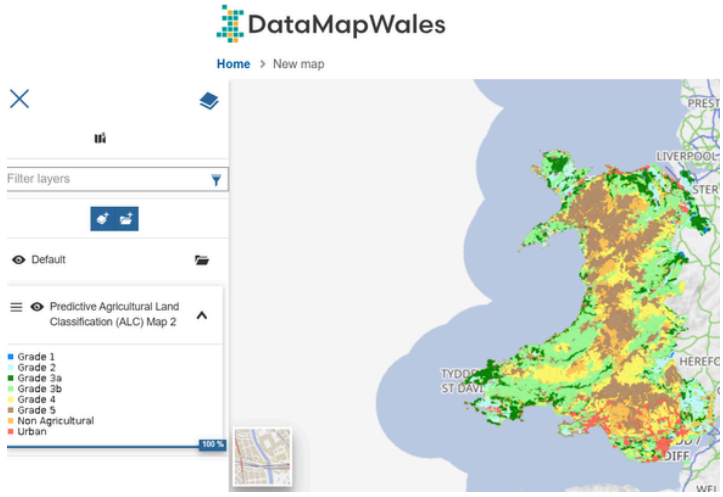
WORKSHEET - Research your catchment

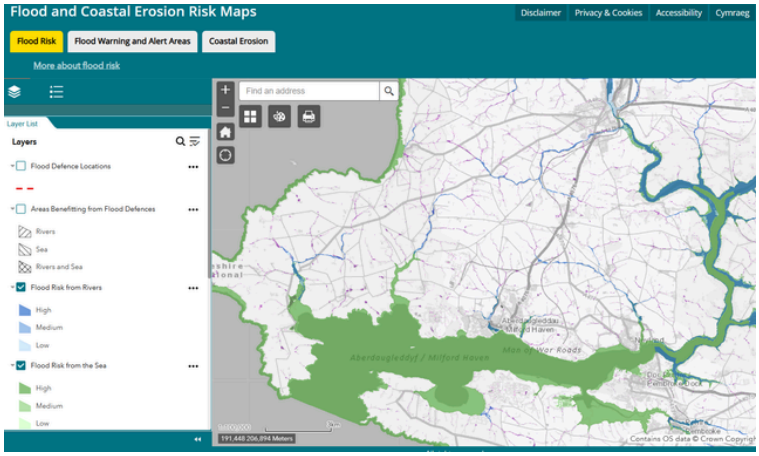
Use the links below to explore different map databases. These maps will help you map out the urban areas, river route, agriculture land use and protected nature areas.

Agriculture Land Use:
Data Map Wales - Agricultural land classification: predictive map
https://datamap.gov.wales/maps/new?layer=inspire-wg:wg_predictive_alc2#/



This map shows urban areas and grades the suitability of land for agriculture. This will help you get a broad overview of land-use in your catchment.

Flood Risk Areas:
Flood and Coastal Erosion Risk Maps -
https://flood-risk-maps.naturalresources.wales/?locale=en

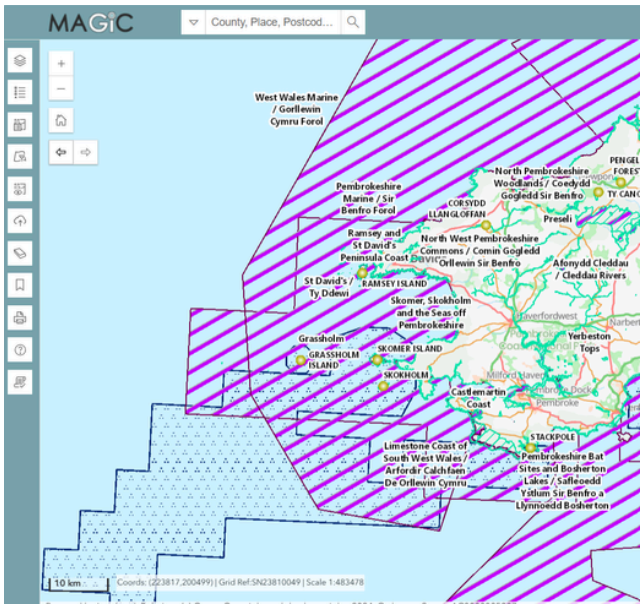


Use this map to explore the route of your local river. Notice the areas that are of higher flood risk - what exisists in these zones?

Water Treatment Works:
Storm Overflow Map -
https://corporate.dwrcymru.com/en/community/environment/storm-overflow-map

This map shows the location of storm overflows. Storm overflows are part of the sewage treatment works and dispose of the waste water into our rivers and seas. When we have lots of rainfall they release more water to help prevent flooding, but this can mean that un-treated sewage is released into our rivers.

