**The Wild Oysters Project**

**Lesson plan: Digital workshop KS2 (8-11yrs)**

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| **Wild Oysters Lesson Plan – Digital Workshop Ages 8-11** |
| **Audience** | Ages 8-11England:KS2 Y4-6 (with option to modify for Y3)Scotland:First/Second Level P4-P6(with option to modify for P3) Wales:KS2 Y4-6 (with option to modify for Y3) |
| **Group size** | Up to 35 students |
| **Location** | Video link-up from local site to classroom |
| **Delivered by** | Local Project Officer/Project assistant (remotely, from the project site, with support from classroom teacher) |
| **Duration** | 1 hour 15 mins |
| **High-level Project Objectives/****Messages** | **Learning Objectives**Students will:1. Develop knowledge and understanding of UK native oysters, including ecosystem services
2. Have a greater knowledge and understanding of marine habitats in the UK and the marine environment = increased ocean literacy.
3. Have increased awareness and understanding of their local Wild Oysters project.
4. Be inspired to care for the marine environment and become marine stewards.

**Key project communication messages****Importance:**1. The health of our marine habitats, such as native oyster reefs, is of crucial importance for wildlife heath & people.

**Problem:**1. Currently our UK marine habitats are degraded.
2. When Oyster reefs are restored, their ecosystem services and function is also restored, which helps towards keeping our ocean healthy and resilient.

**Solution:**1. Everyone has a role to play in keeping our oceans healthy, we need to work together in order to achieve success.
2. We want the general public – Act on doorstep towards helping environment
3. The marine industry and sea users need to be proactive by making space for nature in marinas and reducing pollution.

We want our government to promote and fund the active restoration of marine habitats. |
| **Intended Learning Outcomes** | Focus topic(s): **changing environments**, life cycles, reproduction, **food chains**, **interdependence**, adaptations, **human impact, environmental care**, **careers, citizenship**.**Students will be able to:**(All)* Name two reasons why the oceans are important to them
* State two amazing facts about oysters
* Describe a basic oyster food web

(Many)* State one reason why oysters have declined
* Explain what an ecosystem is
* State two ways that oysters directly benefit other wildlife, incl. people
* Explain how losing oysters has a knock-on effect on other species
* Describe what their local Wild Oyster Project Officer’s job involves
* State one thing they can do to help the marine environment

(Some)* Explain how the oyster reef provides a habitat for other species
* Explain what an ecosystem service is
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| **Curriculum Links** | **England:****KS2 Science**Living things and their habitats * Y4 (changing environments)
* Y5 (life cycles, reproduction)

Animals, including humans * Y4 (food chains)
* Y6 (nutrient and water transport)

Evolution and inheritance * Y6 (adaptations)

**Scotland:****First/Second Level Science**Planet Earth – Biodiversity and Interdependence* SCN 1-02a (food chains, interdependence)
* SCN 2-01a (adaptation)
* SCN 2-02a (interdependence, food webs)

Biological Systems * SCN 2-14a (life cycles)

**First/Second Level Social Studies**People, place and environment* SOC 1-08a (community and environmental care)
* SOC 2-08a (human impact on the environment)

**Wales:****KS2 Science**Interdependence of organisms* 4 (life cycles)
* 5 (food chains/webs)
* 6 (environmental factors)
* 7 (human impact)

**Personal and social education*** Active citizenship
* **Careers and the world of work**
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| **Delivery Schedule** | * 4 online skype lessons per site per year (4 different classes across KS2/3)
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| **Monitoring and Evaluation** | * Feedback form for teacher
* Reflective notes by LPO
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| **Resources and equipment** | LPO (at marina)* Computer/Laptop and/or tablet/smartphone with WiFi/data
* Zoom/Skype/Teams or other video conferencing platform as agreed with class teacher in advance.
* PowerPoint presentation (on USB stick if necessary)
* Access to project site, including the pontoon
* Notepad and pen
* Aerated tank with live oysters
* Real oyster shells
* Video of oyster filtration demo (or necessary resources to perform live demo)
* Quiz questions

Teacher (in classroom)* Oyster fact sheets x 4
* Oyster food web pictures x9 (optional)
* Pieces of string x16\* (optional)
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| **Differentiation** | * Pair share and structured discussion activities to allow all students to participate
* Pair and group work to allow higher achieving pupils to support lower achieving pupils
* Use of open questions to allow for a range of opinions, views and abilities
* Variety of active learning opportunities to support different learning styles
* Opportunity for Q&A with the LPO
* Differentiated content e.g. oyster fact sheets have more detailed information alongside key facts
* Higher achieving pupils can be challenged to calculate how much water will one oyster would clean in its lifetime, and therefore the impact of losing one oyster from the ecosystem
* Higher achieving pupils can be challenged to calculate how many km2 of oyster reefs are left after a 95% decline
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| **Engagement opportunities for SEND pupils** | * Real oyster shells to look at
* Real oysters in tank to look at
* See the project site in real life
* Videos and images to support verbal content
* Variety of active learning opportunities to support different learning styles
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**Activity Plan:**

