



Vocabulary List for Rising Tide

How to use this document:

It may be useful to review some or all of these vocabulary words prior to your students' visit to Rising Tide. The definitions listed here are specific to the exhibition and are not necessarily dictionary-type definitions. In addition, these vocabulary words are listed by the exhibit section in which they appear in the exhibit. To continue your experience at home, please visit our *Rising Tide* web page at:

<http://www.state.nj.us/state/museum/rising-tide>

This web page is full of fun games and interesting facts that provide a great way to keep learning at home or in the classroom – see how you can help to mitigate the impact of climate change!

The Process Continues

1. Greenhouse Phases – Phases in Earth's history when high concentrations of greenhouse gases result in a period of extremely hot average temperatures over millions of years.
2. Paleoclimatologist – A scientist who studies climate change throughout the history of the earth.
3. Ice-house Phases – Phases in the earth's history when the global average temperature is relatively low for many millions of years.
4. Cambrian Period – A geologic period beginning about 542 million years ago and ending 488 million years ago. This is the first period in which fossil of numerous, large, multicellular animals are found.
5. Cyclical – Something that repeats, or occurs in cycles, like the carbon cycle, the water cycle, or the seasons
6. Salinity – A measure of the saltiness of water; the oceans have high salinity.
7. Evaporate – The process by which liquid water turns into gaseous water vapor. In the water cycle, solar energy drives evaporation from bodies of water.
8. Precipitation – The product of condensation of water vapor in the atmosphere. As water vapor condenses, it forms rain, sleet, hail, or snow, which falls to the ground as precipitation.
9. High-latitude – Regions of the earth near the North or South Poles.
10. Basins – A depression, or low part of the earth's surface, typically where water collects, like an ocean basin or lake basin.

11. Interglacial Periods – Intervals of warmer global average temperatures that separate glacial periods within an ice age. The current Holocene interglacial period began approximately 10,000 years ago.

12. Terminal Moraine – A wall of rocks and debris formed by the movement of a glacier as it picks up and plows through an area. A terminal moraine marks the maximum extent of that glacier.

13. Glacial Erratic – A rock carried by a glacier many miles from its point of origin. Glacial erratic boulders in northern New Jersey are common and mark the maximum glacial extent during the Late Pleistocene Epoch.

14. Pleistocene Epoch – A period of geologic time that began 1.8 million years ago and ending 10,000 years ago. The last ice age ended at the end of the Pleistocene Epoch.

Pleistocene Megafauna of New Jersey

15. American Mastodon – American Mastodons (*Mammuthus americanum*) browsed on leaves and shrubs and were very common in New Jersey until they became extinct approximately 10,000 years ago.

16. Woolly Mammoth – Woolly Mammoths (*Mammuthus primigenius*) grazed on coarse tundra grasses in New Jersey until their extinction at the end of the Pleistocene Epoch nearly 10,000 years ago.

17. *Megalonyx* – Jefferson's Ground Sloths (*Megalonyx jeffersoni*) were enormous, gentle woodland browsers that were ancient relatives of modern tree sloths. Giant ground sloths became extinct at the end of the Pleistocene Epoch.

18. *Castoroides ohioensis* – The Giant Beaver (*Castoroides ohioensis*) was an Ice Age beaver the size of a bear! They lived in swamps and wetlands, but became extinct nearly 10,000 years ago.

19. *Cervalces* – The Elk-Moose (*Cervalces scotti*) is an ancient relative of both modern moose and elk that became extinct approximately 11,500 year ago.

20. *Rangifer* – The modern caribou (*Rangifer tarandus*) lives in Arctic regions today, but lived in New Jersey during the Pleistocene Epoch.
21. *Bootherium* – The Woodland Musk Ox (*Bootherium bombifrons*) was an Ice Age relative of the modern musk ox that lived in New Jersey until its extinction nearly 10,000 years ago.
22. *Odobenus* – The modern walrus (*Odobenus rosmarus*) lives today in Arctic and Subarctic seas, but were common off the New Jersey shore during the Pleistocene Epoch.
23. *Ursus maritimus* – Polar bears (*Ursus maritimus*) live today on ice floes near the Arctic Ocean. They mostly eat seals, but sometimes attack much larger animals, like walruses.
24. Megafauna – Literally meaning “large animals”, it often refers to the very large land animals, especially mammals, characteristic of the Pleistocene Epoch.

