

What would it take for you to survive?

Phytoplankton!

- Microscopic
- Photosynthesising
- Primary producers of the seas



What possible challenges?

- A phytoplankton needs to:
 - Get food
 - Survive
 - Reproduce
- Work with your group to identify at least three challenges

List of possible challenges

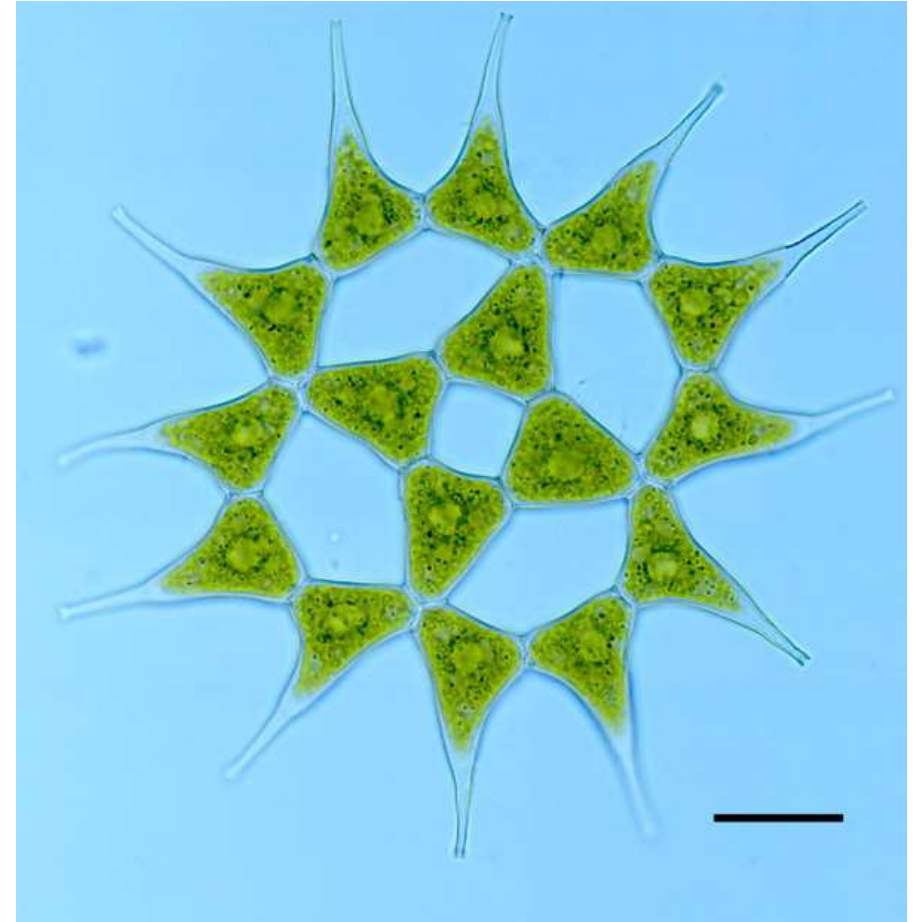
- Light
- Nutrients
- Predation
- Buoyancy
- Reproduction

Strategies to overcome the challenges

- Develop hypothesis in your groups to propose physiological or behavioral traits that might help address any one of these challenges
- Report your hypothesis using the google form: <https://goo.gl/forms/IXOFZJEf84QPZtZx2>

Some traits that help:

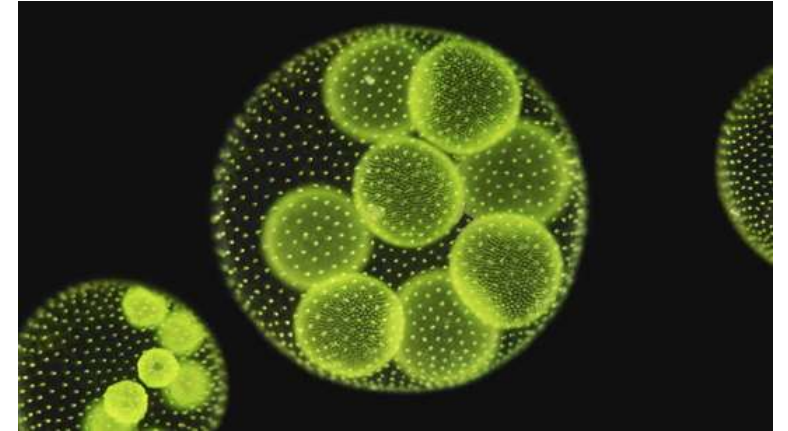
- *Buoyancy*
 - *Size - smaller is better*
 - *Shape - non spherical*
 - *oil/gas filled vacuoles*
 - *Protrusions*
 - *Forming colonies*



