BALTIC SEA LESSON FOR SECONDARY SCHOOL

Version 23/12/2022

BSAG
Baltic Sea Action Group

Structure of the Baltic Sea lesson

1. Our wonderful and unique Baltic Sea
2. Challenges of the Baltic Sea
3. How can we help the Baltic Sea?

Our wonderful and unique Baltic Sea

The Baltic Sea is beautiful and priceless.

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BALTIC SEA IS UNIQUE

- The Baltic Sea is very shallow and young for a sea.
- The water in the Baltic Sea is **brackish water** which is water that is saltier than lake water but less salty than water in oceans.

Photo: Jukka Rapo

WHAT IS THE BALTIC SEA?

- The Baltic Sea is the youngest of the world's seas. It was formed about 10,000–15,000 years ago after the last ice age.
- The average depth of the Baltic sea is 54 meters, whereas the Mediterranean has an average depth of 1500 meters.
- The Baltic sea is almost enclosed, the only connection to the ocean is through the straits of Denmark.
- The water in the Baltic sea changes slowly, so all the nutrients and harmful substances stay in rotation for long time.

CATCHMENT AREA

- The catchment area of the Baltic Sea is four times the size of the sea. Every drop of water that rains on the catchment area ends up in the Baltic Sea.
- The countries on the shore of the Baltic Sea are Finland, Sweden, Russia, Estonia, Latvia, Lithuania, Poland, Germany and Denmark.
- There are a lot of people living in the catchment area: almost 90 million. These people for example grow food and operate factories. It all affects the Baltic Sea.

Photo: Luonto-Liitto

Photo: Jukka Rapo

WATER STRATIFICATION

- The water in the Baltic Sea is unusually stratified, meaning warm water remains on the surface while colder water sinks to the bottom. This stratification is most pronounced during the summer and winter.
- Changes in the water's salinity also cause stratification, as salt water is heavier than freshwater. This salinity stratification is permanent at the Baltic Sea's deepest points. The deep waters are heavy and salty and do not mix with the fresher water at the surface.

THE BALTIC SEA IS VERY BEAUTIFUL

Let's dive under the surface!

Get to know the underwater world.

Video:

VELMU -video - YouTube

Photo: Jukka Rapo

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Photo: BSAG

SENSITIVE INHABITANTS OF THE BALTIC SEA

- The species of the Baltic Sea are very specific, since the sea is very secluded.
- The secludedness, northern location and the cool water with low salt concentration creates challenges for the species living in it.
- Although the animals, plants and algae in the Baltic Sea have adapted to living in these particular conditions, even small changes in their habitat can have dramatic consequences. Protecting marine nature in the Baltic Sea is, therefore, very important.

Photo: Pekka Lehtonen, Metsähallitus

KEY SPECIES OF THE BALTIC SEA

- A key species is a species that's existence is very important for its whole ecosystem.
- Key species make the wellbeing of other species possible by functioning as substrate, shelter and nutrition.
- If a key species were to die off, it would take many other species with itself. That is why conserving key species is relevant.
- Examples of key species are the blue mussel, bladderwrack and eelgrass.

KEY SPECIES OF THE BALTIC SEA

Photo: Visa Hietalahti

Blue mussels filter water efficiently.

Photo: Visa Hietalahti

Bladder wrack strives in clear water.

Photo: Mats Westerbom

Eelgrass sequesters carbon.

Photo: Heidi Arponen, Metsähallitus

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Challenges of the Baltic Sea

The Baltic Sea is beautiful and diverse, but it faces a lot of problems and challenges.

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Photo: BSAG

THERE IS TOO MUCH NUTRIENTS IN THE WATER

- Eutrophication is caused by the nutrients that plants need, such as nitrogen and phosphorus. They enter the water in various ways, for example, through agricultural and industrial runoff or household and commercial wastewater.
- Eutrophication is the Baltic Sea's worst problem. This causes many problems both for the Baltic Sea itself, as well as its coastal residents.
- Harmful blue-green algae blooms that hinder swimming trips in summer are a sign of the effects of eutrophication.

Has blue-green algae blooms stopped you from swimming?

