



Tech4Learning

curriculum



ProjectLearn™  
Academies

instruction

technology

L'Anse Creuse Problem-based Initiative



# ProjectLearn

## Problem-Based Learning Overview

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### Inquiry-based Learning

Problem-based learning is a form of inquiry-based learning which is designed to encourage foster student inquiry or **questioning**. As students explore relevant problems, their desire to know prompts them to inquire.

Inquiry-based learning is not about finding facts or correct answers. The drive is not simply more knowledge or information, but the seeking of information to help solve problems and address issues. In this way, it is a lot about “life-long learning”. The drive is to nurture and expand the habit of inquiring that will prompt a student to continue questioning and searching for answers the rest of their lives. Not just answers to factual questions, but to important issues and concepts students will face over and over again the rest of their lives.

The role of the teacher in this environment is that of an expert learner. Instead of giving answers and telling information to students, the teacher, or expert learner, helps them see patterns, organize information, find sources of knowledge, and utilize past learning to answer new questions. The teacher also structures the learning environment so that student inquiry helps them better understand the world in which they live in and is leveled so that they can gain knowledge within their reach.

The teacher must create an environment where:

- All students are engaged.
- Questions are directed toward important issues and understandings about the world.
- Divergent thinking and questioning helps to prompt new questions and solutions.
- Students have access to the tools and resources necessary to answer their questions.
- Students are guided in their questioning and develop successful strategies for finding answers and solutions.
- Students learn skills that will help them answer important questions on their own.
- Fosters the habits necessary for students to ask good questions and solve them on their own.

### Problem-based Learning

Problem-based Learning, as a model for teaching and learning, has its roots in medical education (McMaster University Medical School) around 30 years ago. Problem-based learning uses the complex problems encountered in the real world as a curriculum to help students develop problem-solving and critical thinking skills that will help them better answer these kinds of questions in the future.

These problems are ill-structured so they do not have one correct answer. The problems are not solved by students as a test of their skills, but are solved as a way to help them develop skills and learn new information a way that will help them recall this information in new applications.

While the teacher provides the students with the real world problems they will be solving, the students direct their own learning as they solve the problem. Student teams are not provided with a set of steps necessary to solve the problem, but follow a general process where they inquire, gather information, reflect, inquire again, and gather more information until they come to their best solution. The teacher facilitates the process and coaches them to find one or more solutions.



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## Problem-Based Learning Overview

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Problem-based learning is characterized by:

### **Real World Problems**

Problem-based learning is designed to be messy and complex. The problems being solved must have value in the real world. Because problems in the real world rarely have one correct answer, using actual events is helpful, even if these are worked into different scenarios. When a problem is designed for students, it is helpful to look at who in the world would care about this issue and who has the expertise to help find a solution.

### **Collaboration**

Collaboration is an essential part of the problem-based learning. Again, this mirrors the real world where people can call upon experts and often have to find a solution amenable to parties with vastly divergent viewpoints.

### **Reflection**

Student self-assessment and peer-assessment should be worked into the process of problem-solving. This will help students understand where their learning is improving and how they might continue improving skills and expanding their knowledge. Reflection on progress and content is also an important part of solving any problem. As students attempt to find a solution, they come across new information and knowledge that may require them to proceed in new directions. Students work should include a conclusion about what they have learned about the problem.

### **Project-Based vs. Problem-Based Learning**

Project-based learning and problem-based learning have a great deal in common. Both

- involve realistic problems and situations.
- are based on authentic educational goals.
- include formative and summative evaluation,
- are learner centered and teacher facilitated.
- are intrinsically engaging and motivating.
- are frequently multidisciplinary.
- Improve students' research and problem-solving skills, as well as their ability to work cooperatively with their peers.

The difference between the two lies largely in their application: Problem-based learning focuses on the problem and the process, while project-based learning focuses on the product.

Comparison taken from: <http://www.pbl.uci.edu/whatispbl.html>



# ProjectLearn

## Bloom's Taxonomy

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Benjamin Bloom, and his co-workers (educational psychologists), developed a hierarchy of educational objectives, which we know today as Bloom's Taxonomy. This taxonomy categorizes questions into six different levels within the cognitive domain of learning. The taxonomy was revised in 2001.



