Imagine if all the ice on Earth melted

Experiment about the impacts of ice melting on the sea level

Type of pedagogical project, activity, action, accompanying	**Activity (scientific experiement)** 
Key words of relevant disciplines/ Pedagogical content	Sea level/ Ice melting/ Ice on continent/ Global warming/ Natural risk
Problematic	**What are the consequences of global warming on the sea level?**
Thematic	Water, major natural risks, global warming
Disciplines (sciences, geography)	*Sciences/Physics/Geography, Civic education*
Pedagogical Objectives/New targeted skills	**The students will be able to:** - Conduct an experiment by following the protocol about change of water states (from solid to liquid) - Understand how melted ice on continent affects sea level - Understand how icebergs in the sea affect sea level - Understand the consequences of climate change on the global ice melting - Understand why sea level rises - Understand the ice melting phenomenon and it consequences on the sea level.

Public target(s) (age, requested skills…)	10- 14 years old
Description (step by step)	At the beginning the teacher introduces the topic of rising sea level to students by showing them a video where they can see what is happening with places on the coast and their populations (sea level is rising and people are losing their living places; they have to move). After watching this video, the teacher starts a conversation so students have to think of possible causes of sea level rising. When students mention that ice is melting, ice bergs are melting, he introduces them to the activity they will do. The teacher explains the experiments they will do, which aims at observing if icebergs in the sea and ice on continents have the same effect on sea level or not. The animator/teacher, gives all the needed materials for the experiments to the students, along with the scientific procedure. The teacher splits the students into groups of four. He gives them a paper with directions on how to do two experiments. **Description of the experiment** **Step 1)** ● Put a solid item (wooden cube, metal cylinder, ...) at the bottom of the 1st bowl. ● Fill it up with water without overflowing the top of the item (3 - 4 cm from the top) ● Put 2 ice cubes **on** the item ● With an erasable marker, draw a line on the bowl to represent the water level. ● Let the ice cubes melt and observe the results: the water level rises **Step 2)** ● Put a solid item (wooden cube, metal cylinder, ...) at the bottom of the 2nd bowl. ● Fill it up with water without overflowing the top of the item (3 - 4 cm from the top) ● Put 2 ice cubes **in** the water. ● With an erasable marker, draw a line on the bowl to represent the water level.

	• Let the ice cubes melt and observe the results: the water level rises At the end of the activity, every group has to write their observations and conclusions of what they have witnessed. They also have to write explanations on why it happened. **The teacher provides an interpretation of the experiment and explains why ice melting on continents affects sea rise and why icebergs which are already in the sea do not.** The last task the teacher gives them is a task to try to apply that knowledge on global warming and sea level rise. The animator/teacher asks to the students to share their results with their classmates.
Place (meeting room, outside space, …)	Classroom
Individual and / or collective actions	Individual or in groups of 2 to 3 pupils.
Material needed	4 ices cubes, 2 bowls, 2 solid items (wooden cube, metal cylinder, ...), water, an erasable marker.
Duration of pedagogical project or activity	**20 minutes** for the experiment **10 minutes** for the groups to express their results
Evaluation of the new acquired skills	Students express their results with the other classmates.
Eco-citizen adaptation, knowledge enhancement and links to other topics	**Link to:** **Activity: Experiment about temperature impact on sea level.** **Knowledge: Marine environment and Climate change** **French content online on the activity:** **V French website** **https://lesjeunesfaceauxcc.wixsite.com/lesjeunesfaceauxcc**

Observations	Some teachers commented on this experience saying that in the case of an iceberg melting, it will produce a small difference on the sea level even with the melting of ice already present in the water. When in the activity, it is written that it won't change at all. The problem is that the activity uses the Archimedes principle, which says that melting ice won't change sea level, but only if this body of ice is totally immerged into water. We have to say to our students that if one part of the ice is emerged, the sea level will rise slightly. This activity can be connected with activities n° 1, 3, 9, 15 (sometimes this connection is about methodology)