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| **Time** | **LPO activity** | **Key questions/messages** | **Learning/SEAL/skills outcomes** | **School staff support** | **Student activity** | **Resources and equipment** |
| **5 mins** | **Welcome and introduction** – Explain who you are (scientist!) and who you work for and where you currently are. Explain why they are doing a digital workshop with you today – you want them to understand how amazing and important oysters are and why we should look after them.Explain to the teacher and students that if they want to ask a question they need to put their hands up, the teacher should choose the student and then relay the question back to you (often it’s not possible to hear the students clearly if they are sat at the back of the room)Talk about how the role of women in Science has progressed and every day we see more and more women and men working in marine sciences. | You are a marine scientist who looks after oysters. You want the students to know how amazing and important oysters are. | * Describe what their local Wild Oyster Project Officer’s job involves
 | Introduce LPO to class and set expectations for behaviour | Active listening. Look at images. | PowerPoint slides with images of LPO at project site |
| **Show the surroundings of the marina (if possible) –** if a tablet/smartphone with a good WiFi or data signal is available take the class on a quick walk around of the most exciting parts of the project site and talk through what you are showing them. This does not need to be detailed at this stage.Introduce learning objectives. | You work at the project site in XXXX, near their school. This is what it looks like. | * Describe what their local Wild Oyster Project Officer’s job involves
 | Support children to  | Active listening | Access to the marina/project site |
| **5 mins** | **Lead discussion on the importance of the sea** - Ask students what the ocean means to them. Show prompt images (these could be modified by the LPO to show images of the local coastline). Encourage children to tell each other their thoughts. Select students to feed back what they discussed to the rest of the classCan add more info if needed:* *I want all of us to take a deep breath, and breath out… now take another breath and breathe out. That second one was provided by the ocean.*
* *Oceans are home to more than 90% of life on the planet and capable of absorbing 1/3 of CO2 emissions - they are our lifeline.*
 | What does the ocean mean to you?Oceans provide us with oxygen and are home to 90% of life on the planet.Healthy oceans can also absorb 1/3 of our CO2 emissions. | * Name two reasons why the oceans are important to them
 | Encourage children to discuss and share ideas. | Look at images.Pair share – discuss in pairs/small groups and share ideas with the class | PowerPoint slides with images of oceans/coastline/marine species from UK and around world. |
| **Lead discussion about what is happening to the sea** - Show prompt images (can again be modified to show images of local areas to make more relevant). Encourage children to discuss the question and select students to share their ideas with the class.Children may suggest answers such as (over)fishing, plastic, chemicals, pollution, sewage, eating fish, habitat destructionCan add anything they don’t suggest e.g. ocean acidification (due to climate change), deep sea mining. | What is happening to our oceans?Humans are harming them through overfishing, pollution, climate change, and habitat destruction. | * State one reason why oysters have declined
 | Encourage children to discuss and share ideas | Look at images.Pair share – discuss in pairs/small groups and share ideas with the class | PowerPoint slides with images of pollution, fish in nets, built-up coastlines etc |
| **10 mins** | **Introduce oysters and explain that they are important for the health of the sea/ocean** – “*This is where oysters come in!* *Oysters are amazing animals and can help keep our oceans healthy. And they are right on your doorstep, here in xxxx!”*Show close-ups of real oysters at the project site (in tank, or in another context) *Does anyone know anything about oysters?* Take one or two answers.*“Oysters are molluscs, like snails, but we call them bivalve molluscs as they have two shells instead of one. They live around the coast rather than in the deep sea and live in large groups that form reefs, a bit like coral reefs! In the UK there is only one species of oyster that is native to our shorelines- the European Native Oyster (Ostrea edulis). Native Oysters form complex, biodiverse reefs. Our UK equivalent to coral reefs!”* | Oysters are amazing and help keep our oceans healthy. They live in the sea around the UK and form reefs like corals. | * State two amazing facts about oysters
 |  | Active listening and participation in discussion.Observe real oysters | PowerPoint slides with images of oysters and oyster reefs.Aerated tank with live oystersReal oyster shells. |
| **Share oyster shells and show images of the inside of an oyster.** For upper KS2 explain some of the adaptations. They have extremely strong adductor muscles to close their shells when threatened. Oysters feed by extracting algae and other food particles from the water they are almost constantly drawing over their gills. | Which part of oyster do humans eat? How has an oyster adapted? | State two amazing facts about oysters | Help pass around oyster shells | Active listening and participation in discussion.Observe real oysters in tank and look at/handle real oyster shells | PowerPoint slides with images of oysters. Aerated tank with live oystersReal oyster shells. |