### Lower Order Thinking Skills

Projects that only require lower order thinking skills to answer are most often not even "driving" questions. These will only require rote knowledge and basic comprehension to answer.

#### Remember

Questions at this level require: information recall, rote knowledge of dates, events, places, and subject mastery.

Students must: define, describe, identify, quote, name, draw, match, recall.

#### Understand

Questions at this level require: understanding of topic, and interpretation of ideas and information.

Students must: compare, contrast, conclude, explain, restate, summarize, differentiate, predict.

### Higher Order Thinking Skills

An "essential" question, by definition, will require higher order thinking skills of problem solving (Application), organizing and identifying patterns (Analysis), defining relationships and creating new ideas based on current knowledge (Synthesis), and recognizing that there are various viewpoints and one perspective is most likely subjective (Evaluation).

#### Apply

Questions at this level require: problem solving, and application in new situations.

Students must: apply, complete, compute, solve, examine, modify, relate, experiment, discover, dramatize, show.

#### Analyze

Questions at this level require: seeing patterns, identification and organization of components.

Students must: analyze, order, diagram, explain, connect, classify, arrange, infer, outline, research.

#### Evaluate

Questions at this level require: discrimination between ideas, assessment of value, recognition of subjectivity.

Students must: assess, rank, measure, argue, convince, judge, discriminate, critique, rank, prioritize, conclude.

#### Create

Questions at this level require: creating new ideas from known information, generalization, and relation.

Students must: combine, integrate, create, design, invent, compose, organize, plan, propose, generalize.



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## Focusing Your Topic for PBL Design

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### Develop an Essential Question

Project-based learning (PBL) involves a large time commitment, so it is best employed to really help students learn and understand the big ideas that we are teaching. But because our content requirements are so very large (think of all those SOLs), and our scope and sequence even longer, we often forget to assess what these big ideas are. As you design a PBL project, you want to focus in on those ideas that will affect how your students view and interact with the world 15 years from now.

Now that you are ready to dive into designing your own PBL lesson, you need to look more closely at your topic to determine its enduring understanding. Then, you can more effectively design a PBL unit that addresses this big idea. Later in the design process, you will address all of the smaller things (facts and information) students will need to know in order to understand the big idea.

Follow these steps to help you determine the enduring understanding behind your topic.

1. On a blank piece of paper, brainstorm a list of ALL the different things you teach on this topic.
2. Review the list. Group the items together by theme or other obvious relationship.
3. Write the theme or relationship next to each grouping.
4. Review the groups. Try to combine them together under a larger theme.
5. Repeat this process until you have only one theme left.
6. Write a sentence of no more than six words that articulates the big idea.

Grant Wiggins and Jay McTighe refer to this process as "Backward Design" in their book *Understanding by Design*. If you are looking for in-depth instructions on how to determine the truly important items in your curriculum, this book is indispensable.

### Develop an Essential Question

Once you have determined exactly what students should understand when they finish a project, framing project work becomes much easier. The next step is to writing the essential question that will drive the project.

In the words of Jerome Bruner in *The Culture of Education* (1996), essential questions are "ones that pose dilemmas, subvert obvious or canonical truths, or force incongruities upon our attention."

An essential question:

1. has many different answers and no obvious correct answer, and as such, provokes disagreement;
2. leads to discovery by requiring students to UNcover and REcover important ideas;
3. seeks to solve real life problems or address real world issues;
4. requires responses to be an assessment of current information combined with experiments and experiences to form an argument or solution;
5. is at the top of Bloom's Taxonomy;
6. engenders further interest in the topic by leading to many more questions.

A PBL project doesn't replace learning you are doing in the classroom it extends it. Projects work that answers an essential question assumes that much "traditional" teaching has already been done. We can't expect students to be able to ask the right questions or challenge assumptions if they are unfamiliar with the history, scientific theory, or mathematical rules that apply.

Write an essential question that will drive the project.



# ProjectLearn

## Problem Design

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Writing an effective and ill-structured problem is not an easy process, and your first few may be time consuming. Look on the web and ask other teachers to give you samples, as it is much easier to create authentic tasks once you have seen other examples.

### Real World Connection

Who might be faced with a problem that requires knowledge from your discipline? Where might they work? List all of your ideas.

What might the create or solve with this information?

Who else would find this information relevant to their life or work?

How would knowing this information affect a person's life or work?

