

5-E Lesson Plan Template

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Subject Area: Science

Grade Level: 6th, 7th, 8th grade

Lesson Title:

Interactive *Multimedia* Learning: Impacting Students' Science Attitudes and Learning Using *Alice*

Introduction

Classrooms are using interactive multimedia as instructional strategies for teaching and learning. Multimedia today refers not only to what is presented through computers, but also through the composition of text and illustrations in print media. It could be through pictures, words spoken or written, video or animation. It facilitates the development of higher-order thinking skills and the integration of many subjects, including art, science, math, and language arts. It is also an exciting way for students to actively participate in their learning. Personalized instruction, instant feedback, real world simulations, and most important of all, having fun while learning, is the hallmark of multimedia. Learners tend to naturally explore topics in a nonlinear manner, selecting portions of the topic that pique their interests and delving deeper into some aspects of the topic. The aim of this lesson is to determine students' learning impact and attitudes towards independent learning and self-paced discovery in science through reading "Invitation to the Game" by Monica Hughes and the use of a computer programming system called *Alice*. A set of other multimedia tools were employed to create the student-centered learning environment using Gardner's Multiple Intelligences.

Alice can be used as an inquiry-based design that supports middle school students in learning. Worlds created by students could be used effectively to promote interdisciplinary understanding and problem solving within a short period of time.

North Carolina Curriculum Alignment

Grade 6, 7, 8

Competency Goal 1 The learner will design and conduct investigations to demonstrate an understanding of scientific inquiry.

Objectives 1.05, 1.07, 1.08, 1.10

Objective 1.05

Analyze evidence to:

Explain observations.

Make inferences and predictions.

Develop the relationship between evidence and explanation.

Objective 1.07

Prepare models/or computer simulations to:

Test hypotheses.

Evaluate how data fit.

Objective 1.08

Use oral and written language to:

Communicate findings.

Defend conclusions of scientific investigations.

Describe strengths and weaknesses of claims, arguments, and/or data.

Objective 1.10

Analyze and evaluate information from a scientifically literate viewpoint by reading, hearing, and/or viewing:

Scientific text.

Articles.

Events in the popular press.

Grade 6

Competency Goal 7: The learner will conduct investigations and use technologies and information systems to build an understanding of population dynamics.

Objectives 7.01, 7.02, 7.03, 7.04, 7.05, 7.06

Lesson Length: 6 weeks

Lesson Overview:

Science fiction is an ideal medium for exploring issues in science in terms of good science and how science works and society while at the same time addressing the basics of literacy. Good science fiction stories do not violate scientific principles, but rely on them to guide thought experiments through to possible consequence. Good science fiction is story, science, and speculation. Students will analyze examples of science fiction and science nonfiction. They will read "Invitation to the Game" by Monica Hughes. Reading responses will be based on the "Book Club" program by Taffy Raphael. As a culminating activity students will select scenes from "Invitation of the Game" and create worlds using the computer software program called **Alice**.

Unit Outcome(s)

The learner will:

1. improve critical reading skills in science using science fiction.
2. Gain an awareness of source, in terms of influences on the author and what the author wishes to convey through the story.
3. Have an awareness of context. While great stories transcend time or setting, the social and scientific landscapes of when and where the story was written, and its context, have a profound impact.
4. Be able to determine the credibility of information from a variety of sources.
5. Create worlds using the computer software program called **Alice**.

List of Materials

1. Computer
2. Internet Access
3. Optional: USB Drive
4. Projector
5. Class Set of "Invitation of the Game" by Monica Hughes
6. Selection of science fiction novels, short stories, young adult dystopias novels
7. Science nonfiction
 - a. articles from *Discover*, *Popular Science*, and *Science News* magazines,
 - b. newspaper "science" columns, brochures from varying sources,
 - c. print versions of media broadcasts, or documentaries (ideally both current and older than 20 years) for students to analyze. A wide variety is preferable to allow a comparison of credible and some less credible sources while honing critical reading skills. Students could bring in articles or request news transcripts.
8. Excerpts from science textbooks.
9. Analysis Cards.
10. Handouts
 - a. Anticipation Guide
 - b. Modified K-W-L
 - c. Writing to Learn
 - d. Reading Response Selections
 - e. Dump and Clump

INSTRUCTIONAL SEQUENCE

Phase One: Engage the Learner

Essential Questions:

1. What is science fiction?
1. What do I already know about this?"
2. What can I find out about this?"

Students will:

1. Complete a Science Literacy Skill survey on the computer through Zoomerang.com
2. Fill out an Anticipation Guide before viewing the movie clips. Science misconceptions will be identified and discussed.
3. Think-Pair-Share: List of science fiction movies, stories, books.
4. Whole Class discussion of partners lists.

