

# Integrated Project-based Learning: Combining PTE Standards and Academic Standards

Use this template for planning and sharing ideas for projects. This template is based on the 6 A's:

*Authenticity\* Academic Rigor\* Applied Learning\* Active Exploration\* Adult Connections\* Assessment*

## Project

<b>Title of Project</b>	<b>Water, Water Everywhere</b>
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<b>School</b>	<b>Twin Falls High School</b>
<b>Pathway / Small Learning Community/Academy</b>	<b>Information Technology/Science</b>
<b>Course Title(s)</b>	<b>Honors Earth Science/IT Helpdesk</b>
<b>Time Frame</b>	<b>Year-round research project based on the weather.</b>

## Authenticity

*Briefly describe your project. Include the key question and provide an overview of what students do and learn. Tell why the question is meaningful to the students and where one might see a similar question tackled by an adult in the workplace.*

<b>Key Question</b>	<b>What is the health of our watershed?</b>
<b>Overview</b>	<b>Water in the Magic Valley has high nitrates, fecal coliform, and arsenic. This issue is being researched by DEQ, Twin Falls City, and the international science community.</b>

## Vocabulary/Key Terms

*List vocabulary words and key terms essential to student understanding.*

### Science

Watershed, pH, dissolved oxygen, biological oxygen demand, fecal coliform, nitrates, phosphates, total solids, turbidity, temperature, macro-invertebrates, global positioning system, riparian, conductivity, salinity

### IT:

Podcast, video stream, progressive download, server, mp3, flash interactive media streaming server, archive, file system, screen capture, cellular, internet

# Active Exploration \* Applied Learning \* Adult Connections

*What classroom-based, community-based, and career-based activities does the project involve? Include a description of the active exploration, applied learning, and adult connections in the project (as needed).*

## Active Exploration

1. Science
  - a. Students will apply the scientific method and ask their own questions about the health of the watershed.
  - b. They will collect their own data using current scientific/research tools, analyze and publish their data to an international data repository to be shared and analyzed by scientists around the world.
  - c. The techniques and tools used by students are the same as used in industry and will be guided by industry partners.
  
2. IT
  - a. Students will research and present a solution to provide the science program the tools and resources necessary to complete their tasks.
  - b. Students will install and configure services needed. They will research and purchase tools used for the study as well as provide training on the devices.
  - c. Students will serve as a service partner for their organizations and be lead by a member of industry.

## Applied Learning

**Science:** Data will be made available through HIS Central for the international science community. The result of the research will be posted on the Citizen Science web portal.

**IT:** Students will deploy resources, provide training, and manage active use.

**Adult Connections** *Who from the community, workplace, postsecondary and/or industry partnership works with students on the project?* Lecture from local industry and community in home design.

1. Twin Falls Canal Company (TFCC)
2. Advanced Technology Solutions, Inc.

Classroom Activities	Community Activities	Career Activities
<ul style="list-style-type: none"> <li>- Demonstration and classroom session on streaming formats and conferencing technology.</li> <li>- Training on testing and streaming equipment.</li> <li>- Presentation of streaming solutions</li> <li>- Practicing with testing and streaming equipment on school grounds.</li> </ul>	<ul style="list-style-type: none"> <li>- Fieldtrip to local watershed accompanied by member of the TFCC and members of the IT program</li> <li>- Presentation of results to the MOSS group through video conferencing solution provided by the IT students.</li> </ul>	<ul style="list-style-type: none"> <li>- Research</li> <li>- Deployment of services</li> <li>- Collaborative work on data</li> <li>- Guest speakers</li> <li>- Technical writing</li> </ul>

## Academic/PTE Rigor

**Standards** Use the space below to list the state content standards and PTE industry standards addressed by the project. (A list of the content standards is available at <http://www.sde.idaho.gov/ContentStandards/default.asp>. This page, which includes selected high school level standards, is designed to let you easily create a list of standards you are addressing. You may then copy and paste the list into this template.)

### Science

Standard 1 – Nature of Science

Standard 4 – Earth and Space Systems

Standard 5 – Personal and Social Perspectives; Technology

### IT

Standard 1 – Creativity and Innovation

Standard 2 – Communication and Collaboration

Standard 3 – Research Skills and Critical Thinking

Standard 4 – Digital Citizenship

Standard 5 – Technology Operations & concepts

- Communicate and understand ideas and information
- Collect, analyze and organize information
- Identify and solve problems
- Use technology
- Initiate and complete entire activities
- Act professionally
- Interact with others
- Understand all aspects of an industry
- Take responsibility for career and life choices

**Student Goal(s) Once the project begins, ask students to generate one or two personal goals.**

Student goals:

## Assessment

*How do you and the students know the project is a success? What are your criteria for measuring students' achievement of the disciplinary knowledge and applied learning goals of the project? What evidence do they use to demonstrate their progress? What deliverables do they need to complete prior to the final exhibition? How will students self-assess?*

IT - Data is accessible through HIS Central and results and resources are available on the Citizen Science web portal.

Science – Project will be graded using the rubric included.