### Curriculum Connection

What topics or concepts do you cover in your classroom that are required by this person?



# ProjectLearn

## Problem Design

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### Problem

Think of a problem/situation that requires the use of this knowledge? Write a scenario.

### Student Understanding

What is the essential question?

What is the enduring understanding?

### Evaluation

As students develop a solution, what can they create that would provide acceptable evidence of concept mastery?

Does the solution have value outside of the classroom? To whom?



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## Project Design: Sample Tasks

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### Science

#### Rainforest Resources: Hoard or Share?

The government of a small Central American country has put a hold on 20,000 acres of pristine rainforest. They are trying to determine if they should use the land for a national park, sell it to the Sierra Club and make it off limits to all human incursion, open the land to an eco-tourism company, or parcel it up to the local inhabitants, who are currently living in poverty and could sell the wood and use the land for farming.

Your team will be assigned to be members of the Sierra Club, employees for the National Park Service, owners of an eco-tourism company, or members of a local tribe. Your job is to become the voice for your group. Using visual, multimedia, print materials, videos, and any other resources you can find, make a ten minute presentation on why the government should give the land to your group.

#### Bats

The Mayor of the City feels very strongly about the need to make smart choices about the safety of her city. To make sure that her decision to kill all bats is smart, she is sending a team to find out the facts about the bats. Instead of sending only people with similar jobs, the team will have people with different jobs. Each person should share an opinion that reflects both her or his informed view as well as the specific perspective of their position. Your team will make a Group Report to the Mayor of the City. The report will show your ideas from the viewpoint of a Biologist, an Ecologist, a Mythologist, and a "Vampirolologist."

### Social Studies

#### Lewis and Clark

The President has asked the country to think up new ways to teach its citizens American History, particularly America's Westward Expansion. You have been approached by the History Channel to create a multimedia production about the Lewis and Clark expedition. The show should retrace their journey and include interesting facts and stories about the events and locations along the way.

#### Cinco de Mayo

Cinco de Mayo is approaching on the calendar. Your job is to plan and give a Cinco de Mayo celebration for the entire school. Part of the celebration should include a presentation of the historic event that is the reason for the celebration. The celebration should also include the music, art, food, and activities typical of Cinco de Mayo.

#### Civilizations

The President of the United States wants to make sure that this country (civilization) doesn't fade away like so many before - Greek, Roman, Egyptian, Indus River Valley, Xin Dynasty. As a member of the Civilization Preservation Committee, you must compare the United States to a past civilization, and provide ideas to help ensure continued growth and warnings about problems that encourage decline.

### Math

#### Weekend Budget

You and two partners are members of the Dodger family: Matthew, June, and Alex. The Dodger family just purchased a new beach house. Each family member gets his or her own "fun room" to fill with items of the member's choice. You have one weekend to spend \$9,000.00 purchasing items for the fun rooms (That comes to \$3,000.00 per person!). All items for the fun rooms must be purchased from Internet Suppliers. You have a lot of money to spend! How well can you budget your money and your time? Your goal is to spend as much of the \$3,000.00 as possible on your fun room. Be sure to check with your other "family" members so that you don't duplicate items and can buy things that everyone will use.



# ProjectLearn

## Project Design: Sample Tasks

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### English Language Arts

#### Author Cards

Have you noticed that there are lots of baseball card clones available now? Baseball cards have led to NASCAR cards, football cards, basketball cards, and even rock star cards. What if the library had author cards to look at? Create an author card that contains a picture of the author, biographical information (Name, Date of Birth, Hometown, Family), list of books that the author wrote, brief description of your favorite title by that author, and why you like that particular title or author. Print the cards and begin trading!

#### Island of the Blue Dolphins

"This is the opportunity of a lifetime," the Chief exclaims after reading about Karana in *The Island of the Blue Dolphins*. He assembles members of your team, including the science editor, fashion editor, feature editor, history editor, nutrition editor, and yourself, the managing editor, and tells you, "We are going to cover all facets of this story, with each of you reporting in your particular specialty. I want reports about what she eats, wears, how she lived, the history of her island, the native habitat there, and all of you will be putting your heads together to write an editorial about the Russians and Aleuts victimizing her people. Each of these needs to be a full length story which we'll put into our tabloid format. Don't forget to include graphs, charts, maps and/or pictures with your stories."

