



The Science of Co-Teaching: Collaborating in Biology

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our story



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essential elements of our partnership

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3 options instead of 4

modified assessment

Evolution Test

1. Approximately 98% of the information in human DNA is shared by chimpanzee DNA. This is evidence of which of the following?

- Humans evolved from chimpanzees
- Chimpanzees and humans share a common ancestor
- As chimpanzees evolve, they will become more similar to humans
- All of the above

2. Which of the following statements about the DNA of two species is TRUE?

- The more similar the DNA, the more recent the common ancestor is likely to be.
- The more similar the DNA, the more distant the common ancestor is likely to be.
- The more different the DNA, the more likely it is that their common ancestor is extinct
- You cannot conclude anything about common ancestry using DNA evidence.

3. Based on the similarity in gene sequences below, which two organisms share the closest evolutionary relationship?

Salamander Gene: ATCGAAATC
 Bird Gene: ATCGTTCG G
 Alligator Gene: ATCGAAAGCC
 Squirrel Gene: ATCGTTCG G

- Squirrel and Bird
- Salamander and Bird
- Salamander and Alligator
- Alligator and Squirrel

Evolution Test - M

1. Approximately 98% of the information in human DNA is shared by chimpanzee DNA. This is evidence of which of the following?

- Humans evolved from chimpanzees
- Chimpanzees and humans share a common ancestor
- Chimpanzees evolved from humans

2. Your DNA is similar to your...

- Friends
- Family
- Neighbors

3. Based on the similarity in gene sequences below, which two organisms share the closest evolutionary relationship?

Salamander Gene: ATC GGA AAT C
 Bird Gene: ATC GGT TCG G
 Alligator Gene: ATC GGA AGC C
 Squirrel Gene: ATT GGT TCG G

- Squirrel and Bird
- Salamander and Bird
- Salamander and Alligator
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adapted question

spaces added for clarity

differentiating instruction

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other ways we differentiate:

- hands-on/authentic experiences
- peer support
- modified goals/objectives

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Penn High School
Biology 9
Curriculum Map

<p>B.2.2. Use a model to illustrate that cellular respiration is a chemical process whereby the bonds of food molecules and oxygen molecules are broken and the bonds in new compounds are formed, resulting in a net transfer of energy.</p>	<p>B.2.2.a.1. Use a model to describe how cellular respiration results in a net transfer of energy.</p> <ul style="list-style-type: none"> □ Name the chemical elements (inputs/outputs) involved in cellular respiration using a 2D model. □ State the compounds for cellular respiration using a word model. (Ex. Glucose (C₆H₁₂O₆) stored energy and ATP (usable energy)) □ Explain the process of cellular respiration using a graphic organizer. □ Sequence the process for cellular respiration using a 3D model. □ Describe a transformation of energy from lipids, carbohydrates and protein into ATP/heat. □ Explain a visual connecting the relationship between photosynthesis and cellular respiration by identifying the inputs and outputs for each. Name the cell structures required for each.
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Professional Learning Community:
Biology

Agenda

- Share a beginning of the year lab or photosynthesis lab (5 min.)
- Quiz corrections (2 min.)
- Start building semester calendar (10 min.)
- Question reflection ideas (5 min.)

PLC Goals

- Teach the same units in the same order
- Have more than 2 tests a semester

Norms

- Start at 3:25 PM. be on time.
- Mindful use of tech
- Accept Google invite



Individualized Education Program			
Student: DOB: _____	Age: _____	Grade: _____	STN: _____
Effective IEP Dates: _____ to _____	File Date: _____		
Case Conference Committee Meeting Scheduled			
Date: _____	Time: _____	Place: _____	
Guardian Information: _____			

role sharing

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structures we use
to support all students



experiential education/
project-based learning

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co-teaching in project-based &
experiential education:

- all teachers can connect with a wide range of students
- roles can be differentiated if needed (e.g., one takes data/assesses and one provides instruction)
- many different skills and competencies can be addressed (including IEP goals)



duet teaching

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station teaching

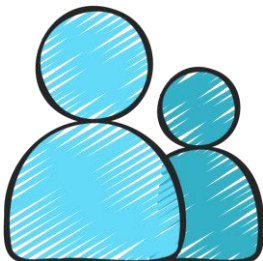
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- classroom performance [semester grades] 2-3% higher than the non-co-taught honors class
- iLearn co-taught outperformed solo taught



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Over half the students identify themselves as students of both teachers.



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outcomes

survey says...

- Rate your experience in this class:
 - 84.5% = 7 or higher [34.5% = 10/10, 13.8% = 9/10 & 22.4% = 8/10]
- Which of these describes your experience in this class:
 - 74.1% more availability of support
 - 55.2% greater access to notes
 - 53.4% greater personal attention
 - 48.3% more opportunities than other bio classes
- Rank your top 2 learning experiences:
 - 63.8% field trips
 - 60.3% labs
 - 36.2% PBL
- 75% of students would enroll in co-taught course again



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- I believe the purpose of a co-taught class is to be able to teach students with two different perspectives, while also including as many students as possible.
- The biggest positive was being able to build a relationship with both teachers and being able to receive help that I need in order to succeed.
- Both teachers can give you their perspectives on how to solve a problem. You can either take one of the teacher's advice, or make something of the two ideas and make your own.
- Everyone is able to be included in activities even with barriers or difficulties doing stuff.
- I would recommend being in a co-taught biology class if you want better help in your class. You get two points of view and extra help. [It's also] more fun and [you can] do more things.



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In the co-taught classes, we had more opportunities. We participated in educational field trips, hands-on labs, and even raised our coho salmon with the partnership of DNR staff. The non-co-taught classes did not get to engage in these activities. Some may think that having applied students in the classes slows the learning process down, but in reality, we learned more by going into greater depth with our topics. Having the applied students enrolled also encouraged us as peers to be leaders to help our classmates learn. This opportunity builds leadership skills and supports applied students by showing them that they are accepted in our normal classes and have equal learning opportunities.

I ask for your consideration and support to increase the number and availability of a variety of co-taught classes for the improvement of PHM's student body. If you would like to speak further, I would be happy to meet with you.

Sincerely,

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Dear Dr. Galiter,

Last year as a Freshman, I was a student in an honors co-taught biology class. Co-teaching in this class fostered a great environment where every student was included. We had so much fun because we all helped and encouraged each other to be better as students and people. Extra classroom teachers allow for this experience. The memories we made in this class will last a lifetime. All of the hands-on activities instilled curiosity to learn more and develop a deeper interest in biology. Every subject should offer a co-taught version, no matter what skill level of the class. Extra teachers to facilitate hands-on experiences inspire a deeper interest in the subject matter and solidify the lesson taught, improving grades and test scores.

In my honors co-taught biology class last year, our class's grade average was 3% above the non-co-taught honors class' average grade and iLearn scores were higher than the non-co-taught classes. I speculate that co-taught classes would improve grades and increase standardized test scores. Most importantly, EVERY student would have access to every course offered at Penn High School.

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