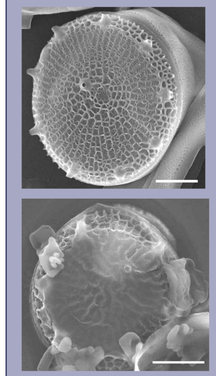
Diatoms: Charismatic microfauna in the classroom

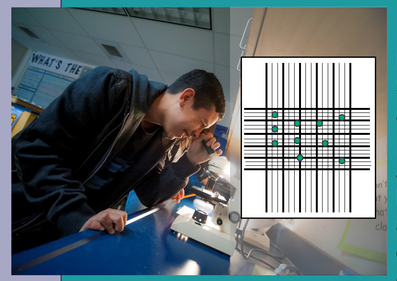
Sarah Lerch • UCSD, Scripps Institution of Oceanography • slerch@ucsd.edu
Felicia Ryder • Wangenheim Middle School • fryder.sandi.net



Diatoms may seem like just another microscopic phytoplankton, but their ecological importance and diverse beauty set them apart.

This unit was designed to introduce 7th grade life science students to primary production, nutrient limitation, genetics and mutation through the exploration of diatoms, a truly charismatic microfauna.

Primary production: Nutrient limitation and diatom growth

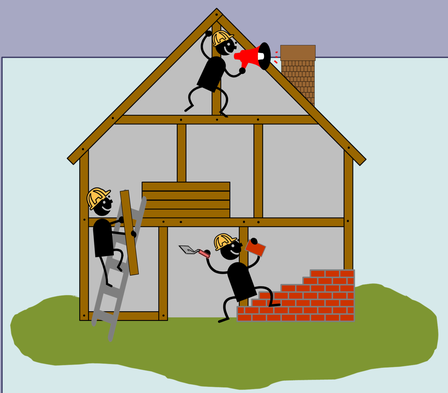


Growing diatoms in the classroom:
Finding a happy medium

Learning goal:
Students understand the role of marine primary producers in marine food webs and how nutrient availability impacts primary production.

Activity:
Diatoms are grown in three different nutrient medias containing high, medium and low amounts of phosphate. Students hypothesize about the impact of these different medias, track growth over time through cell counts, graph growth curves and analyze results.

Mutation: Genetics and phenotype



Proteins and phenotype:
A cellular construction zone

Learning goal:
Students understand that genes determine phenotype through a variety proteins with different functions.

Activity:
Students use a house being constructed by workers as an analogy for a cell being built by proteins. Students match components of the construction site to their analogous protein counterparts.

Causes of mutation:
Mistakes and the environment

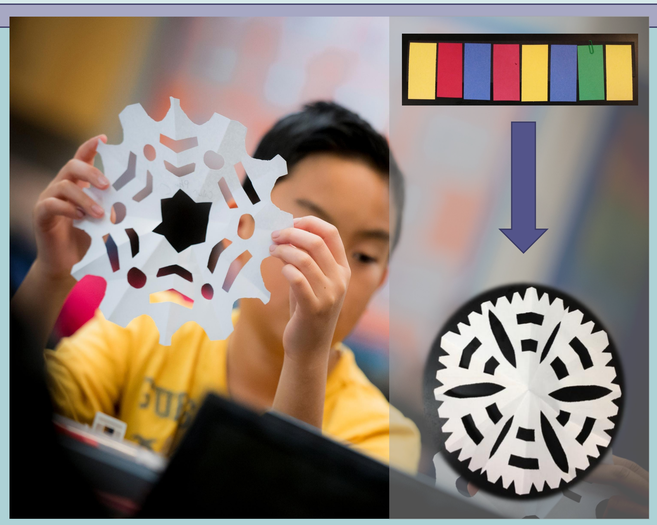
Learning goal:
Students learn what a mutation is and ways in which mutations can be created.

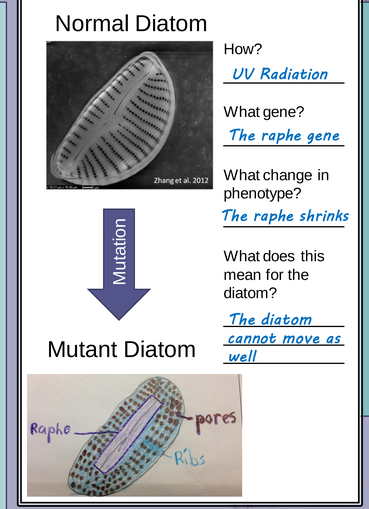
Activity:
Students read “scientific articles” describing different causes of genetic mutation (UV radiation, carcinogens and DNA building mistakes). Students must then present their findings to the class, sharing what they have learned.

Genes to proteins:
Making the cut

Learning goal:
Students understand that the pattern of base pairs in a gene determines the structure of the protein which the gene codes for.

Activity:
Students generate their own “proteins” (snowflakes) using the code provided in the pattern of “base pairs” in their “gene” . A genetic mutation then alters the “base pairs” and the code. Students then create a mutant “protein” whose altered shape can easily be compared to their normal one.





Modeling mutants:
Diatoms gone wrong

Learning goal:
Students apply knowledge of mutations to diatoms and use critical thinking in order to create models of mutants.

Activity:
Students synthesize everything they have learned throughout the unit by generating their own mutant diatom. The mutation must affect a specific gene, have a specific cause and generate a mutant phenotype. The impact of this phenotypic change on the health of the diatom must then be assed.

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