**The Wild Oysters Project**

**Lesson plan: Assembly KS2 (8-11yrs)**

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| **Wild Oysters Lesson Plan – Assembly Ages 8-11** |
| **Audience** | Ages 8-11 (target audience – but can be delivered to wider age range if whole year/school assembly)England: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** | Whole year/school |
| **Location** | In school |
| **Delivered by** | Local Project Officer/Project Assistant  |
| **Duration** | 20-30 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**, **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 one amazing fact about oysters

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

(Some)* Explain what an ecosystem service is
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| **Curriculum Links** | **England:****KS2 Science**Living things and their habitats * Y4 (changing environments)

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)

**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* 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** | * 3 school assemblies per site per year (3 schools 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)* Access to computer and projector
* PowerPoint presentation (on USB stick if necessary)
* Aerated tank with live oysters
* Real oyster shells
* Video of oyster filtration demo (or necessary resources to perform live demo)
* Quiz questions
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| **Differentiation** | * Pair share and structured discussion activities to allow all students to participate
* Use of open questions to allow for a range of opinions, views and abilities
* Opportunity for Q&A with the LPO
* 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 touch
* Real oysters in tank to look at
* Videos and images to support verbal content
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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** |
| **2 mins** | **Welcome and introduction** – Explain who you are (scientist!) and who you work for. Show photos of you at the project site doing your job. Explain why you have come to visit their school today – you want them to understand how amazing and important oysters are and why we should look after them.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 |
| **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.Whiteboard. |
| **Ask students what is happening to the oceans -** Show prompt images (can again be modified to show images of local areas to make more relevant). Ask students to put up their hand if they can think of any things that are happening to the oceans/seas.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
 |  | Look at images.Share their ideas about what is happening to the ocean | PowerPoint slides with images of pollution, fish in nets, built-up coastlines etc |
| **3 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 images and tank of oysters and explain they will get to see them close up later. Pass around real oyster shells and show images of native oyster reefs.*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 one amazing fact 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 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.”* | 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. | 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: can any students calculate how many km2 are remaining? (1,000km2) | 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.  | PowerPoint slides with images of fishermen, fish markets, fishing boats |
| **2 mins** | **Explain that oysters are amazing animals –** share some ‘wow’ facts to get the students excited about oysters: *“They can live for up to 15 years, they are all born males, but can change between male and female several times during their life. Each adult female can produce about one million babies per year. One oyster can clean up 200 litres of water in a day – that’s a whole bathtub worth! They create places to live for other animals and can even absorb carbon from the air into their shells to help us with the climate crisis!”* | Oysters are amazing! | * State one amazing fact about oysters
 |  | Active listening.Read facts on the slides. | PowerPoint slides with oyster facts |
| **2 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 (15 years x 365 days x 200 litres = 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 hours it takes for the oyster to filter the tank. | Video of oyster filtration demo(Or equipment to carry out demo in classroom) |
| **3 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
 |  | Active listening and participation in discussion.Look at images/demonstration | Oyster shells.PowerPoint slides with definitions of habitat, ecosystem, biotic and abiotic.Video of oyster nursery. |
| **2 mins** | **Explain how oysters help humans** – *“so as you can see oysters do some amazing things, and some of these things are very useful for us humans. That’s why I like to think of them as our secret superheroes!”* Here are just some other of the useful things that oyster reefs can help us with:* 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 what an ecosystem service is
 |  | Active listening | PowerPoint with slides of oyster reef ecosystem services |
| **3 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.”* Show photos and videos of marine scientists in the field (including themselves if possible) doing their job/working to restore oysters.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
 |  | Active listening | PowerPoint slides with images of marine scientists working to restore oysters in the field. |
| **3 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** | **Q and A** – Spend a few minutes answering any questions the children may have about oysters, the project, 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. |  |

Total – 30 mins