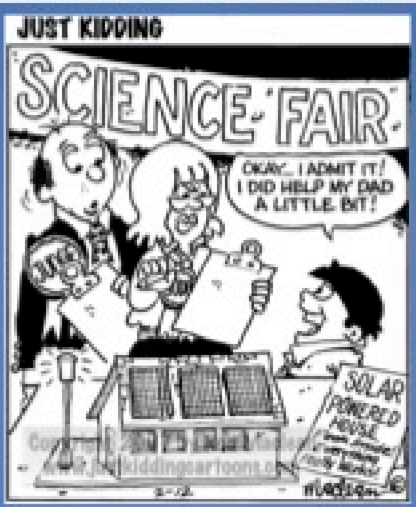
Incorporating Inquiry: Students As Scientists



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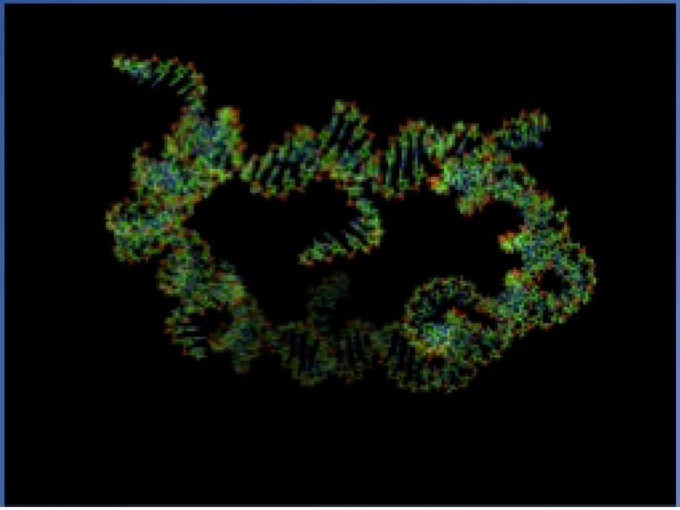
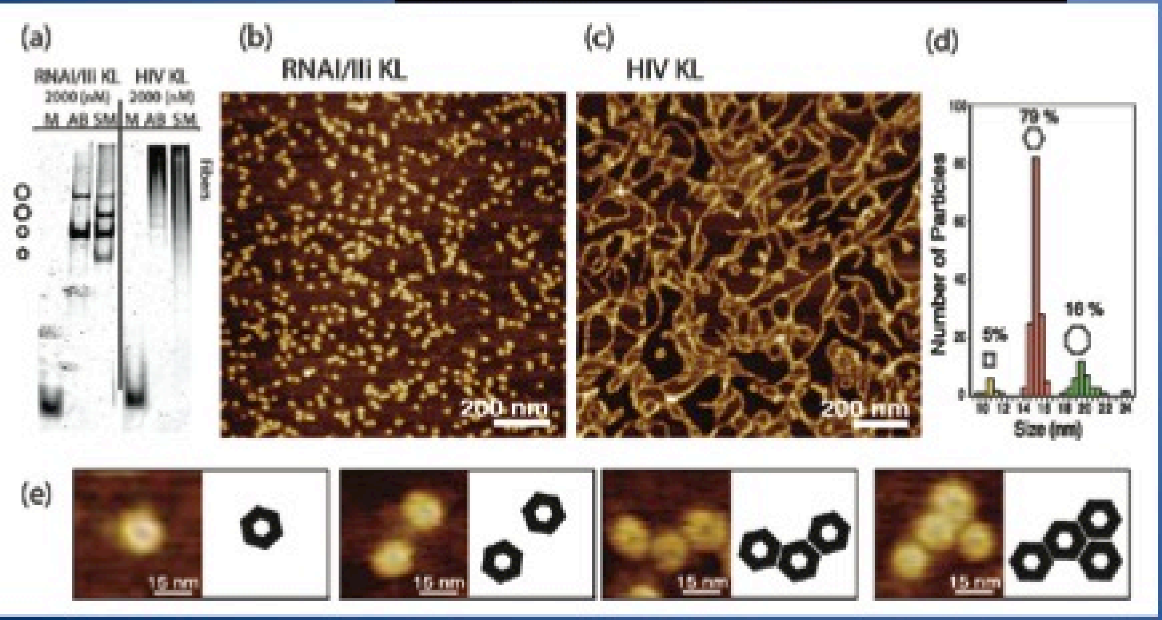
UCSB RET II

