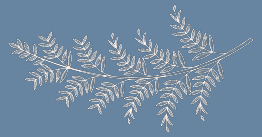
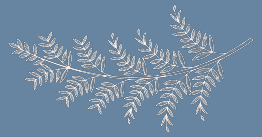
DYNAMIC PLANET

Lesson 5, 11/14



Y'all did so well on last week's quiz! The key has been posted to the Google Classroom, and we'll go over it a bit now. If anyone has any questions about the quiz, or didn't get to take the quiz but would still like to, please don't hesitate to let me know! I can spend a little extra time with you after a lesson someday.

CONGRATS!! :))



Moving into this unit, I want to know what you guys thought about the review worksheets and study guides from last unit. Were they a good length and difficulty level? Did you feel that they helped prepare you for the quiz? Do you have any other weekly review ideas?

FEEDBACK?

01. PLATE TECTONICS

Processes and features of plate tectonic motion, age of ocean floor

02. TOPOGRAPHIC FEATURES

Features found at continental margins, estuaries, ocean basins, mid-ocean ridges

03. COASTAL FEATURES

Coastal features and processes, uplift and subsidence, influence on sea level rise



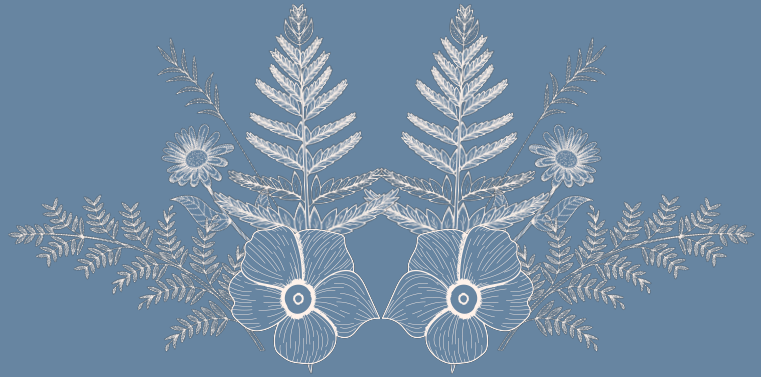


PLATE TECTONICS

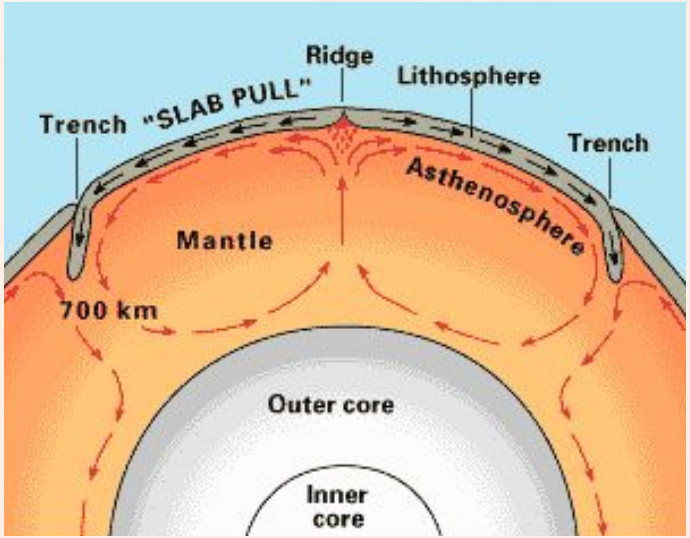
Processes and features of plate motion, age of ocean floor

PLATE TECTONICS

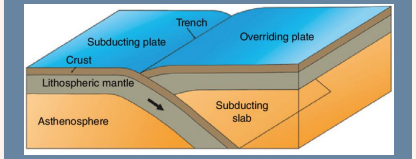
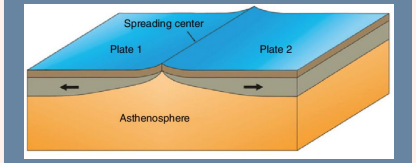
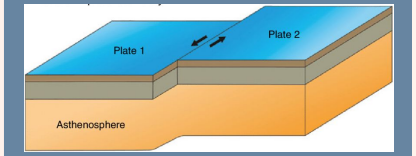
The Theory of Plate Tectonics describes the large-scale motion of tectonic plates (divided pieces of Earth's crust) due to convection currents resulting from density differences in the mantle.

