Algae 101

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Title

Phykos- Greek for “alga”

ologist- a person who studies or has knowledge of a particular kind of science

Phycologist- a person who studies or has knowledge of a particular kind of algae

Psychologist- a person who studies normal or abnormal behavior …. Of algae!

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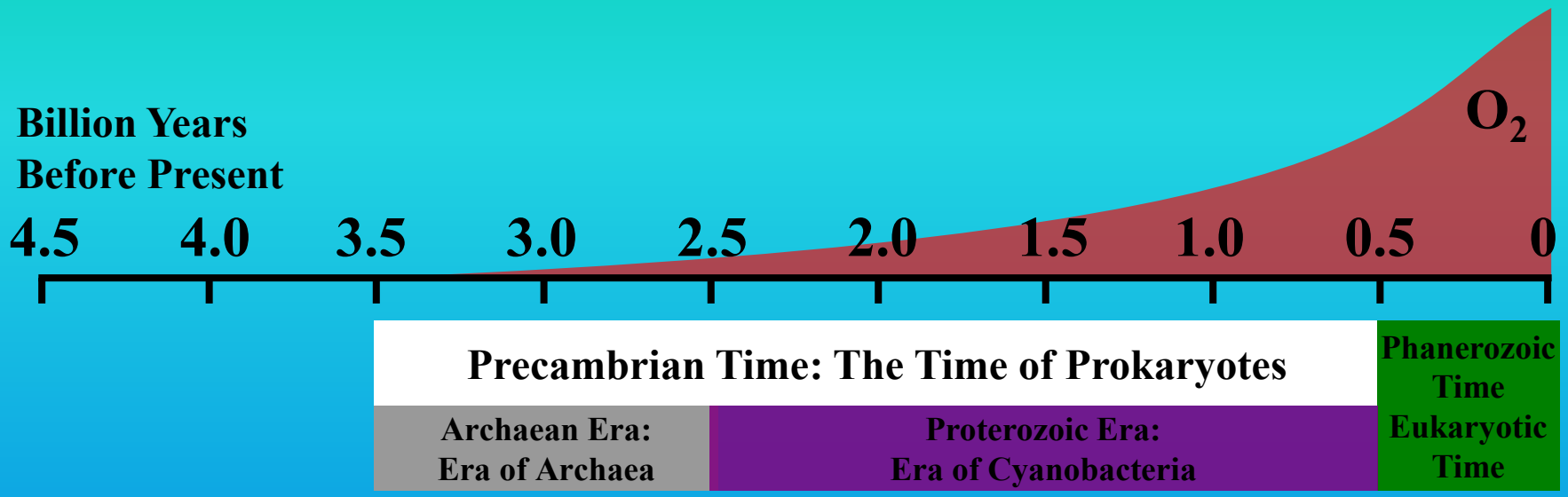
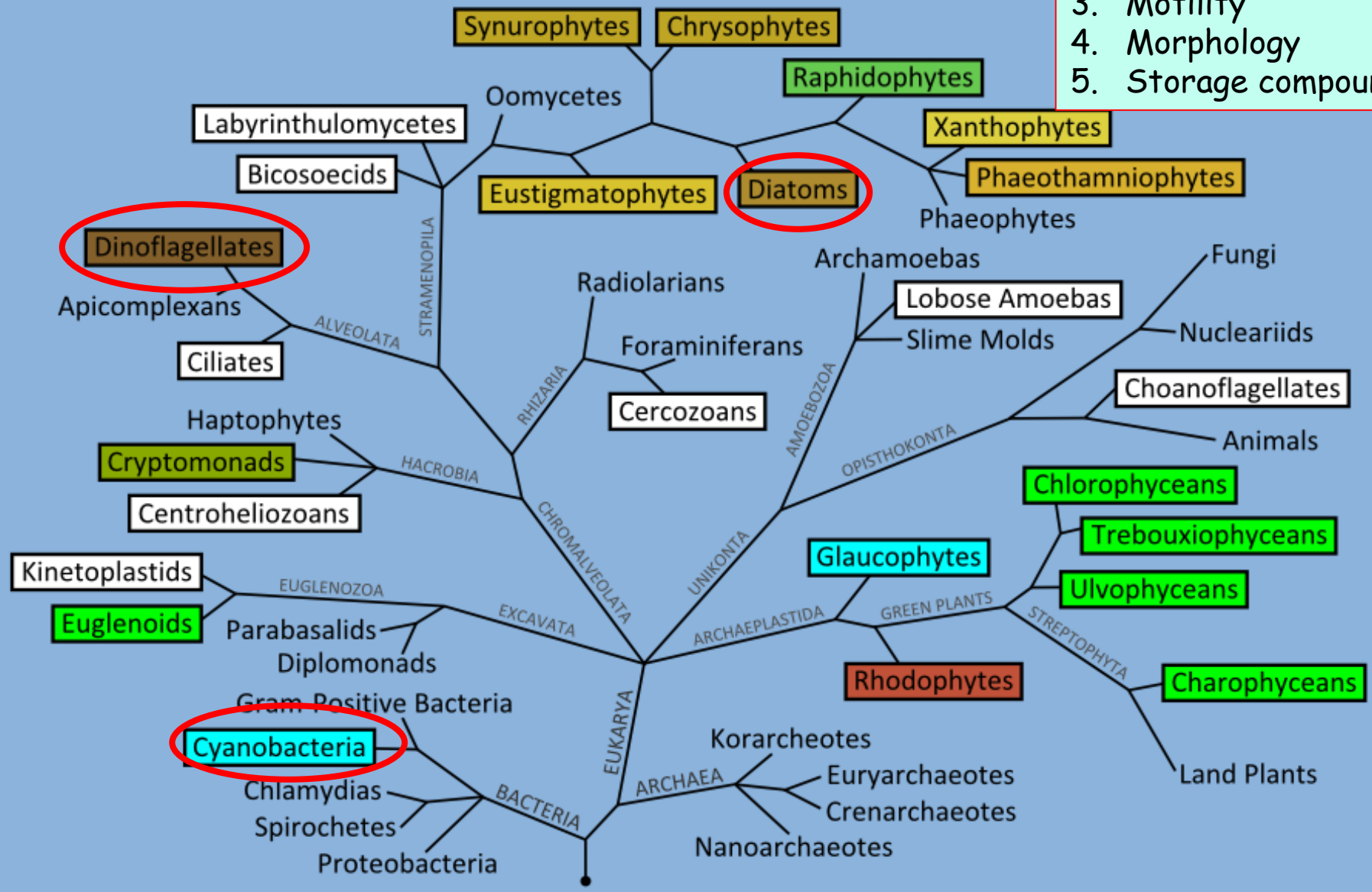
Timeline of Planet Earth



The Family

1. Pigments
2. Cell wall
3. Motility
4. Morphology
5. Storage compound



The Family: Pigments

1. Green algae
2. Golden Brown
3. Diatoms
4. Browns (seaweeds)
5. Red algae
6. Cyanobacteria

	Algal Group	Pigments
1	Chlorophyceae (green algae)	Chl-a, Chl-b, β-carotene, Xanthophylls
2	Xanthophyceae	Chl-a, β-carotene, Xanthophylls
3	Bacillariophyceae	Chl-a, Chl-c, β-carotene
4	Phaeophyceae (brown algae)	Chl-a, Chl-c1, Chl-c2, Fucoxanthin, β-carotene, Xanthophylls
5	Rhodophyceae (red algae)	Chl-a, Chl-d, β-carotene, Phycoerythrin and phycocyanin
6	Myxophyceae	Chl-a, β-carotene, Phycocyanin, phycoerythrin

Green Algae

- Share many characteristics with plants, including photosynthetic pigments and cell wall composition
- Contain cellulose in cell walls
- Scientists believe that green algae share a common ancestor with mosses
- Found in fresh and salt water and moist areas on lands
- **Few** are multicellular and have well-developed structures

Starch

The Family: Green Algae

unicells

colonies and coenobia

filaments

macrophytes

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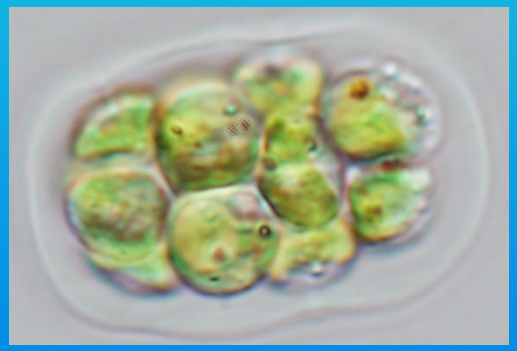
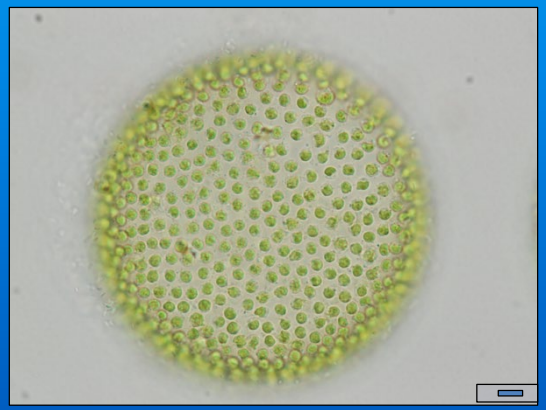
The Family: Green Algae

non-motile

motile





motile reproductive stages

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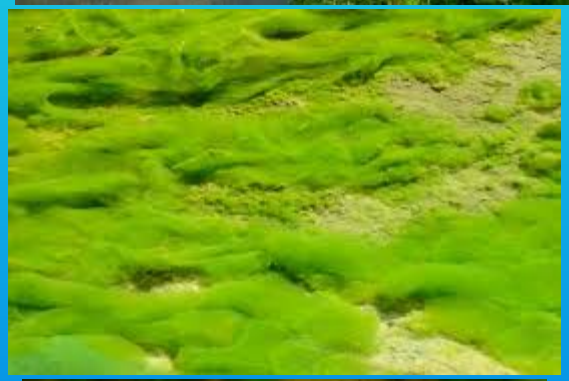
Green Algae "Blooms"