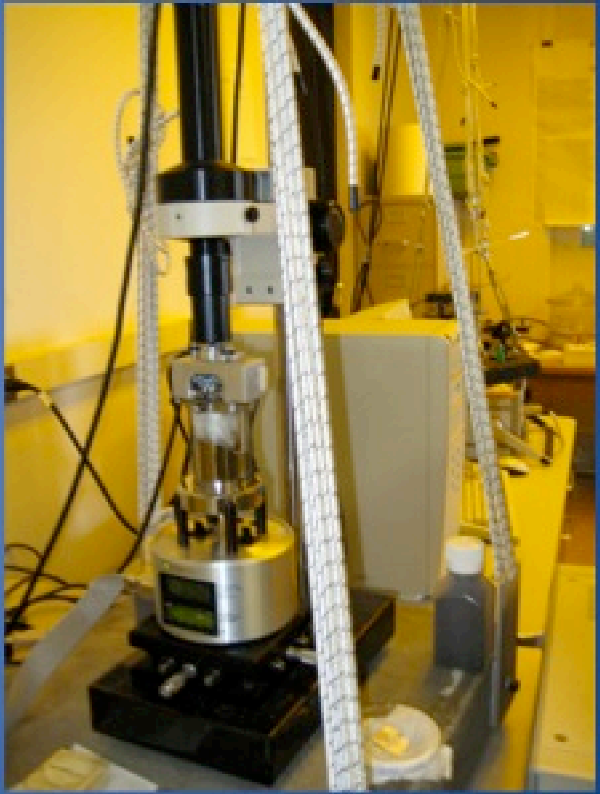
Challenging But Fun

- Just Do It
- Intrinsic motivation
- Authentic assessment
- Take more responsibility
- Discovery