Evidence supporting plate tectonics: similar fossils/mountains/glacial remnants on distant continents, shapes of continents fit well together, seafloor spreading/magnetic reversals, etc.

Earth is composed of seven or eight major plates (depending on how the plates are defined) and several more minor plates.



TYPES OF PLATE BOUNDARIES

Type of Boundary	Image	Description	Associated Features and Processes
Convergent Boundary		Two plates are colliding; plates will either subduct (ocean-ocean/continent) or heave upwards (continent-continent).	Trenches, volcanoes, volcanic island arcs, mountains, earthquakes and tsunamis are common
Divergent Boundary		Two plates are moving apart from one another.	Mid-ocean ridge (oceanic) or rift valley (continental). Less violent earthquakes than convergent boundaries.
Transform Boundary		Two plates are sliding past one another; lithosphere is neither created or destroyed.	Faults and earthquakes; faults can also be found on the seafloor at mid-ocean ridges.

AGE OF OCEAN FLOOR

Most crust in ocean basins is less than 200 million years old due to constant renewal from seafloor spreading and subduction.

Generally, seafloor closer to a mid-ocean ridge will be younger than seafloor that is further away.

Age of seafloor can be determined by examining Earth's changing magnetic field, which is recorded on the seafloor as normal and reversed stripes. These stripes can also be matched with records from already-dated continental crust.