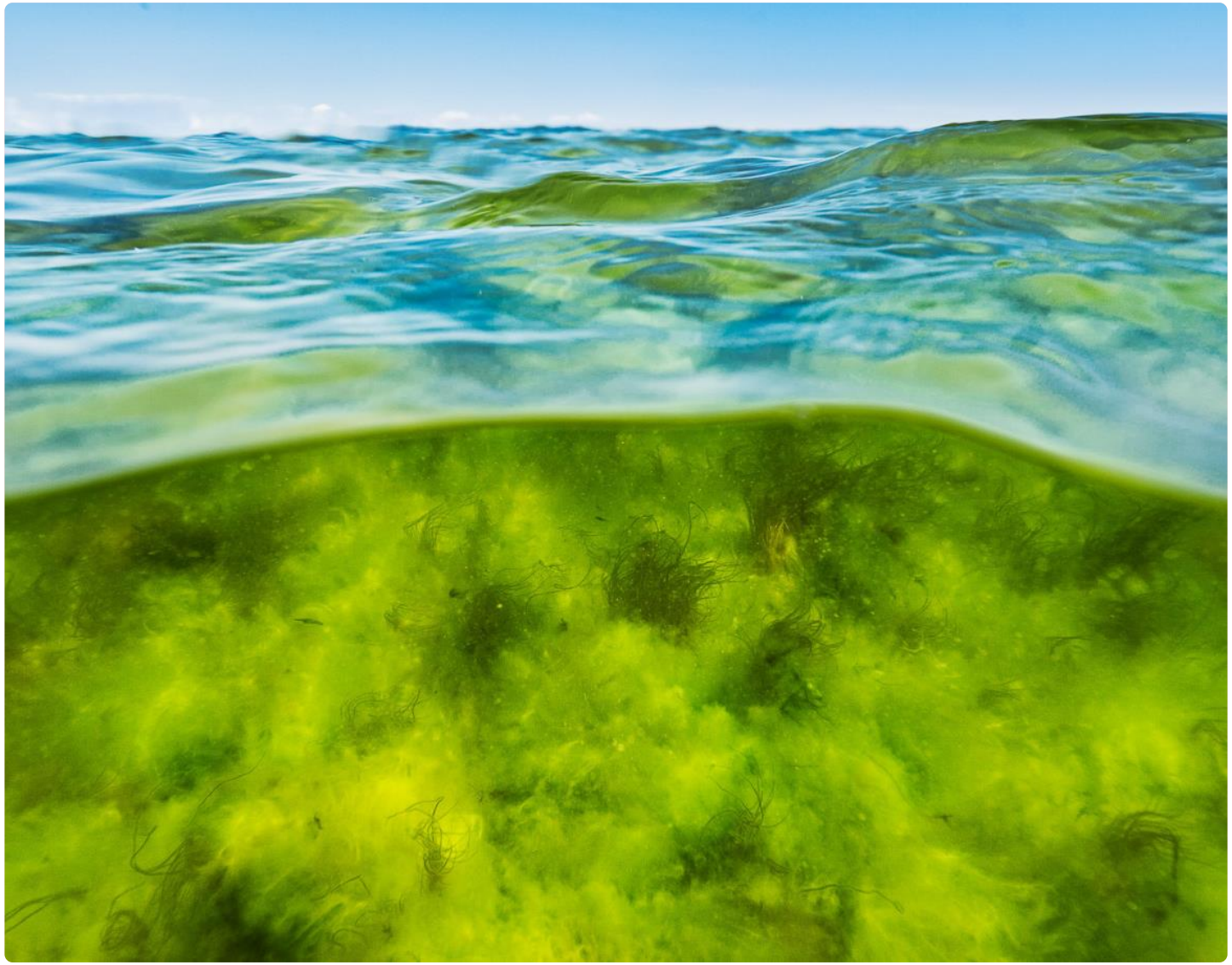
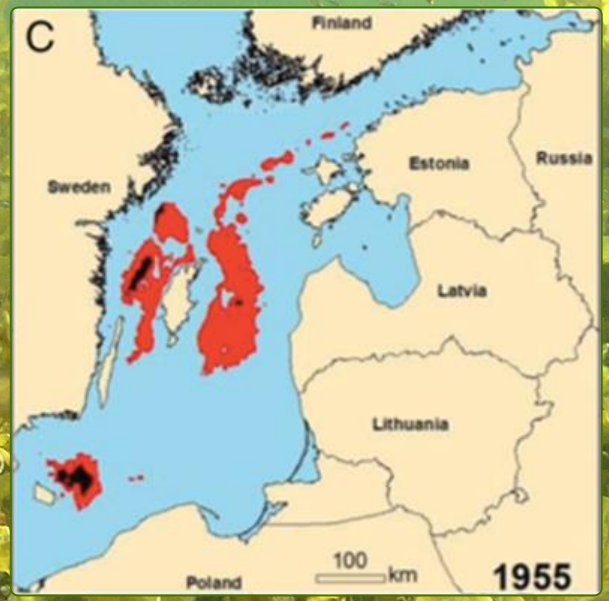