nuisance, maybe; toxins, no

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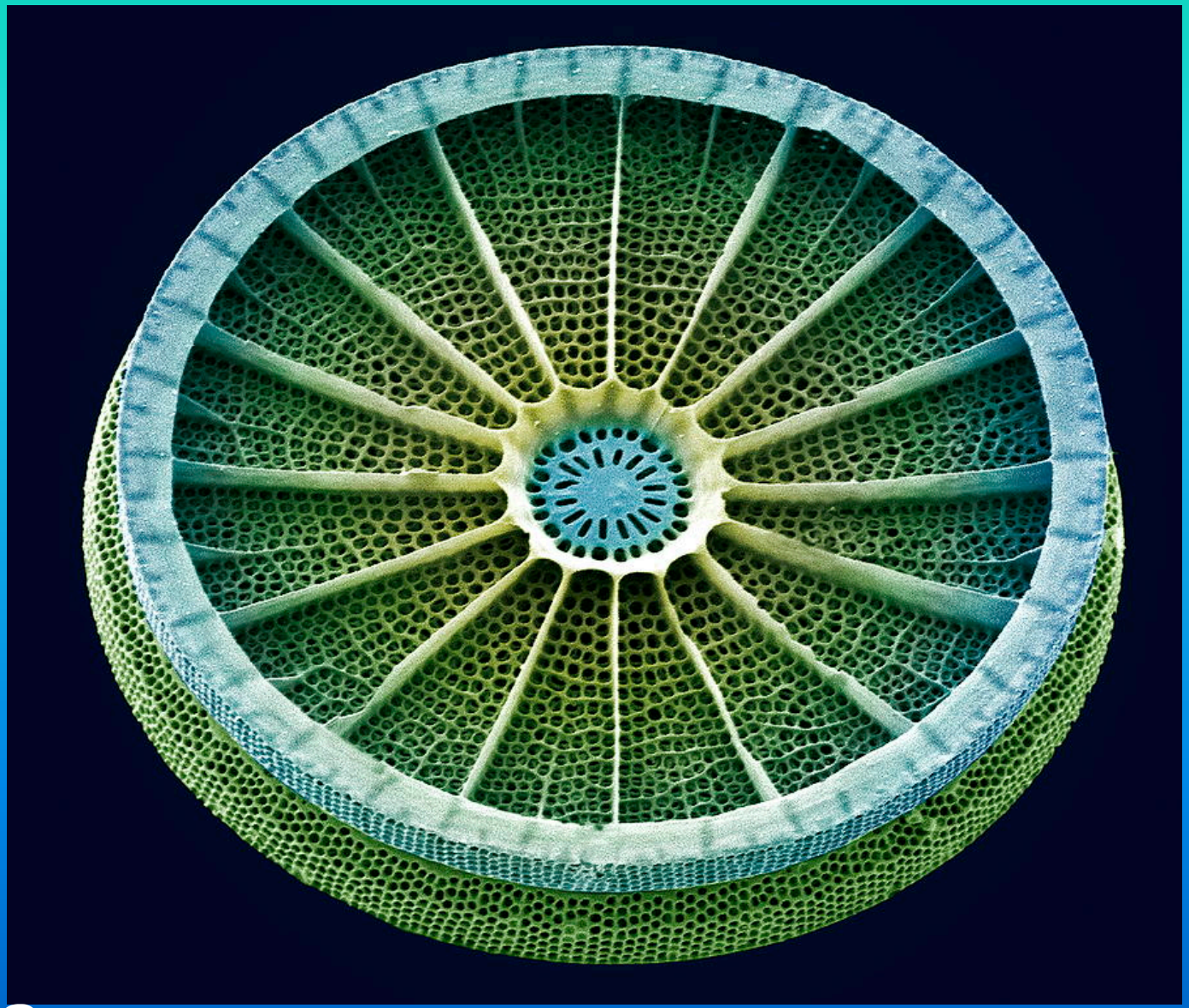
Diatoms live in glass houses



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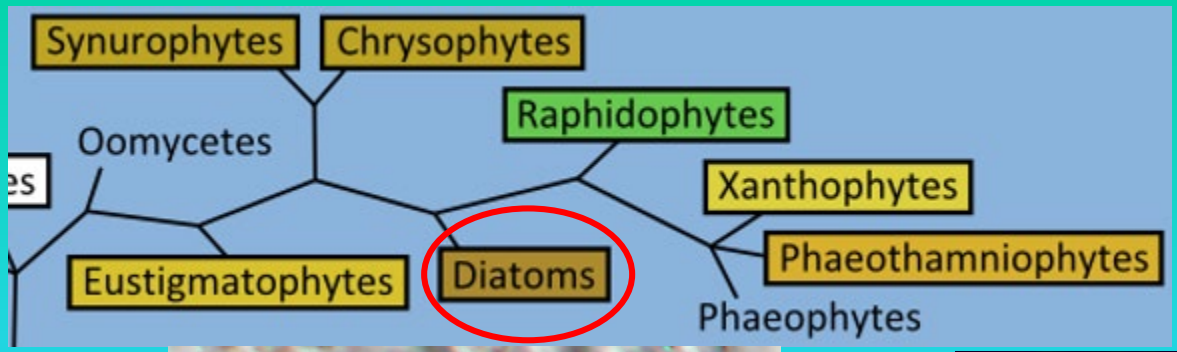
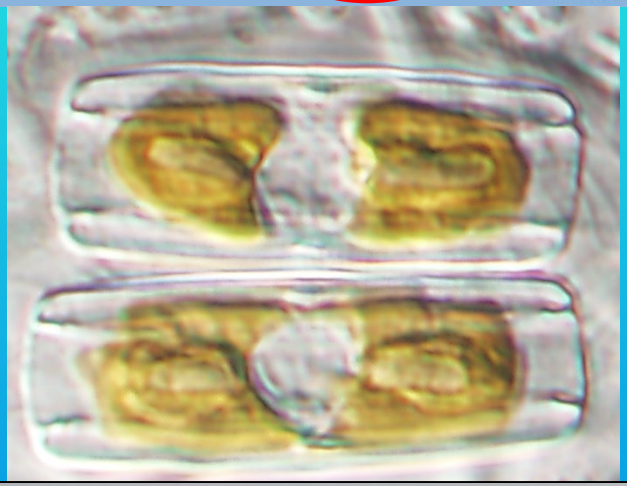
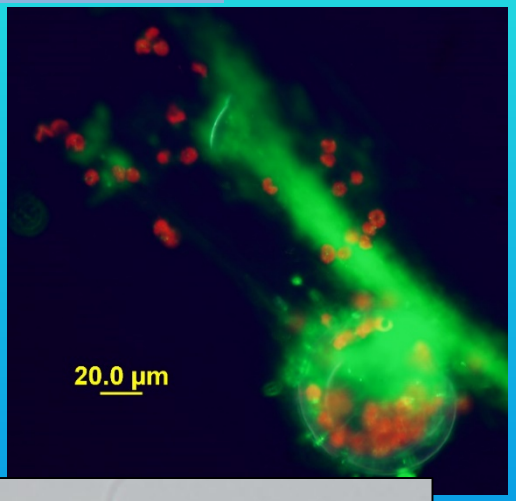
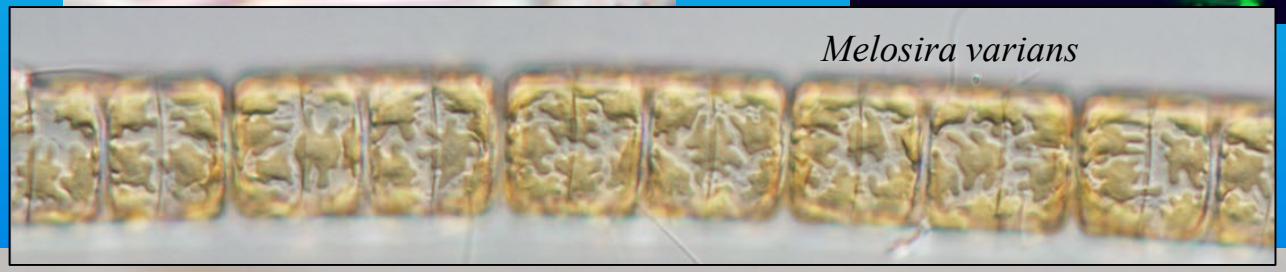


1. Pigments-Chl a and c
2. Cell wall-silica
3. Motility-if you have a raphe
4. Morphology-centric or bilateral, single cells or filaments
5. Chromoplast types







