NNOCCI National Network for Ocean and Climate Change Interpretation

PRACTICE WITH 'HEAT TRAPPING BLANKET'

The overall science communication strategy of NNOCCI rests on interpreters using their exhibits as 'teachable moments' about climate and ocean change, taking every opportunity to use the creatures in zoos and aquariums to educate the public about the process and impacts global warming. The metaphor of *Heat Trapping Blanket* is a cornerstone of the strategy for framing these interactions productively.

Your team has been assigned to interpret _____ for this exercise.

With your partner, work up an 'interpretive scene' of 60-90 seconds that dramatizes how you might introduce this information to a visitor. Your scene should:

- Use Heat Trapping Blanket to explain the mechanism of climate change before introducing the information about the impacts on the oceanic creature. Be sure to use the checklist to help you use the metaphor accurately.
- Explain the impact of climate change on the creature, translating the facts provided below into the style and tone you might use as an interpreter.

Use the information below, taken from the New England Aquarium's website, as a reference. It documents the impacts of climate change on several oceanic animals.

SEA TURTLES

Climate change directly affects the reproduction of sea turtles in three ways. First, sea level rise will affect significant nesting beach areas on low-level sand beaches such as Bonaire, the Maldives and the Great Barrier Reef. Second, rising temperatures increase the chance that sand temperature will exceed the upper limit for egg incubation, which is 34 degrees C. Third, rising temperatures bias the sex ratio toward females because temperature during incubation determines the sex of the egg. Loggerhead turtle nests in Florida are already producing 90 percent females owing to high temperatures, and if warming raises temperatures by an additional 1 degree C or more, no males will be produced there.

RIGHT WHALES

A tiny crustacean, *Calanus finmarchicus*, is a key food source for right whales, as well as for cod, haddock, herring and mackerel. Without dense patches of this zooplankton, female whales can't bulk up to prepare for calving, carry a pregnancy to term or produce enough milk. When the concentration of zooplankton is too low, right whales do not feed; such highly concentrated patches often occur where currents converge or at the boundary of water of different densities. Changes of seawater temperature, winds and water currents can affect patch formation of zooplankton. Aquarium researchers have noted that shifts in zooplankton populations could affect North Atlantic Right Whale ranges.

SEALS

According to scientists, the retreat of sea ice has reduced the platform that seals traditionally use to rest between searches for fish and mussels…The loss of sea ice in Antarctica has caused a decrease in the amount of algae, plankton and krill, the foundation of the ocean's food chain. [The] Bering Sea's ecosystem….appears to be showing early climate change effects including the reduction of food for bottom-dwelling creatures. A recent study shows that global warming will greatly affect the Bering Sea's phytoplankton. The Bering Sea has typically had a large presence of phytoplankton. Phytoplankton are eaten by zooplankton, which are in turn eaten by large fishes. The changes observed in the Bering Sea's ecosystem affect the marine mammals, including seals, that are part of its food chain.

AMERICAN LOBSTER

Lobsters are cold-blooded, their body temperatures determined by the water in which they live. Higher temperatures cause cold-blooded animals to use more energy for respiration, leaving less energy for feeding, growth, energy storage, immune response and reproduction…As ocean temperatures fluctuate, so do the lobsters' habits. Lobsters can respond to temperature changes by changing their habitat. For example, lobsters are likely to move toward higher latitudes or to areas cooled by tidal mixing. In New England, for example, such populations will move north toward the Bay of Fundy…Warming temperatures increase the lobster's respiration rate and oxygen needs while reducing the amount of dissolved oxygen available. Research has found that as water temperatures rise above 69 degrees F, lobsters' respiration rate increases to a point where their demand for oxygen exceeds the supply, causing physiological stress.

COD

Commercial fish and shellfish, including cod, have thresholds of water temperature that limit the conditions under which they can reproduce and grow. Temperature influences the location and timing of spawning, which affects the growth and survival of young cod. It is believed that a temperature of 54 degrees F is the maximum for cod survival and that temperatures above 47 degrees lead to a decline of growth and survival of cod. Traditionally, the conditions on Georges Bank, an enormous shoal off the Massachusetts coast, have been ideally suited to the growth and reproduction of cod. There, the intersection of the warm Gulf Stream with the cold, nutrient-rich Labrador current provides optimum conditions for phytoplankton, the zooplankton that eat them and the cod larvae that eat them.