### Art

#### American Colonial Art

The local art museum has just received a donation and would like to purchase several pieces of artwork from American Colonial Times, but no one at the museum knows anything about paintings from this time. As an expert on American Colonial art, the museum has asked your team to recommend 3 pieces that the museum should purchase to start their collection. You will need to compile your research into a persuasive presentation to present to the museum board. Your presentation should also include sample literature to share with patrons visiting the museum to view the paintings.

### Physical Education

#### Olympics

Your local cable channel is planning a big special about the fans and athletes of the upcoming Olympics. But they need some help! They are looking for experts who can tell them about Olympic events and the athletes from the United States who will be participating in those events. They are looking for actors and actresses who could pretend to be United States athletes in the Olympics or fans of each of the events. Each of the grade levels will be responsible for researching, writing and producing an interview about some of the events and the athletes in that event that are participating from the United States in the Summer Olympics 2004.

### Health

#### Breakfast Cereal

You have been chosen to participate on a team to design and implement a new advertising campaign for healthy kids' breakfast foods. Your job is to research popular breakfast foods and the tactics used by the companies who produce them to sell them to kids. Before you can design your campaign, though, you need to learn a little about the importance of breakfast, what makes a breakfast nutritious, and how companies use advertising to sell their products to kids.

#### Healthy Snacks Campaign

The US Department of Health has noticed a decline in healthy eating. To help improve nutrition this summer, they have asked your team to create an advertising campaign that demonstrates the benefits of nutritious snacks, the harmful effects of poor nutrition, and suggests some healthy choices you can make as you reach for a snack between meals. Your advertising campaign might include stickers, posters, postcards, public service announcements, recipes, or other effective ways to improve nutrition through healthy snacking.



Completing successful projects with your students follows several basic steps. You probably follow many of these steps in your classroom projects already. Use the following process to ensure successful student technology projects.

### **Step 1: Create Foundations**

Before students begin applying their knowledge to solve a problem or answer a real world question, they must have a strong foundation of information. Help your students develop a foundation of knowledge about the topic so they are ready to explore themes and ideas through in depth project work.

### **Step 2: Set Expectations**

Students need to have a clear understanding of you expectations for their work on the project. As you explain the scope of the project, share your project goals, the types of products they can create (posters, multimedia, web pages, etc.) to meet the project goals, and the technology tools they can use to create the products. Define your standards for behavior during the project building process.

Share checklists and rubrics that will help them understand your expectations for the various activities they will be completing during the process. Share examples of high-quality completed work to clarify product expectations and prompt new ideas.

### **Step 3: Form Teams**

Learning in a collaborative setting works the best in heterogeneous groups Group students, or have them group themselves, by varying levels of expertise, ability, and skills. You can foster positive interdependence among team members by asking the students to take on roles such as leader, researcher, or recorder.

Understanding a student's work style will help you facilitate a teams formation, conflict resolution, and project completion.

### **Step 4: Brainstorm Ideas**

Begin the planning process by having students brainstorming as many ideas as possible that relate to the essential question. This is not the time to solve the essential question, but the time to bring up as many potential issues and approaches as possible.

### **Step 5: Develop the Vision**

Next students should begin to focus on their approach to answering their projects essential question. Their vision should reiterate project goals, articulate their goal for their product, and address how the product addresses the audience that will be viewing it. A completed vision will help the students move in the right direction.

### **Step 6: Create a Storyboard**

Next, each team creates a storyboard to plan out their project. The storyboard should include content and a strong direction for each portion of the project. The storyboard should be approved before work on the project can begin. The storyboard provides a road map for how the students will achieve their vision for their project.



### **Step 7: Build the Project**

During project building, teams work independently without direct instruction. Students should review their storyboard and assign the necessary tasks for project completion. Discuss appropriate research resources and copyright issues. After they have gathered the necessary resources and supporting research, they can begin putting the project together. When a rough draft is complete, the students should review the rubric and make adjustments to the project. When all of this is complete, they begin preparing to present their completed project work.

### **Step 8: Present the Project**

Each team now formally presents their project. Often this is done through an oral presentation, but can also be done with small groups, peer-to-peer, submission to an expert, or even in a mini-trade show or conference. In addition to demonstrating the project they created, students should share their learning during the project. The audience should give feedback on the project content and delivery. The instructor can also comment on your insight of the process for this team and help to sum up the learning that occurred during the process.