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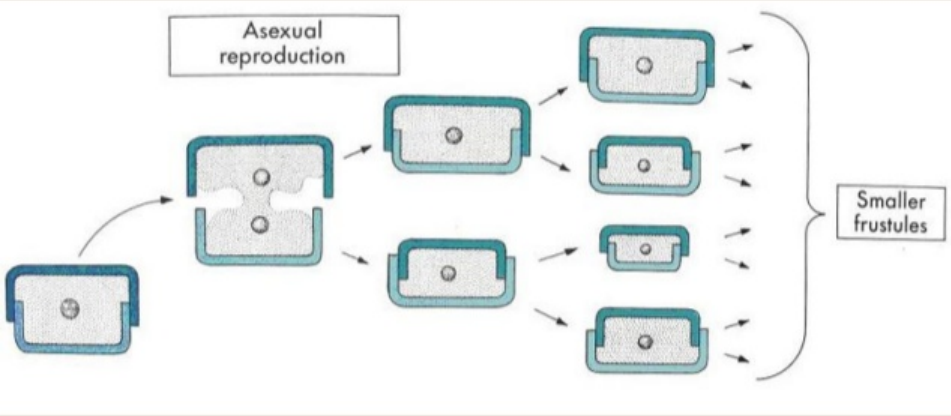
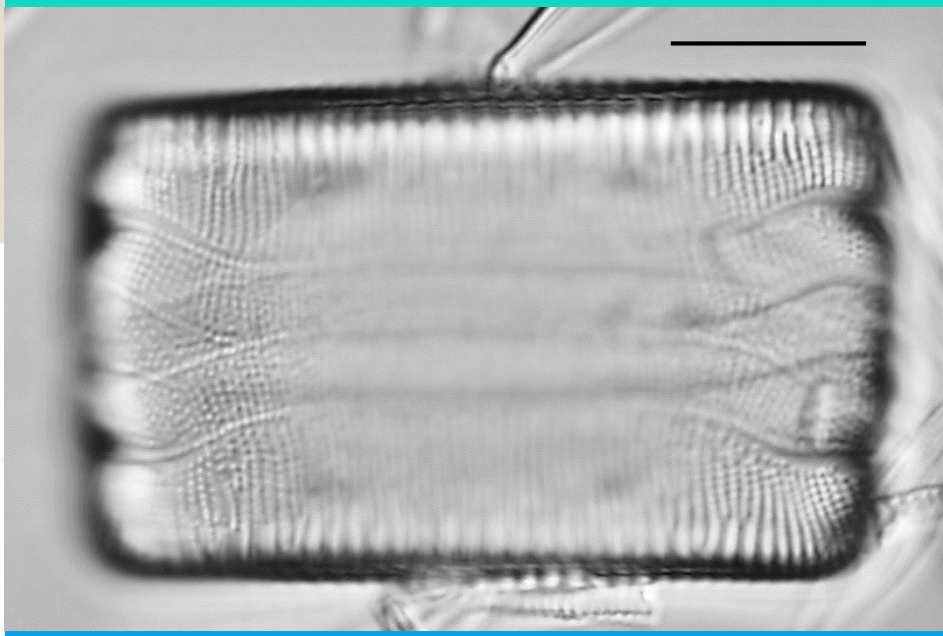
Diatoms live in glass houses

Reproduction

- Reproduction of diatom is primarily asexual by binary fission, with each daughter cell receiving one of the parent cell's two frustules (or theca).





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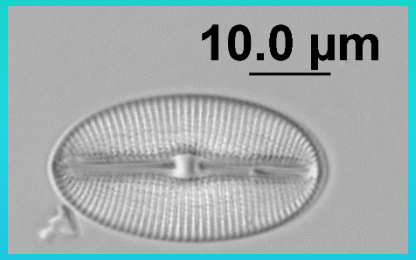
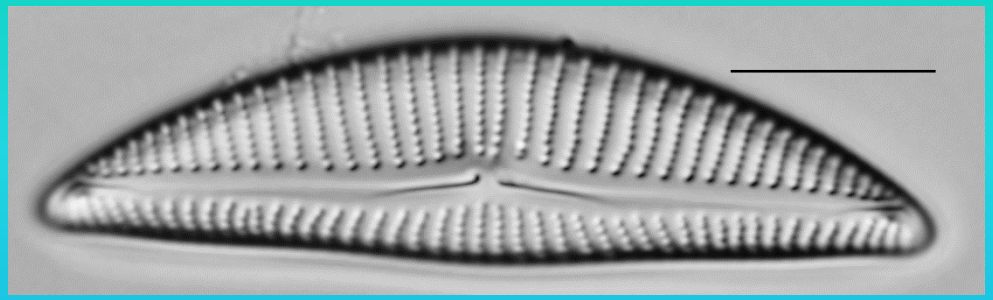
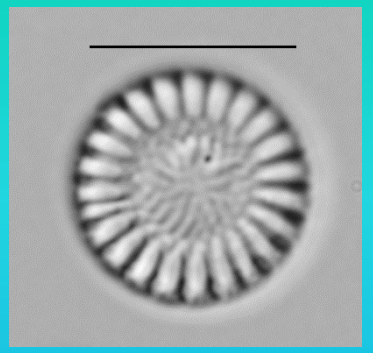
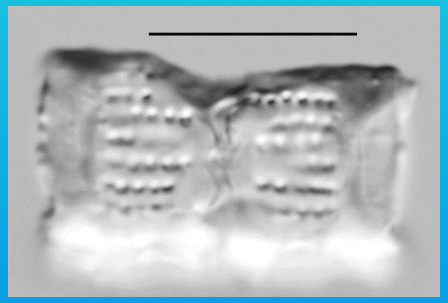
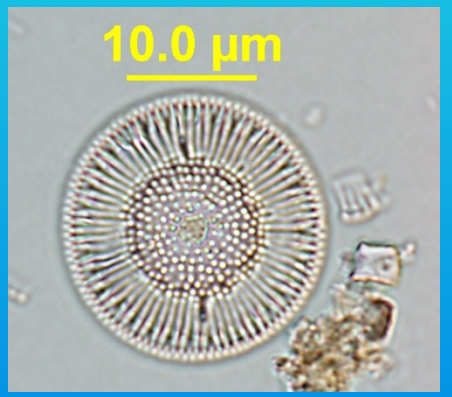
The Family: Diatoms

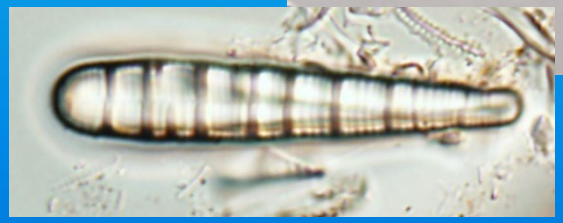


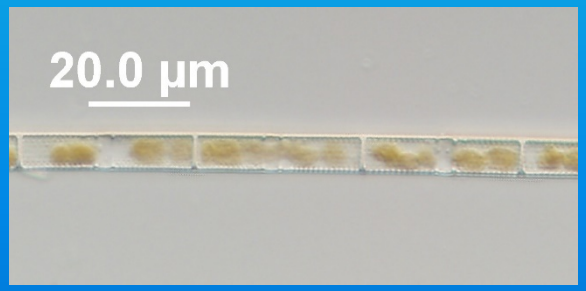


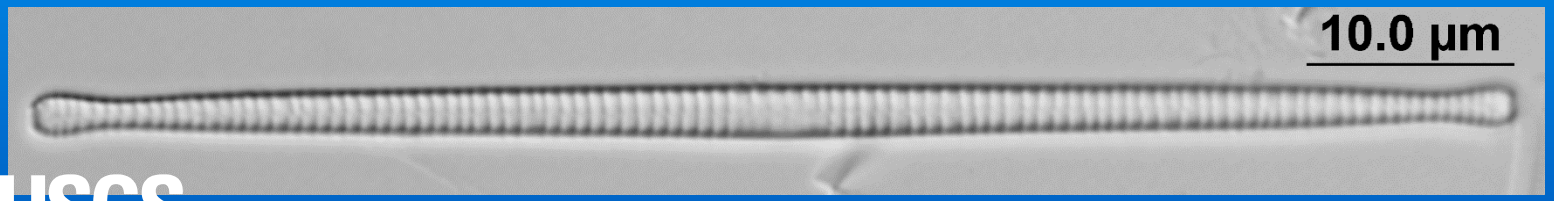












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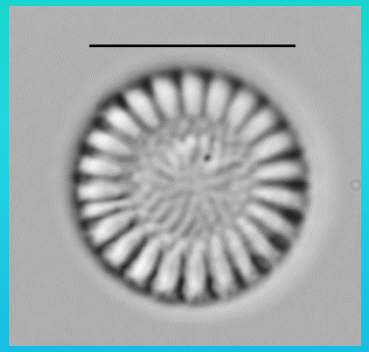
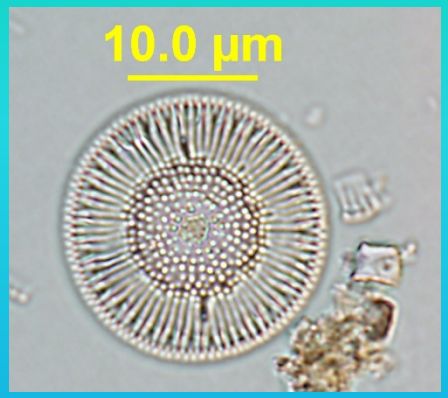
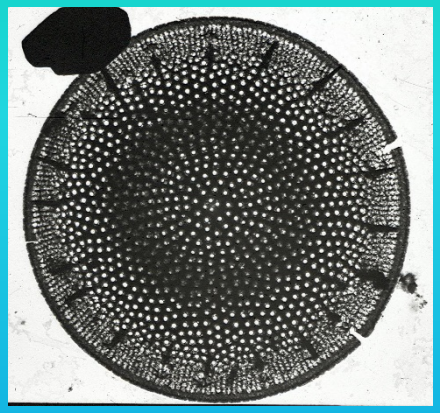
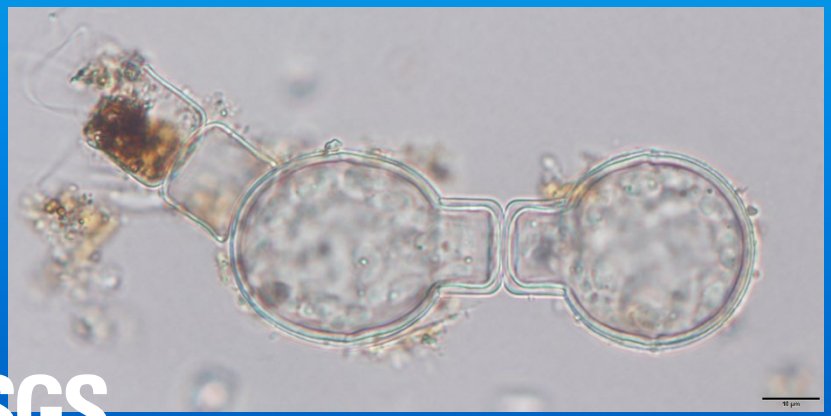
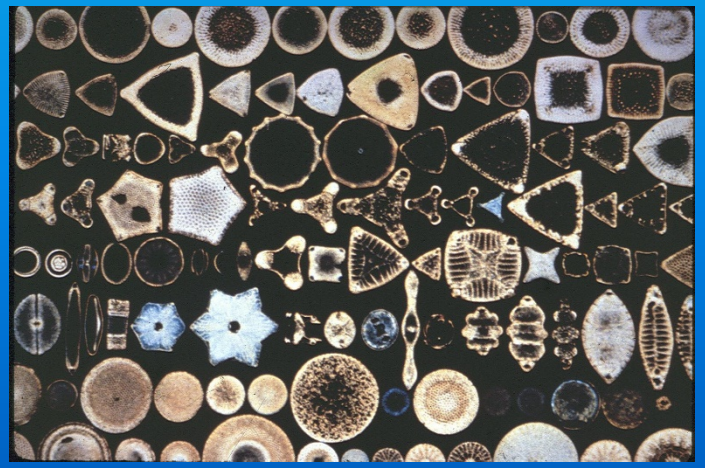
Centric Diatoms