Pediastrum biwae

Some traits that help:

- *Motility*
 - *Ability to sink/rise*
 - *Structures that enable motility - flagella*
 - *Knowing when to move - sensory features*
- *Food - light and nutrients*
 - *Light sensitivity*
 - *Motility - move lower to nutrient rich waters at night and higher to get the light during the day*



Volvox sp.

Some traits that help:

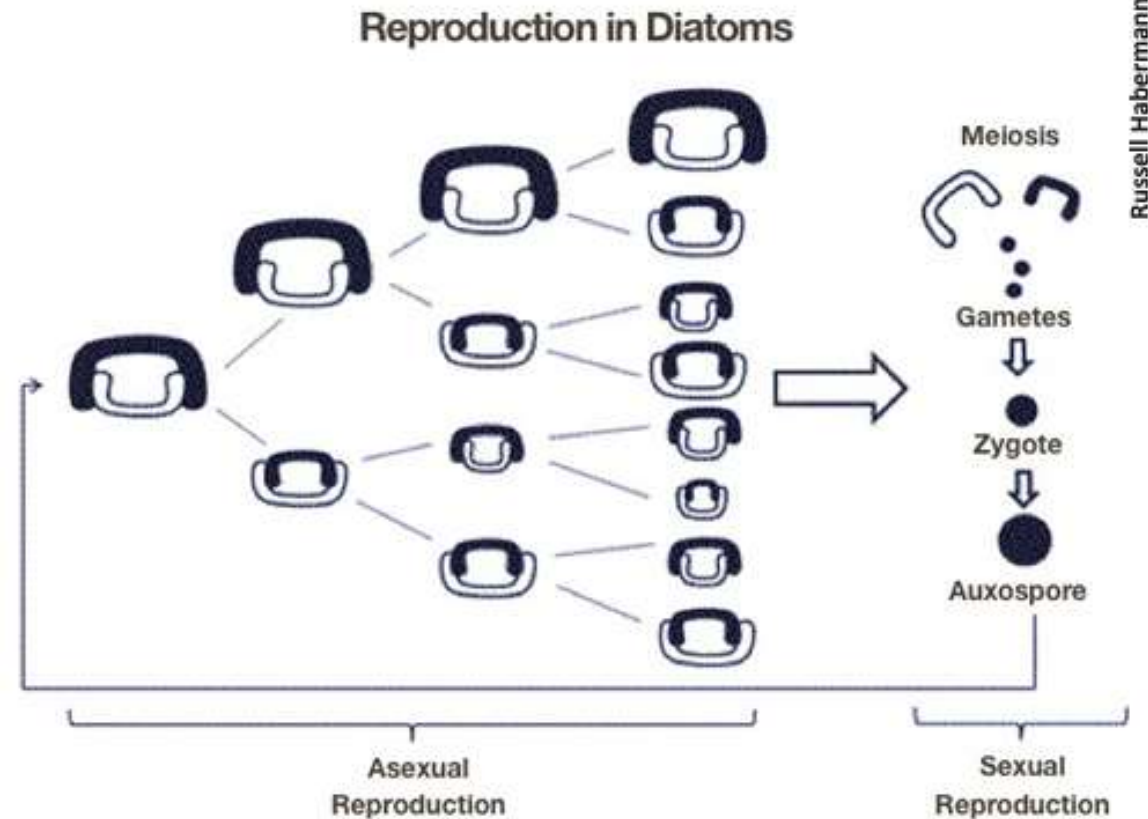
- *Avoiding predation*
 - *Ornamentation*
 - *Multicellularity*



Chlorella vulgaris

Some traits that help:

- *Reproduction*
 - *Ocean is homogeneous so mostly asexual*
 - *Sexual - survive foul environment or overcome functional limitations as in diatoms.*



Putting it all together - HW

- Construct a consensus model in your group whose function is to explain the challenges phytoplankton face and the mechanisms they have evolved in order to face said challenges.
- Submit on D2L

Trade-offs!

- Remember that a trait that solves one problem could in fact worsen another - there are always tradeoffs.
- Evaluate the tradeoffs