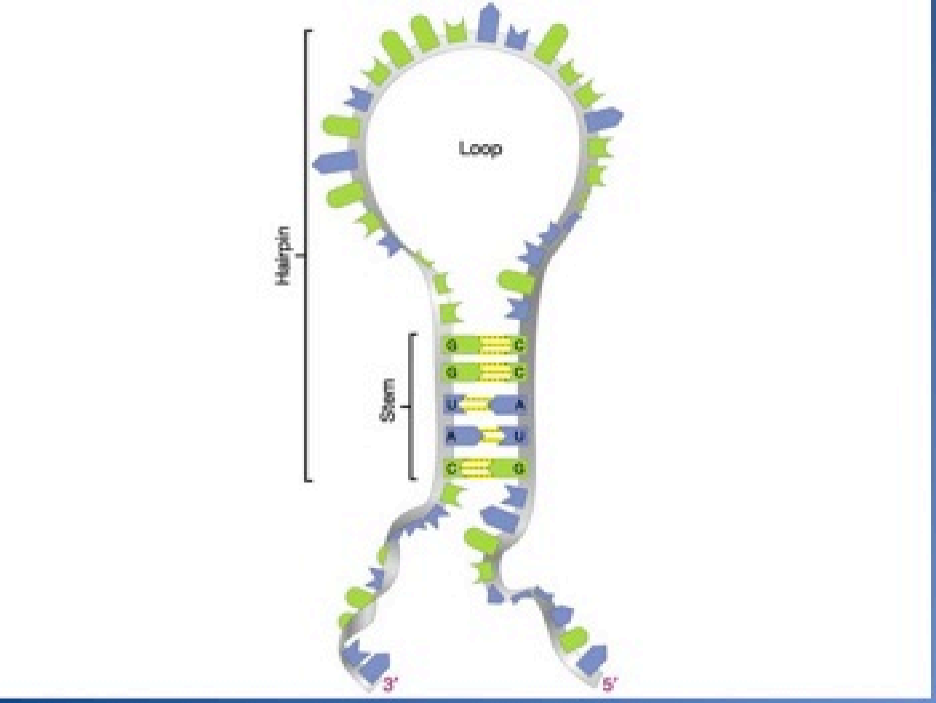
Putting Research Into Practice

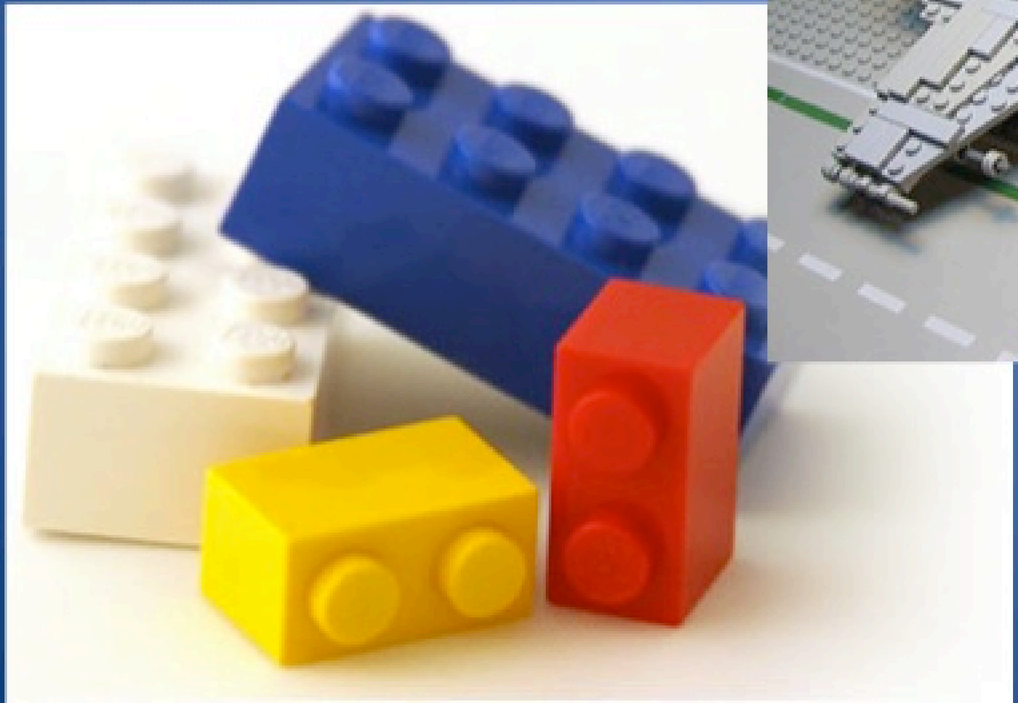






Putting Research Into Practice





Innovation

- Inquiry-based
- Provide a real-world practical application
- Utilize UCSB Professors & Research

Name: Date: Per:

Lab Report

Question:

Hypothesis:

Control:

Independent Variable:

Dependent Variable:

Procedure:

Materials:

Data/Results:

Conclusion:

A.

1. Was your hypothesis correct? EXPLAIN why you accepted or rejected the hypothesis using data from the experiment.
2. What was the control? (If no control, why?)
3. Summarize your data.

B.

4. What were the independent and dependent variables?
5. Explain how the experiment may have produced data that was incorrect (sources of error).

C.

6. What experiment would you test in the future that relates to the ideas in this lab?
7. How does this experiment relate to what we are learning in class? BE SPECIFIC use the correct vocabulary terms.
8. Describe how the information learned in this experiment relates to the real world.

California State Standards

Grade Seven

Cell Biology

1. All living organisms are composed of cells, from just one to many trillions, whose details usually are visible only through a microscope. As a basis for understanding this concept:

Earth and Life History (Earth Sciences)

4. Evidence from rocks allows us to understand the evolution of life on Earth. As a basis for understanding this concept:

Investigation and Experimentation

7. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.

Grade Eight

Forces

2. Unbalanced forces cause changes in velocity. As a basis for understanding this concept:

e. Students know that when the forces on an object are unbalanced, the object will change its velocity (that is, it will speed up, slow down, or change direction).

Structure of Matter

3C. Students know atoms and molecules form solids by building up repeating patterns such as the crystal structure of NaCl or long-chain polymers.

Investigation and Experimentation

9. Scientific progress is made by asking meaningful questions and conducting careful investigations. As a basis for understanding this concept and addressing the content in the other three strands, students should develop their own questions and perform investigations.

California State Standards

Physics:

1.Newton's laws predict the motion of most objects. As a basis for understanding this concept:

b. *Students know* that when forces are balanced, no acceleration occurs; thus an object continues to move at a constant speed or stays at rest (Newton's first law).

c. *Students know* how to apply the law *F=ma* to solve one-dimensional motion problems that involve constant forces (Newton's second law).