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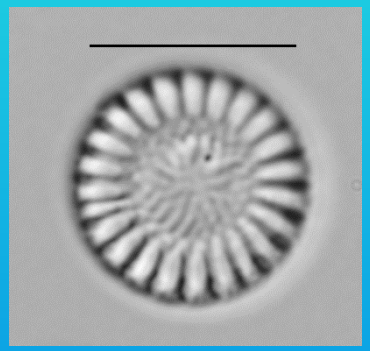
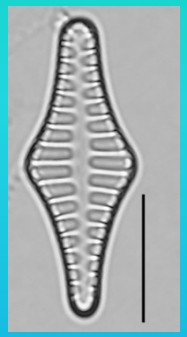
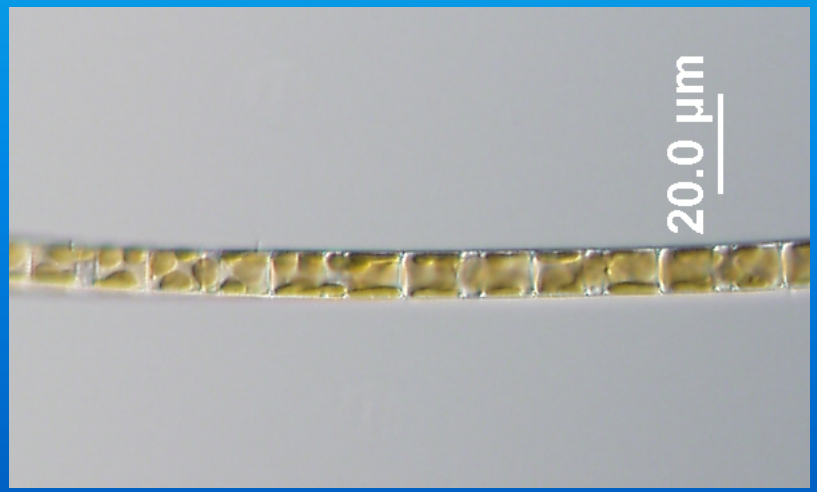
The Family: Diatoms- motility (non-motile forms)







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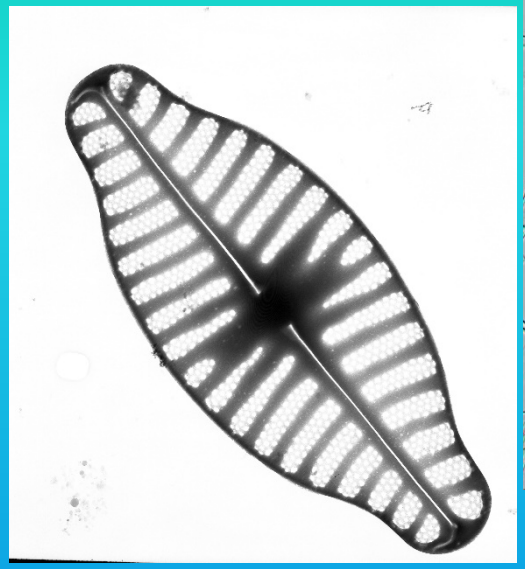
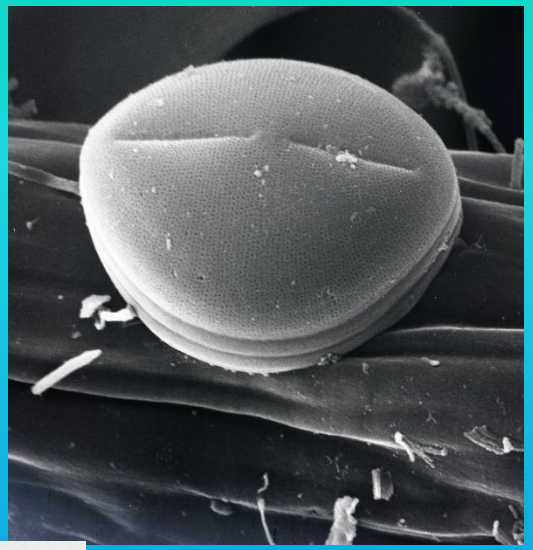
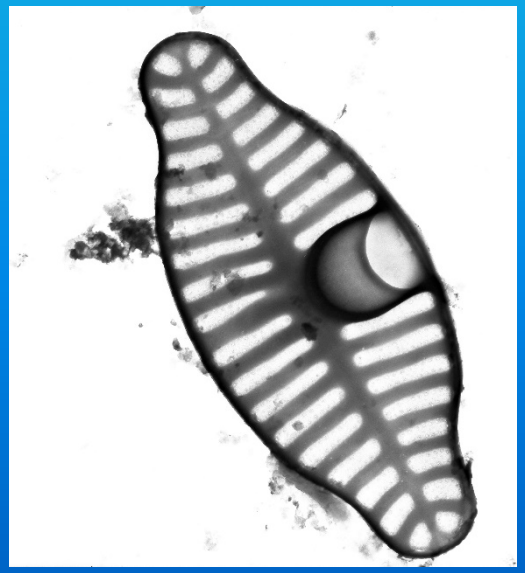
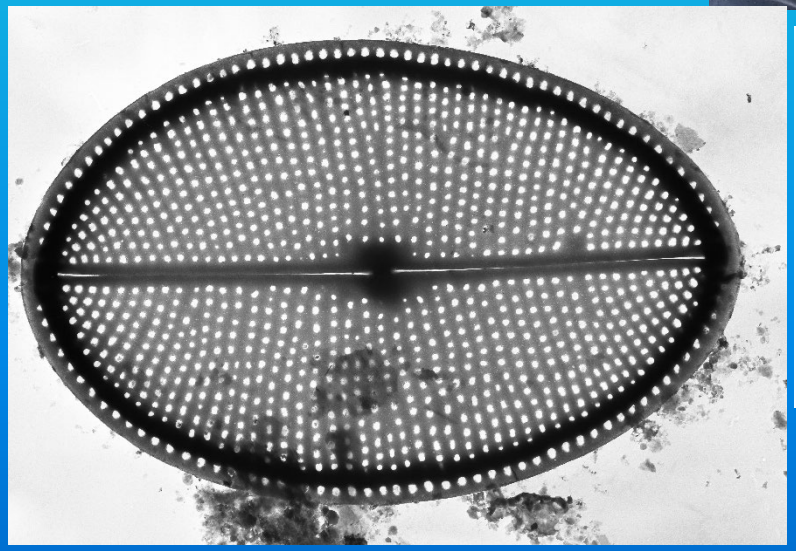
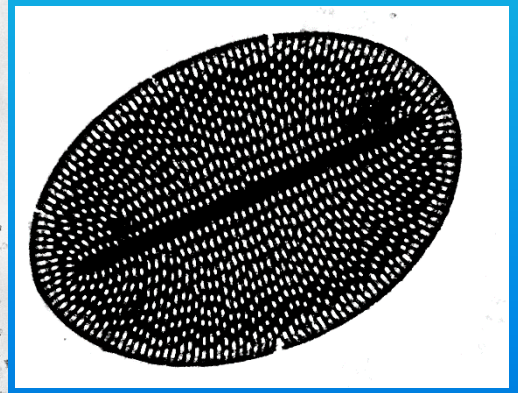
The Family: Diatoms- single raphe