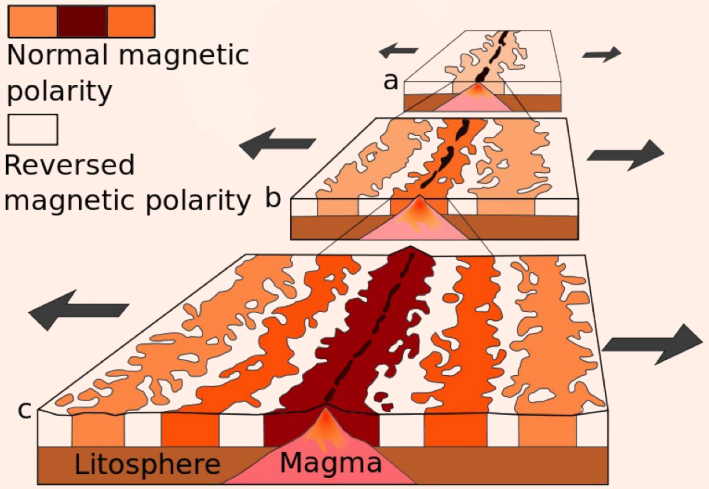
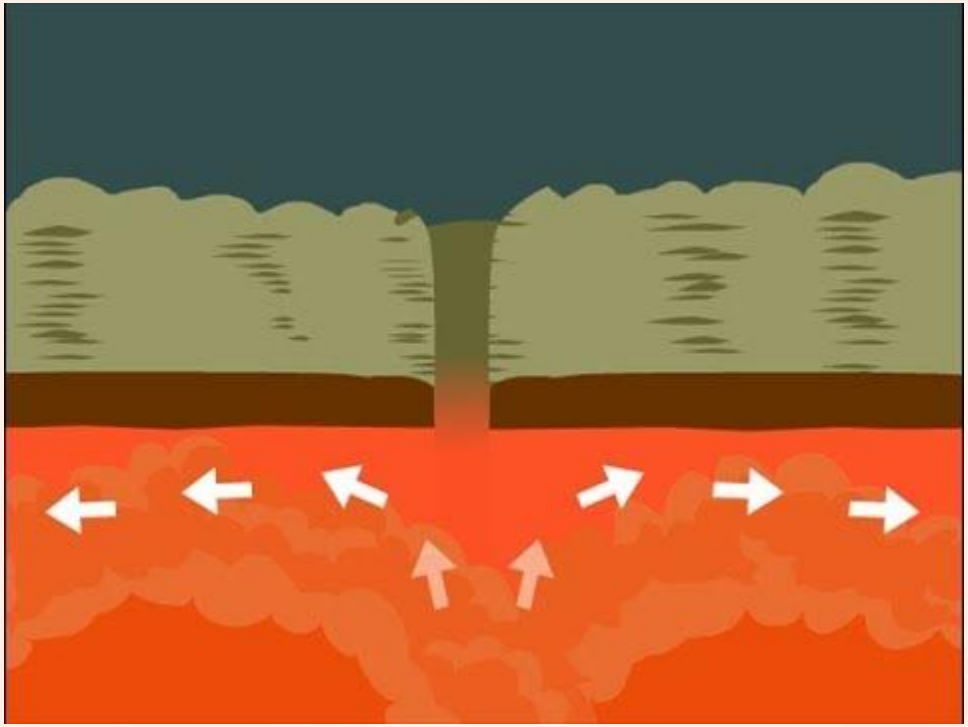
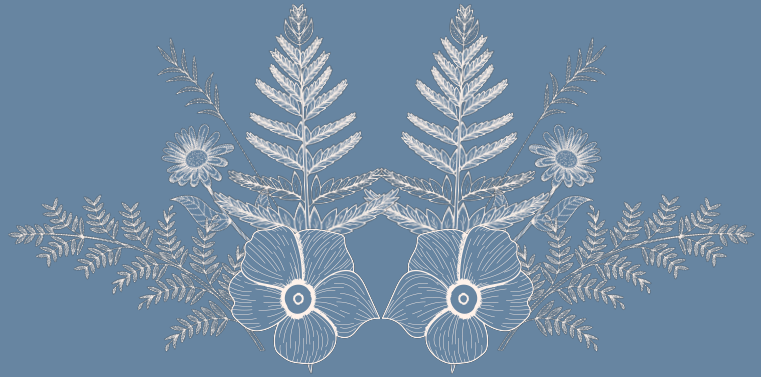


PLATE TECTONICS VIDEO





TOPOGRAPHIC FEATURES

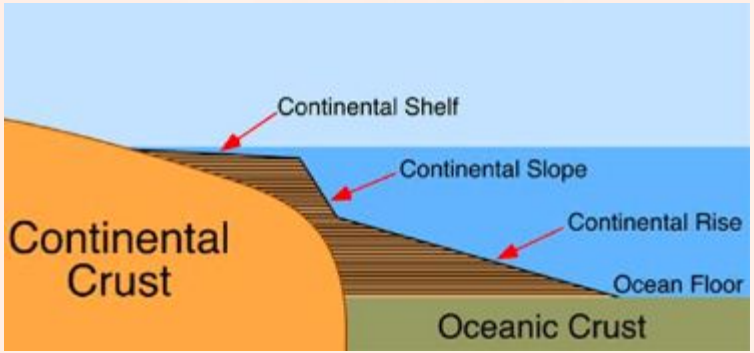
Features found at continental margins, estuaries, ocean basins, mid-ocean ridges

CONTINENTAL MARGIN

Shallow water area found in proximity to continents; constitutes about 28% of oceanic area. Width and sediment input can vary considerably.

Methods of sediment transport to continental margins: river input, mass wasting, direct runoff, glacial action, aeolian processes.

Consists of the continental shelf, slope, and rise (in that order) all of which have different slopes, characteristics, etc.



ESTUARIES

Partially enclosed coastal body of brackish water, where the river flows into the sea.