5. View brief movie clips and some action figures from movies such as Star Wars, Star Trek, etc.
6. Whole Class discussion-students share their beliefs, experiences, likes and dislikes of the movie clips.
6. Begin to fill out the first column of the "Writing to Learn" handout.

Phase Two: Explore the Concept

Students will:

1. Work in small groups to allow discussion and consensus.

Part I: Science fiction

1. Be provided with the short story and given time to read to themselves. If time does not permit a full story, or if reading levels vary greatly, an excerpt will be read aloud to the class. (Provide interested students with the complete story later.)
2. Each group will be given a different Analysis Card. 10 minutes for student groups to discuss and answer the questions on their card. Students will be encouraged to make their best guess. You want them to pick up impressions from the writing presented to them. After discussion, more detailed information will be shared about the author.
3. Choose a member of their group to read aloud their card to share their group's response with the class. Discussion of the answers as a class will follow.

Part II: Nonfiction science

Students will:

1. Each group given a copy of a nonfiction science article and Analysis Cards 3, 5, and 6. Focus class discussion of student results per article on credibility of source and assumptions by the various authors about the scientific knowledge of readers.

[Note: If students have difficulty learning about a nonfiction author, they should rely on the reporting source as part of their criteria for credibility. Students should be able to list the clues they would use to help them rank such sources including apparent bias in surrounding materials, reputation and history of the publication process (e.g. was the material peer reviewed?), and funding. This can be an important lesson in assessing the credibility of materials taken from the internet. As for context, you will likely be using material written within students' own social and scientific experience. Again, point to the publication itself as an indicator. An interesting extension is to repeat with older material.]

Part III: Invitation to the Game-4 weeks

1. Students will fill out the K and W of the Modified K-W-L handout.
2. Teacher will read-aloud Chapter 1. Students will select from 14 different reading responses to respond to the chapter.
3. Daily students will:
 - a. be divided into groups of 4.
 - b. read "**Invitation to the Game**" for the first 10 minutes of class.
 - c. write their response in their INB for 5 minutes.
 - d. share their responses with their group for 5 minutes.
 - e. select one student from their group to share with the whole class. 5 minutes.

Phase Three: Explain the Concept and Define the Terms

Using the Mobile Lab:

Student will:

1. "Passage Impressions"- write paragraphs using words displayed in order on the board; share with class.
2. record in their INB any words they are not familiar with.
3. explore word relationships by using graphic organizers, writing sentences using the words, read their sentences to the class, and then check the text to see if it supports their sentences. They will revise their sentences if necessary.
3. share their revisions.
4. categorize vocabulary words using the "Dump and Clump" handout.

Science Fiction vocabulary

<http://www.jessesword.com/sf/list>

Phase Four: Elaborate on the Concept

Students will:

1. select any of their reading responses for "invitation of the Game, and present in following presentation formats: powerpoint, video, video with text, and **Alice** 3D animation and animation with text.
2. pick any character and a scene from "Invitation to the Game" and create an **Alice** world.
 - a. Create storyboard-have teacher approve before creating **Alice** world.
 - b. Follow rubric.

Phase Five: Evaluate students' Understanding of the Concept

All students were assessed based on their thinking and problem-solving skills, and on their ability to transfer these skills to newer contexts by creating selected scenes of their choice from "Invitation to the Game" and creating **Alice** worlds. Then they were given an online quiz.

They were then given a brief one-page survey that sought their reasons for selecting particular world presentations and their perception of the usefulness of these world presentations for able students and students with learning disabilities.

Evaluation of the multimedia was done through questionnaires, interviews, and a rubric. The questionnaires contained basic questions that had clear positive or negative responses, followed by wider questions to amplify the positive or negative responses. Students were asked about their general reactions to learning from the specific activities covered by the questionnaire, and were also asked to compare learning from the multimedia activities with learning from the other course materials.

On the last day of the unit, we watched a science fiction movie voted on by the class.