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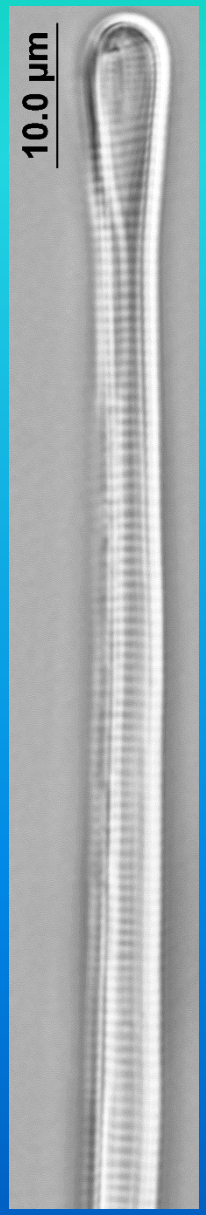
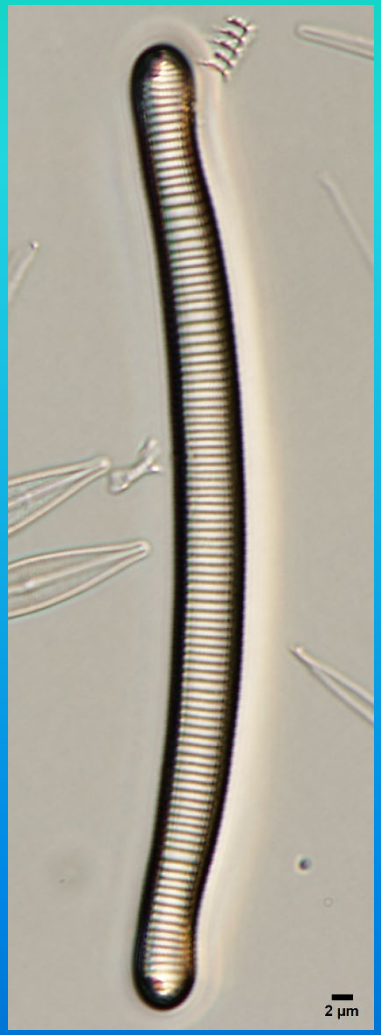
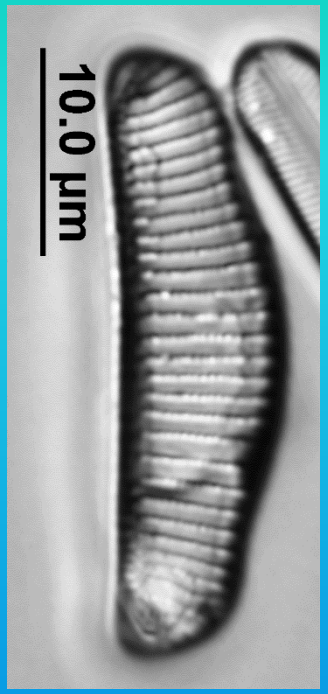
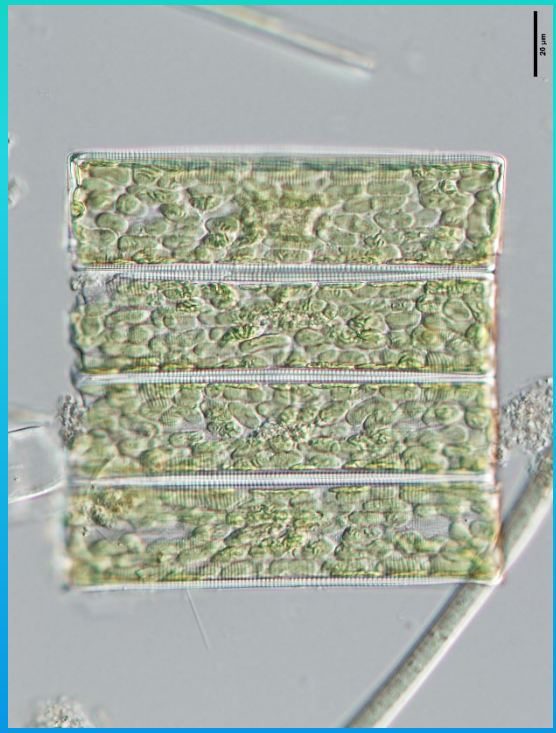
The Family: Diatoms- rudimentary

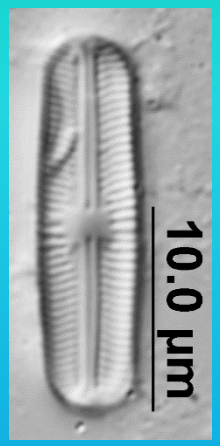


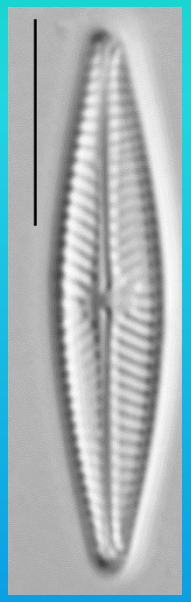




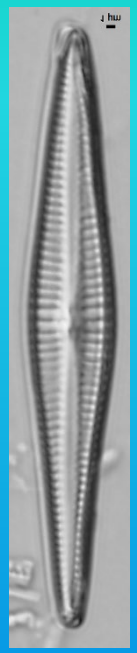


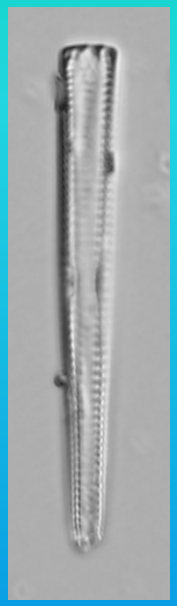
The Family: Diatoms- raphe on both sides- bilaterally symmetrical

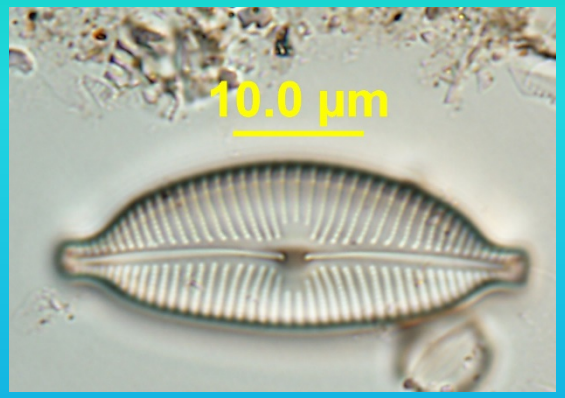




The Family: Diatoms- raphe on both sides- not bilaterally symmetrical







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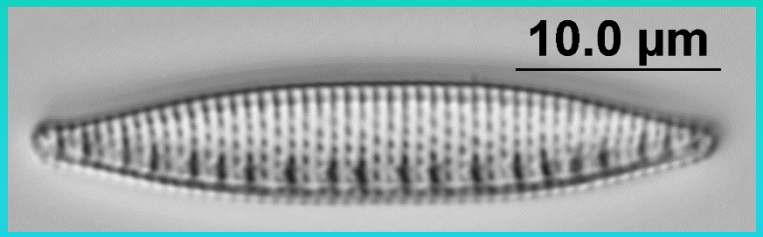
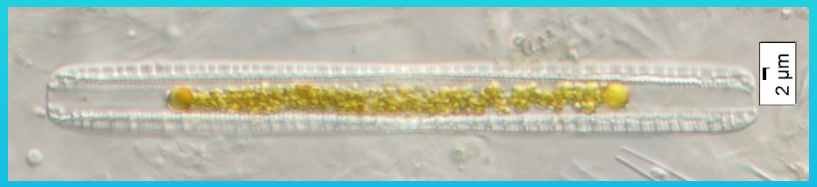
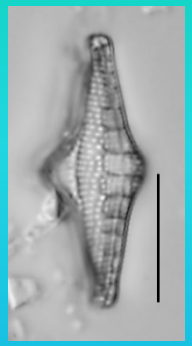
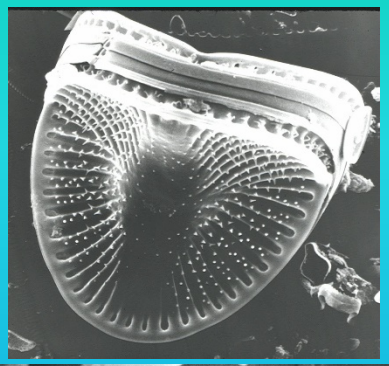
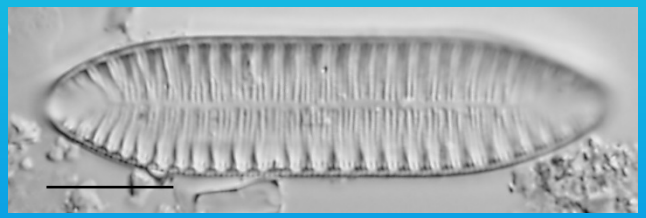
The Family: Diatoms- raphe in raised "keel"