Subject to marine influences (tides, waves, saline water influx) and river influences (freshwater flow, sediment). This mixing of seawater and freshwater provides high levels of nutrients, making estuaries very productive.

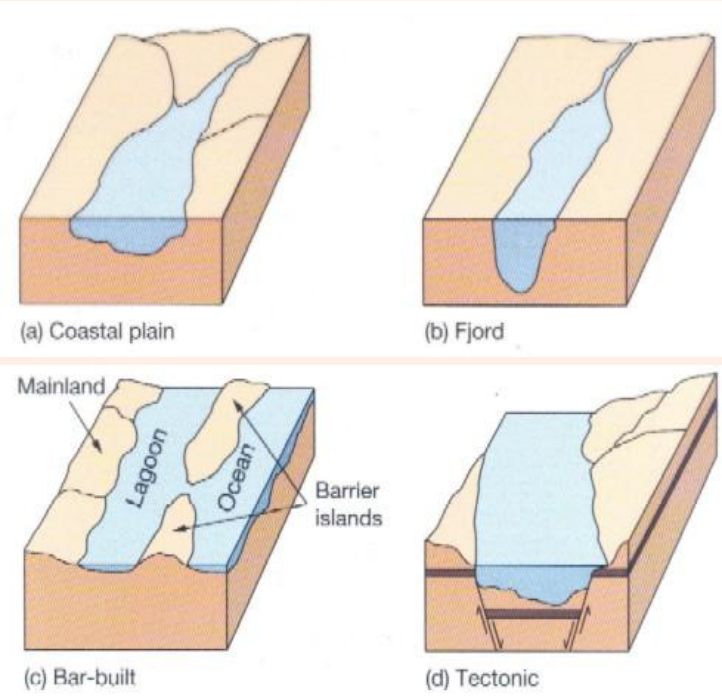
Estuarine habitats contain wetland plants and soils that act as a natural buffer between land and ocean, absorbing floodwaters and dissipating storm surges.



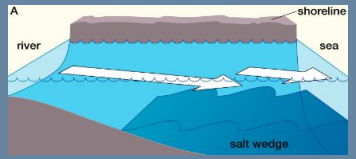
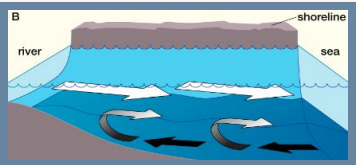
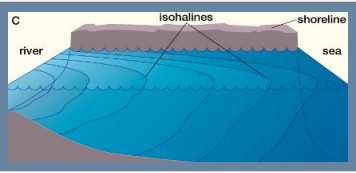
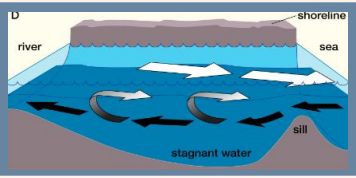
TYPES OF ESTUARIES (BY GEOMORPHOLOGY)

Type of Estuary	Description	Examples
Bar-Built Estuary	Sediment deposition keeps pace with rising sea levels, so estuaries are shallow and separated from sea by sand spits or barrier islands.	Extensive along Atlantic and Gulf coasts of United States; Outer Banks, Nauset Barrier Beach at Cape Cod.
Coastal Plain Estuary (Drowned River Valley)	Created when sea levels rise and fill a pre-existing river valley.	Hudson, Thames, and Seine Rivers, Chesapeake Bay, Delaware Bay, Tampa Bay.
Fjord Estuary	Created when water fills a fjord (a deep, steep, U-shaped valley created by glaciers).	Puget Sound (Washington) and Glacier Bay (Alaska).
Tectonic Estuary	Tectonic activity causes subsidence (sinking of land), which creates a depression for water to fill.	Very few examples of tectonic estuaries; San Francisco Bay.