| **Show images of oysters around the world** (incl. ZSL project in Mozambique) – *“Different types (species) of oyster are found globally. In many places they are a source of food and money, as well as being part of the local culture. In the UK they have been eaten since Roman times and in Whitstable in England there is still an oyster festival every year – these people are the Oyster King and Queen! In Mozambique women collect oysters from the sea shore as a social activity and sell them at market – they are easy to collect as they don’t even need boats to reach them. In other parts of the world oysters make pearls, which can be collected and used for making jewellery. In France oysters are considered a delicacy.”*Ask students if they have any knowledge or memories of oysters, or if their families do. | Oysters are also found all over the world, for example in Mozambique | * State two ways that oysters directly benefit other wildlife, incl. people
 | Support children to take part in the discussion | Active listening. Look at images.Share own experiences of oysters if they have them. | PowerPoint slides with historical images of oyster and oyster projects in other parts of the world. |
| **Show historical images of oysters in UK –** *“Oysters used to be common around UK (and in people’s diets!), and were a big part of everyday life. This drawing is from Oyster day in 1835- the arrival of the first oysters of the season at Billingsgate fish market. Oysters were a staple part of their diet as they were so cheap – around 4 for 1 penny. However, oysters have now practically disappeared due to the same problems that are affecting the seas and oceans generally - overharvesting, pollution and habitat loss. In the 1800s more than 200 million native oysters were sold annually on the London market, even though there were far fewer people living in London back then. This map from 1883 shows that there were huge oyster reefs around the UK coastline, in the English Channel and North sea. Scientists think that there used to be around 20,000 km2 of oyster reefs around the UK at one point, but 95% of this has now been lost. Over time people have forgotten about oysters and how amazing and important they are.”* Extension: students can calculate how many km are remaining. | Oysters used to be common in the UK, but have now almost disappeared due to humans | * State one reason why oysters have declined
 | Support children to take part in the discussion | Active listening.Look at images. Suggest reasons why oysters have disappeared. | PowerPoint slides with images of fishermen, fish markets, fishing boats, pollution, habitat destruction |
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| **5 mins** | **Demonstrate how oysters keep our oceans clean** – “*One of the most amazing things about oysters is that they can clean up the oceans. Just one small oyster can filter 200 litres of water in just one day – that’s the same as a bathtub filled all the way to the top. Imagine how much water a whole reef could clean up in a day!* “Show video of/demonstrate oyster filtration. Ask students to guess how long it will take for the oysters to clean the tank, then get them to watch the clock to see if they are right. Higher achieving pupils can be challenged to calculate how much water will one oyster would clean in its lifetime, and therefore the impact of losing one oyster from the ecosystem (15x365x200=1,095,000 litres!) | Oysters are filter feeders. They clean up our oceans by filtering particles out of the water.  | * State two ways that oysters directly benefit other wildlife, incl. people
 | Support children to take part in the activity | Active listening.Watch video/demonstration.Count how many seconds it takes for the oyster to filter the tank. | Video of oyster filtration demo(Or equipment to carry out demo at marina) |
| **5 mins** | **Explain that oysters create ecosystems** – “*Another job that oysters do is to provide other animals with shelter and a place to live. Oyster reefs are made up of lots of oysters all living on top of one another, with spaces in between, which makes a really good home for other animals.”*Demonstrate the 3D structure of an oyster reef using empty oyster shells. Go through definitions of habitats and ecosystems with students.*“Native Oysters form complex, biodiverse reefs. Our UK equivalent to coral reefs!**Not many people realise that we have such amazing marine habitats in the UK. Often people think you have to travel abroad to see amazing wildlife but we have incredible marine habitats (such as oyster reefs, seagrass beds, kelp forests and saltmarshes) that are home to some of our favourite species- such as seals, seahorses, fish and crabs. Some of these are like underwater rainforests as they are home to so many species!”*Show video of oyster nursery with other species living between shells. | What is a habitat?What is an ecosystem?How are they different?Oyster reefs create ecosystems by providing habitats for many different animals and plants. | * State two ways that oysters directly benefit other wildlife, incl. people
* Explain what an ecosystem is
* Explain how the oyster reef provides a habitat for other species
 | Help children build reef using oyster shells | Active listening and participation in discussion.Look at images/demonstration and answer questions. | Oyster shells.PowerPoint slides with definitions of habitat, ecosystem, biotic and abiotic.Video of oyster nursery. |
| **5 mins** | **Explain how oysters help humans** – discuss with the class how humans might be connected to the ecosystem and reveal the links on the food web. Discuss how it would affect humans if oysters disappeared from the ecosystem.**ALTERNATIVE OPTION:** model this as per the food web game.Talk through any additional benefits oysters provide if have not been discussed yet:* They support fisheries through the nursery habitats they create
* One Oyster can filter 200L of water per day- Improving water quality & clarity
* They also absorb carbon into their shells providing a sink during this climate crisis!
* Denitrification – oysters can remove excess nutrients from water – particularly nitrogen, which at high levels can promote harmful algal blooms and fish death
* They improve biodiversity creating reef habitats with shelter and feeding grounds for other marine life and wildlife such as birds.
* They have also been an important food source – enjoyed by us since Roman times.