New Jersey’s Ice Age Legacy

25. Ice Age – Any period in Earth’s history during which extremely cold conditions persist. We are presently living in an ice age.
26. Laurentide Ice Sheet – The Laurentide Ice Sheet was an enormous sheet of ice that covered most of Canada and the northern U.S. during the Pleistocene Epoch.
27. Megafauna – Literally meaning “large animals.” It often refers to the very large land animals, especially mammals, characteristic of the Pleistocene Epoch.
28. Peale – Charles Willson Peale opened the Peale Museum in Philadelphia in 1783. This museum featured the world’s first skeletal reconstruction of an American Mastodon.
29. Thomas Jefferson – Thomas Jefferson was the third president of the U.S. who expected Lewis and Clark to encounter mammoths and giant ground sloths during their exploration of the American West.

30. Tusk – Tusks are extremely long teeth characteristic of many modern and ancient megafauna, including mastodons, mammoths, and walruses.
31. Extinction – The death of every individual of a plant or animal species. Rapid climate change likely caused the Pleistocene Megafaunal extinction nearly 10,000 years ago.
32. Beringia – The Bering land bridge between Alaska & Siberia was exposed during the Pleistocene Epoch, allowing many animals, including early humans, to migrate into North America.
33. Glacier – A large mass of ice formed by the accumulation of snow over a period of tens to millions of years.
34. Tundra – Regions of the earth in which tree growth is prevented by low temperatures and short growing seasons. Tundra is typically found near the earth's poles and in high elevations.
35. Subarctic – a region in the Northern Hemisphere south of the Arctic region and covering much of Alaska, Canada, and northern Asia.
36. Tundra – a biological region where tree growth is hindered by very low temperatures and short growing seasons. Tundra is mostly found in Arctic region, but also can be found at high elevations.
37. Anglers – fishermen
38. Dredgers – Dredging is a type of excavation that usually takes place underwater. Any bottom-dwelling marine animals, like clams and oysters, are harvested by fishermen who use dredges, also called dredgers.
39. Continental Shelf – The portions of the edges of continents that extend under the oceans. Continental shelves are usually shallow (less than 200 meters deep) and very flat.
40. *De facto* – A phrase from the Latin language meaning “in fact”, or, “in reality”.

41. Permafrost – Soil that is frozen for at least two years. Permafrost usually can be found in Arctic regions where the ground rarely, if ever, thaws.

42. Sloths – Sloths are mammals that live today only in trees in the rain forests of Central and South America. During the Pleistocene Epoch, giant ground sloths lived on open ground and stood up to 20 feet tall.

43. Vertebrate Paleontology – Vertebrate paleontology is the study of ancient and extinct animals with backbones.

44. Arctic Ice floes – Thick, solid layers of ice that forms on the ocean's surface near the earth's poles and moves, or floes, as it is pushed around by wind and ocean currents.

45. Sebaceous Glands – Small glands in the skin which secrete an oily substance in hair follicles. Mammoths used this oily substance to increase the thermal efficiency of their hair.

46. Flute – A groove or furrow. Some paleo Indian points have fluted ends onto which the shaft of the spear was connected.

Animals in Peril

47. Polar Bear – Polar bears (*Ursus maritimus*) are the world's largest terrestrial predators. They live in Arctic regions and depend on the sea ice for hunting and resting.

48. Musk Ox – Musk Ox (*Ovibos moschatus*) are ancient Arctic herbivores. They may be negatively affected by climate change if increased snow fall makes it harder for them to find food.

49. Caribou - Caribou (*Rangifer tarandus*) are large Arctic and Subarctic deer that travel in huge herds. As polar temperatures increase, they will be affected by more pests and may have a harder time finding food.