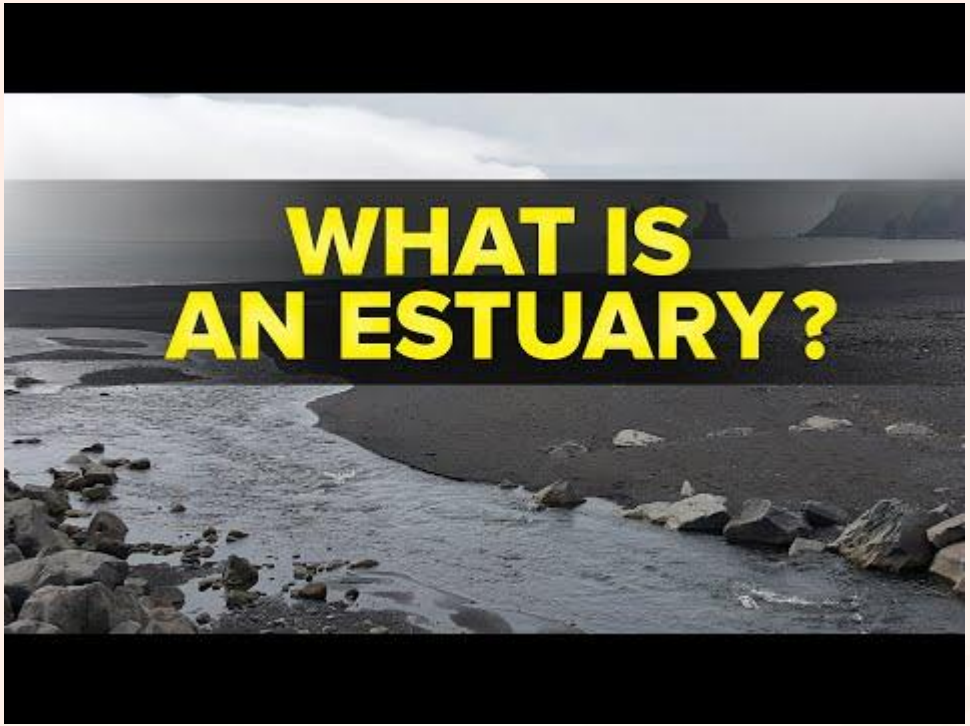
TYPES OF ESTUARIES (BY GEOMORPHOLOGY)



TYPES OF ESTUARIES (BY WATER CIRCULATION)

Type of Estuary	Image	Description	Examples
Salt-Wedge Estuary (Highly Stratified Estuary)		Freshwater floats on top of seawater; denser water moves landward along bottom of estuary, forming a wedge shape.	Mississippi River, Columbia River, Hudson River
Slightly Stratified Estuary (Partially Mixed Estuary)		Seawater and freshwater mix, but lower layers of water typically remain saltier than upper layers.	Very deep estuaries; Puget Sound and San Francisco Bay.
Vertically Mixed Estuary (Well Mixed Estuary)		Strong tidal currents eliminate layering, so salinity is vertically consistent.	Delaware Bay and Raritan River (New Jersey).
Fjord-Type Estuary		Fjords have a narrow barrier near the ocean that restricts circulation with the open ocean.	Found along glaciated coasts like British Columbia, Alaska, Chile, Norway.