Essentially, they keep our oceans healthy and resilient and for those reasons we like to think of them as our SuperheroesExplain that these benefits to people are known as ecosystem services. | Humans are part of the ecosystem.Oysters do jobs that help humans, such as filtering water.These are called ecosystem services. | * State two ways that oysters directly benefit other wildlife, incl. people
* Explain how losing oysters has a knock-on effect on other species
* Explain what an ecosystem service is
 | Support children to take part in the discussion**ALTERNATOVE OPTION:**Assist with giving out pictures and string.Provide help and encouragement to students if needed, totake part in the activity. | Active listening and participation in discussion.**ALTERNATOVE OPTION:**Volunteers help model how humans connect to the food web.Active listening and participation in discussion. | PowerPoint slides with image of oyster food chains/web and the different species found in an oyster reef ecosystem.**ALTERNATOVE OPTION (in school):**‘Human’ picture x1.Piece of string x1 |
| **10 mins** | **Lead oyster bingo fact-finding activity** – *“Let’s find out some more amazing facts about oysters.”* Split the class into 4 groups – A, B, C and D (based on who they are sitting next to). Explain that there is going to be a quiz at the end of the session and the teams will be playing against each other, so they need to learn as many facts as possible in 5 minutes! Show the facts on the screen and talk through a selection of them. Students then spend 5 minutes looking at the fact sheets and writing down/memorising the facts in their teams. Explain there will also be questions about the other things they are going to learn about during the session – so they need to be listening! | Oysters are amazing! | * State two amazing facts about oysters
 | Give out fact sheets.Support children to listen, read fact sheets and work as a team.Collect in fact sheets afterwards. | Listen to and read oyster facts. Work in teams to memorise facts. | PowerPoint slides with facts.**In school:**Oyster fact sheets – 1 sheet per team. |
| **10 mins** | **Lead oyster food web discussion/activity** – “*does anyone know what a food web is?* *A food web shows how all the living things (organisms) in an ecosystem are connected (interdependent). It’s like a tangled web made of lots of different food chains.”*Show the different animals in the food web and get the students to discuss in pairs/small groups which animal eats which. Ask the students to feed back their ideas, then reveal the arrows linking up the picturesAsk the students to discuss what would happen if one species was lost from the ecosystem. How this would have a knock-on effect on the other elements of the system? **NOTE:** If the teacher is willing to print out the resources at school and the classroom set-up allows, you could try running the physical version of the food web game (from the Pre site-visit workshop), with the support of the class teacher. This would be preferable as it would provide a movement break for the students, but would rely on the teacher supporting and doing the necessary prep in advance (refer to pre-visit workshop plan for the food web game instructions). | Food webs show how all the elements of an ecosystem are interconnected.Many different species depend on oysters for survival (oysters are ecosystem engineers).Losing oysters from an ecosystem would negatively impact other species. | * Describe a basic oyster food web
* State two ways that oysters directly benefit other wildlife, incl. people
* Explain how losing oysters has a knock-on effect on other species
 | Support children to take part in the discussion**ALTERNATIVE OPTION:**Assist with giving out pictures and string.Provide help and encouragement to students if needed, to take part in the activity. | Active listening and participation in discussion.**ALTERNATIVE OPTION:**Volunteers wear pics and use string to represent energy transfer in a food web. Rest of class help volunteers to arrange themselves.Volunteers model what happens when species are removed from the ecosystem. with help of class. | PowerPoint slides with image of oyster food chains/web and the different species found in an oyster reef ecosystem.**ALTERNATIVE OPTION:****(in school):**Oyster reef food web pictures x8.Pieces of string x16.Trophic level labels |
| **5 mins** | **Explain how projects like Wild Oysters are helping to put oysters back** – *“When Oyster reefs are put back, so are their ecosystem services, which helps towards keeping our ocean healthy. How cool is it that we have a species that when restored, it naturally helps us to tidy up our oceans… a bit like a Brita water filter/ hoover, giving us a helping hand! However, oyster numbers have dropped so dramatically that they will only be saved if we give them a helping hand, otherwise they will become extinct in the wild.**“Marine scientists like the me are helping to put oysters back in different areas of the UK, including right here in xxxx. I work for a conservation project called Wild Oysters, and we are creating new oyster beds and restoring the marine ecosystems in 3 different places in England, Scotland and Wales.”* **IDEALLY** (if time/facilities/data/WiFi allow) take the class on a more detailed behind-the-scenes tour of the project site / oyster frames / demo of some of the work you do. **OR** (if limited by facilities/signal etc.) **s**how photos and videos of marine scientists in the field (including themselves if possible) doing their job/working to restore oysters. Ask students if they can guess what they might be doing in the images/videos and why.Talk through the different activities/roles you have to do for your job. | The Wild Oysters project is helping to put back oysters in the local area and other parts of the UK.New reefs are being created by putting old shells on the sea bed, and mother oysters under pontoons where they release their larvae onto the bed below. | * Describe what their local Wild Oyster Project Officer’s job involves
 | Support children to take part in the discussion | Active listening and participation in discussion. | PowerPoint slides with images and video clips of marine scientists working to restore oysters in the field. |
| **5 mins** | **Lead discussion about how they can help** – Ask children what they could do to help. Encourage them to think back to the beginning when they discussed how humans are causing harm to the oceans and oysters to disappear (show prompt images).Encourage children to discuss the question and select students to share their ideas with the class.Comment on the ideas and suggest other actions that they could take to help out:* Get involved and volunteer at local Wild Oysters project
* Share fascinating facts about oysters and how important they are with others
* Help clean up your local area
* Work together – this could be recycling with your family at home, or organising a beach clean-up with your school
* Reduce waste - especially plastic waste – so that it doesn’t end up in the environment (click on the image to expand the infographic)
 | There are lots of things that the students/school can do to help oysters too. | * State one thing they can do to help the marine environment
 | Encourage children to discuss and share ideas | Look at images.Pair share – discuss in pairs/small groups and share ideas with the class | PowerPoint slides with images of problems and solutions for oysters, and suggested actions. |
| **5 mins** | **Oyster quiz! –** Students get onto in their original four teams (A, B, C and D). Rotating around the four groups, ask each group one question at a time, at random from the fact sheet, Give them 10 seconds to discuss as a team before they give their answer. When you have run out of questions from the fact sheet ask questions from the presentation until each team has answered the same number of questions, e.g.:* what is an ecosystem?
* what does biodiversity mean?
* how many species have been found living in an oyster reef?

