Purpose:

The e-learning module is designed for theoretical training of seafarers in accordance with STCW Convention in the part concerning prevention of pollution of the marine environment.

What is an e-learning module?

E-learning module is the electronic textbook on one or more sections. Theoretical materials can be accompanied by drawings, diagrams, photos, animations and videos. There is a test for assessment of knowledge gained at the end of each section.

Contents:

- **Introduction.** Sustainable shipping and the marine environment
- **Environmental challenges.** Environmental impact of discharges to the sea, oil, chemicals, sewage and solid waste.
- **Enviromental challenges.** Emissions to air, greenhouse gases. Other emissions to air. Introduction of invasive species including ballast water. Other impact on the marine environment; noise, antifouling, ship recycling.

Target groups

Deck - Management
Deck - Operational
Deck - Support

Engine - Management
Engine - Operational
Engine - Support

Ship types

Generic

Regulations

Table A-II/1 STCW Code

Competence:	Ensure compliance with pollution prevention requirements

Table A-II/2 STCW Code

Competence:	Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and the protection of the marine environment

Table A-II/3 STCW Code

Competence:	Ensure compliance with pollution prevention requirements

Table A-II/5 STCW Code

Competence:	Apply precautions and contribute to the prevention of pollution of the marine environment

Table A-III/1 STCW Code

Competence:	Ensure compliance with pollution prevention requirements

Table A-III/2 STCW Code

Competence:	Monitor and control compliance with legislative requirements and measures to ensure safety of life at sea and the protection of the marine environment

Table A-III/5 STCW Code

Competence:	Apply precautions and contribute to the prevention of pollution of the marine environment

Table A-III/6 STCW Code

Competence:	Ensure compliance with pollution prevention requirements

Table A-III/7 STCW Code

Competence:	Apply precautions and contribute to the prevention of pollution of the marine environment

MARINE ENVIRONMENTAL AWARENESS
Version: 07/2022

Block 1: Marine environment

2. Marine Ecology – the basics

When mentioning sea life most people imagine large visible organisms, such as whales, dolphins, and fish. While these animals are easily spotted by the naked eye, they actually are not so abundant. The vast majority of plants and animals in the sea are microscopically small, very abundant and crucial for the existence of larger marine life. These microscopic organisms are the basis of sea life, for they feed larger animals, which in turn feed humans.

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MARINE ENVIRONMENTAL AWARENESS
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Block 1: Marine environment

4. Particularly Sensitive Sea Area's (PSSA's)

It is difficult for individual countries to protect sea areas from international shipping activities. That is because international laws allow free transit for ships in international waters. Therefore, protection has to be agreed on in the International Maritime Organization. The IMO has two instruments to protect sea areas from shipping activities: Particularly Sensitive Sea Areas (PSSAs) and Special Areas. Special areas are always coupled to MARPOL Annexes, while PSSAs are not. In this article, the focus is on PSSAs.

A PSSA is a marine area that needs special protection because it has important ecological, social, cultural, economic, scientific or educational characteristics, which may be vulnerable to damage by international shipping activities. PSSAs are established by the IMO. When an area is approved as a PSSA, specific measures can be used to control the maritime activities in that area. Such measures can be routing measures, mandatory piloting, reporting

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MARINE ENVIRONMENTAL AWARENESS
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Block 2: Discharges to the sea: Oil
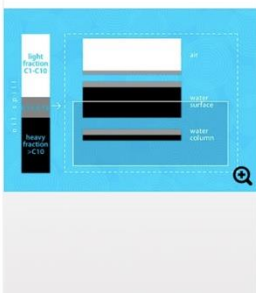
3.Fate of oil spills

The fate of oil spilled in sea water depends on a number of factors, such as the type of oil spilled, the amount, the prevailing weather and sea conditions; and whether the oil remains at sea or comes ashore.

3.1 Weathering processes

Oil, when spilled at sea, will normally break up and be dissipated or scattered into the marine environment over time. This dissipation is a result of a number of chemical and physical processes that change the compounds that make up oil when it is spilled. The processes are collectively known as weathering.

Oils weather in different ways. In general, compounds will evaporate into the air, dissolve in the water, or stay on the water surface. These general processes are shown in figure.

After an oil spill, the oil will quickly spread in a thin layer on the sea surface. In a few minutes, a thousand liters of crude

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MARINE ENVIRONMENTAL AWARENESS
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Block 2: Discharges to the sea: Solid waste

1. Marine litter: mostly plastics

Marine litter can be defined as any persistent, manufactured or processed solid material discarded, disposed of or abandoned in the marine and coastal environment (United Nations Environment Programme – UNEP). This includes items that are discarded (thrown or lost) in the sea, brought to the sea by rivers, sewage, storm water or winds, or left by people on beaches and shores.

Marine litter consists mostly of items that degrade slowly, such as plastics, metal and glass. In many regions, plastics constitute between 60 and 80% of all marine litter (Derraik 2002). Some regional examples include:

- The Mediterranean seabed, where plastics accounted for 77% of all debris, of which 93% plastic bags (study in 1994, cited in UNEP 2005);

- The ocean surface of the North Pacific, where plastics accounted for 89% of all floating litter (study in 1998, cited in UNEP 2005).

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Block 3: Greenhouse gases

4.1 Global temperatures increase further

The Earth's temperature is predicted to increase in the future. For the next two decades, the IPCC predicts an average warming of about 0.2°C per decade. Should the concentrations of all GHGs and aerosols be kept constant at year 2000 levels, a further warming of about 0.1°C per decade would be expected (IPCC 2007 SPM SYN).

4.2 Extreme weather conditions

Extreme weather conditions are expected to occur more frequently. Average global warming will increase the chance for heat waves (very likely), intense tropical cyclone activity (likely), and heavy rainfall events (very likely). On the other hand, land areas affected by drought will experience even greater drought (likely). The latter will, for instance, negatively affect agriculture, increase the risk of wildfires, and put pressure on fresh water resources. One important thing to realize here is that weather is not the same as climate. Weather refers to the conditions of the atmosphere over a short period of time (days, weeks, months), while climate is the average condition of the atmosphere over longer periods of time (often decades: time frames of 10 years).

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MARINE ENVIRONMENTAL AWARENESS
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Block 2: Test tasks

COMMENT

The effects are relatively easy to identify, and range from disorder and nausea, to coma and death. Symptoms of chronic toxicity occur after prolonged toxic exposure - a shorter life span, reduced reproduction success, cancer, reduced resistance to diseases, etc.

Text of question:

The following occurs as a result of chronic toxic effects on the body ...

Choose the correct answer

○ chronic intoxication.

○ acute intoxication.

Attempts: 1   Skip the task

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