ESTUARY ECOSYSTEMS



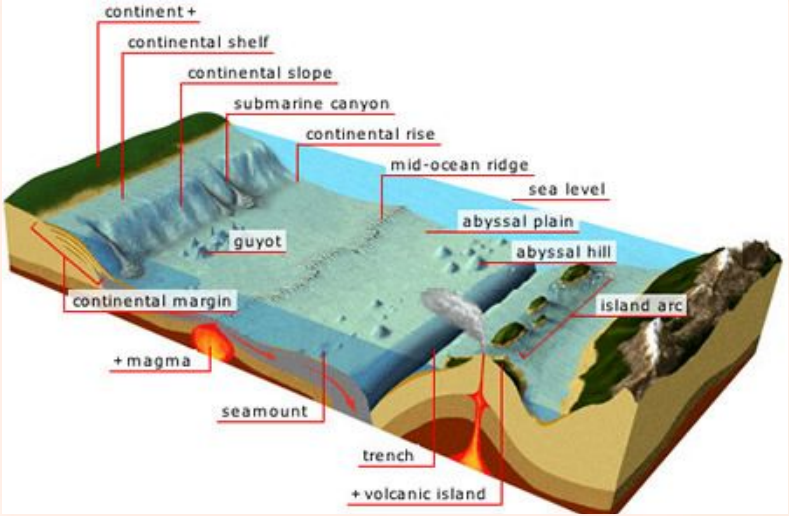
OCEAN BASINS

Hydrologic definition of ocean basins: any place that is covered in water (includes continental margins and inland seas).

Seamounts: isolated, steep, cone-shaped hills/volcanoes with a relief of over one kilometer that haven't reached the ocean's surface.

Guyots: isolated seamounts with a flat top lying over 200 meters below the sea surface. Have reached the surface, but were eroded down and resubmerged.

Other topographic features found in ocean basins: mid-ocean ridges, trenches, fracture zones, abyssal plains and hills.

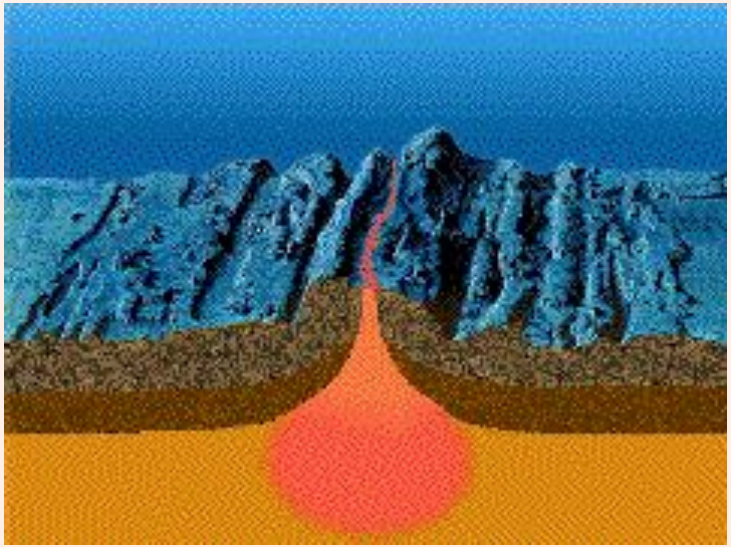


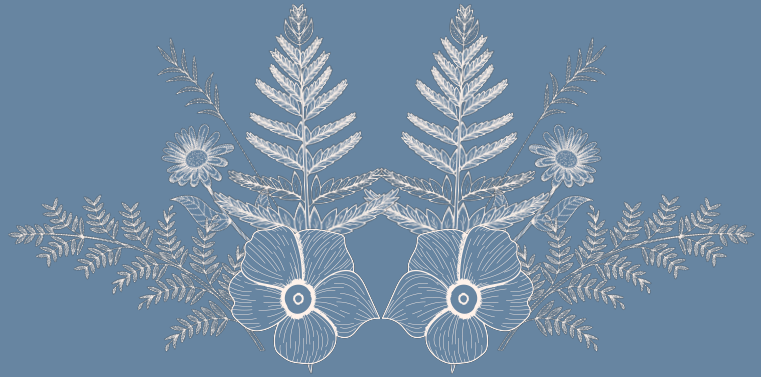
MID-OCEAN RIDGE

An underwater mountain range formed by seafloor spreading at a divergent boundary. Production of new crust results from mantle upwelling.

Mid-ocean ridges around the globe are linked; the system is the longest mountain range on Earth, These mountains are both seismically and volcanically active.

Mid-ocean ridges are often flanked by inactive transform faults called “fracture zones”.

