Ocean Action Pod Core activity

A Spoon's Story: An introduction to lifecycle assessment

A Life Cycle Assessment (LCA) looks at the entire lifecycle of a product, from the sourcing of all of its raw materials, through all the processing and transportation of those materials, its assembly and sale, its active 'use phase' and what ultimately happens to it at the end of its life.

We take the humble disposable plastic spoon and consider its past, its present and its future!

This is an interactive drama/role-playing group exercise. Students are lead through an adaptation of a classic dramatic devising exercise[1]. Using mime, physical theatre and collaboration, the group explores and acts out the industrial process behind a plastic fork as a continuously moving timeline.

This activity is complimented by the activity 'What's that debris', which picks up where this activity finishes by exploring how plastic items travel to the ocean and what ultimately happens to them.

Key points of learning, in order:

- Plastic is made from oil and gas, which is pumped out of the ground or from under the seabed. Oil and gas are finite resources.
- Oil and gas are refined and subjected to industrial processes that turn it into plastic pellets.
- Plastic pellets called nurdles are transported around the world on big ships.
- Factories around the world use nurdles by melting them and turning them into products that we recognise – like a plastic spoon.
- A lot of cheap plastic objects are made thousands of miles away in places like China, then stuck on more big ships and transported all over the world, including to Australia. A plastic spoon is a global traveller!
- Plastic should not be used once! There is so much energy and so many resources invested in a simple plastic spoon that it is crazy to throw it away so easily! Better to use a reusable spoon and wash it!

[1] *This exercise is adapted from 'The Machine of rhythms' by world famous Brazilian drama pioneer and teacher Augusto Boal.*

THE ACTIVITY: *How to make a plastic spoon*

Equipment

- Dead sea creatures (board)
- Oil rig (board)
- Oil tanker (board)
- Giant nurdles x5 (board)
- Container ship x2 (board)
- Gas flames x3 (board)
- Hammers x2 (board)
- Giant spoon (board)
- Music player (optional)
- Prompt cards for activity leader

Optional warm-up game: Pass the stuff ***DRAS3.1***

This is a classic drama game designed to get everyone relating to 'stuff' that isn't actually there. The teacher starts by holding a ball of 'stuff' in her hand. She tosses the stuff up and down a few times, demonstrating it's weight. She bounces it on the ground and catches it again. She pulls it out like a lump of chewing gum, then roles it back up into a ball. After demonstrating the versatility of this stuff, she makes eye contact with another adult and throws it to them. The second adult catches the stuff, maybe with a bit of a jump, plays with it themself, then asks the class who wants it next. Spend a few minutes passing the stuff around. Encourage extreme creativity. It might be straightened into a spear and thrown at someone. It might be flattened into a Frisbee. It can be rolled along the ground, etc.

Number of participants: minimum 28, ideal 34, maximum 40

Time allowed for activity: 25 minutes

The teacher should lead this activity as the narrator or storyteller, prompting students to add to the story. **Use the prompt cards to assist as needed**. The idea is to build up a cumulative vignette of how a plastic spoon is made, with all students participating. The key concept in this activity is that at any one point we are dealing with imaginary 'stuff' at whatever stage of the process it happens to be. Imagination and drama are key to making the stuff seem real.

This whole activity is governed by rhythm. So playing some repetitive funky music will add to the overall feel and help everyone keep in time. However, save it for the end (see below).

SETTING UP

What follows is a step by step process whereby roles are added one by one. As each new student gets into their activity move quickly on. The idea is to introduce everyone to their roles so that they also get an idea of the whole system. Do the whole things as a walk through with no music.

There are 34 roles described below, though this can be altered up or down slightly as needed and will include some adults. Take a moment before you start to ensure that you know how many individuals you have to participate and add/remove roles as needed.

There are five main physical locations that you will need to identify. Use existing landmarks or items like small cones. The locations are: oil field; refinery; factory; Australian port; your school. Lay them out with four in a square and the school in the centre.

START

Today we are going to make a plastic spoon!
Ask who wants the giant spoon. Choose one student but don't hand it over. Tell them that they'll get their moment in the spotlight in a minute! In the meantime, you should keep hold of the spoon and use it for gesturing, etc.

Who knows how plastic is made?
Someone might say that it is made from oil. You can also explain that plastic can be made from gas too.

Who knows where oil and gas come from?
Choose one student to hold the dead sea creatures board. Where is the oil and gas? It's under the sea bed! The student should lie on the ground near the edge of the space and be **an oil and gas field**. They can make glooping noises and gas noises. Explain that there are oil and gas fields all over the world but that this one is in the Gulf of Mexico, off the eastern coast of the USA.

How do we get at the oil?
Choose two students to be an **oilrig**. They should stand over the oil field and start pumping – mechanical sucking noises are encouraged!

The oil rig is out at sea! How can we get it to the shore?
Choose one student to hold the **oil tanker** board and act out the oil tanker. The oil tanker needs to go and dock with the oilrig. It should make a big chugging noise. The oil tanker moves very slowly!

