Thought Swap Activity Teacher Guide

Approximate Time: 20-minutes

As part of the first activity, the 'thought swap' engages the entire class in an interactive activity that allows students' misconception on pollution and marine debris to be uncovered. The 'thought swap' can be completed in approximately 20-minutes and will develop students' listening and speaking skills. The four questions for the thought swap are listed below, with many potential answers to help the teacher guide the class discussion.

- To begin, have students pair off, and if there is enough room, have the students form two lines facing one another.
- One student will respond to the first question and the other student will listen to the response and prepare to report it to the class.
- Read the first question aloud and give the students 30 seconds to respond to the listener.
- Call on a few of the listeners to report their partner's response to the class.
- On the chalkboard, briefly summarize the responses reported by the listeners and ask the rest of the class if they have anything to add before moving on.
- Use the responses provided to supplement the list that the students create.
- Repeat the process with the other three provided questions provided below. Have the students switch listener and responder roles for each round.
- This activity can be shortened to 10-minutes by asking fewer questions, or other topics can be explored.

Question 1: What is pollution?

- Pollution is the introduction of contaminants into an environment that causes instability, disorder, harm or discomfort to the ecosystem.
- Pollution can take the form of chemical substances or energy (e.g., noise, heat, light).
- Pollutants, the elements of pollution, can be foreign substances or naturally occurring; when naturally occurring, they are considered contaminants when they exceed natural levels.
- Pollution is often categorized as point source (originating from one place) or non-point source pollution (originating from many places).

Question 2: What are some different types of pollution?

- *Air pollution*: The release of chemicals and particulates into the atmosphere. Common gaseous air pollutants include carbon dioxide, methane, carbon monoxide, sulfur dioxide, chlorofluorocarbons (CFCs) and nitrogen oxides produced by industry and the burning of fossil fuels. These can affect human and organism health and are the major driver of global climate change.
- *Water pollution*: The release of waste products and contaminants into the ocean, storm drains, river drainage systems, and groundwater. Includes liquid spills, wastewater discharges, fertilizers, pesticides and littering.

- *Soil contamination*: Chemicals that are released by spill or underground leakage. Among the most significant soil contaminants are hydrocarbons, heavy metals, herbicides & pesticides.
- *Noise pollution*: Encompasses roadway noise, aircraft noise, industrial noise, as well as high-intensity sonar, which is usually underwater.
- *Light pollution*: Includes light trespass, over-illumination and astronomical interference. This often interferes with animals' ability to navigate or with their natural diurnal patterns.
- *Visual pollution*: Can refer to the presence of overhead power lines, motorway billboards, scarred landforms (as from strip mining), open storage of trash or municipal solid waste.
- *Thermal pollution*: Temperature change in natural water bodies caused by human influence, such as use of water as coolant in a power plant.

Question 3: How do you think plastic pollution gets into the ocean?

- Runoff from land is the most significant source of marine debris. The source of most marine debris in waterways originates on land.
- Beach-goers can leave litter, such as cigarette butts.
- Though it is illegal to dump plastics, debris can come from ships dumping debris overboard.
- Ships can accidentally spill debris or shipwrecks can create debris.
- Fishing gear is often accidentally lost overboard.
- Look over this website for more information on this topic: *http://marinedebris.noaa.gov*

Question 4: How do you think plastic pollution affects marine organisms?

- Entanglement of birds, seals, turtles or fish in fishing line and other debris.
- Ingestion of plastic debris, which can cause death from starvation, damage to the digestive tract or decreased immune system strength.
- Chemicals inside of plastics can also affect hormones of animals, which can negatively affect their health, their ability to reproduce, and the health of their offspring.
- Debris can crash into or get snagged on coral and rocky reefs, or scour benthic habitats This can damage organisms physically disturbing them or their habitats.