### **Assess the Project and Process**

Assessment occurs throughout the process. Summative assessment can be done during the project presentation. Process assessment should take place at foundation activities, the vision, storyboard, rough draft, final project, and project presentation. Have students grade themselves through the project rubric and self-assessment questions you ask of them.

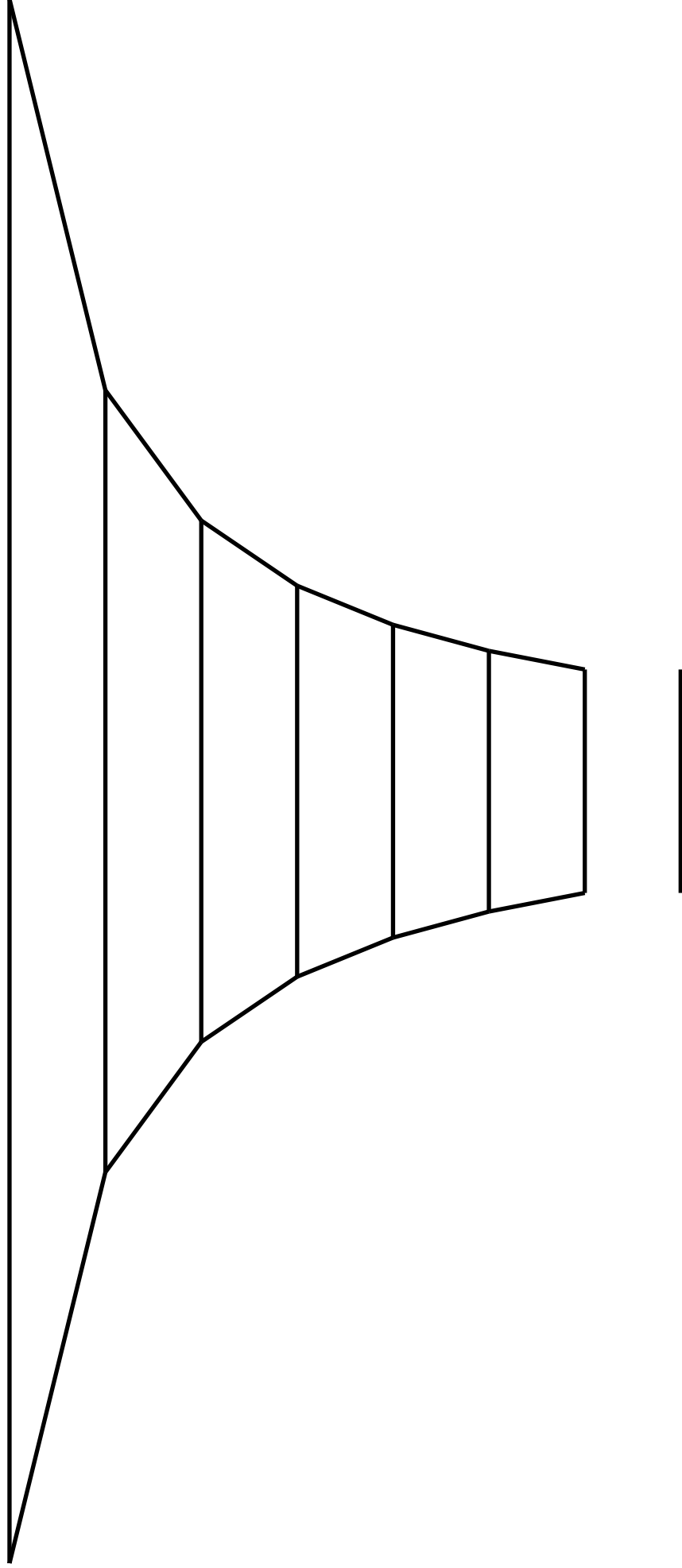


# Narrowing a Brainstorm

## Graphic Organizer

Name: \_\_\_\_\_

Write down the big idea or all the ideas you brainstormed in the top box. The next box is smaller. Write a narrower description of the idea or get rid of at least two ideas in the list. The next box is even smaller. Once again, pick the best ideas or parts of the larger idea. Repeat this process until you only have one specific idea in the bottom box.