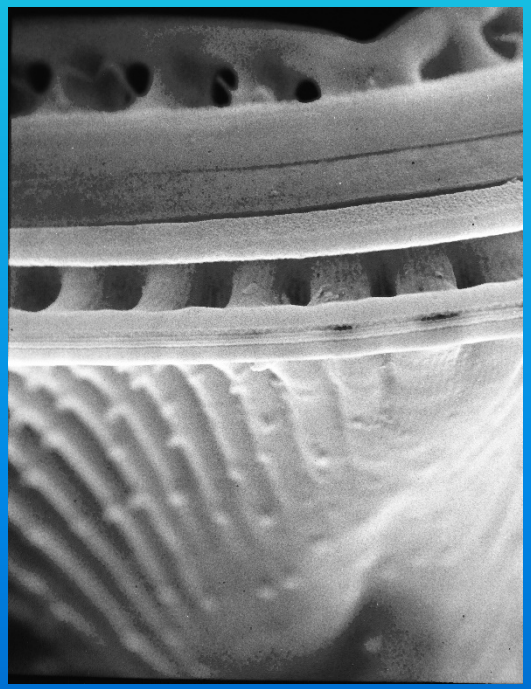


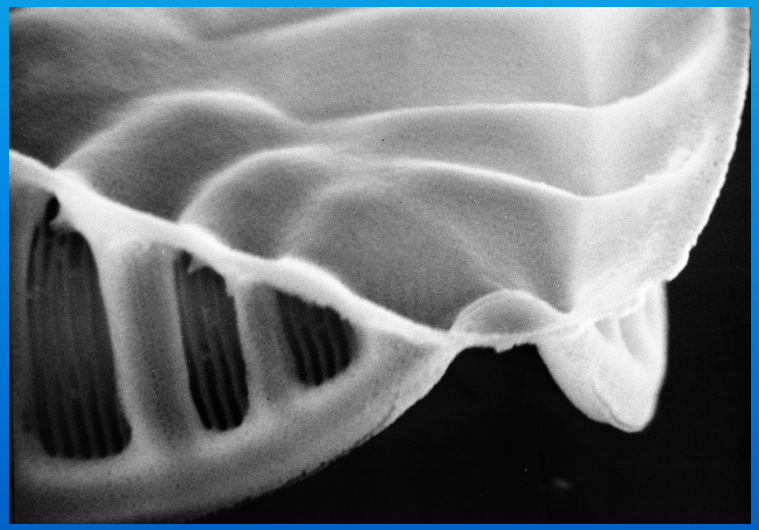


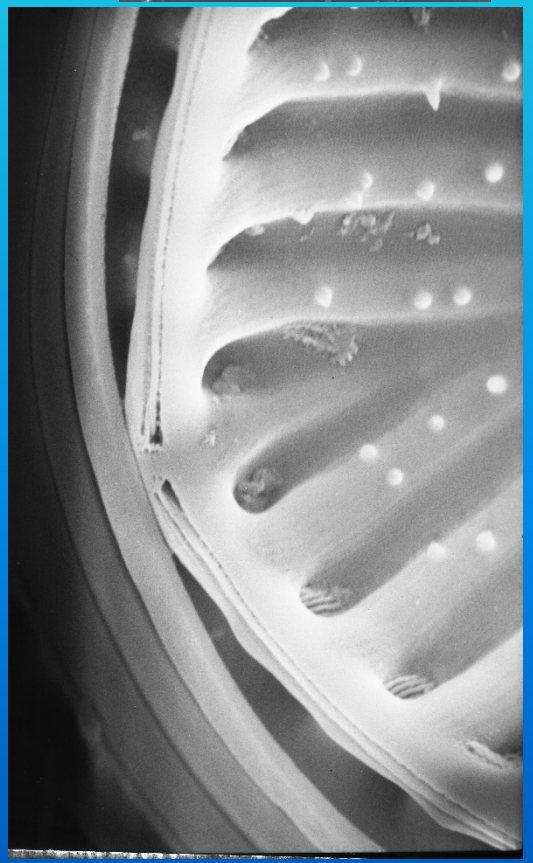












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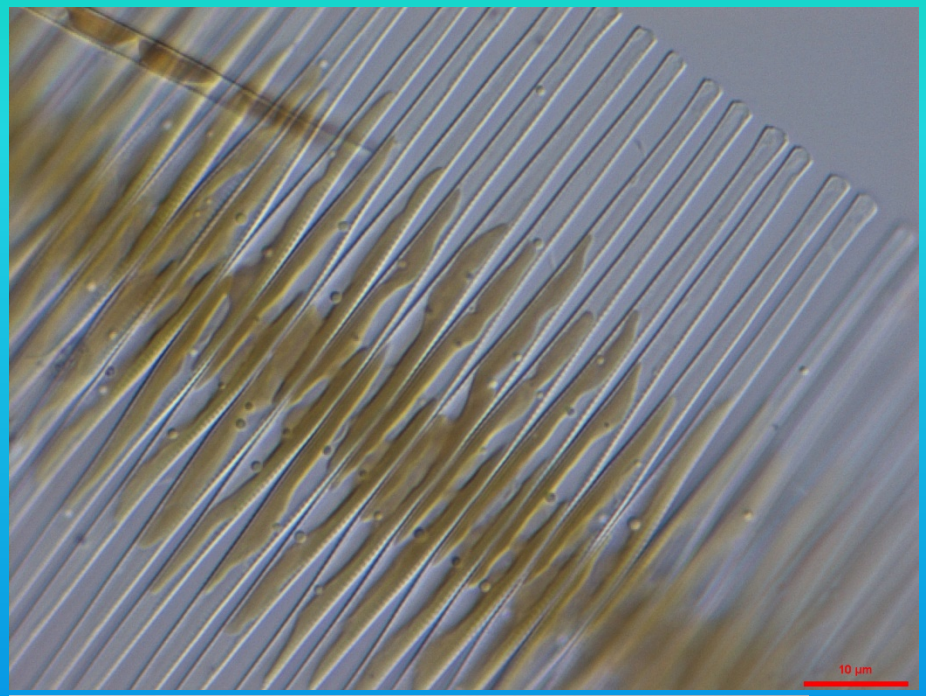
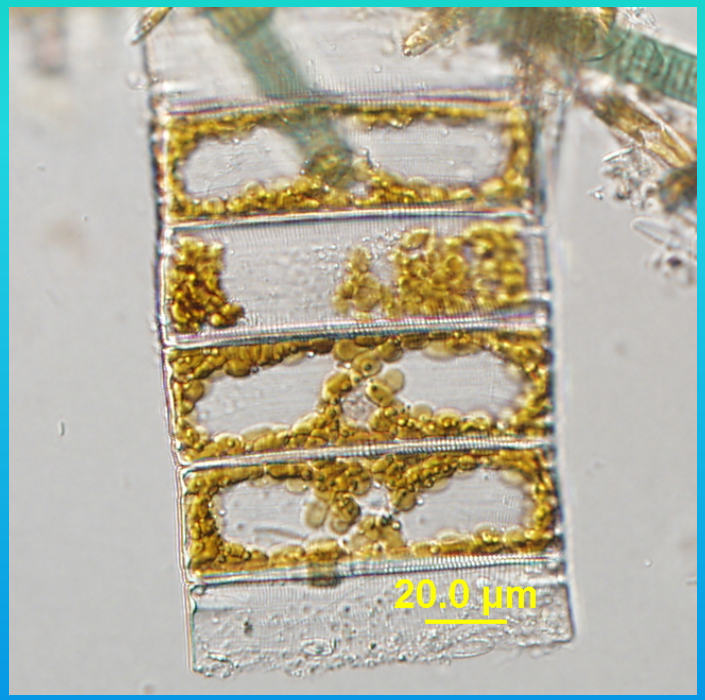
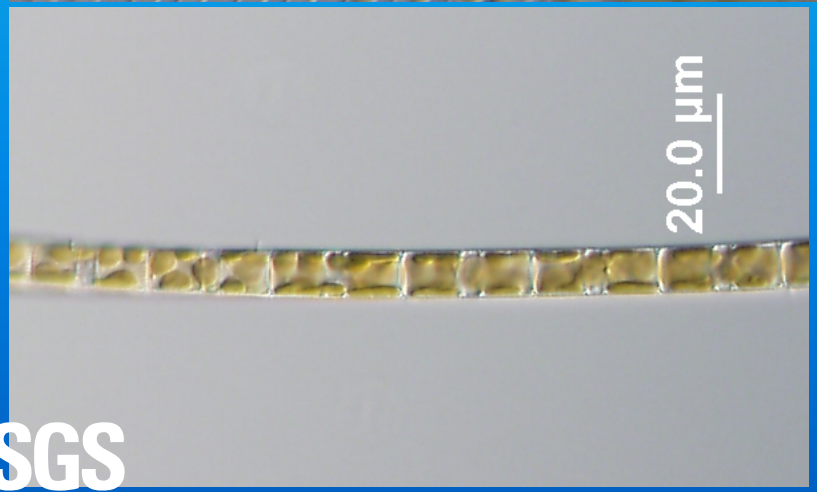
The Family: Diatoms- unicells and filaments







Floating or attached

Issues: filter clogging, rock snot, a bit of taste and odor

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Diatoms: HABs

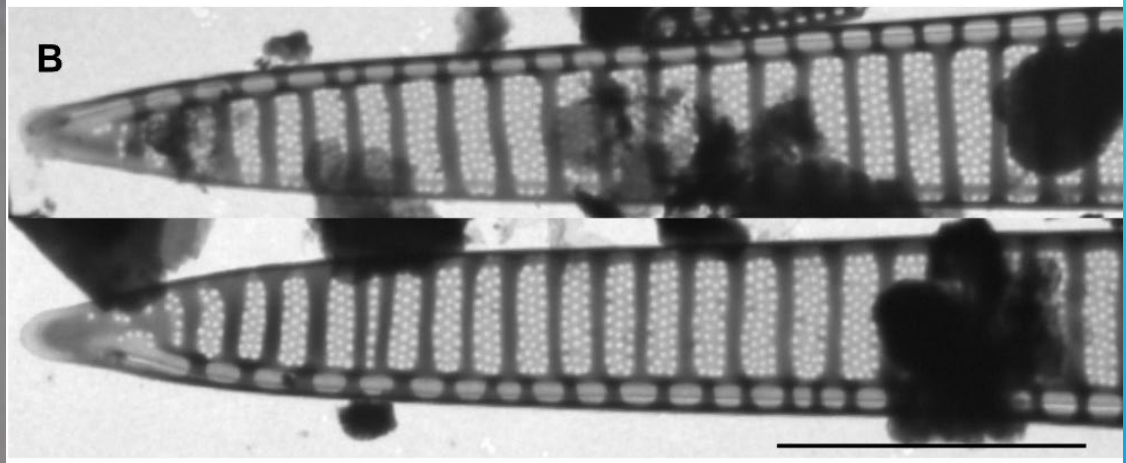
AMNESIC SHELLFISH POISONING

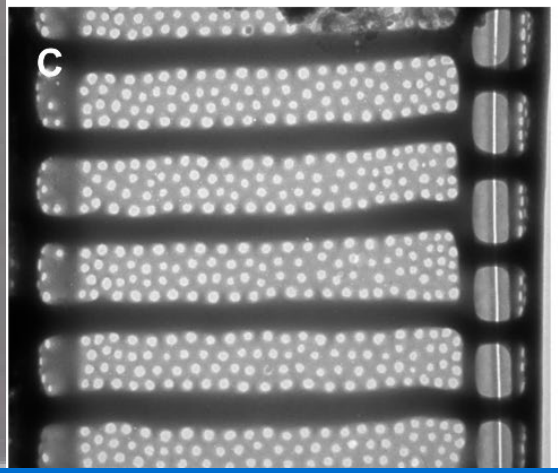
Presented by Natalie Nieto and Judea Wiggins

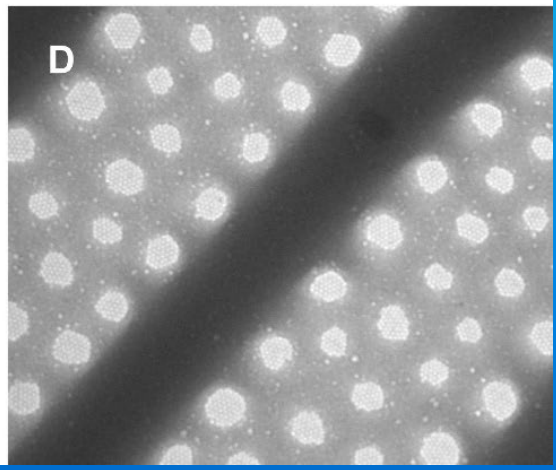
Amnesic Shellfish Poisoning – What is it?