50. Walrus - Walruses (*Odobenus rosmarus*) are huge Arctic marine mammals who rely on sea ice for feeding and resting during the breeding season.
51. Brant – The brant (*Branta bernicla*) is a type of goose that lives in estuaries but migrates to the Arctic each summer to breed. These birds are negatively affected by El Niño/La Niña weather patterns.
52. Common Eider – The Common Eider (*Somateria mollissima*) lives on North American, European, and Siberian coasts, but breeds on Arctic Islands each summer. Climate change may be affecting their populations.
53. Snow Goose - The Snow Goose (*Chen caerulescens*) is a very common bird that may be benefitting from climate change. Their numbers are increasing, leading to other problems throughout their range.
54. Red Knot - The Red Knot (*Calidris canutus*) migrates from the tip of South America to the Arctic each year to breed – one of the longest migrations in the animal kingdom. They stop each spring in New Jersey to feast on horseshoe crab eggs.
55. Piping Plover - The Piping Plover (*Charadrius melodus*) is a small shorebird that spends its summers on New Jersey's coastlines, but breeds each summer in the Arctic. It is now endangered.
56. Ruddy Turnstone - The Ruddy Turnstone (*Arenaria interpres*) winters on rocky coastlines around the world, but breeds during the summer in the Arctic. It relies on horseshoe crab eggs during its migration.
57. Harbor Seal - Harbor Seals (*Phoca vitulina*) are wide-ranging marine mammals. They are not threatened at this time, but they are negatively affected by El Niño conditions.
58. Diamondback Terrapin - The Diamondback Terrapin (*Malaclemys terrapin*) is the only turtle in the world adapted to live only in brackish-water coastal marshes. These environments are at high risk of flooding from sea-level rise.
59. Spring Peepers - Spring Peepers (*Pseudacris crucifer*) are small nocturnal chorus frogs found across Eastern North America. Some populations of these frogs are now beginning to breed earlier each spring.

60. Grey Treefrog - Grey Tree frogs (*Hyla versicolor*) are small arboreal frogs that can change their colors. Some populations of these frogs are now beginning to breed earlier each spring.
61. American Bullfrog - American Bullfrogs (*Rana catesbeiana*) are the largest North American frogs and are voracious predators. Some American bullfrog populations are now beginning to breed earlier each spring.
62. Fowler's Toad- The Fowler's Toad (*Bufo fowleri*) is a common eastern toad that secretes poison from its paratoid gland. It is susceptible to parasites, which may become more problematic with warming temperatures.
63. American Toad - The American Toad (*Bufo americanus*) is a common eastern toad that lives in meadows and woodlands. It is susceptible to parasites, which may become more problematic with warming temperatures.
64. Horseshoe Crab– Horseshoe Crabs (*Limulus polyphemus*) are ancient arthropods more closely related to spiders and scorpions than to crabs. They assemble annually at the Delaware Bay to lay their eggs in the beach.
65. Migration – many birds migrate each year to breeding and/or feeding sites. The Delaware Bay is a common stopover point along the Atlantic flyway, where millions of birds come from all over the world to feast, on their way to Arctic breeding grounds.
66. Endangered – Many animals, including some native to New Jersey, are in danger of becoming extinct. Climate change is expected to endanger many more species
67. Extinction – Extinction is the complete disappearance of a species from the earth. Continued climate change is expected to lead to the extinction of up to one-third of all species by 2100.
68. Habitat – A habitat is an environment in which an animal or plant lives. Many coastal and low-lying habitats, especially shorebirds, will be destroyed by climate change and sea-level rise.
69. Delaware Bay – The Delaware Bay is an estuary that serves as a breeding ground for horseshoe crabs, and as a critical stopover point for millions of shorebirds along the Atlantic Flyway.

70. Atlantic Flyway – The Atlantic Flyway is a major migration route along the East Coast of North America for birds migrating from Arctic summer breeding grounds and wintering grounds throughout North and South America.
71. Breeding Grounds – The Arctic serves as breeding grounds for million of migratory birds each summer. These birds come here to take advantage of the long summer days and hordes of flying insects for food.
72. Bufotoxin – A toxic substance found in the paratoid gland of Fowler’s and American toads. These toads excrete this poison when threatened.
73. Fungus – Many amphibians are susceptible to fungal infections because they live in warm moist areas and they breath partly through their skin. Climate change is causing fungal infections among amphibians to spread, threatening many with extinction.
74. El Niño – A Pacific Ocean-atmosphere phenomenon that affects global weather patterns across the globe. Many species are affected by El Niño, further exacerbating population losses cause by climate change.
75. Terrestrial predators – Terrestrial refers to land-living creatures. Predators are animals that hunt for their food. The world’s largest terrestrial predator is the polar bear.
76. Parasitic nematode – Nematodes are a diverse group of tiny animals that live all over the world, often as parasites. Parasitic nematodes are killing musk oxen more rapidly as the Arctic climate warms.
77. Eelgrass – A type of grass that lives in shallow regions of the world’s oceans. Eelgrass is one of the primary foods of the brant as it winters in tidal estuaries.
78. El Niño/La Niña – A global weather phenomenon that occurs every few years. El Niño/La Niña cycles effect plants and animals, like Harbor Seals and, and often result in decreasing their populations.
79. Spawning – The process by which many aquatic organisms, like fish, mussels, and oysters, reproduce.