For the final 3 rounds ask the following questions (each team gives a different answer):* Name one animal that relies on oysters
* Name one reason why humans need oysters
* Name one way we can help oysters

Tally up the results as you go along and reveal the winning team at the end! (Have a bonus question up your sleeve in case in case you need a tie-break.) | Oysters are amazing and important and there are lots of ways to help them. | * State two amazing facts about oysters
* State two ways that oysters directly benefit other wildlife, incl. people
* State one thing they can do to help the marine environment
 | Support children to take part in the activity.Select a different person from each team to answer the question for each round. | In groups discuss and answer questions about oysters | Fact sheet and quiz questions. |
| **[5 mins]** | **[IF APPLICABLE] Explain that they will be coming to visit the local project site** - Talk through what they will be doing when they come to visit the site. Show images and timetable.Explain that as part of the project it is important to collect information/data about the oyster reef which will help the scientists understand what is going on.  | The students will get to be marine scientists for a day!They will be helping to collect important data about the oysters and the ecosystem. |  |  | Active listening | PowerPoint slides with images of the marina and children taking part in activities.Slide of Timetable for the day. |
| **5 mins** | **Q and A** – Spend a few minutes answering any questions the children may have about oysters, the project, your job/career, the site visit, or any other aspect of the session so far.Encourage students to work in pairs to come up with questions and then select students to ask their questions. | Any questions? |  | Support children to come up with and ask questions. | In pairs, students think of one or two questions they would like to ask the LPO.Ask their questions when prompted. |  |
| **END** | **Thanks and goodbye** |  |  |  |  |  |

Total – 75 mins