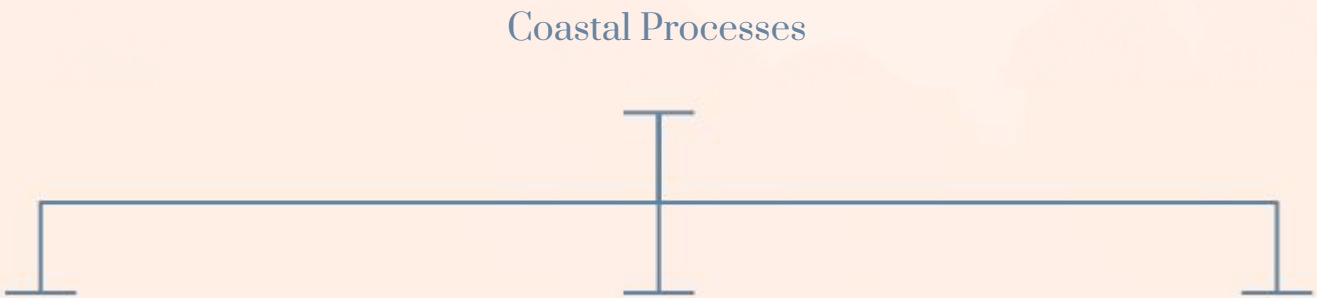




COASTAL FEATURES

Coastal features and processes, uplift and subsidence, influence on sea level rise

COASTAL PROCESSES



Erosion

Wearing away of land by the sea, usually by destructive waves. Caused by five main processes: corrasion, abrasion, hydraulic action, attrition, corrosion/solution.

Transportation

Movement of materials in the sea and along the coast by waves, mainly by longshore drift. Occurs by four main processes: traction, saltation, suspension, solution.

Deposition

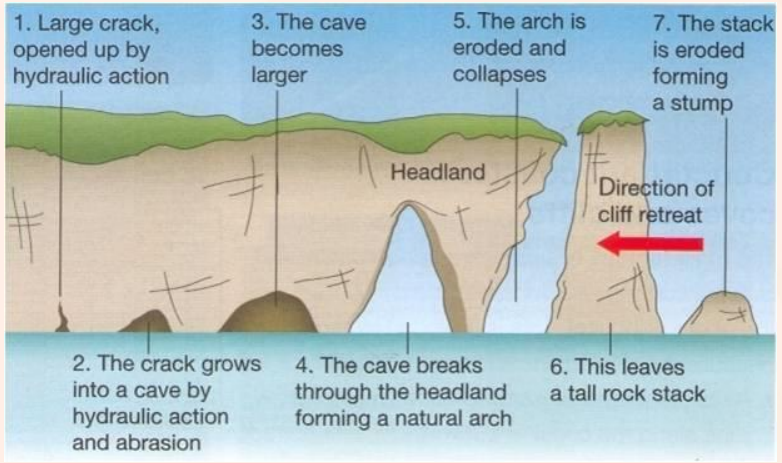
When eroded material is dropped by waves. Can occur because: wave loses energy, shallow waters, sheltered areas (bays), little/no wind.

EROSIONAL COASTS

Erosional coasts typically have little to no sediment, high relief, and rugged topography. Example: west coasts of North and South America.

Sea cliffs are the most widespread landforms found on erosional coasts.

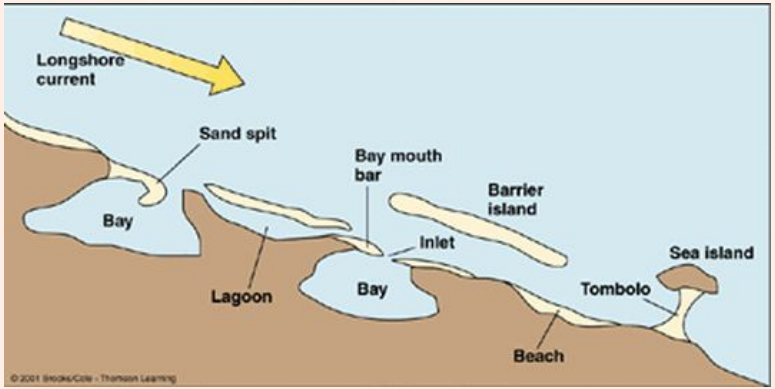
As sea cliffs are further eroded by waves, they can become sea caves, sea arches, sea stacks, and sea stumps (in that order).



