Origin and Evolution of the Ocean Floor
S=slide

S1 Oceans cover more than 70% of the surface

S2 Key Concepts
1. The features of continental margins for both passive and active margins

2. The features of the ocean floor, abyssal plains, trenches, ridges, and volcanic features

S3 Mapping the Seafloor
Bathymetry is the measurement of ocean depths and charting the topography of the ocean floor

Bathymetric Techniques
sonar = sound navigation and ranging - sound energy used to measure water depth

Seismic Reflection Profiles – used to map the rock structure beneath the sediment

S4 SONAR measures water depth using sound waves transmitted into the water then measuring how long it takes the sound wave to travel to the bottom and return – measured with sensitive receivers to within fractions of a second – sound waves travel at 1500m/sec
Sidescan does not provide water depth

S5 Seismic reflection profile – uses low frequency sounds

S6 Ocean Floor
Three major units of ocean floor topography are: continental margins, deep-ocean basins, and oceanic ridges (mid-ocean ridges)

Continental margins are either passive or active

S7 Major topographic divisions of the North Atlantic
Topographic profile has a vertical exaggeration (40x)

S8 Passive Margins
Passive margins are found along most of the coastal areas of the Atlantic and Indian oceans – not along active plate boundaries

Continental shelf – gently sloping surface from the shoreline toward the deep ocean – extension of the continent
Continental slope – steeper slope on the seaward edge of the continent
Continental rise – gradual incline

S9 Figure showing the major features of a passive margin

S10 Active Continental Margins
Occur where oceanic lithosphere is being subducted beneath the edge of a continent – common around the Pacific Rim
Continental slope may descend abruptly into a deep-ocean trench – continental shelf is narrow if present at all
Accretionary wedge – sediment from the ocean floor and some oceanic crust are scraped off and plastered onto the overriding continent

S11 Figure of an active continental margin – note the lack of continental shelf

S12 Features of the Deep Ocean
Deep-ocean trenches – long, narrow creases and are the deepest parts of the ocean
Abyssal plains – very flat features and may be the most level places on Earth
Seamounts, guyots, and oceanic plateaus – volcanic features
Coral atolls – ring-shaped features that start by growing around a volcano in water with a range of temperatures between 18 to 30°C

S13 1.Seamounts - submarine volcanoes
2. Guyots - flat-topped seamounts
3. Oceanic plateaus – resemble flood basalt provinces

S14 Stages of coral reef development from the fringing reef along the margins of a volcano, barrier reef with the volcano in the middle, and an atoll which is a continuous or broken ring of coral reef and a central lagoon