Biology/Life Sciences

Cell Biology

1. The fundamental life processes of plants and animals depend on a variety of chemi- cal reactions that occur in specialized areas of the organism's cells. As a basis for understanding this concept:

a. *Students know* cells are enclosed within semipermeable membranes that regulate their interaction with their surroundings.

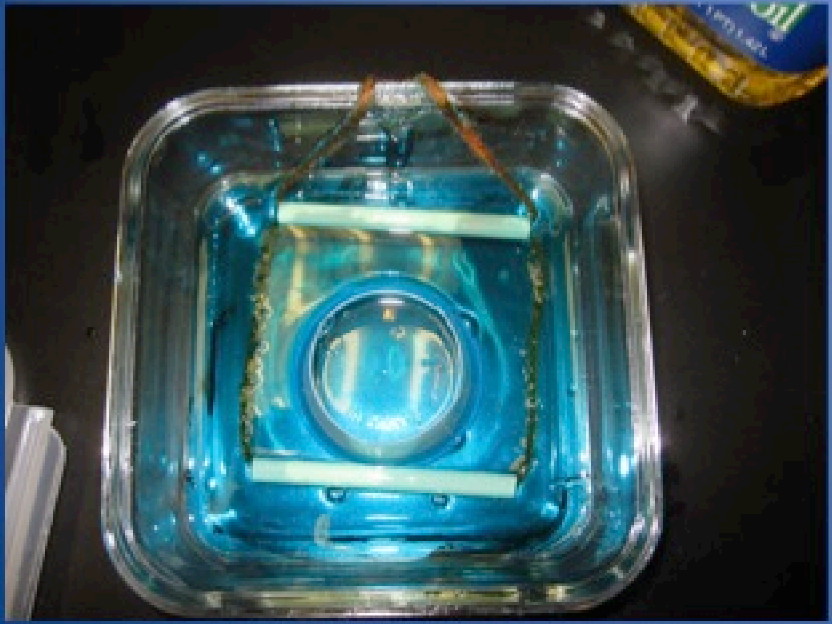
Bioplastic Helmets

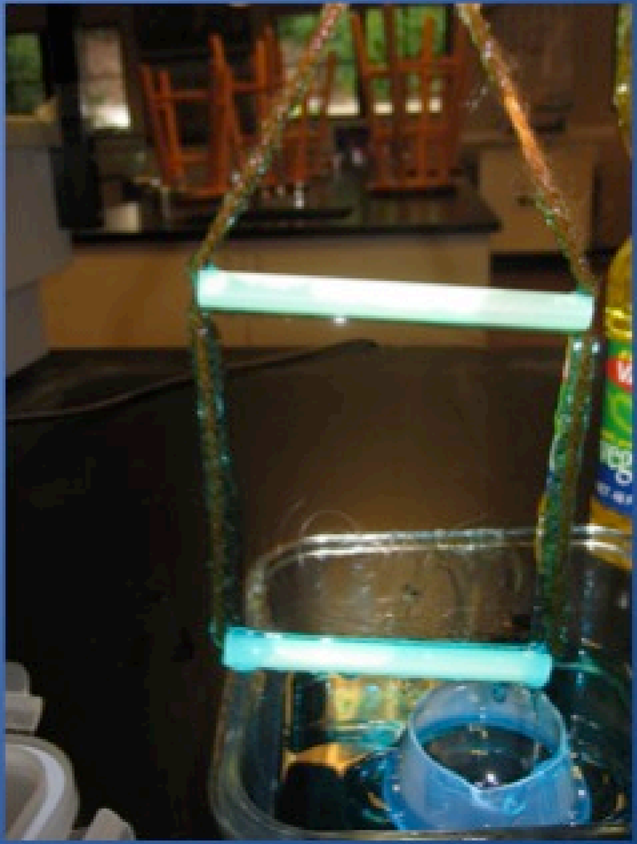
- Bioplastic versus Petroleum
- Making Bioplastic Helmets
- Experimental Helmet Design
- Crash Test Dummies
- Plastic Outweighs Surface Plankton 6 to 1 Reading