80. Invertebrate – Animals without back bones.
81. Pinnipeds – A diverse and widely-distributed group of marine mammals that includes walruses, sea lions, and harbor seals.
82. Brackish Water – Slightly salty water. Water that is more salty than freshwater but less salty than the oceans.
83. Amphibians – A Class of cold-blooded vertebrate animals that include frogs, toads, and salamanders. Amphibians require water to lay their eggs in.
84. Permeable – A material that allows liquids or water to pass through. The skin of amphibians is permeable, allowing air and water to pass through.
85. Anthropogenic – Human created or human caused. Anthropogenic greenhouse gases are ones created by human activities.
86. Arachnid – A Class of invertebrate animals, all of which have eight jointed legs. Some examples of arachnids include spiders, scorpions, and ticks.
87. Arboreal – referring to animals that live in trees. Some species of frogs, like spring peepers, and mammals, like modern sloths, live primarily in trees, and are therefore arboreal.
88. Voracious – very eager, or eating large quantities of food. For example, a voracious predator is one that eats a lot of food and a lot of different kinds of food.
89. Parotid – The parotid gland is found near the ear in many toads. In Fowler's and American Toads, the parotid gland produces poison used to deter predators.
90. Exacerbated – to aggravate, or to increase the severity, bitterness, or violence of something.
91. Synchronicity – Occurring at the same time, or simultaneously.

Greenhouse Gases

92. Atmosphere - The layer of gases surrounding the earth. It is composed primarily of nitrogen (78%) and oxygen (21%), with very small amounts of many other gases, including greenhouse gases.

93. Methane - (CH_4) A natural greenhouse gas that comprises 0.0000017% of Earth's atmosphere. CH_4 is the biggest contributor to anthropogenic climate change after carbon dioxide.

94. Biosphere - The global sum of all ecosystems. The portions of the earth that contains all living things.

95. Carbon Cycle – The carbon cycle exchanges Earth's supply of carbon between the atmosphere and other reservoirs, like the planet's oceans, organisms, limestone rocks, and fossil fuels.

96. Industrial Revolution – The Industrial Revolution began around 1750. This was the beginning of large-scale use of fossil fuels for fuel, and the beginning of rapid increased in atmospheric greenhouse gases and global temperatures.

97. Solar Radiation – Radiation from the Sun reaches Earth and some is absorbed by the oceans and continents turning into heat. Greenhouse gases trap some radiation that would otherwise escape into space, increasing global average temperatures.

98. Water Vapor – Water vapor is the gaseous form of water (H_2O) and is the most common and effective greenhouse gas.

99. Geological – Geology is the study of the earth. Geological phenomena are incidents or objects that are related to the physical processes of the earth, like volcanic eruptions or earthquakes.

100. Anomalies – Any occurrence or object that is strange, unusual, or unique, or discrepancy or deviation from an established rule.

Fossil Fuels

101. Fossil Fuel - Fossil sources of carbon or hydrocarbons found in the earth's crust that are burned to create energy. Fossil fuels are the main source of anthropogenic, or man-made, greenhouse gases.

102. Coal - A fossil fuel formed by the preservation of large amounts of plant material. The burning of coal is the largest anthropogenic source of methane and CO₂ to the atmosphere.

103. Petroleum - Literally means "rock oil." Naturally occurring liquid hydrocarbons found in the earth's crust. The burning of petroleum products is a major source of anthropogenic greenhouse gasses.

104. Natural Gas – A gaseous fossil fuel that is primarily methane. It is usually found associated with oil fields or in fields that produce only natural gas.

105. Crust – The crust of the earth is the solid, outermost layer which is usually between 5 and 50 km thick. All of the fossil fuels that we use come from the earth's crust.

106. Drake's Well – Drake's Well, first drilled near Titusville, Pennsylvania in 1859, is considered to be the beginning of the modern oil industry.

107. Hubbert – M. King Hubbert was a geophysicist who predicted that oil production would begin to decline after reaching a maximum.

108. Oil Shale – A semi-solid organic chemical compound similar to petroleum. Mining oil shale is extremely damaging to the environment and refining it requires a lot of energy.

109. Gasoline – A fuel produced from the refining of petroleum, or crude oil.

110. Asphalt – a petroleum-based product used to pave roads.

111. Glacial Ice Cores – Long tubes of ice collected by scientists by drilling into a glacier. They are very helpful to the study of ancient climates because they trap tiny bubbles of air from when that ice was created, thousands of years ago.

