ARCTIC OCEAN
SCIENTIFIC ADVENTURES

EDUCATIONAL PACKAGE NO.02

General concepts of the Arctic Ocean

Hints

Don't write too big or you will not have enough space to clearly identify all of the elements.

THE ARCTIC AND ME

1. What is the polar amplification? Explain the phenomenon.

Polar amplification refers to the fact that, as a result of global warming, temperatures in polar regions are increasing twice as fast as elsewhere on the planet due to positive feedback mechanisms (snow covered surfaces that reflect solar radiation are melting, exposing dark colored ground surfaces that absorb heat) and the oceanic and atmospheric transport of heat towards the poles.

2. Who sees opportunities associated with the melting of the Arctic ice cap? What are their arguments?

There are boundary disputes between the countries bordering the Arctic Ocean. Each would like to claim the largest territory possible, to control maritime traffic in the expanding ice-free zone and gain mining and oil exploration rights to the newly-accessible sea-floor.

3. What are the two principal causes of rising sea levels?

(1.) Thermal expansion of warmer water

(2.) Melting of sea-ice

4. Melting of the sea ice has important consequences for the native Inuit population and animals. Provide an example for each.

Inuits: Difficulty finding suitable locations for traditional fishing and hunting activities.

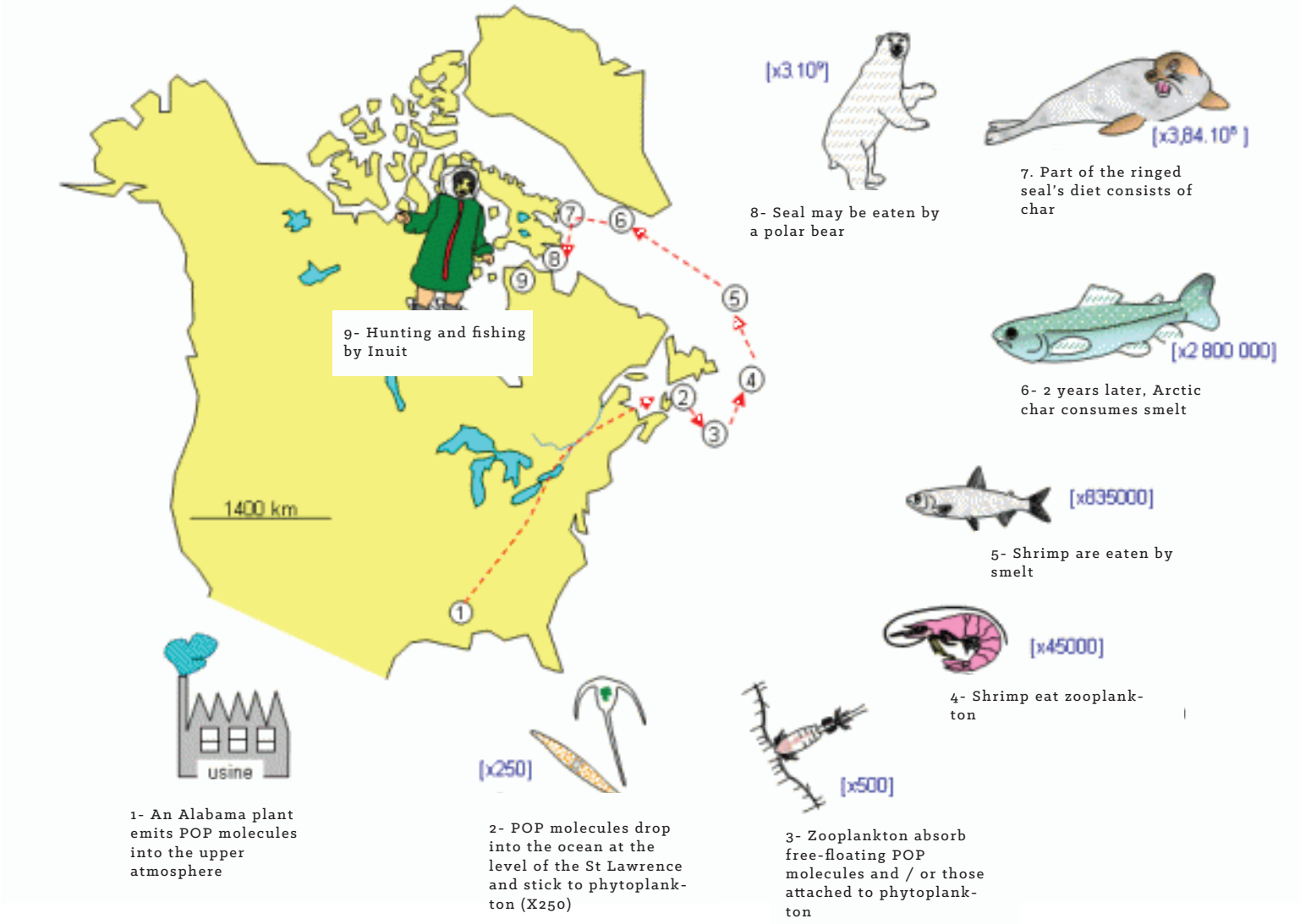
Animals: Habitat loss, difficulties finding places to rest and warm up on the snow pack.

5. Inuits live thousands of kilometers from large metropolitan areas. Will they be affected by chemical products? Illustrate this phenomenon through discussion of the food web. Refer to the following terms: persistent organic pollutants (POP), phytoplankton, zooplankton, small predators, large predators, humans.

There are various ways to disseminate pollutants: air pollution, domestic greywater, food web.

Title : Map of Bioaccumulation of POP

Scenario explaining the bioaccumulation of POPs (persistent organic pollutants) in the trophic levels of a food chain resulting in consumption by Inuit
Red arrow: progression of the molecule (x1000) = concentration of POP / initial concentration.



1- An Alabama plant emits POP molecules into the upper atmosphere

2- POP molecules drop into the ocean at the level of the St Lawrence and stick to phytoplankton (X250)

3- Zooplankton absorb free-floating POP molecules and / or those attached to phytoplankton

4- Shrimp eat zooplankton

5- Shrimp are eaten by smelt

6- 2 years later, Arctic char consumes smelt

7. Part of the ringed seal's diet consists of char

8- Seal may be eaten by a polar bear

9- Hunting and fishing by Inuit

source: http://www.intellego.fr/soutien-scolaire--/aide-scolaire-svt/-schema-de-la-bioaccumulation-d-un-pop--polluant-organique-persistant--dans-les-niveaux-trophiques-d-une-chaine-alimentaire-aboutissant-aux-inuits/37177