

Ballast water lesson plan

VELS

Civics and Citizenship: Community Engagement: L4, 5, 6

Science L 4, 5; Geography: L 4, 5, 6: Knowledge and Understanding

Ballast is the name given to anything used to balance an object to make it more stable e.g. sand bags on hot-air balloons. In the past, ships used solid ballast such as rocks or bars of metal and these are often found in shipwrecks.

Modern ships use seawater to help provide stability. Ships pump water in and out of special compartments and this water can accumulate dirt and oil and carry undesirable marine organisms from port to port i.e. bacteria, plankton, algae and the spores, eggs or larvae of bigger organisms. These stowaways can then invade new habitats, causing damage to the local ecosystems - the Northern Pacific Seastar is thought to have arrived in Australian waters in this way.

Ballast water can also be treated in a number of ways before it is discharged e.g. heating, chlorination, skimming, ultra-violet irradiation or ozone treatment.

The purpose of this experiment is to use simple laboratory separation techniques to purify a sample of 'ballast water'. In reality, more sophisticated techniques are used.

Equipment:

cooking oil
sand
cardboard
filter paper
beakers
stirring rods / spoons

Artificial ballast water is produced by mixing water with cooking oil to represent the oil pollution and sand to represent the microscopic organisms.

Method:

1. Prepare 'ballast water' with sand, oil and water and stir well to mimic the action of ballast pumps.
2. Looking at the solution, and taking the properties of its constituents into account, devise ways to clean the 'ballast water'.
Approaches may include: skimming, filtration, spinning or a combination of methods.
3. Test out your experimental design. Does your procedure result in cleaner 'ballast water'?
4. Do you think that your experiment would be practical on a large scale? (consider time and expense)
5. Investigate ways that ballast water is actually treated.

Useful websites:

Global ballast water organisation site:
<http://globallast.imo.org>

Environmental Protection Agency guidelines on ballast water:
<http://www.epa.vic.gov.au/water/ballastwater/default.asp>

Contact:
Port Education Centre
ported@portofmelbourne.com
Ph: 9645 3000