

Exploring Life Field Observation #2

Submitted by Al Bodzin

Teacher - Loretta Fair

School: Freedom High School

Location: Bethlehem, PA

Dates: 3/19/01, 3/21/01

Number of observation days: two

Classroom characteristics:

Number of students: 20

Level of students: Tenth grade *honors level* biology

School socioeconomic level: Lower to middle class suburban school district.

Length of class period: 90-minute block.

Number of computers: 14 operating iMac computers.

Computer setting: Two iMacs were placed at each lab station.

Grouping: Students were worked in groups of 2 at each computer.

Class Content:

EL materials used

As homework, the students read the first two sections of the Exploring Life Chapter 7 text (color).

Day 1 - Concepts 7.1, 7.2 and 7.3

Day 3 - Concepts 7.4, 7.5, and 7.6. The teacher instructed the students to do the *Closer Look* on section 7.5 before other areas of this concept.

Day 3 - Teacher used the bear and the apple example from the Website to elicit student's prior knowledge to begin the lesson.

Prerequisite materials

- The teacher did the photosynthesis chapter in the Miler/Levine elephant book.
- The teacher always teaches photosynthesis prior to cellular respiration.
- The teacher usually presents information to students during the first part of class and engages them in an activity during the second part of class.

Teacher adopted materials

- The teacher provided each student with a worksheet containing an outline with questions. The purpose of the outline is to focus students' reading.
- To introduce this chapter, The teacher always burns a marshmallow with a Bunsen burner to introduce the cellular respiration chapter.
- The teacher created a step-by-step question guide for students to use as they viewed the Exploring Life materials.
- Students used ball-and-stick models to learn the processes of glycolysis and fermentation on Day 2.

Evaluator Description

While students worked with the Website materials, the evaluator rotated around the classroom and discussed Exploring Life with each group of students.

The following questions were asked:

- How is the navigation on the Website?
- What do you like about Exploring Life?
- What do you not like about Exploring Life?
- Overall, what do you think of Exploring Life?
- How could Exploring Life be improved to help you learn the biology concepts?

Additional sub-questions were asked during student interviews as the students brought up diverse questions and comments.

Summary of Findings:

Student attitude about learning

- Many learners commented that Exploring Life was interactive. Most students commented that Exploring Life was a better way of learning biology content than learning biology with a textbook and "what the teacher normally does".
- The learners noted that the Web-based graphics and animations helped them to understand the content.

- All but two learners stated that using the Website was better than using the textbook by itself. Two learners commented that they were "used to learning with the textbook and the teacher notes."
- Segmenting animations into smaller chunks helps learners understand presented concepts.
- The bear and the apple example on the Website (that illustrates the breaking down of glucose) were well received by both students and the teacher.
- Most learners had difficulty understanding the left side of the animation of Concept 7.4. They did not understand why the hydrogen atoms moved so fast. The teacher had to explain to the learners the concept that the animation was intending to illustrate.
- Most learners did not understand the relationship of the Hindenburg example to the concept of Electrons "falling" from food to oxygen during cellular respiration.
- Most learners had difficulty understanding the processes presented in the pinball animations.

Teacher attitude

- The teacher emphasized that the greatest strength of the Web material is to reinforce the concepts that are presented in the lecture and text.
- The teacher created a variety of worksheets with open-ended questions to ensure that her students learned the main concepts from both the text and Web materials. This is an accountability measure to make sure that students are not just "clicking around" on the Website.

Navigation

- Learners initially do not read the text on the Website. They click on images immediately. The teacher had to instruct students to "read the text."
- All students commented that the navigation was good. They found it easy to move around and find things on the Website.

Evaluator Recommendations:

1. **Chapter 7: Decrease** the speed of the animations. The students felt they move too fast. Animations should be segmented if they contain multiple steps.
2. **Chapter 7:** More user control is needed for the animations. Animations should be segmented similar to the ones in Chapter 8.
3. **Concept 7.4:** The left side of the animation needs to be explained to the students. They did not understand why the hydrogen atoms moved so fast.
4. **Typo - Section 7:** It says, "copleted an activity" instead of "completed an activity."
5. **Concept 7.6, Question 2:** Does not give a correct answer in the immediate feedback response.
6. **Concept 7.5 Explore!, Question 3b:** The students could not locate an answer for "Brains and Nerves".
7. **Concept 7.4 animation B:** Two hydrogen atoms in the electron transport chain disappear and then reappear. Four students asked where these atoms disappeared.

Discussion

The teacher had reviewed the photosynthesis chapter. She commented that Chapter 8 is too involved and detailed for her general biology students to use. "It is an appropriate level for my *honors biology* students to use. It is good for *honors biology* students to see how complicated the reactions are."

The teacher also stated that the level of her academic biology students is probably lower than other academic biology classes in more affluent school districts. Academic biology teachers at Freedom High school teach biology at a lower level than the level of the Exploring Life materials.

Final observations

Teacher attitude

- Prior to the observation, The teacher was very enthusiastic to use the Exploring Life materials with her honors biology students. "This is the same thing I cover in cellular respiration."
- The teacher commented that she would prefer to use Exploring Life rather than use the Miller/Levine book with her *honors biology* classes.

Text

- The teacher commented that that text was the best part. The computer is good for reinforcement. She commented on how the computer will save much time to help students learn the concept. "No lab can illustrate the concept [cellular respiration] like the computer does. It would take too much time. I like how you teach it and then put the students on the computer for reinforcement and they see the animations and get feedback."

Student use of Computers

- The teacher noted that she foresees difficulty having students use the computer for taking tests and quizzes. With only 14 computers, not all students will be able to access the computers at the same time. The teacher expressed that it would be difficult for her to structure her class time to enable all students to use the computers for final chapter assessments.
- The teacher commented that she likes the idea that her students will be able to send her feedback via e-mail. "This will be a good function when it works."

Teacher adoption of materials

- The teacher, a seasoned biology teacher, uses a repertoire of materials to teach a specific concept or topic that she has used continuously over the years. The teacher always uses kinesthetic models to teach the process of glycolysis and fermentation. Lecture and drawing diagrams on the blackboard was emphasized throughout the first half of each observed lesson.

Examples of student comments

Positive comments:

- "I can actually understand the concept better because I can see it happen. Its not just flat paper."
- "The animations give me better ideas how the things work together."
- "You can see what's going in and going out. It is very visual."
- "I like the visual diagrams. It shows you how to put the steps together into an individual process."
- "You have to be an idiot not to be able to move around." - Commenting on the ease of navigation.
- "I was confused at first, but I was able to stop and pause on different things and revisit." - Referring to the navigation controls of the section 7.1 animation.
- "Its [Exploring Life] is good. Better than the textbook and the teacher telling us."
- "It's [Exploring Life] pretty good. Very self-explanatory."
- "The computer helps reinforce the concepts."

Negative comments:

- "I don't understand what's happening here. It moves too fast." - Student referring to Concept 7.4 animation A.
- "The animations go to fast." [Points to the fermentation pinball].