112. Carbon cycle – the cycle in which carbon is exchanged between the biosphere, atmosphere, and the earth.
113. Carboniferous Period – A geologic period which began nearly 360 million years ago (mya) and ended 300 mya. Most of the world's coal is the remains of fern forests that existed all over the earth during the Carboniferous Period.
114. Combustion – The process of burning. The combustion of fossil fuels creates greenhouse gases.
115. Coal ash – Coal ash is a byproduct of the process of burning coal. Coal-fired power plants have to store tons of coal ash in ponds, which sometime overflow their banks and flood towns.
116. Zooplankton – Tiny, usually microscopic organisms that live in fresh water and oceans. The skeletons of these tiny creatures build up on ocean bottoms over millions of years and may eventually be transformed into petroleum or natural gas.
117. Environmental repercussions – repercussions refers to consequences. Environmental repercussions refers to the consequences of our actions on the environment.
118. Finite – not infinite. Earth's supplies are fossil fuels are limited, or finite.
119. Geophysical – the branch of geology that deals with the physics of the earth and its atmosphere. Some geophysicists search for fossil fuels in the earth's crust.
120. Energy infrastructure – the framework or facilities used to produce and distribute energy or fossil fuels.

Climate Change and New Jersey

121. Agriculture - The production of goods, particularly food products, through farming. Severe changes in weather patterns expected with future climate change will drastically effect agriculture all over the world.

122. Flood - A deluge, or an increase in the amount of land submerged by water. Floods are predicted to become more common and more intense with continued climate change and deforestation.

123. Drought - An extended period of time in which a region receives below average precipitation. Droughts are an expected consequence of future climate change.

124. Extinction - The complete disappearance of a species. Large-scale extinctions are a predicted result of climate change - up to 2/3 of all species could become extinct as a result of climate change.

125. Sea Level – Sea level is expected to rise in the next century as increasing global average temperatures melt the polar ice caps. Higher sea levels will destroy wetland habitats and human infrastructure.

126. Erosion – Erosion is the removal of solid materials, like sand, from an area. Beach erosion, already a serious problem along the New Jersey shoreline, will become a much bigger and more expensive problem as sea levels rise and storms intensify.

127. Fishery – a fishery is an industry involved in the harvesting of one or more species of sea food. New Jersey’s vibrant fishing industry is worth millions of dollars, but is threatened by climate change and sea level rise.

128. Shellfish – Shellfish are invertebrate animals, like oysters and shrimp, that create an exoskeleton, usually made from calcium carbonate. As the oceans become more acidic, it will be much more difficult for the these animals to produce their shells.

129. Forest – A forest is an area with many trees. By the end of the century, New Jersey’s forests will be less dense and made up of more southern as a result of climate change.

130. Storms – As the climate grows hotter, storms are expected to become more common and more intense.

131. Topography – the surface features of an area of land. For example, an area may have a flat, hilly, or mountainous topography.

132. Coastal Erosion – Erosion that occurs along a shoreline or beach.

133. Ocean - the vast body of salt water that covers almost three fourths of the earth's surface.

134. Carbonate (CaCO_3) shells – The shells and external skeletons of many marine animals are made of calcium carbonate, or CaCO_3 , which dissolves easily in acid.

135. Phytoplankton – the small plants or plantlike organisms that float in the ocean.

What Can Be Done?

136. Unabated – undiminished, not weakened, or reduced.

137. Reduce – to diminish or decrease

138. Reuse – to use again

139. Recycle – to change or alter something in order to use it again for a new use. Many materials, like tin cans and glass, can be turned into other products many times, saving energy and resources.

140. Wind turbines – a type of machine with a rotor and propellers driven by wind pressure. The rotating propellers create electricity that releases no greenhouse gases or pollution.

141. Photovoltaic cells – a product that produces electricity when it is exposed to sun light. Photovoltaic cells release no greenhouse gases or pollution.

142. Uranium – A radioactive element used to produce electricity in nuclear power plants. Nuclear energy releases no greenhouse gases, but does create a waste material that remains radioactive for thousands of years.

143. Biofuels – fuel created from renewable biological resources, such as plants or landfills. Biofuels, do release greenhouse gases and pollution, but less than traditional fossil fuels.

144. Hydropower – short for hydroelectric power, or electricity created from moving water. Dams store water so that it can be used to power turbines and create electricity.