Where will the oil tanker take the oil?
Choose four students to be an **oil refinery**. They should go a reasonable distance from the oilrig (in Texas).

> **Now the oil tanker has a destination** – chug chug chug – as the tanker approaches the refinery it should blast its foghorn (a big deep bass noise). The tanker can dock at the refinery for long enough that its oil can be pumped out. Then it should return to the oilrig for another load.

How to be a refinery:

- One student is the **pump**, for unloading the oil tanker (more pumping noises).
- Two students make a **big tank** by holding both hands and spread their legs wide apart. The tank holds all the gloopy crude oil (gloopy noises).
- One student should be given a **gas flame boar**d – they heat up the gloopy crude oil in the tank (make noises like a roaring gas flame)

How do we turn the hot oil into plastic?
First we need to 'crack' the oil into tiny pieces. Choose two students to take **hammer boards**. They mime hitting the oil in the tank with 'CRACK' or explosion noises. You can explain that the real process doesn't actually use hammer but that we are using hammers to that they remember 'cracking'.

The cracked oil gives us something called 'feedstock'. Feedstock is what plastic is made from. Feedstock is a name that we give to various types of 'petrochemicals' (chemicals made from oil).

We need to transport the feedstock away from the refinery.
Choose two students to hold hands and connect to the refinery. They are a **pipeline** for the feedstock (more pumping noises).

Where do we think the feedstock will go next?
The next destination is the plastic factory.

- Two students will be a **catalytic reactor**. The feedstock pipeline squirts out feedstock into the catalytic reactor. The reactor should whir and shake about and make lots of mechanical noises.
- The catalytic reactor makes 'plastic fluff'. The next student is a **fluff grabber**, who passes fluff from the reactor to the next person, the melter.
- The **melter** needs to take another of the flame boards. They melt the fluff as it is passed to them (flame roaring noises). This makes molten plastic.
- Next comes the **extruder**. The extruder pushes the molten plastic through a tiny hole. The student might make the hole with one hand and use their other arm to mime the process of pushing the plastic through.
- Next comes the **nurdle chopper**. The nurdle chopper stands next to the extruder and chops the extruding sausage of plastic into lots of small bits called nurdles. Use karate chops and suitable sounds!

So we have lots of nurdles. Nurdles are how all plastic begins its life
Now we need some **nurdle packers**.

- One student grabs the new nurdles and places them into a shipping container.
- Another student is a crane – when a container is full the crane needs to load it onto a container ship.

Next we need a container ship
Choose one student to hold the first **container ship** board. They are going to take the nurdles on a very very very long sea voyage of 20,000km, all the way to China. The ship can meander around the edges of the space.

Where is the container ship going?
The container ship is going to the Spoon Factory. How to be a spoon factory:

- One student is going to **unload** the ship
- One student takes the third **gas flame** board and **melts** the nurdles as they are unloaded
- One student **pumps** the molten plastic into spoon shaped moulds
- The next student **cracks open the moulds** and empties them onto a conveyor belt.
- Two students should form a **conveyor belt**, in whatever way they want - suggest lots of turning wheels and whirring.
- Next we have a **spoon packer**, who places the new spoons into boxes and then into a shipping container.
- Another **crane** loads containers onto the second container ship.
- Give the second **container ship** to another student. Remember to make the right noises!

Where is the second container ship coming from?
China!

And where is it going?
Australia – That's another 20,000km!

The shipping container arrives at the port in Australia.

- We need **another crane!**
- We need **a truck** (student should mime a steering wheel and make truck noises)

[At this point there will be 31 places allocated so you may need to include teachers and helpers. Make sure you have one child left holding the giant spoon]

Where is the truck going?

- (Optional, if spare people) add a warehouse with packers and sorters
- Your school canteen - choose a classroom assistant to **unpack the truck** at the canteen and place the spoons out on the counter

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WRAP UP

Now that the whole system has been laid out and everyone knows his or her roles you can run the whole exercise again, with music. Begin with some role-play:

Original student enters a role-play with the classroom assistant who unloads the truck.

> Student: "Excuse me, please can I have [something you eat with a spoon]?
>
> Assistant: "Would you like a plastic spoon with that?"
>
> Student: "Yes"
>
> Assistant: "One moment…"
>
> [Assistant starts music]

The activity leader very rapidly calls/prompts everyone into position in order of their appearance. Make sure that everyone keeps doing their action and noises after other people are added.

> Assistant: [finishes unloading the box of spoons. Turns off the music]
>
> "Here you go"
>
> [Hands giant spoon to the student]

Invite a big round of applause and everyone bows!

Curriculum Links

Key Curriculum areas covered:

CREATIVE ARTS
Drama
DRA S3.1 - Develops a range of in-depth and sustained roles. Collaborates to convey dramatic meaning by responding abstractly to represent ideas, feelings, objects and situations.

HSEI
Geography
GE3-2 - Explains interactions and connections between people, places and environments

SCIENCE

Material World

ST3-12MW - Identifies the observable properties of solids, liquids and gases, and that changes made to materials are reversible or irreversible

ST3-13MW - Describes how the properties of materials determine their use for specific purposes.