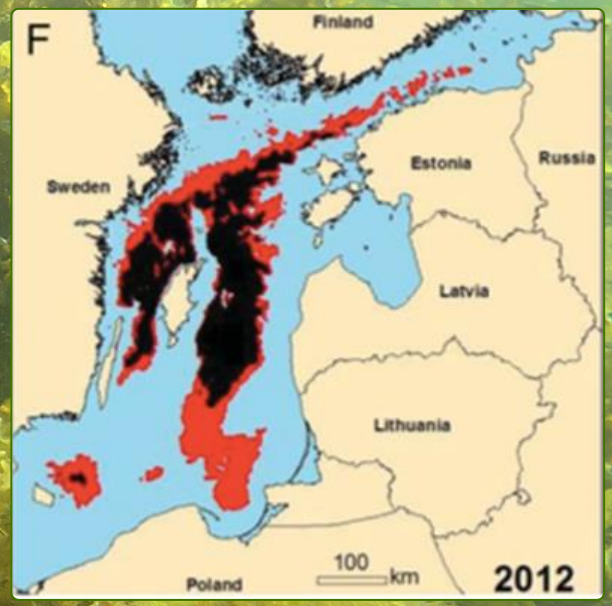
Photo: Jukka Rapo

INTERNAL LOAD REGULATES EUTROPHICATION

- Internal loading returns nutrients that have already ended up in the sea and are bound to bottom sediments back into the water column.
- The ability of bottom sediment to bind phosphorus varies. This ability depends on the oxygen situation of the seabed. The depletion of oxygen impairs the ability of the sediments to retain phosphorus.
- The oxygen conditions on the bottom, in turn, are affected by the level of marine eutrophication and the internal properties of the sea.

INCREASE OF HYPOXIC (LOW-OXYGEN) DEAD ZONES IN THE BALTIC SEA: YEARS 1906, 1955, 2012





(Carstensen et al 2014) https://www.pnas.org/content/111/15/5628

Photo: Heidi Arponen, Metsähallitus

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Photo: Eija Rantajärvi, SYKE

TRASH IN THE BALTIC SEA

- Most of the trash in the sea comes from land.
- If you toss a candy wrapper into the nature, it will most likely end up in the sea.
- Majority of the marine litter in the Baltic Sea is plastic.

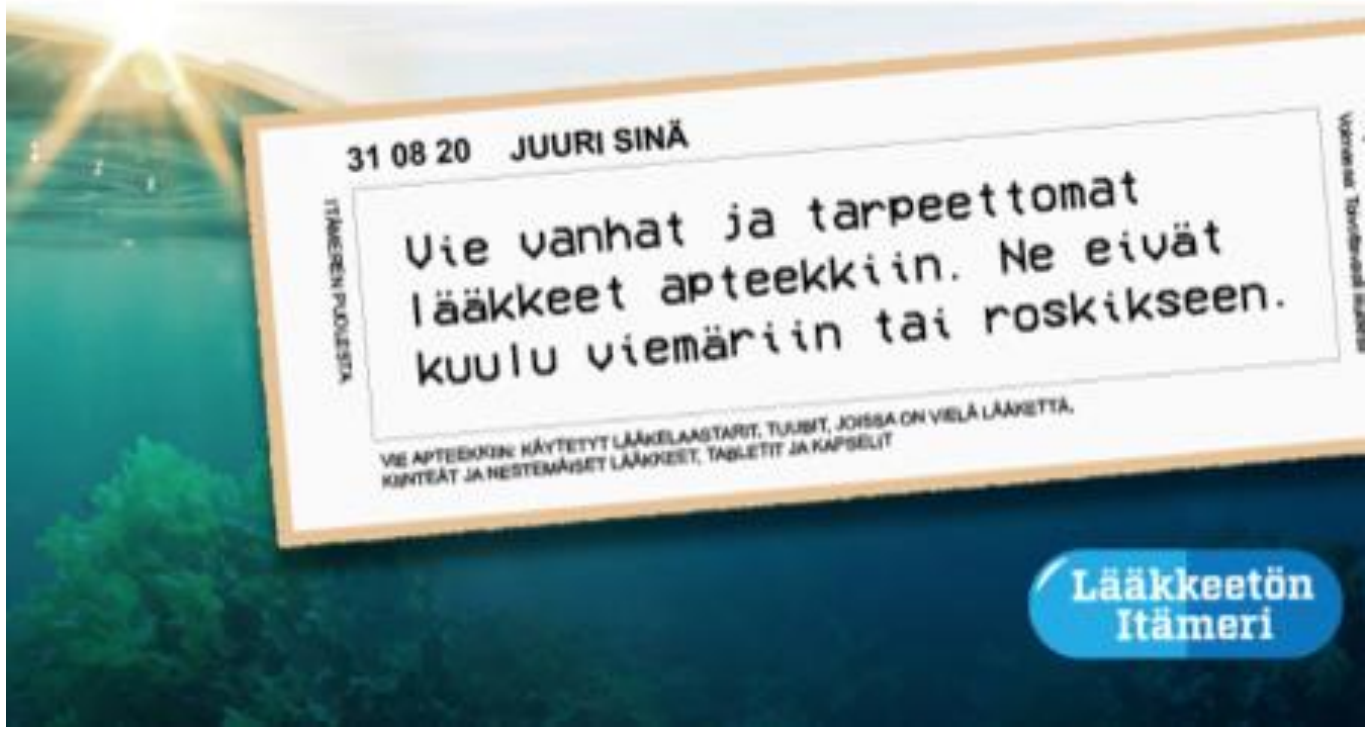
Think carefully of what you purchase. Reuse, recycle and take the trash where it belongs. That way there is less trash also in the Sea.

