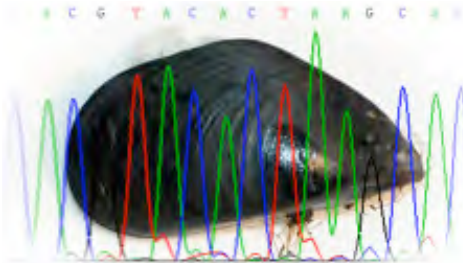


# Marine Biotechnology and Bioinformatics



A program of ITEST (Information Technology Experiences for Students and Teachers) funded by the National Science Foundation



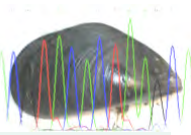
## Snail Size Dilemma: Does Size Really Matter

Biology

10<sup>th</sup> Grade

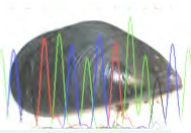
Erna Kessell

William Daylor High School,  
Sacramento, CA



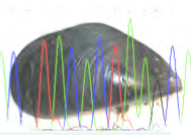
# Background Context

- ▶ Invasive vs native ?
- ▶ Same species or not? If not explain size variance
- ▶ Collection, wet lab, computer analysis



# Instructional Goal

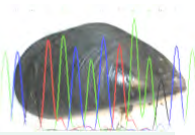
- ▶ Investigate whether size is due to:
  - ▶▶ Native or Nonnative
  - ▶▶ Age
  - ▶▶ Nutrition
  - ▶▶ Infection
  - ▶▶ Sex



# State Standards

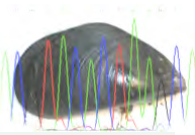
Standard 5a: Know the general structures of DNA, RNA and proteins.

- ▶ Standard 5d: Know how basic DNA technology is used.
- ▶ Standard 6g: Accommodation of an individual organisms to its environment and adaptations of a lineage of organisms through genetic change.



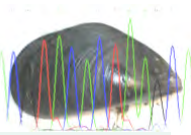
# Instructional Objectives

- ▶ Define native and nonnative species
- ▶ Explain random sampling



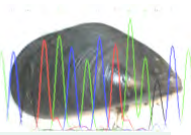
# Instructional Objectives

- ▶ Use NCBI cutter and BLAST programs
- ▶ Conclude results from the investigation



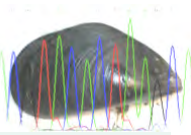
# Materials and Resources

- ▶ 20 meter transect
- ▶ Quadrats
- ▶ Hammers
- ▶ Small wooden boards
- ▶ Snails
- ▶ Forceps
- ▶ Microscope slides
- ▶ Computers
- ▶ Dropper bottles with water in them.
- ▶ NCBI cutter
- ▶ BLAST
- ▶ Power point presentation



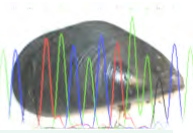
# Instructional Strategies

- ▶ Field work at collection site
- ▶ Lab investigation
- ▶ Computer investigation using BLAST and NCBI cutter



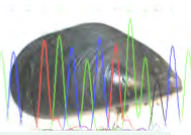
# Assessment

- ▶ Lab write up with detailed conclusion
- ▶ Oral reports of group lab analysis



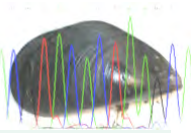
# Learning Outcomes

- ▶ Oral reports indicated whether students understood the goals and objectives.



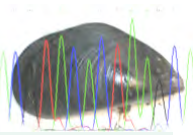
## Lessons Learned

- ▶ Group work for collection, wet lab and computer lab work.
- ▶ Area that worked well:
  - Crushing the snails-taking turns
  - Slide making of sample
  - Prelab power point of the investigation
  - Computer worksheet
- ▶ Area that didn't work well
  - Combine part I with part II



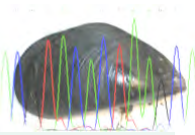
## Contact

- ▶ For more information about this lesson, contact:
  - ▶▶ Erna Kessell
  - ▶▶ Teacher, 10<sup>th</sup> grade
  - ▶▶ William Daylor HS,
  - ▶▶ Sacramento, CA
  - ▶▶ [ekessell@egusd.net](mailto:ekessell@egusd.net)

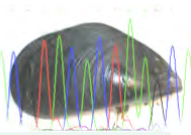


# Slide with Text & Data Chart

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# Slide with Table



# Slide with Image & Text

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- ▶ Use your slide layout types to add the perfect layout for your needs