

Best Practices of Technology Integration

Title: *Plot, Proof, and Persuasion...Supporting Ideas in Science, Mathematics, and English Language Arts*

Subject(s): Physical Science, Geometry, English Language Arts, Technology

Intended Grade Level(s): 9th and 10th

Description:

Trying to get a point across to an audience without supporting arguments is like trying to push a car with a feather. There must be “strength” behind ideas and opinions that will convince others that an idea or opinion is worthy of consideration.

For this assignment your role is that of an investigative journalist. You and your group will create a one-two page newsletter of publish quality (using Microsoft Word, Publisher, or some other software program) that reports accurate and timely information about a device which uses waves from the electromagnetic spectrum. Your investigation includes the historical development, the current technological advancement, and any controversy related to the selected device. You will present your newsletter (including an explanation of the process) to other students.

Narrative:

Students at the 9th and 10th grade level are gaining intellectual confidence in many areas. An integrated approach to intellectual inquiry and research analysis offers practice that forces synthesis of different content areas. This project is considered a “Best Practice” because through this project students practice and gain confidence in using the technical vocabulary of science, along with the logic processes of math, and solid critical reading and writing skills.

This project requires substantive conversation among students and with teachers. The analysis and writing required in this project demands higher-order thinking. Students will be practicing a professional role in their research, analysis and writing from a journalistic perspective. The collaborative editorial demands ALL standards for teaching and learning—substantive conversation, deep knowledge, higher order thinking, and connections beyond the classroom.

In this project student groups will come to their own understanding of how a particular technology has developed. They will need to consider what has affected the development, either positively or negatively. They will also need to consider the impact of the development on human life. This analysis, and the questions students must create and consider, require intellectual processes that breed confidence in formulating questions, consider a variety of perspectives, and formulate theses that literature can support and/or refute. Formulating solid arguments to support a clear thesis will be

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analyzed and practiced. Evidence of this skill will take shape in the newsletter created by each group. Six of the seven standards for assessment are met through this project— organization, alternatives, content, process, elaborate written communication, and connection to the world.

Curriculum Benchmarks:

[MI.MAT.III.1.HS.3](#)

Present data using the most appropriate representation and give a rationale for their choice; show how certain representations may skew the data or bias the presentation.

[MI.MAT.III.1.HS.4](#)

Identify what data are needed to answer a particular question or solve a given problem and design and implement strategies to obtain, organize and present those data.

[MI.MAT.III.2.HS.5](#)

Formulate questions and problems and gather and interpret data to answer those questions.

[MI.MAT.III.3.HS.3](#)

Formulate and communicate arguments and conclusions based on data and evaluate their arguments and those of others.

[MI.MAT.III.3.HS.4](#)

Make predictions and decisions based on data, including interpolations and extrapolations.

[MI.MAT.V.2.HS.5](#)

Explore problems that reflect the contemporary uses of mathematics in significant contexts and use the power of technology and algebraic and analytic reasoning to experience the ways mathematics is used in society.

[MI.SCI.I.1.HS.4](#)

Diagnose possible reasons for failures of mechanical or electronic systems.

[MI.SCI.I.1.HS.7](#)

Gather and synthesize information from books and other sources of information.

[MI.SCI.I.1.HS.8](#)

Discuss topics in groups by being able to restate or summarize what others have said, ask for clarification or elaboration, and take alternative perspectives.

[MI.SCI.I.1.HS.9](#)

Reconstruct previously learned knowledge.

MI.SCI.II.1.HS.4

Discuss the historical development of key scientific concepts and principles.

MI.SCI.II.1.HS.6

Describe the historical, political, and social factors affecting developments in science.

MI.SCI.IV.4.HS.5

Describe different types of waves and their technological applications.

MI.ELA.3.HS.6

Determine the meaning of specialized vocabulary and concepts in oral, visual, and written texts by using a variety of resources, such as context, research, reference materials, and electronic sources.

MI.ELA.3.HS.8

Analyze their responses to oral, visual, written, and electronic texts, providing examples of how texts affect their lives, connect them with the contemporary world and transmit issues across time.

MI.ELA.7.HS.4

Demonstrate flexibility in using strategies for planning, drafting, revising, and editing complex texts in a variety of genre, and describe the relationship between form and meaning.