Photo: Jukka Rapo

HARMFUL SUBSTANCES

- Various different harmful substances have ended up into the Baltic Sea during the years. They end up in the sea from, for example: industry, cities, traffic and ships.
- Medicinal substances are harmful to the Baltic Sea. Expired or otherwise unused medicine need to be recycled in the right way. They should not be thrown into the toilet or trash.

Discuss at home: do you take your old medicine to the pharmacy?



MARITIME TRANSPORT

- Approximately 2,000 cargo ships will be sailing in the Baltic Sea at any given moment, carrying everything from oil products and liquid chemicals to bulk freight and trucks. A large number of passenger car ferries also operate in the Baltic Sea, carrying both passengers and cargo. This burdens the sea.
- An oil spill is the single worst environmental threat the Baltic Sea has. Fortunately, many countries around the coast of the Baltic Sea have prepared well for an oil spill.
- Read more: bsag.fi

Photo: Jukka Rapo

CLIMATE CHANGE AFFECTS EVERYTHING, ALSO THE BALTIC SEA

- Climate change makes the northern winters warmer and rainier.
- The Baltic Sea is predicted to become warmer and the salt concentration is predicted to decrease.
- All of the possible effects of climate change on the Baltic Sea and its nature are not known. The Baltic Sea will most likely become more eutrophicated.

How can we help the Baltic Sea?

The Baltic Sea can still be saved!

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INTERNATIONAL PROTECTION OF THE BALTIC SEA

- International cooperation has a strong base in conserving the Baltic Sea. International agreements align common goals and objectives.
- Even though the agreements are made as international cooperation, the ways to reach the terms are determined differently in every country.
- For Finland a relevant international agreement is the ‘Convention on the Protection of the Marine Environment of the Baltic Sea Area’, which is monitored by the Helsinki Commission HELCOM.

Photo: Micke Aminof

HOW CAN WE HELP THE BALTIC SEA?

- Multiple organizations and foundations work for the benefit of the Baltic Sea. They, for example, take concrete actions to better the condition of the Baltic Sea and keep in touch with politicians, who are the ones that decide about matters concerning the sea.
- With cooperation we can reach great results and the Baltic Sea can be saved.

WHAT CAN I DO?

When eating and shopping

- Eat more vegetables and domestic fish. Pay attention to how the food is produced. Favor sustainably produced food produced close to you.
- When thinking of buying something new, consider if you really need it. When buying, buy sustainable, repairable and recyclable devices and clothing. Avoid plastic packaging and plastic bags.

In traffic

- Walk, cycle and favor public transportation. Have your holidays somewhere near.

At home

- Avoid unnecessary chemicals in cosmetics, cleaning and washing laundry.
- Sort waste correctly and compost.

By sea and land

- Don’t litter at sea or land.
- Don’t disturb the nature of the archipelago. Avoid damaging vegetation and moving outside of the trails.

In society

- Discuss and influence. Try to motivate your friends and family to be interested in conserving the Baltic sea.

The Baltic Sea needs help from all of us!

We would like to thank your school for joining the cooperation for saving our beloved Baltic Sea.

At Baltic Sea Action Group (BSAG) our goal is to restore the good ecological balance of the Baltic Sea in changing climate conditions. We protect the Baltic Sea, prevent loss of biodiversity and curb climate change.

Read more about the Baltic Sea
https://www.bsag.fi/en/the-baltic-sea/
https://www.marinefinland.fi/en-US

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