**Web Quest: Food, Water and Medicine from the Sea**

Go to: <http://oceanexplorer.noaa.gov/edu/learning/player/lesson12.html>

**Lesson: click on the “Lesson” tab and watch the video. Answer the questions below.**

1. What fraction of the protein humans eat comes from fish?
2. What is overfishing?
3. What is aquaculture?
4. What kind of damage can aquaculture cause?
5. What is desalination?
6. What percentage of the population experiences sever water shortages?
7. What makes up 70% of the freshwater supply?
8. How did ancient mariners desalinate ocean water?
9. How is water now desalinated?
10. Give one example of an organism used as a medicine source?

**Global Impact: click on the “Global Impact” tab and watch the video. Answer the questions below.**

1. What is bycatch?
2. What percentage of a catch is made up of the bycatch?
3. What is done with the bycatch?
4. What is the harm of bottom trawling?

If icebergs become valuable resources, it seems inevitable that conflicts will arise over their use and control. Who owns the icecaps and icebergs, and who will regulate their use and movement - the nearest countries? Whoever can grab onto them? The United Nations? What about the poorer countries, or those with no seaports - these are in many cases the ones that need water the most.

**A Fish by Any Other Name – Wild vs. Farmed Salmon: read and do the activity on wild vs. farmed salmon. Answer the following questions.**

1. Describe how aquaculture can harm the habitat around a fish farm.
   1. Large numbers of fish are contained in a small area in fish farms. Their wastes, and any leftover food they don’t eat, will sink to the bottom below the cages and pens. This material can smother bottom life and disrupt the natural nutrient cycling, perhaps causing toxic algal blooms. Decomposition of large amounts of waste and algae can use up the oxygen in bottom sediments and waters and kill slow-moving organisms.
2. What are the environmental benefits of fish farming?
   1. Farmed fish are held in nearshore cages and so are easily harvested. Fishing techniques that can cause environmental damage, like bottom trawling, or that produce a large bycatch, are not necessary. If fish farming reduces the pressure on wild stocks, those populations may be able to rebound, which would help not just the fish but also the other species that feed on them.
3. Suggest ways to minimize the negative environmental impacts of aquaculture.
   1. If offshore fish farms were restricted to areas with strong currents, or if the size of the farms was restricted, the waste problem would be reduced. If cages are kept in good repair, escapes can be minimized. Perhaps the most effective way to protect the marine environment would be to move fish farms out of the sea, to pens and ponds built on land.
4. Which is more likely to turn a profit, salmon fishing or salmon farming? Explain your answer.
   1. Salmon farming is probably more profitable. Wild stocks are declining, so it may take more work to catch fewer fish. A salmon farmer can control the number and size of fish grown, and isn’t affected by regulations restricting when or how the fish are harvested.
5. Farmed and wild salmon are both affected by parasites and diseases. In recent years, though, several populations of one of these groups have been devastated by infestations of sea lice picked up from the other type of salmon. Where do you think outbreaks of infectious diseases are most likely to begin? How would these conditions spread to the other category of salmon?
   1. Diseases will break out more often in fish farms because large numbers of animals are kept in one place under crowded conditions. If sick fish escape their pens, or if wild fish swim past them on their way to or from their spawning grounds, they can become infected. If the diseases that develop on a fish farm are not endemic to the area, the local wild population may have little or no natural resistance.
6. One type of salmon contains significantly higher levels of environmental pollutants like PCBs, dioxins, and pesticides than the other. Most scientists attribute this difference in contaminant levels to the different diets of wild and farmed salmon. Wild salmon eat a range of plants, shrimp, and smaller fish. Farmed raised salmon are fed high protein pellets made from concentrated fish and fish oils. Do wild or farmed salmon contain more toxins? How might the difference in diet cause this?