

WP 7 –Preparing for a future world: improving education and awareness at all societal levels



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Aim of WP

The main objectives are:

- 1) to develop and deliver educational resources at school and university level in response to needs identified by teachers across the world (PAS)*
- 2) to increase awareness of the general public (including influential people) to Arctic environmental change and its global implications (BBC, USFD)*
- 3) to establish a new generation of researchers capable of making high level assessments of environmental change in the Arctic and its global implications (AMAP).*

Task 7.1

Increased public awareness of Arctic environmental change and its global implications (Lead: USFD, sub-contract to BBC)

Agreed MOU with BBC Studios

- Final draft contract close to agreement
- First Earth platform expects 10 million viewers
- 4 short films
- We provide footage and help with story-line



[illegible]

Task 7.3

Promotion of polar issues by providing educational resources to schools.

(Lead: IGF-PAS)

At least 3 tool-kits will be developed:

- syllabus with introduction
- 5 basic concepts to remember
- mind map
- glossary
- materials for teachers, lesson plans
- worksheets for pupils
- online activities (crosswords, quizzes etc.)
- presentations, animations or recordings of experts' lectures
- experiment scenarios



Task 7.3

Preparation of Polish version of toolkits:

- 1) *Permafrost*
- 2) *Glaciers*



GRUPA DOCELOWA

UCZNIOWIE W WIEKU LAT 13-19

ZESTAW NARZĘDZI DLA SZKÓŁ

WSTĘP

„Lodowiec” to francuskie słowo, które pochodzi od łacińskiego *glacies* oznaczającego lód. Lodowce są największymi ruchomymi obiektami na ziemi. Są to masywne rzeki lodu, które tworzą się w miejscach, gdzie każdej zimy pada więcej śniegu niż topnieje każdego lata.

Lodowiec to duże, wieloletnie nagromadzenie krystalicznego lodu, śniegu, skał, osadów i często płynnej wody, które powstaje na lądzie i przemieszcza się w dół zbocza pod wpływem własnej wagi i ciężaru. Lodowce pokrywają obecnie 10 procent powierzchni Ziemi. Podczas ostatniej epoki lodowcowej lodowce pokrywały 32 procent powierzchni Ziemi.

Glaciologia łączy w sobie wiedzę z:

- Fizyki: Kryształy śniegu i lodu, przemiany fazowe, dynamika przepływu lodu, termodynamika,
- Geologii: Krajobraz, erozja, sedimentacja, ...
- Chemii: Izotopy, skład,
- Meteorologii: Klimat, opady,
- Oceanografii: Prądy oceaniczne.

Ponieważ na masę lodowców mają wpływ długoterminowe zmiany klimatu, np. opady, średnie temperatury i zachmurzenie, zmiany masy lodowców są uważane za jedno z najbardziej wrażliwych wskaźników zmian klimatu i są głównym źródłem zmian poziomu mórz.

Obrazy satelitarne pokazują, że 10% światowych lodowców znajduje się w odwrocie. Najstarszy, najbardziej sprasowany lód w lodowcach często cofa się jako pierwszy, ponieważ znajduje się poniżej poziomu morza, a ogrzewające temperatury oceanu otaczają go i topią.

MAPA NITELI

KONSPEKT

ZAGADNIENIA ARKTYCZNE:



Task 7.3

Educational toolkit „Studying past environments”


- syllabus with introduction with mind map and glossary
- materials for teachers, lesson plan
- worksheets for pupils
- answers for teachers
- online activities (crosswords, quizzes etc.)
- powerpoint presentation
- videos: Analysis and importance of peatlands & Secrets of dead plants

Task 7.3

Producing Educational Resources

- For e-book and stand-alone
- Important in Covid year
- Primary education With Wicked Weather Watch
- Secondary and under-graduate education with Toms State University and tool-kits with IGF, PAS
- On-going

Simple experiment



INTER = ACT


6.2 What causes the sea level to rise?

You will need: A metal pet food dish or other metal dish/pan, with a flat rim if possible.
Cold water.
Ice cubes.
Magic marker pen, ball point pen/pencil and paper.
Something to heat the water – e.g. hot water bottle, a heat pack.

1a) Does melting sea ice lead to sea level rise?
Take the metal dish and half fill it with water.
Put ice cubes in the water.
Using the magic marker pen, draw a line on the side of the pet dish to show the level of the water. This line represents the sea level.
Allow the ice cubes to melt completely, without heating the water!
Check the 'sea level'. Has it gone up?

