Experiment: Albedo feedback

Objective:
Study the effect of different albedo (= reflectivity) on surfaces warming. This experiment will help you understand why sea ice retreat contributes to global warming.

Background:
The "Albedo" corresponds the fraction of radiation reflected by a surface. This term is used in Earth Sciences to indicate how different surfaces reflect and absorb solar energy.
Before starting, formulate your hypothesis on the different behaviour of two surfaces appearing dark and white: which of the two surfaces reflect less light and absorb more? Write your hypothesis below.

Materials:
- 2 glasses;
- White cardboard;
- Dark ink;
- 2 thermometers;
- 2 warm lamps.

Group structure

Not more than 4 persons

1-2p	experiment
1p	documentation
1p	presentation

1) Preparation:
Pour water in equal quantity in the two glasses and dye it with the dark colourant (the darker, the better). Insert one thermometer in each glass and cover one of the two glasses with the white cardboard.

Turn on the lamps pointing to the two glasses.
Insert measures of temperatures in the table on the side.
Draw your experimental setup below!

2) Observations:
At regular time intervals, note down the temperatures measured below the white (W) and the dark surfaces (D):

Time (hh:mm:ss)	Temperature W (°C)	Temperature D (°C)
START:		
+2min:		
+4min:		
+6min:		
+8min:		
+10min:		
+12min:		
+14min:		
+16min:		

3) Analysis:
Draw in a graph the temperatures in the two glasses (y axis) versus time (x axis). In which glass the water warms up more quickly?

4) Interpretation
1. What is represented in the glass covered by the cardboard and in the one uncovered? Which of the two systems warms up more quickly?
2. Interpret the result: What happens in the Arctic when sea ice melts, uncovering the dark ocean?

(If your answers do not fit here, you can write behind)