# ProjectLearn

## Vision

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**Name(s):**

**Date:**

### Topic

What is the project topic?

What question about this topic will your project answer?

### Audience

Who is the audience for this project?

What will your project include to reach this audience?

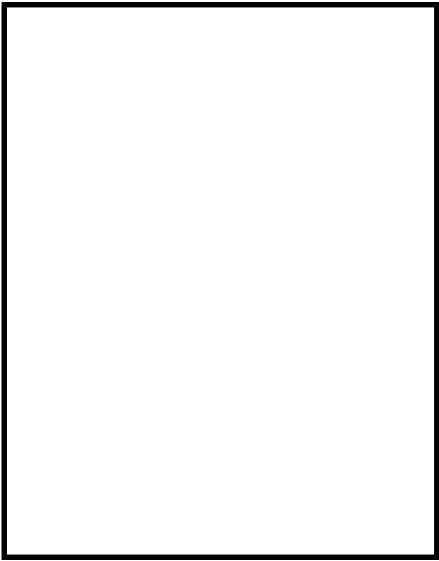
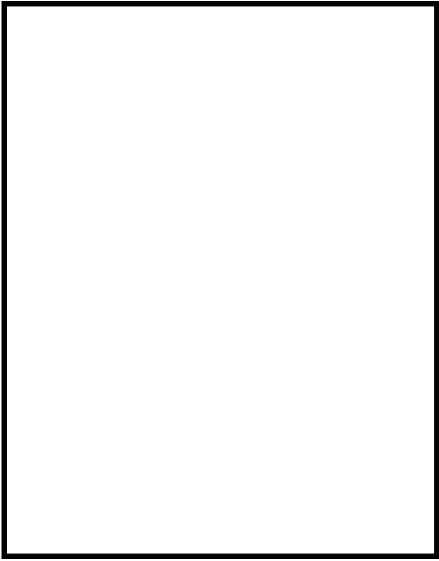
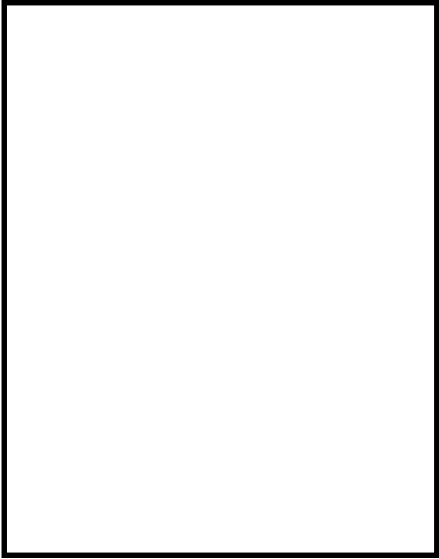
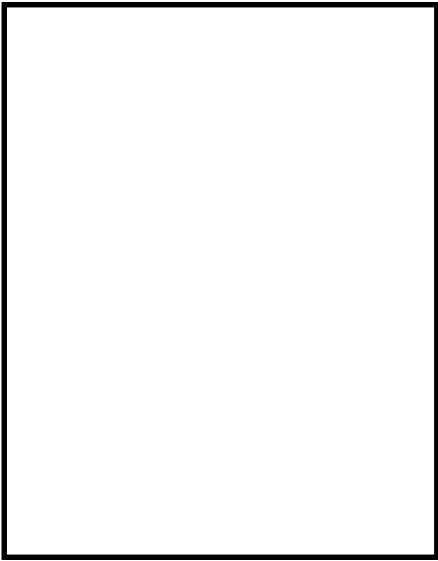
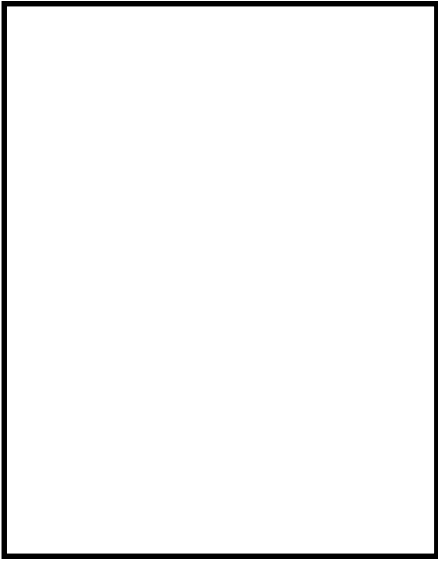
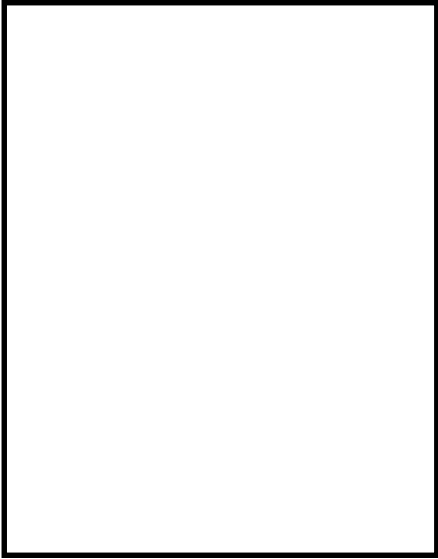
### Goal