DEPOSITIONAL COASTS

Depositional coasts have abundant sediment accumulation (mostly mud and sand), low relief, and widespread coastal plains. Examples: Atlantic and Gulf coasts of United States.

Examples of topographic features found on depositional coasts: deltas, barrier islands and estuarine systems, strand-plain coasts, beaches and coastal dunes.

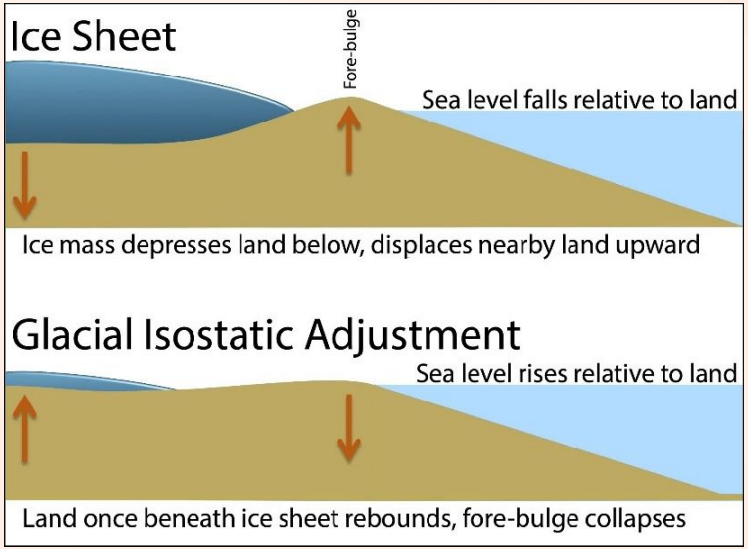


UPLIFT AND SUBSIDENCE

Uplift: the process by which Earth's surface slowly rises due to increasing upward force or decreasing downward force. Examples: glacial isostatic adjustment, mountain-building due to tectonics.

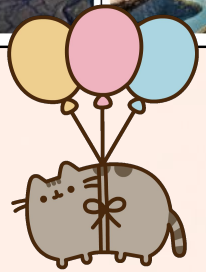
Subsidence: gradual settling or sudden sinking of the ground because of underground material movement. Causes: pumping, fracking, mining, earthquakes, erosion, sinkholes, etc.

Uplift decreases relative sea level, subsidence increases relative sea level.

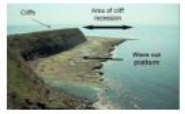


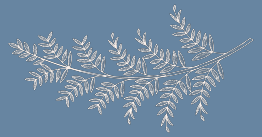
SO MANY FUN COASTAL FEATURES WOW

Barrier beach:	Barrier island:	Bay:	Bayou:
			
Baymouth bar:	**Bight:**	**Cape:**	**Cove:**
			
Cuspate foreland:	**Delta:**	**Fjord:**	**Harbor:**
			





Headland:	Lagoon:	Mangrove forest:	Peninsula:
			
Promontory:	**Salt marsh (tidal marsh):**	**Slough:**	**Sound:**
			
Spit:	**Tidal flat (mudflat):**	**Tombolo:**	**Wave-cut platform:**
			



As always, I'll send out an email with this week's materials and a review worksheet. We'll also be doing a plate tectonics lab next week! You'll need graham crackers and frosting. And, as always, feel free to contact me throughout the week about anything at all!

NEXT WEEK...

THANKS!

Any questions?

Feel free to contact me about anything :)

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