Bioplastic Helmets

Cell Membrane and Transport Lab

- Cell Membrane Lab: Soapy Film Model
- Egg-Citing Egg-Speriment: Selectively Permeable Eggs





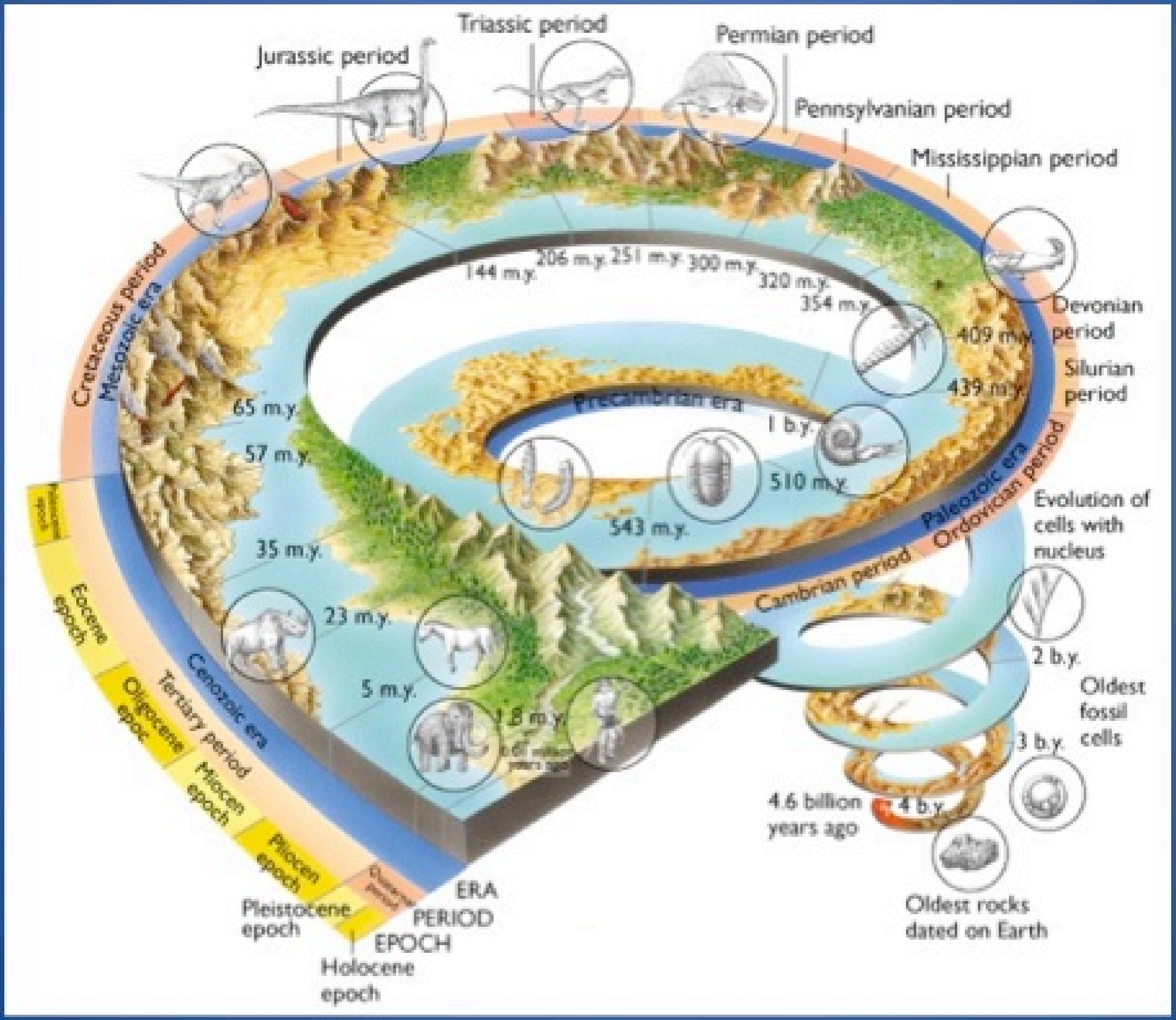
Electrolysis Lab

- Splitting Water Lab
- Exploring Electrolysis Lab

Nitinol Wacky Wire

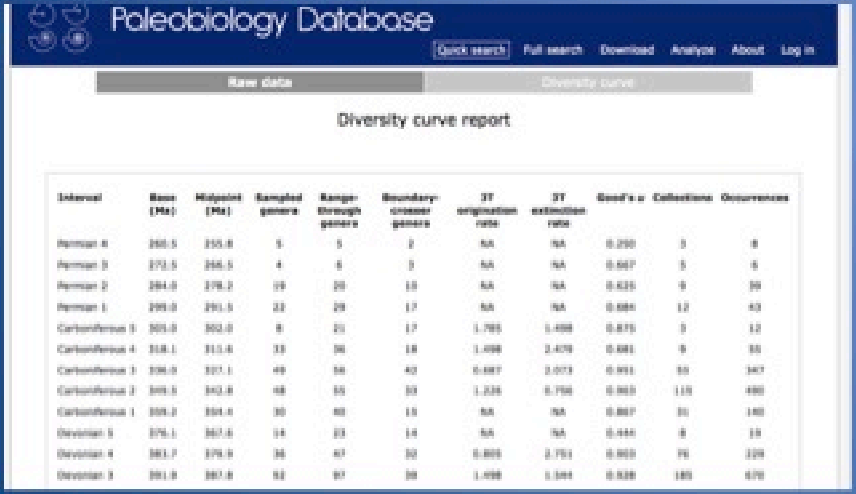
- Demonstrating Change
- Inquiry Into Wacky Wire: How it works and how it is used
- History of Nitinol
- The Force of Nitinol
- Inventing With Nitinol

Analyzing Earth History



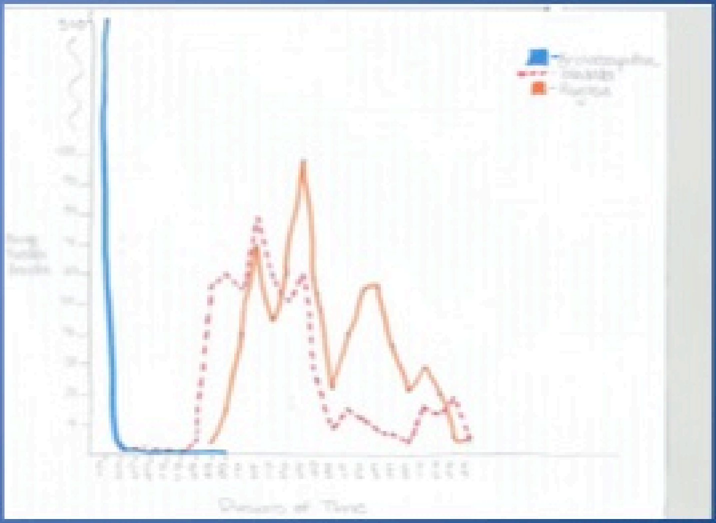
Analyzing Earth History

- Understanding Mass Extinctions: Graphing Diversity Data



Diversity curve report

Interval	Base (Ma)	Midpoint (Ma)	Sampled genera	Range-through genera	Boundary-crosser genera	3T origination rate	3T extinction rate	Good's u	Collections	Occurrences
Permian 4	260.5	255.8	5	5	2	NA	NA	0.250	3	8
Permian 3	272.5	266.5	4	6	3	NA	NA	0.667	5	6
Permian 2	284.0	278.2	19	20	10	NA	NA	0.625	9	39
Permian 1	299.0	291.5	22	29	17	NA	NA	0.684	12	43
Carboniferous 5	305.0	302.0	8	21	17	1.785	1.408	0.875	3	12
Carboniferous 4	318.1	311.6	33	36	18	1.498	2.479	0.681	9	55
Carboniferous 3	336.0	327.1	49	56	42	0.687	2.073	0.951	55	347
Carboniferous 2	349.5	342.8	48	55	33	1.226	0.758	0.903	115	490
Carboniferous 1	359.2	354.4	30	40	15	NA	NA	0.807	31	140
Devonian 5	376.1	367.6	14	23	14	NA	NA	0.444	8	19
Devonian 4	383.7	379.9	36	47	32	0.805	2.751	0.903	76	229
Devonian 3	391.8	387.8	52	97	39	1.498	1.544	0.828	185	670



Analyzing Earth History

- Sampling Inquiry: Evaluating what information we do have
- Current Mass Extinction: Why do we learn Earth History

Thanks!

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