## Recommended Resources / Sample Products

### Software or Materials Needed

*(Examples)*

Flash Interactive Media Streaming Server  
Open Meetings  
Server Hardware  
ArcGIS and/or ArcExplorer  
Google Earth  
GeoMapApp  
Vernier Software, water quality/GPS sensors, LabQuests  
GPS units  
OziExplorer

### Teacher-Developed Materials

*(Examples of materials that can be shared with other classes. Please attach samples.)*

Rubric

### Student-Developed Materials

*(Examples of products that can be shared with other classes. Please attach samples.)*

Video tutorials  
Video-based presentations of research findings  
Data collection on HIS Central

### Websites Used

*(Examples)*

<http://www.citizenscience.us>  
[http://www.scc.idaho.gov/programs\\_services/waq.htm](http://www.scc.idaho.gov/programs_services/waq.htm)  
[www.Envirothon.org](http://www.Envirothon.org) (see: Canon Envirothon)  
<http://www.deq.idaho.gov/water/index.cfm>  
<http://www.idwr.idaho.gov/>  
<http://earthobservatory.nasa.gov/NaturalHazards>

### Final Words

*(In a sentence or two, highlight your project's overall value.)*

Students have the opportunity to collaborate with and provide data to the international science community. Students also have the opportunity to provide web-based communication services using leading commercial and open source software applications.

### Teacher Tips/Extensions

*(Use the first person to share a useful idea that helps with implementation and ensures success. Make it chatty, informal.)*

You need to know your stuff. This is a very technical project and only something you want to tackle if you have the ability to walk the students through the tools and services when necessary.

### Extensions

*(List any ideas for students who may want to go deeper into the learning standards.)*

Students stream live feeds of their conclusions from the site of data collection.

## Timeline

*What sequence of teaching and learning experiences will equip students to develop and demonstrate the PTE standards and the Academic standards?*

September: Intro activities to learn how to use the testing equipment. Research on server-based and portable streaming solutions. IT students present tools and provide training to science students.

October: Fieldtrip to watershed for data collection. Implement tech resources. Compile, post, analyze and publish data and results.

TBA: Students present their findings from the data collection site via internet video stream to project partners.

(Adapted from the Boston Public Schools Signature Projects.)

**Rubric Follows**

Category	4	3	2	1
Content	Project focuses on 4 or more of the following topics: <ul style="list-style-type: none"> <li>• What is water quality?</li> <li>• What affects water quality?</li> <li>• Prevention of water pollution</li> <li>• Impact of pollution on humans</li> <li>• Impact of pollution on aquatic and terrestrial life</li> </ul>	Project focuses on 3 of the following topics: <ul style="list-style-type: none"> <li>• What is water quality?</li> <li>• What affects water quality?</li> <li>• Prevention of water pollution</li> <li>• Impact of pollution on humans</li> <li>• Impact of pollution on aquatic and terrestrial life</li> </ul>	Project focuses on 2 of the following topics: <ul style="list-style-type: none"> <li>• What is water quality?</li> <li>• What affects water quality?</li> <li>• Prevention of water pollution</li> <li>• Impact of pollution on humans</li> <li>• Impact of pollution on aquatic and terrestrial life</li> </ul>	Project focuses on 1 of the following topics: <ul style="list-style-type: none"> <li>• What is water quality?</li> <li>• What affects water quality?</li> <li>• Prevention of water pollution</li> <li>• Impact of pollution on humans</li> <li>• Impact of pollution on aquatic and terrestrial life</li> </ul>
Idea	Independently identified a question which was interesting to the student and which could be investigated.	Identified, with adult help, a question which was interesting to the student and which could be investigated.	Identified, with adult help, a question which could be investigated.	Identified a question that could not be tested/investigated or one that did not merit investigation.
Hypothesis Development	Group developed a hypothesis well-substantiated by a literature review and observation of similar phenomena.	Group developed a hypothesis somewhat substantiated by a literature review and observation of similar phenomena.	Group developed a hypothesis somewhat substantiated by a literature review or observation of similar phenomena.	Group needed adult assistance to develop a hypothesis or to do a basic literature review.
Data Collection	Data was collected several times. It was summarized within the group in a way that clearly describes what was discovered.	Data was collected a minimum of two times. It was summarized within the group in a way that clearly describes what was discovered.	Data was collected a minimum of two times. Adult assistance was needed to clearly summarize what was discovered.	Data was collected only once and adult assistance was needed to clearly summarize what was discovered.
Description of Procedure	Procedures were outlined in a step-by-step fashion that could be followed by anyone without additional explanations. No adult help was needed to accomplish this.	Procedures were outlined in a step-by-step fashion that could be followed by anyone without additional explanations. Some adult help was needed to accomplish this.	Procedures were outlined in a step-by-step fashion, but had 1 or 2 gaps that require explanation even after adult feedback had been given.	Procedures that were outlined were seriously incomplete or not sequential, even after adult feedback had been given.
Conclusion/Summary	Group provided a detailed conclusion clearly based on the data and related to previous research findings and hypothesis statement.	Group provided a somewhat detailed conclusion clearly based on the data and previous research findings and the hypothesis statement.	Group provided a conclusion with some reference to the data and the hypothesis statement.	No conclusion was apparent or important details were overlooked.