MI.ELA.9.HS.3

Develop and extend a thesis by analyzing differing perspectives and resolving inconsistencies in logic in order to support a position.

Timeline:

This project can be as detailed in each content area as the specific curriculum guidelines for the course allow. In our school this project is centered in the physical science classroom and supported in geometry and English 10.

Materials/Hardware/Software :

- Michigan Curriculum Frameworks teaching materials (texts, course packs, other) for Physical Science, Geometry, and English Language Arts
- Technology Research Resources
- Publishing Software for newsletter

Teacher Preparation:

The best guide for teacher preparation is the Michigan Curriculum Frameworks along with the school district curriculum guidelines.

Prerequisite Student Skills:

Time and materials are determined by materials approved by the school district along with teacher discretion in delivering adopted curriculum. Minimally, students must have basic computer skills, research resource knowledge, basic high school reading and writing skills, and knowledge of publishing software.

Activities/Procedures:

Students will work in groups of three (unless otherwise negotiated). Each group will have two investigative reporters and one graphic layout/editor.

Each student will find and read a news article on the **historical development** of a chosen device, summarize the key ideas of the article (one paragraph), identify the thesis of the article, and explain what arguments were used to support the thesis (when applicable). Students must connect evidence to the thesis and include the source of the article.

Each student will find and read a newspaper article on the **technological advancement** related to a chosen device, summarize the key ideas of the article (one paragraph), identify the thesis of the article, and explain what arguments were used to support the thesis (when applicable). Students must connect evidence to the thesis and include the source of the article.

Each student will give a one-minute verbal analysis in front of the rest of the class. The analysis of research should include an opinion statement (thesis) that is defensible, has literature to support it, and can be supported with solid arguments. The student will explain the progress of the group, problems that have been encountered, and solutions that have been found. Proper vocabulary and effective speech practices (eye contact with audience and audible voice) are required.

Each group will use the information gathered from the reading and other research to create a one-two page newsletter. The newsletter will include two informational articles and one editorial. The editorial will represent the consensus of the group's response to any controversy connected to the chosen device (for example, cell phones and cancer). Supporting charts, graphs, tables, and pictures are to be included as well.

Assessment/Evaluation:

Each student will write a reflective essay at the end of this project. The essay will respond to the following questions:

How did you accomplish clarity and accuracy in your research?

What have you learned about using resources?

What have you discovered about your ability to plan with others?

What problems did you have to solve in order to complete this project?

What have you discovered about your own thinking?

What improvements could your group make if you were going to work together again?

Identify the most significant thing you learned in each content area (geometry, physical science, and English).

Rubrics are used for this project in our school. The following rubric was utilized and each teacher uses other rubrics for specific content area evaluation. For example, recognition and creation of a thesis in English Language Arts, and recognition and creation of postulates and supporting facts in Geometry.

Grading Rubric:

Speech	Article 1	Article 2	Newsletter	Criteria/Standards
	✓	✓	✓	Accurately Summarizes Article
✓	✓	✓	✓	Uses Vocabulary Correctly
	✓	✓	✓	Includes Name of Person Credited With Device
	✓	✓	✓	Includes Country Associated With Device
			✓	Uses Visuals Appropriately (Graphs/Charts)
✓				Uses Eye Contact
✓				Uses Audible Voice
✓	✓	✓	✓	Beginning, Middle, End (Development of Topic)
✓	✓	✓	✓	Expresses Evidence For Each Statement
		✓		Transmits Electronically
			✓	Peer Editing (List of Comments/Ideas)
			✓	Lists At Least 5 Sources
			✓	Accurately Identifies Type of Waves Utilized in Device (Science Only)
			✓	Graphic Layout of Newsletter
	✓	✓	✓	Recognizes Thesis Statement (As Opposed to Main Idea)
	✓	✓	✓	Recognizes Supporting Arguments, Facts, Statistics for a Position
	✓	✓	✓	Recognize Fallacy of Logic (English 10)
				Reflective Essay (After Project Completion)

Follow-up Activities:

Extending this learning beyond this lesson includes the following:

- Holding students accountable for using technical vocabulary accurately and effectively identifying an author’s thesis
- Creating a reasonable thesis
- Analyzing development of technology through a period of time
- Using data to support language
- Using data and language to support a thesis

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