- Amnesic shellfish poisoning (ASP) is an illness caused by the ingestion of contaminated shellfish, i.e. mussels, clams, oysters, and even Dungeness crabs that prey on shellfish.
- Shellfish become 'contaminated' when they consume phytoplankton, or algae, containing high concentrations of the marine toxin, *domoic acid*.

Pseudo-nitzschia

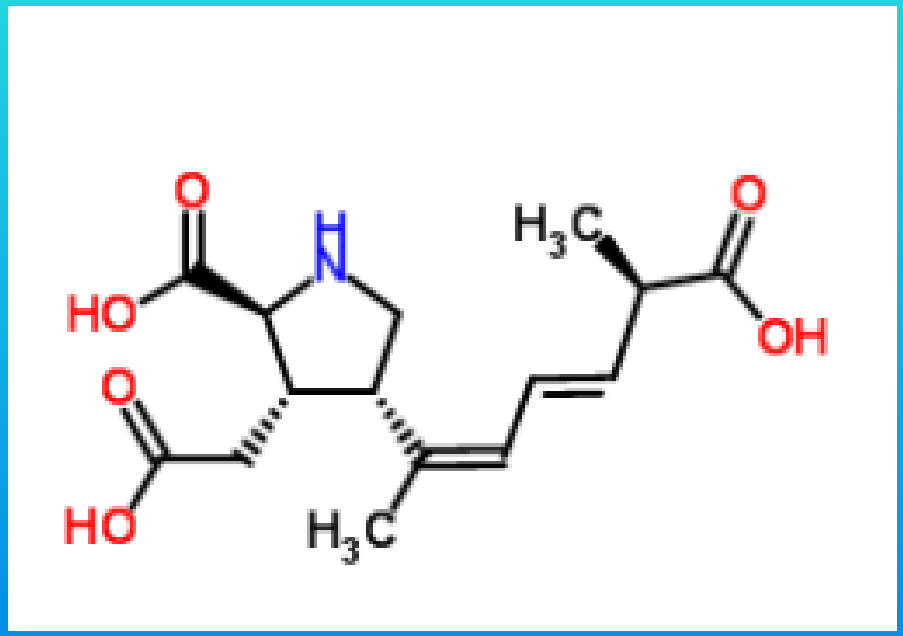






Domoic Acid – What is it?

- Domoic acid is an excitatory neurotransmitter and derivative of glutamine; it is also a conditionally essential amino acid – not synthesized by the body, but instead dietary-obtained.



Domoic-acid producing *Pseudo-nitzschia* species and their vectors

Harmful Algal Species associated with shellfish closures or poisoning events	Geographic Area	Vector Organism
Pseudo-nitzschia pungens f. multiseries	Gulf of Maine Puget Sound, WA Massachusetts Maine	Mussel Bay scallop+ Sea scallop+ Anchovy Sardine
P. australis *P. multiseries*	California	Mussel Rock crab Dungeness crab Razor clams Sand crab (*Emerita*)
P. australis *P. cuspidata*	Washington Oregon	Razor clam Dungeness crab
P. australis *P. pseudodelicatissima*	Puget Sound	Blue mussel Littleneck clam Manila

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Biomagnification

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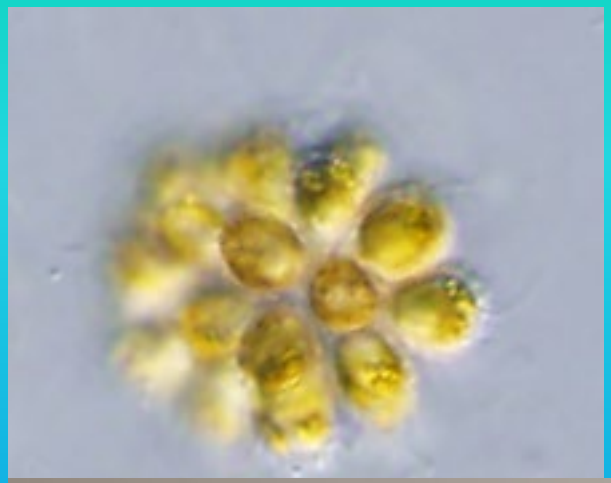
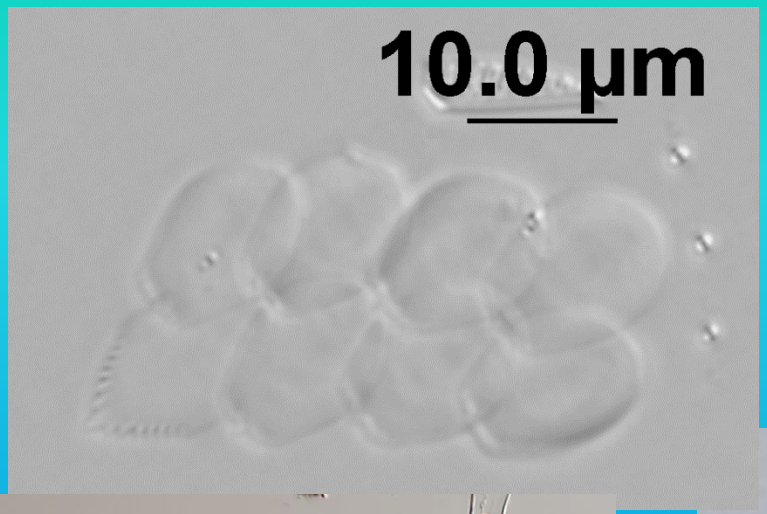
The Chrysophytes (close relatives of the diatoms)





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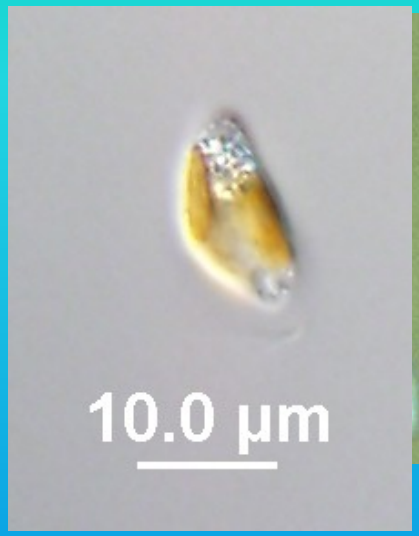
The Haptophytes



Prymnesium parvum

http://www.bing.com/images/search?view=detailV2&ccid=Mqu9fgyy&id=FFAA1F69AC7C4DA9679D659897B19884BAB12BE9&thid=OIP.Mqu9fgyyevTWZUuQ1DQIgEsDA&q=prymnesium&simid=607992939159225526&selectedIndex=0&ajaxhist=0