1b) Does melting ice on land lead to sea level rise?
Fill the same metal dish/pan half full.
Using the magic marker pen, mark the level of the 'sea'.
Put ice cubes on the rim.
Allow them to fully melt without heating the water!
Check the 'sea level'. Has it gone up?
NB: If you can't find a metal dish with a flat rim, allow the ice cubes to melt through your fingers. It will have the same effect!

1c) Do warmer oceans lead to rising sea levels?
Fill the metal dish/pan three quarters full.
Heat it with a hot water bottle / heat-pack. If you are using a pan you can heat it on a stove but you must be accompanied by an adult.
What happens to the water?



INTER = ACT

The science behind the results

What causes the sea level to rise?

Climate change raises the level of the sea. Increasing global and Arctic temperatures cause the sea level to go up for two reasons:

1. Hotter air melts ice on the land, such as glaciers and the Greenland Ice Sheet. The hotter the air is, the more ice melts and the faster it melts. The melted ice turns into flowing water and runs off the land into the sea, adding more water to the ocean.
2. Water expands (gets bigger) as it gets warmer. When we cook food in a pan, we don't fill the pan to the top as the water overflows when it gets hot. In the same way, warm seawater takes up more space in the ocean basin, causing the sea level to rise (go up).

Sea ice that melts does not cause the sea level to go up. This is because ice is just frozen water and if it melts when it is already in the water then the volume (amount) of water stays the same, and the sea level stays the same.

From our experiments we know that:

- 1a) Melting sea ice does not lead to sea level rise. In the first part of the experiment, the water level (sea level) did not go up.
- 1b) Melting ice on land does cause sea level rise. In the second part of the experiment, the water level (sea level) went up.
- 1c) Warmer Arctic seas increase sea level. In the final part of the experiment, the water level (sea level) went up / split out over the edge of the metal dish.

Why does this matter?
Even a small increase in sea levels could affect tens of millions of people across the globe living along the coast, and the landscapes around them. Higher sea levels would flood some low-lying areas, forcing people to abandon their homes and move to another area and some low-lying islands could be completely covered by water. As seawater goes inland it can cause freshwater fish, birds, and plants to lose their habitats. Higher sea levels also mean that storm surges – the rise in seawater level during a storm – will be bigger and happen more often, reaching farther inland and causing more frequent flooding.



*Sophisticated
animation
by TSU*

Task 7.4

Online lessons for secondary schools

(Lead: IGF-PAS)

- 60 online lessons for secondary schools (IGF-PAS + NIBIO)
- additional set of webinars by Transnational Access Users (all stations with TA)
- **Planned for 2022-2024**



Task 7.4

May 2021

TODAY

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Mon	Tue	Wed	Thu	Fri	Sat	Sun
26	27	28	29	30	1	2
	8a A SLED DOG LIFE!	8a PLASTIC AND OTHER POLLUTANTS, ALL THE 10a Niedźwiedź polarny 1p Phytoplankton in the Arctic				
3	4	5	6	7	8	9
7a Greenland: Kalaallit Nunaat in a nutshell 8a Ocean currents and climate	8a INVASIVE SPECIES: WHEN WILD GEESE EAT	8a WIND TURBINES, WHEN GOOD BECOMES BAD	8a SUSTAINABLE CITIZENSHIP, WHAT'S IN IT	7a ET SLEDEHUNDELIV! 1p Arctic soils and nutrient cycle		
10	11	12	13	14	15	16
8a Przystosowania roślin do klimatu Arktyki	7a Siberia	7a Northern lights - a magic spectacle in the sky 1p Ecotoxicology		1p Sekrety ekotoksykologii		
17	18	19	20	21	22	23
7a Why is permafrost dangerous for Earth's	7a Syberia	8a Arctic hydrology 1p Greenland: Kalaallit Nunaat in a nutshell		9a Climate of Svalbard 1p Arctic soils and nutrient cycle		
24	25	26	27	28	29	30
		8a Procesy hydrologiczne w Arktyce 10a Svalbard [PL]		7a Svalbard [EN] 9a Klimat Svalbardu		
31	1	2	3	4	5	6
	8a Niebezpieczna wieloletnia zmarzlina	6:30a Siberia				



Requirements from others and ways forward

- *Continuing animation and video production from TSU and Usheffield*
- *Continuing resources from Wicked Weather Watch*
- *Acceptance of the toolkit „Studying past environments“*
- *Decision on the next topics (one for NIBIO and two for IGF) – based on the animations prepared by Terry and Univeristy of Tomsk*
- *Ready for collaboration with other partners willing to conduct webinars about reasearch in their stations*
- *Ideas for new resources welcome, but capacity for production not guaranteed!*