What are diatoms?
diatomos

“to cut in half”

named for their two halves: two cell walls made of glass (silica)
What are diatoms?

• Diatoms are a type of primary producer that fall within the group of phytoplankton
  • Their golden-brown color comes from accessory pigments
What are diatoms?

- Diatoms are a type of primary producer that fall within the group of phytoplankton
  - Their golden-brown color comes from accessory pigments
- They are microscopic organisms
What are diatoms?

• Diatoms are a type of primary producer that fall within the group of phytoplankton
  • Their golden-brown color comes from accessory pigments
• They are microscopic organisms
• Diatoms are eaten by zooplankton which, in turn, are eaten by other, larger organisms, similar to plants on land.
What are diatoms?

- Diatoms are a type of primary producer that fall within the group of phytoplankton
  - Their golden-brown color comes from accessory pigments
- They are microscopic organisms
- Diatoms are eaten by zooplankton which, in turn, are eaten by other, larger organisms, similar to plants on land.
- They build "glass houses"
What are diatoms?

• Diatoms are a type of primary producer that fall within the group of phytoplankton
  • Their golden-brown color comes from accessory pigments
• They are microscopic organisms
• Diatoms are eaten by zooplankton which, in turn, are eaten by other, larger organisms, similar to plants on land.
• They build “glass houses”
• Unicellular
  • May form chains
Diatoms

Productive Coastal Ecosystems

Oxygen

Nutrient Cycles
Productive Coastal Ecosystems

- Diatoms, which are primary producers, harness the energy of the sun to photosynthesize.
- This creates energy in the form of sugars which other, larger organisms need to survive.
- Productive marine food webs rely on abundant diatom populations.

[https://maps.stefanfreelan.com/salishsea/](https://maps.stefanfreelan.com/salishsea/)
Oxygen

• Plankton produce ~50% of the world’s oxygen daily.

\[ 6\text{CO}_2 + 6\text{H}_2\text{O} \xrightarrow{\text{Light}} \text{C}_6\text{H}_{12}\text{O}_6 + 6\text{O}_2 \]

Carbon dioxide + Water $\rightarrow$ Sugar + Oxygen
Nutrient Cycles

• Diatom blooms can occur in nutrient-rich water
Nutrient Cycles

- Diatom blooms can occur in nutrient-rich water
  - These blooms occur seasonally after winter periods of dormancy

Jackson et al., 2015
Nutrient Cycles

• Diatom blooms can occur in nutrient-rich water
  • These blooms occur seasonally after winter periods of dormancy
• Diatoms are a major “sink” for carbon dioxide globally
Nutrient Cycles

• Diatom blooms can occur in nutrient-rich water
  • These blooms occur seasonally after winter periods of dormancy
• Diatoms are a major “sink” for carbon dioxide globally
• Diatoms build “glass houses” made of silica
Nutrient Cycles

• Diatom blooms can occur in nutrient-rich water
  • These blooms occur seasonally after winter periods of dormancy
• Diatoms are a major “sink” for carbon dioxide globally
• Diatoms build “glass houses” made of silica
  • They can be used to measure changes in climate based on the preserved carbon in their silica-based shells that has been incorporated into sediments
  • Temperature affects the way that diatoms build their glass houses
Biological Pump

• Plankton are key players in global carbon sequestration at the bottom of the ocean. As they die, they sink to the bottom and are buried in sediments.
How do they build their “glass houses?”

• The shells, or “frustules” are built from dissolved silica in water (bio-engineer their glass houses)

**Pros**
- Strong shell
- Anti-predation
- High abundance in environment
- Fairly insoluble

**Cons**
- Impermeable (but not with adaptations!)
- Cannot grow as cell grows
Centric/ Pennate
Chains
Chains

**Pros**
- Increased surface area
- Anti-predation
- Resistant to turbulence
- Decrease sinking rates

**Cons**
- Fragile
- Anti-predation

---

Spines
Spines

**Pros**

- Sink slowly
- Deters predators

**Cons**

- Fragile
- Energetic cost

Size
Size

**Small**
- Sink slowly
- Available to more predators
- Larger surface area-volume ratio
  - Can survive in low nutrient environments

**Large**
- Sink quickly
- Deters predators
- Lower surface area-volume ratio
  - Need a lot of nutrients

Art and Science
Ernst Haeckel

- February 16, 1834 – 1919
- German scientist that focused on evolutionary history/phylogeny
  - Interested in symmetry
- Created detailed scientific illustrations of organisms
Sketching diatoms

*Questions to help you sketch:*

- What shapes are you noticing?
- Are the diatoms symmetrical?
  - What kinds of symmetry do you observe? Radial, bilateral, etc.
- What features do you notice that might help these diatoms adapt to life in the ocean? Spines, size, etc.
- Are there any details that you want to include in your sketch?
Negative space

The empty space around an image

- The goal is to not get ink in the negative space of your design
- What you carve away will be white space in your stamp block
- What is left is the “positive space”
  - It will be covered in ink
Ready to linocut?

1. Transfer your sketch to your rubber block by flipping sketch onto block and shading over the sketch with your pencil
2. Color in the parts of your sketch that you want to be dark vs. light
3. Use a smaller blade to carve out details and a larger blade to carve out larger spaces
4. Take your block to the ink station and ink up!
5. Place your block on a piece of printing paper and lightly press it down
6. Flip your block over and use the pressing tool to press on the back of your paper in a circular motion
7. Gently lift your paper off of the stamp
8. Write your name on your print and place it at the drying station