Invitation to the Game Quiz

<http://www.asu.edu/clas/english/englished/yalit/game/index.htm>

Extension Activities

1. Invitation to the Game Webquest

<http://coe.west.asu.edu/students/pwann/itgwq/index.htm>

2. Create an interactive game or science fiction story world in **Alice**.

Resources

Bibliography

Young Adult Utopian Novels
Westerfield, Scott *The Uglies*,
Westerfield, Scott *Pretties*
L'Engle, Madeleine *A Wrinkle in Time*
Hughes, Monica *Invitation to the Game*
Hughes, Monica *Devil on my Back*
Hughes, Monica *The Dream Catcher*
Hughes, Monica *The Other Place*
Hughes, Monica *The Tomorrow City*
Lowry, Lois *The Giver*
Lowry, Lois *Gathering Blue*
Lowry, Lois *Messenger*
Golding, William *Lord of the Flies*
Anderson, M. T. *Feed*
McNaughton, Janet *The Secret Beneath My Skin*
Hoover, H. M. *This Time of Darkness*
Haddix, Margaret Peterson *Among the Hidden*
Layne, Steven L. *This Side of Paradise*
Stephens, J. B. *Paradise City*
Thompson, Julian F. *Gypsyworld*
Card, Orson Scott *Ender's Game*
Hilton, James *Lost Horizon*

References

Czerneda, J. (2006, February 1). Science Fiction & Scientific Literacy. *Science Teacher*, 73(2), 38. (ERIC

Document Reproduction Service No. EJ758633) Retrieved July 18, 2008, from ERIC database.

Dunn, W., Cooper, S., Pausch, R (2006). *Learning to Program with Alice*. Upper Saddle River, NJ: Pearson/Prentice Hall.

Kearney, M. (2004, December 1). Classroom Use of Multimedia-Supported Predict--Observe--Explain Tasks in a Social Constructivist Learning Environment. *Research in Science Education*, 34(4), 427. (ERIC Document Reproduction Service No. EJ734225) Retrieved July 16, 2008, from ERIC database.

Moore, D., Moore, S., Cunningham, P., Cunningham, J. (Ed.). (2006). *Developing Readers and Writers in the Content Areas K-12*. New York, NY: Pearson Education, Inc..

Srinivasan, S., & Crooks, S. (2005, April 1). Multimedia in a Science Learning Environment. *Journal of Educational Multimedia and Hypermedia*, 14(2), 151. (ERIC Document Reproduction Service No. EJ726272) Retrieved July 16, 2008, from ERIC database.

Steelman, J. (2005, September 1). Multimedia Makes Its Mark. *Learning and Leading with Technology*, 33(1), 16. (ERIC Document Reproduction Service No. EJ719943) Retrieved July 16, 2008, from ERIC database.

Teoh, B., & Neo, T. (2007, October 1). Interactive Multimedia Learning: Students' Attitudes and Learning Impact in an Animation Course. *Online Submission*, (ERIC Document Reproduction Service No. ED499660) Retrieved July 16, 2008, from ERIC database.

URLs used in this lesson plan

Adventures in Alice Programming

<http://www.cs.duke.edu/csed/alice/aliceInSchools/workshop08/realschedule.php>

Alice

<http://www.alice.org/>

Classroom Management Strategies for Middle Grades Science Teacher

<http://www.ncpublicschools.org/docs/curriculum/science/middlegrades/5elessonplans.doc>

Science Interactive Notebook PPT

<http://slideshare.net-Inb> For Workshop Presentation (2)

Fair Use Guidelines for Educational Multimedia

<http://www.utsystem.edu/ogc/INTELLECTUALPROPERTY/ccmcguid.htm>

Gardner's Multiple Intelligences

<http://www.tecweb.org/styles/gardner.html>

Products of Gardner's Multiple Intelligences

<http://www.adifferentplace.org/intelligences.htm>

SF Site

<http://www.sfsite.com/home.htm>

Science Fiction Vocabulary

<http://www.jessesword.com/sf/list>

The Merrill Collection of Science Fiction, Speculation and Fantasy

http://www.torontopubliclibrary.ca/uni_spe_mer_index.jsp

You Tube-Invitation to the Game

http://www.youtube.com/watch?v=QRAAxhV_Ypo

Invitation to the Game Book Summary

<http://www.asu.edu/clas/english/englished/yalit/game/summary.htm>

Monica Hughes, Lois Lowry, and Young Adult Dystopias

http://muse.jhu.edu/journals/lion_and_the_unicorn/v026/26.2hintz.html