Salty water and fish kills

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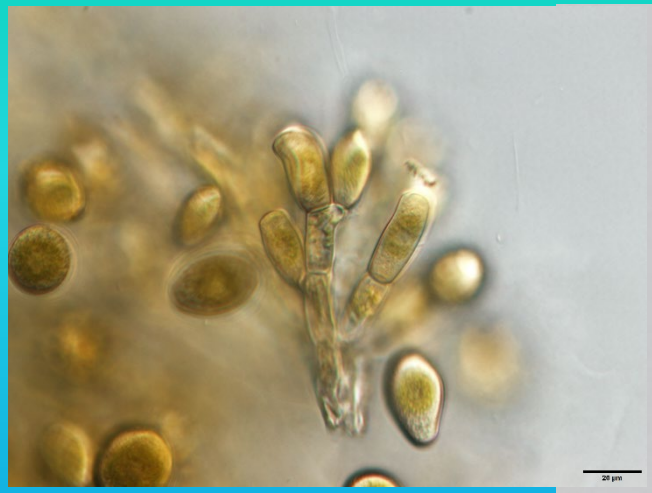
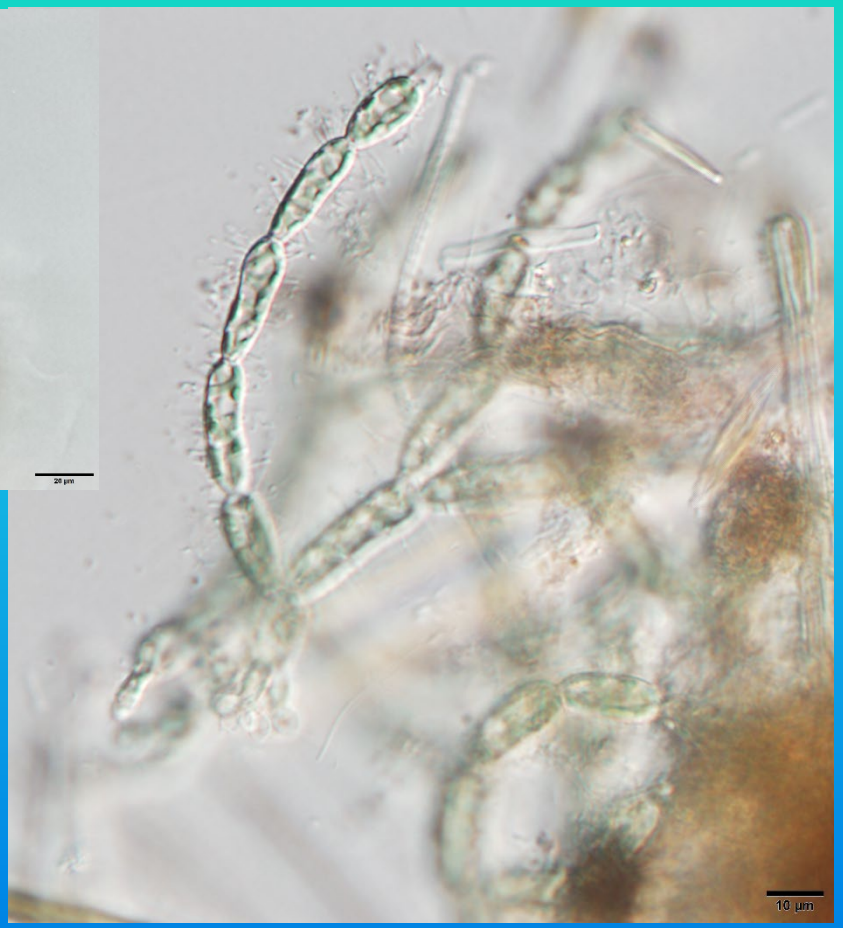
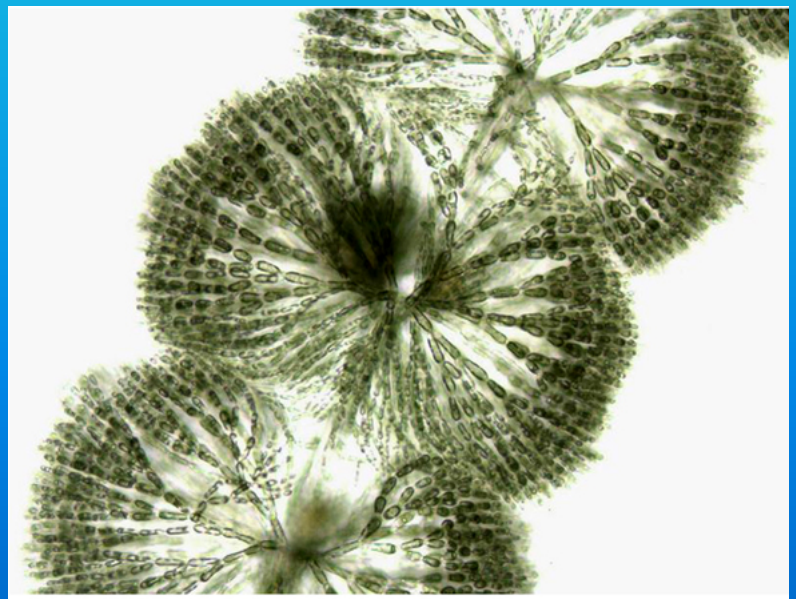
The Reds: clean water indicators

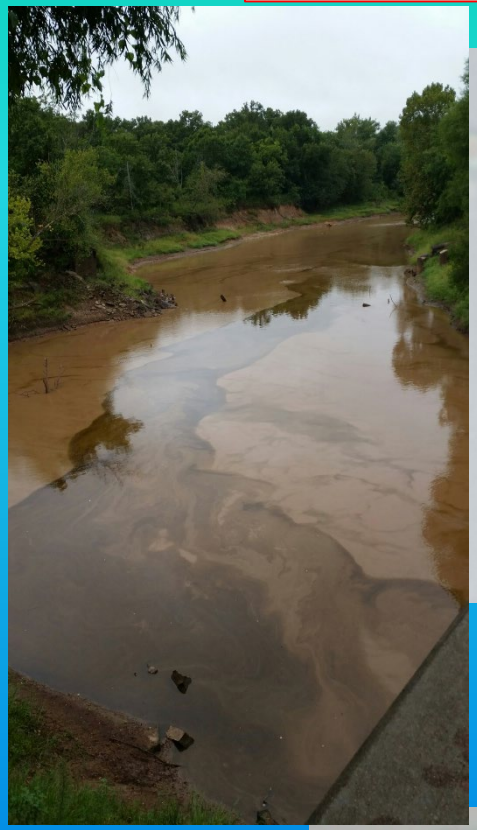


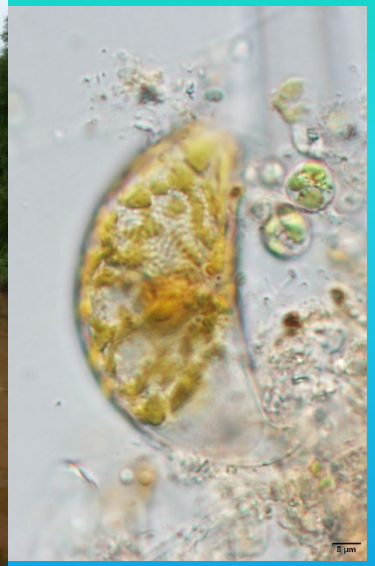


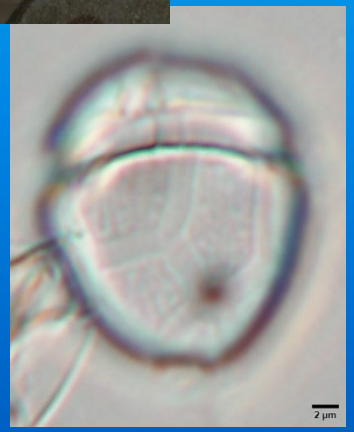


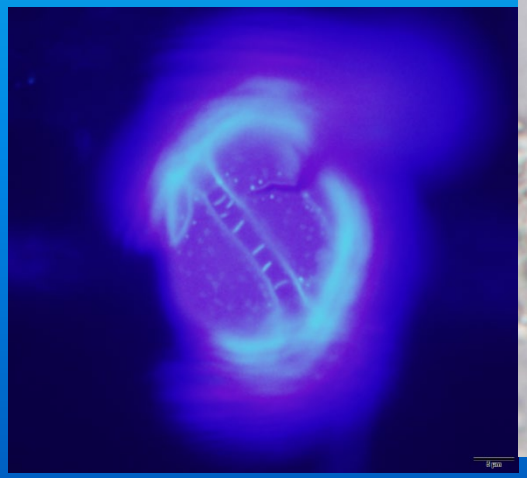
Am Zentralfaden entspringen in regelmäßigen Abständen dicht gedrängte Wirtel, die der Froschlaichalge, Batrachospermum, ein perlschnurartiges Aussehen verleihen. Sie bestehen aus verzweigten Zellfäden. (Mikroskopische Aufnahme: Dr. Johanna Knappe, Philipps-Universität Marburg)

The Dinoflagellates: many toxin producers in marine habitats









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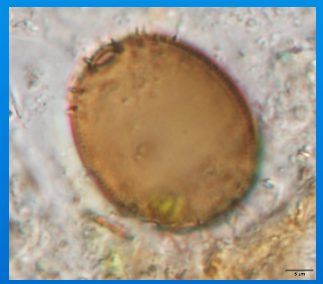
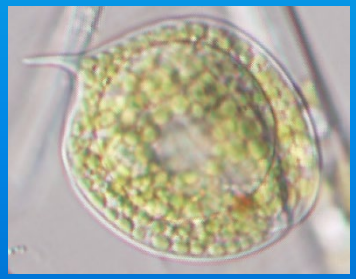
The Euglenoids





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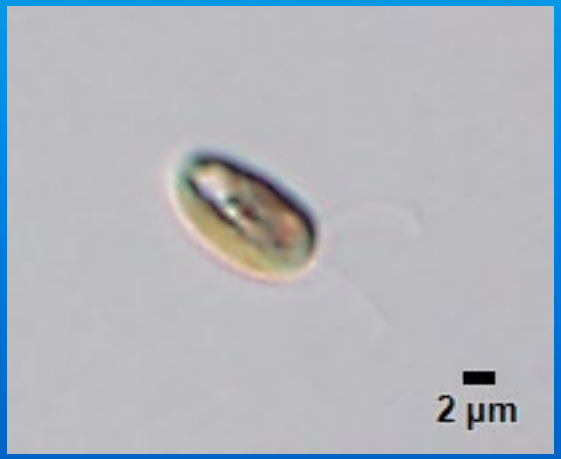
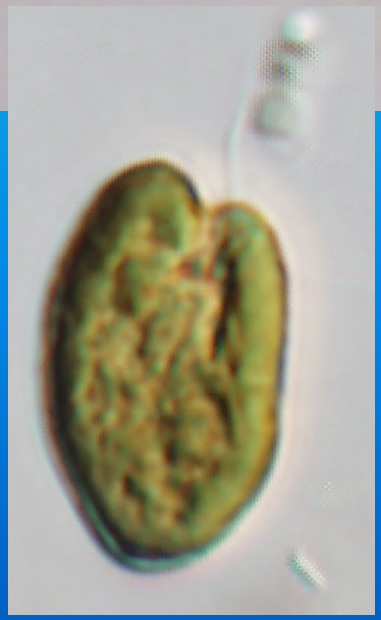
The Cryptomonads





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The end!