

Unit 2 Study Guide: Causes of Mass Extinctions Study Guide

Use this guide to help you test your knowledge by quizzing yourself on the terms with the definitions hidden and answering the concept questions. Keep in mind that many words in English have multiple definitions, and these definitions are the ones relevant to the article you have read.

Vocabulary or Terminology

Aerosol – a tiny solid particle or tiny droplet of liquid that is suspended in the atmosphere. Sulfates often form aerosols both as solids and dissolved in tiny water droplets.

Basalt – a volcanic rock formed when lava crystallizes. It is made up of several different minerals (but by definition is low in quartz and feldspar). It makes up much of the bedrock below the ocean and most volcanic islands, but it is unusual on the interior of a continent, except as a flow basalt.

Comet – An icy or mostly icy object from outside of Earth's atmosphere. Sometimes, these are caught by Earth's gravity and fall, but they are likely to melt when they strike the atmosphere.

Continental shelf – a section of submerged rock offshore from a land mass that is not as deep as most of the ocean. These tend to be fertilized by runoff from the land and well-supplied with dissolved oxygen by offshore winds. These are unlikely to be found where ocean rock is subducting under a continent (a **plate-tectonics** process).

Crater – a bowl-shaped depression in the ground. These can be formed by a number of processes, including meteorite impact and volcanic eruption.

Crust – the outer compositional solid layer of Earth, consisting mostly of silicate rock.

Decay product – the element that is left behind when **radioactive isotopes** break down.

Deposit – a layer consisting of a type of rock that crystallized or lithified or was metamorphosed in a single event, or in a series of similar events.

Fissure – a volcanic vent that is a relatively narrow crack in the ground rather than a mountain. These can extend for kilometers.

Food web – a description of an ecosystem in terms of energy flow; what does each type of organism eat? Photosynthesizers turn sunlight into sugars at the base, and are in turn eaten by herbivores, who are eaten by carnivores, who may be eaten by other carnivores, and all of whom are fed on by decomposers.

Hot spot – an area in the upper mantle above which volcanoes form, usually well away from the edges of a **plate**. Rock in this part of the mantle is believed to be partially molten, melting and applying pressure to the rock above it. The geologic community debates a variety of possible reasons for the existence of hot spots, but there is no current consensus.

Igneous – Describes rocks that have crystallized directly from magma or lava.

Isotope – a form of an element with a particular number of neutrons. Some of these are unstable, prone to **radioactive decay**, such as carbon-14 and uranium-238. However, carbon has at least two stable

isotopes, carbon-12 and carbon-13. The ratio between the two carbon stable carbon isotopes generally does not change unless carbon that was buried or frozen is released back to the atmosphere abruptly.

Mantle – The complex compositional layer under Earth's crust.

Meteor – a rocky or mostly rocky object from outside of Earth's atmosphere that gets caught by Earth's gravity and falls. Most of them are reduced to dust when they strike the atmosphere.

Mid-ocean ridge – one of several long chains of volcanoes found deep in Earth's oceans. These are areas where the plates are moving apart and the lava released from between them forms new ocean crust.

Mineralogy – describes the chemical composition, crystal structure, and physical properties of minerals, the components that make up most rocks.

Ozone – an oxygen compound made up of three oxygen atoms. A layer high in the atmosphere with a relatively high proportion of ozone absorbs some of the more dangerous wavelengths of ultraviolet radiation.

Plankton – marine organisms that float in the oceans or other bodies of water, too small to propel themselves by swimming. These organisms include algae, who perform most of the photosynthesis in the oceans (and on Earth), who are the base of the marine **food web**.

Plateau – a large area of flat terrain that is elevated above the surrounding terrain. These generally have steep edges.

Plate tectonics – a widely accepted theory that explains both slow changes like continental drift and rapid ones like earthquakes. It describes the **crust** and upper **mantle** as broken into plates that move relative to one another. Not only do the plates move past each other, they can be pulled apart, letting new crust form between them, usually at **mid-ocean ridges**, or one can be pushed under another into the mantle (subduction).

Province – in geology, a large area on a map defined by the bedrock or other geologic features, such as a mountain belt or an area with basaltic bedrock.

Radioactive decay – the process by which certain **isotopes** such as uranium-238 (called parents) change into isotopes of other elements, such as lead-206 (called daughters).

Radiometric dating – a method of determining the age of a rock based on the **radioactive decay** of unstable isotopes within organic molecules or mineral crystals. Rates of radioactive decay for unstable isotopes and the concentrations of given type of parent and daughter isotopes in certain contexts are well understood. For example, we know that uranium-238 can be trapped inside zircon when it crystallizes from magma, but its eventual daughter, lead-206, cannot. So investigators measure the ratio of uranium-238 to lead-206 in zircon crystals in ancient rocks and use the known rate of decay to determine how long ago the crystals formed.

Stratovolcano – also called a composite volcano. These tend to be conical in shape, are generally located on coasts or large islands, and are capable of explosive eruptions, which release large quantities of volcanic ash and sulfate aerosols into the atmosphere.

Sulfate – a compound formed when oxygen reacts with sulfur. These may form **aerosols**.

Weathering – chemical and physical breakdown of rock exposed to air, water, salt, and other features of Earth’s surface. These processes usually come before erosion (in which the products that the rock has broken into are carried elsewhere).

Zircon – a mineral found in many kinds of igneous rock and volcanic ash that can be readily dated because it usually traps **radioactive** isotopes of uranium in its crystals when they form.