MAGIC Map:
Interactive Map - https://magic.defra.gov.uk/



This map will show you all the protected areas -you'll just need to add some filters first. After opening the map you'll need to use the 'search for layer' tool on the left to search and add the following layers:

- Special Area of Conservation
- Sites of Scientific Interest
- Special Protection Areas

Click all that apply. Alternatively type 'Wales' in the search for layer tool bar and click all that apply.

Then zoom into your catchment. Use the map 'legend' to distinguish between protected areas and other sites.

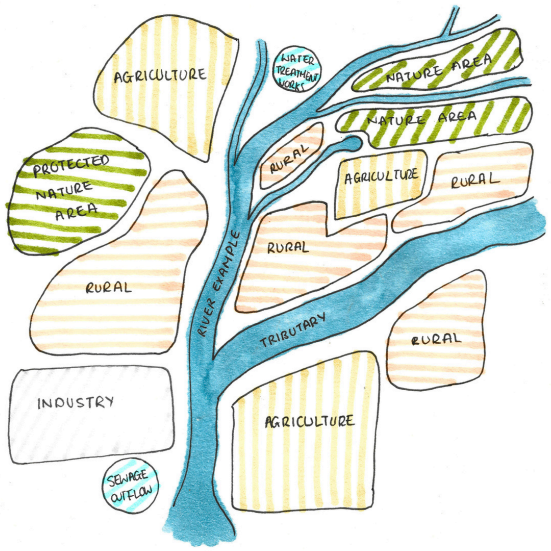
Google Maps/ Google Earth
Google Maps - https://www.google.co.uk/maps
Great satelitte imagery to help you piece together your catchment!

Create your map

Use the research you've found from the maps to create your catchment map. Keep it simple, outlining the areas that fall under the following categories:

- Urban Areas
- Water treatment works
- Agriculture
- Industry
- Protected nature

Draw your river first and then add in the sections covered by each other land use.



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3 Discussion - Bring your river catchment to life

Now you have explored factors within your local river catchment these can now be linked back to the issues they might cause for our river health. Break down each element added to your river maps into the following categories, discussing good and bad points that may be caused by each:

- Uraban Areas
- Water treatment works
- Agriculture
- Industry
- Nature

Is there agricultural land within your catchment?
What impacts might this have on our river?

Is there urban development within your catchment?
What impacts might this have on our river?

Are there industries within your river catchment?
What impacts might this have on our river?

Is there any natural environment within your river catchment?
What impacts might this have on our river?

Add more questions and discussions around how to minimise these impacts if you would like to expand further. Or, take a look at our additional discussion activity for this workshop!

4 Conclusions

The key take-aways from this workshop:

- Learners know what a river catchment is ✓
- Leaners understand what exists within our river catchment, and their potential impacts on our rivers. ✓
- Leaners understand that in order to protect our rivers, we must include every aspect within the river catchment. ✓

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5 Additional Discussion Activity

The discussion can be taken further by thinking from the perspective of individuals and organisations within your river catchment. Split your learners into 4 groups. Each group will 'become' one of the following:

- Manufacturers/ Factory owners
- Conservationists (someone who protects nature)
- Agriculture landowner
- Sewage network workers

Feel free to make these categories specific to your local area!

Problem: House builders would like to build 1,000 new homes within your river catchment.

Thinking from the perspective of your given character, what are the positive and negative effects of this proposition happening? Here are some ideas as to what hurdles each category might face and how they will prevent them:

Manufactures

- Will need to make a lot more supplies for the building of the homes. Increased output means an increase in the use of materials and waste.
- More waste equals more money as it costs to dispose of waste correctly to stop it from entering our waterways. Pouring the waste down the drain is not an option!
- Manufacturers will need to use additional profit to pay for the correct disposal of waste materials.

Conservationists

- Have concerns over losing valuable land and nature to make space for more urban development.
- Fewer natural 'sponges' in nature to soak up the nutrients and slow the flow of water will mean mitigating these effects through other avenues; water treatment works will need to expand, and flood management will have to be done manually.
- Nature should be protected as much as possible during development, or enhanced where possible.

5

Additional Discussion Activity

Agriculture landowner

- More homes means more people, and more people means more food is required to feed them.
- Agriculture landowners may think about expanding their herds or crop fields to account for this.
- With this, more slurry and fertiliser will be produced so storage will need to increase and fertiliser use be closely managed.

Sewage network workers

- More homes and more people mean an increased need for clean water and human waste disposal. Therefore, the sewage works need to increase in size.
- This is a costly expansion for the sewage company - are the home builders going to cover these costs?
- Without expansion, it is likely that the sewage works could not cope with the increase in sewage, causing a high amount os spills into our rivers to occur.

When changes happen within a catchment, everyone has a role in considering the health of the river to ensure we have a thriving water environment to enjoy and use for years to come.

End of workshop - Thank you for incorporating rivers in your education.