Exercise:

Arctic ice management

Temperatures are now so high at the North Pole that scientists are contemplating radical schemes to avoid catastrophe.

Physicist Steven Desch has come up with a novel solution to the problems that now beset the Arctic. He and a team of colleagues from Arizona State University want to replenish the region's shrinking sea ice by building 10 million wind-powered pumps over the Arctic ice cap. In winter, these would be used to pump water to the surface of the ice where it would freeze, thickening the cap.

The pumps could add an extra metre of sea ice to the Arctic's current layer, Desch argues. The current cap rarely exceeds 2-3 metres in thickness and is being eroded constantly as the planet succumbs to climate change. Thicker ice would mean longer-lasting ice. In turn, that would mean the danger of all sea ice disappearing from the Arctic in summer would be reduced significantly.

Desch and his team have put forward the scheme in a paper that has just been published in Earth s Future, and they have worked out a price tag for the project: $500bn. It is an astonishing sum. However, it is the kind of outlay that may become necessary if we want to halt the calamity that faces the Arctic. They say that it is now warming twice as fast as their climate models predicted only a few years ago.

Hence, Desch's scheme to use wind pumps to bring water which is **insulated** from the bitter Arctic cold by its icy surface, where it will freeze and thicken the ice cap. Nor is the physicist alone in his Arctic scheming. Other projects to halt sea-ice loss include one to artificially whiten the Arctic by scattering light-coloured aerosol particles over it to reflect solar radiation back into space, and another to spray sea water into the atmosphere above the region to create clouds that would also reflect sunlight away from the surface.

All the projects are highly imaginative, and extremely costly. The fact that they are even being considered reveals just how desperately worried researchers have become about the Arctic. The situation is causing grave concern, and it is now much more serious than even the worst case scenarios originally suggested.

Last November, when sea ice should have begun thickening and spreading over the Arctic as winter set in, the region warmed up. Temperatures should have plummeted to -25C but reached several degrees above freezing instead. It s been about 20C warmer than normal over most of the Arctic Ocean. **This** is unprecedented.

In fact, sea ice growth stalled during the second week of January - in the heart of the Arctic winter - while the ice cap actually retreated within the Kara and Barents seas, and within the Sea of Okhotsk. Similarly, the Svalbard archipelago, normally shrouded in ice, has remained relatively free because of the inflow of warm Atlantic water along the western part of the island chain. Consequently, although there has been some recovery, sea ice remains well below all previous record lows.

Equally worrying is the likely impact on wildlife. Juvenile Arctic cod like to hang out under the sea ice. Polar bears hunt on sea ice, and seals give birth on it. We have no idea what will happen when that lot disappears.

In addition, there is the problem of increasing numbers of warm spells during which rain falls instead of snow. That rain then freezes on the ground and forms a hard coating that prevents reindeer and caribou from finding food under the snow. Nor would the rest of the world be isolated. With less ice to reflect solar radiation back into space, the dark ocean waters of the high latitudes will warm and the Arctic will heat up even further. The Arctic ice cap reaches its maximum extent every March and then, over the next six months, dwindles.

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Questions

1) What is the writer s intention in the first paragraph?

A) To criticise an existing way of doing things.
B) To predict problems a project could face.
C) To inform the reader about an innovative concept.
D) To persuade influential bodies to undertake a course of action.

2) What outcome does the writer suggest in the second paragraph?

A) The thinning of the sea ice could be halted.
B) The risk of there being no sea ice in the future would be dramatically lowered.
C) 2-3 metres of additional sea ice could be deposited.
D) The constant erosion of the sea ice could be stopped.

3) What does the writer mean when he describes the water as being **insulated** in the fourth paragraph?

A) The ice cap protects the water underneath from freezing.
B) The effect of the sun prevents the water from getting too cold.
C) Arctic water is colder.
D) Pollution in the water makes it difficult for it to freeze.

4) What objective is the writer describing at the end of the fourth paragraph?

A) Cleaning the ice that has been discoloured.
B) Increasing the amount of snow that falls on the ice.
C) Making the thickness of the ice uniform.
D) Preventing the sun from impacting the ice.

5) What is the writer referring to with the word **This** at the end of paragraph 6?

A) Conditions that have never happened before.
B) Conditions that happen very rarely.
C) Normal winter conditions.
D) Conditions that were predictable.

6) What reason does the writer give in the seventh paragraph for the sea ice not getting thicker?

A) The winds from the north are too warm.
B) The ice cap is not thick enough.
C) Seismic activity under the ice had an effect.
D) Warm water currents affected the formation of the ice.

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