Dynamic Planet

Lesson 6, 11/21

Recap of last week

Some quick things from last week!

- In case you missed it: last week was the start of our new “unit”, in which we’ll discuss geologic features and processes related to the ocean
- I did send out a **review worksheet** for last week’s lesson! Same drill as always: feel free to make a copy and complete it at any time, and email it to me after you’re done so I can check (I highly encourage you do this so I can gauge everyone’s understanding of the content :))
- I’ll send out a key for this week’s worksheet in this week’s email. Until then, feel free to ask any questions now or email them to me later
- Just to make sure everyone’s aware: our class moved times last week, but from now on we’re returning to our normal time of **4-5 PM EST** every Saturday

Get hyped for the new “unit”! The work/content will begin to pick up next week.

Sign up for Thanksgiving Trivia Night!

You should've received an email from ScioVirtual about this as well but basically it'll be a fun night of science trivia where you can compete with students all across the nation for fun prizes! It'll be next Tuesday (11/24) from 7-8:30 PM EST. Sign up here: https://forms.gle/Bprgdr5a2f4pA3wm9!

Let’s jump into today’s lab!

Lab preparation

Today we're doing a graham cracker plate tectonics lab! Here's what you need to do to prepare:

- Find each of the following **materials**: frosting, graham crackers, a plate (preferably paper), and food coloring (optional). If you're unable to find these materials, materials of comparable texture work too (regular crackers; peanut butter, Nutella, Cool Whip, etc.)
- Add red/orange food coloring to your frosting to make it look like mantle fluid
- Spread the frosting around the plate to simulate the **mantle**
- Place two graham crackers next to each other on top of the frosting, to represent **tectonic plates** floating on the mantle, forming a plate boundary

Link to instructions: https://www.playdoughtoplato.com/graham-cracker-plate-tectonics/

Let’s simulate some boundaries!



Dip the ends of your crackers in water. Then, push the two soggy ends together. What “feature” did this form? What boundary is this similar to?



Gently press down on each cracker while pulling them apart. What happens to the “mantle” fluid? What boundary does this simulate?



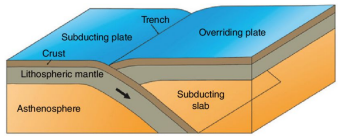
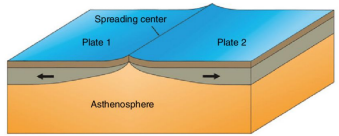
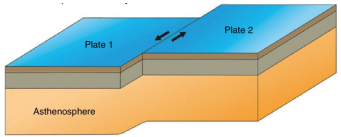
Gently push on your crackers and slide them against one another. How does this feel? What boundary is this like?



Bonus!

Gently press one graham cracker under another. What type of “zone” does this create? What type of boundary is this similar to? Hypothesize how this type of boundary would create volcanoes.

Plate tectonics review

Type of boundary	Image	Description	Features and processes
Convergent		Two plates are colliding; plates will either subduct or heave upward.	Trenches, volcanoes, volcanic island arcs, mountains, earthquakes, tsunamis.
Divergent		Two plates are moving apart from one another.	Mid-ocean ridge or rift valley. Less violent earthquakes than convergent boundaries.
Transform		Two plates are sliding past one another; lithosphere is not created nor destroyed.	Faults and earthquakes; faults can also be found at mid-ocean ridges (fracture zones).

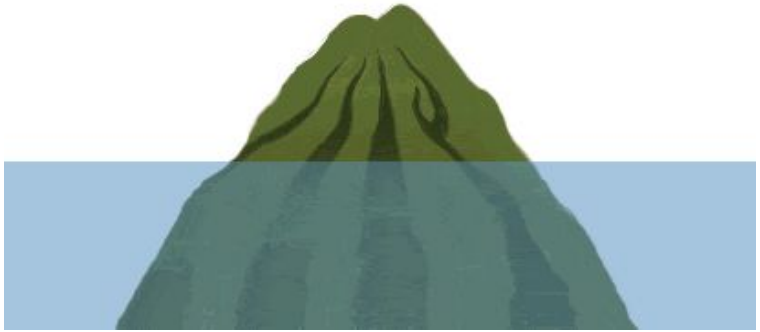
New content today: reef formation

What is coral?

Coral reefs are made up of colonies of coral polyps!

- Coral is a sessile animal that relies on its relationship with the plant-like algae zooxanthellae to build the **largest structures of biological origin** on Earth
- The type of coral that builds reefs are in the order Scleractinia and are called **hermatypic** coral (non-reef-building coral are known as ahermatypic)
- Hermatypic coral build reefs by producing a hard skeleton made of **calcium carbonate**, which forms the stony framework of the reef





Coral reef

Coral reef: when free-swimming coral larvae attach to rocks/other hard surfaces.

Form when seamounts erupt over and over until hardened lava builds up into an island. Coral starts to grow underwater on the volcanic rock because it likes the warmth/hydrothermal vents found there.

The reef will grow a fringing reef around the island, then the island will begin to subside.

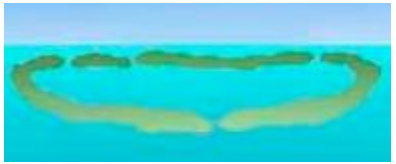
Steps of reef formation



Fringing reef: a reef that is fully attached to and projects directly from shore, forming a “border” around the shoreline. The most common type of reef.



Barrier reef: the island has subsided; reef is parallel to shoreline but at a greater distance, separated from land by a lagoon. The highest point can reach the water’s surface, causing a barrier to navigation.



Atoll: island sinks completely but coral continue to grow upward, forms a circular reef with central lagoon. Gaps may form in reef that provide access to central lagoon.

Significance of coral reefs

Coral reefs are very important!

- About **25% of the ocean's fish** rely on healthy coral reefs. Fishes and other organisms shelter, find food, reproduce, and rear their young in the many nooks of reefs
- Reefs can act as buffers that **protect coastlines** from storms and erosion
- Reefs can be a source of new foods and new medicines
- Over **half a billion people** depend on reefs for food, income, and protection. Fishing, diving, and snorkeling on or near reefs adds hundreds of millions of dollars to local businesses



Threats to reefs

Unfortunately, coral reef ecosystems have been threatened by human activity.

- Reefs are **severely threatened** by disease, predators, oceanic storms, pollution, sedimentation, unsustainable fishing practices, and rising temperatures and ocean acidification due to human-created climate change
- When these stresses occur, zooxanthellae (the symbiotic algae) will leave the coral, in what is known as **coral bleaching**. This eliminates the coral's largest food source (the algae) and leaves the coral susceptible to disease and even death
- Studies show that **50% of the world's reefs** have been destroyed

Ten ways you can help coral reefs!

For next week...

- As always, I will be sending out an email to everyone with class updates
- We do not have class next week; no ScioVirtual courses will be running next week because it's **Thanksgiving break**!! Hope everyone has a safe and happy Thanksgiving!
- I will be sending out a review worksheet as always. You'll have an extra week to complete this worksheet so I highly encourage everyone does! This week is a good week to catch up on old worksheets/quizzes you might of missed as well
- Sign up for **Thanksgiving Trivia Night**!!! I will send more information about it in the email, as well as link all the information to these slides later



Thanks!

Any questions?

Happy Thanksgiving everyone!!!

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