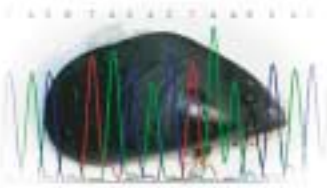

Marine Biotechnology and Bioinformatics

for Teachers

Uses of Genetic Technology

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Introduction

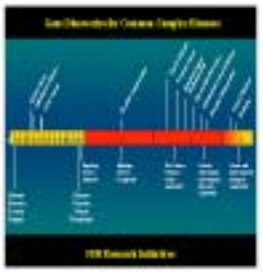
Students have learned about DNA, Mendelian Genetics, tRNA and mRNA, protein synthesis, the concept of Genetic Fingerprinting as per California State Science Standards. Students are familiar with Genetic Fingerprinting through TV shows such as CSI. Many Students are also familiar with many diseases having a Family History/Genetic component and individual differences in response to medications.

Some basics of both Classification and Evolution are also introduced prior to teaching Uses of genetic Technology so students understand the difficulty scientists face in identifying who or what something is related to, e.g., Which animal is most closely related to an Elephant or where did Native Americans come from?

Specific standard based knowledge is integrated into personal, and commonplace terminologies to allow students to understand applications of Genetic Testing Technologies.

Instructional Goal

Students will understand current uses of Genetic Technologies and have the background to understand future their relevant careers developing Genetic Technologies with.



Instructional Objectives

- How Gene codes are different and can be read
- Students will complete a Gene Code search and comparison using CLUSTAL
- Students will compare the Genes of related organisms to determine their Evolutionary Relationship(s).
- Students will investigate the Human Genome Project and analyse Human Population variations to determine Human Population Relationships
- Students will investigate Personal Family History and its' affect on their own disease risk.
- Students will learn about the use of Genetic Testing to determine personalized medical treatment.

Method

Students are first introduced to Genes as codes and are then asked to compare sentences of different languages and determine which languages are most related.

Example: **Je vais au marche**

Yo voy al mercado

I go to the store

Ich gehe nach verkaufen

Students are asked to discuss how one can use clues to determine the degree of relationship of the languages and how that is similar to genetic codes for organisms.

Genetic codes are then introduced and are compared first on paper and then the series of activities begins starting with the computer based use of Clustal for genetic code reading.

Results/Learning Outcomes

- Students are able to successfully use a computer to perform a genetic analysis and comparison.
- Increased understanding of uses of Genetic Technologies to understand evolutionary history
- Students are familiar with the Human Genome Project
- Human Genetics are understood as a new and evolving tool in the development of individualized medical and preventative health treatment.

Conclusion/Lessons Learned

These activities were highly successful and at the close of this series of lessons students are clearly able to explain uses of Genetic Technologies to include, Individualized medicine, Determining history of Human Migration, and analysis of degree of relationship between organisms.

These activities need further ongoing support with discussion of common news issues such as finding Genetic linkages to cancer and obesity, the discovery of new species and ongoing news events related to Genetics in general and the Human Adam' detailing the Human Genome Project was very supportive of this unit.

Genetic Genome Project specifically.

The video 'In Search of technologies and websites such as Clustal or the Human Genome Project evolve so rapidly that these activities and related web sites must be continuously updated to reflect rapidly changing material.

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