14. **What paradoxical effects does global warming have on the environment with respect to precipitation? Why does this happen?**

   Global warming can cause flooding in one country and drought in a neighboring country. This is because global warming both increases precipitation and relocates it. It also causes soil evaporation to take place.

15. **What is Gore’s first “canary in a coal mine?” What is meant by this expression?**

   The Arctic is the first “canary in a coal mine,” i.e., a warning sign or first indication that a problem is emerging.

   The expression comes from the days when coal miners used to carry caged canaries with them underground. Since they have small lungs, they are more vulnerable to poisonous gases than larger human beings. If a canary in a coal mine were to die, this would alert the miners as to the presence of toxic gases in the mine and give them enough time to escape.

16. **What is happening to the permafrost in the northern regions and how can this effect be seen?**

   The permafrost in the northern regions is thawing. The effects can be seen in structural damage to buildings and pipelines due to subsidence, and also by the sight of “drunken trees” (trees that set their roots in permafrost and which are now falling over every which way as the permafrost melts).

17. **What accounts for the fact that the Arctic Ice Cap is melting faster than was anticipated?**

   Ice, which is white, reflects 90% of incoming solar radiation back into space, acting like a giant mirror. Open ocean, however, since it is dark in color, absorbs 90% of incoming solar radiation. When the Arctic Ice Cap started to melt, more and more open ocean became exposed and more solar radiation was absorbed, thereby steadily increasing the rate of ice melt. This fact was at first not understood by scientists.
18. What is the “ocean conveyor system” and how does this affect global climate? What happened the last time there was a disruption of this system?

The Ocean Conveyor System is a system which redistributes heat in a circular fashion from the warm equatorial regions in the south to the cold polar regions in the north. Warm ocean currents move north and heat is lost, with evaporation taking place. The heavier and saltier water sinks and causes the now colder waters to flow south. The system has kept Earth’s temperatures reasonably constant within historical ranges.

The last time the Ocean Conveyor System was disrupted was when an “ice dam” in North America holding back an enormous amount of melted glacial water gave way. Cold water flooded into the Atlantic Ocean and heat transfer from the Gulf Stream stopped, causing Europe to go into another ice age that lasted 1,000 years. This entire event could have happened in as little as 10 years.

19. What are three other effects of global warming Gore talks about besides glacial melt and increased storms?

Other effects of global warming include the introduction of invasive species from southern regions, the spread of new infectious diseases also moving north from equatorial regions, and the bleaching of coral reefs due to increased temperatures and ocean acidity.

20. What is the second “canary in a coal mine?” What is happening there these days?

Gore’s second “canary in a coal mine” is Antarctica, where ice shelves that were thought to be stable until very recently are breaking up and falling into the ocean. An example of this was the huge Larsen-B Ice Shelf that was the size of the American state of Rhode Island, and which broke apart in a single season in 2002.

21. What is the difference in effect between land-based ice and sea-based ice when it melts?

Unlike sea-based ice, when land-based ice breaks up and falls into the sea it raises sea levels. The comparison can be demonstrated by the analogy of ice cubes that are contained inside a glass and which leave the water level in the glass unaffected when they melt, versus ice cubes that are stacked above the glass and which causes water to flow out of the glass when they melt.
22. What would the effect be of the melting of either the West Antarctica land-based ice or the Greenland ice?

If either the Greenland ice or the West Antarctic ice melted, or if half of the Greenland ice and half of the West Antarctic ice melted, ocean levels worldwide would rise by around 20 feet (almost 7 meters).

23. What did scientists learn about the pools of water that had formed on the Antarctic ice?

Instead of refreezing when they go through the ice as scientists had thought, the pools tunnel all the way through the ice forming “moulins.” The bottom of the ice where it meets the bedrock then becomes lubricated by the melt water, causing the ice to slide into the sea.