What do you want people to come away with after viewing your project?



**ProjectLearn**  
Storyboard

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## ProjectLearn: Project Evaluation

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Each team should formally share their project with peers, experts, and instructors. An oral presentation is a common way to present a multimedia project. You can also share projects through small group discussion, peer-to-peer meetings, submission to an expert, or even in a mini-trade show or conference.

In addition to demonstrating the product they created, students should share their learning during the project. The audience should give feedback on the project content and delivery. The instructor should share insights into the learning that occurred as the team completed the project-building process.

### Getting Feedback

Promote growth by asking clarifying and open-ended questions that will further group discussion and response. Give feedback on the project, individual responses, and audience thoughts based upon what the group has already mentioned. Highlight key concepts and issues that are part of the learning process for this project.

Create a list of the questions so that everyone can see what you expect the learners and the audience members to answer after sharing or viewing each project.

Write the issues arising during the sharing process in a place that everyone can refer to when forming their own reflections and feedback.

Each student presenting should share what they learned about:

- the subject matter content.
- their technical skills needed.
- planning, organizing, and implementing a project.
- how they learn.
- how their group functioned.
- working in a group.

Ask the audience what they learned about:

- the subject matter content.
- effective presentation strategies.
- using technology purposefully.

Ask the audience to share opinions about the project.

- What did you think about while viewing the project?
- How did the project engage you?
- Why did the project engage you?
- How might the project be revised or even extended?

Remind the audience that effective critiques are:

- free of value judgments.
- specific, personal, and directed at one's work.
- founded on trust from someone respected.
- immediate enough to be useful.

To be successful, the final feedback process must be engaging to the creators, the audience, and the instructors. Keep in mind that audience feedback and critique should be friendly in nature and promote continuous growth.



# ProjectLearn: Project Evaluation

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## **Self-Assessment**

Use the space below to create a written assessment of the work that you did during the project. Use the questions to help direction your writing.

## **Content Knowledge**

Write about the new content knowledge you gained while working on this project. Be sure to highlight the things you learned that might not have been included in the final product or project presentation.

## **Collaboration and Teamwork**

Write about the work you did that contributed to your team's success. List your contributions and how they affected the project.

## **Technology Improvement**

Write about the new technology skills you gained as you worked on the project.





Tech4Learning supports 21<sup>st</sup> century student outcomes by providing tools for project exploration and discovery and professional development opportunities that transform classrooms from *teachers telling* to *students doing*.

*"I'm calling on our nation's governors and state education chiefs to develop standards and assessments that don't simply measure whether students can fill in a bubble on a test, but whether they possess 21st century skills like problem-solving and critical thinking and entrepreneurship and creativity."*

President Barack Obama, **March 10, 2009**

## CORE SUBJECTS AND 21<sup>st</sup> CENTURY THEMES

*A focus on 21<sup>st</sup> century outcomes begins with strong foundations in the core subjects.*

Creating unique products engages students in their learning, motivating them to master difficult concepts. Creating curriculum products using multimedia technologies leads to knowledge that is "richer, better connected, and more applicable to subsequent learning and events."<sup>1</sup> Studies show a positive impact on learning when students are required to engage in inquiry, analyze content, construct knowledge, and effectively communicate their learning.<sup>2</sup>

For example, students can use:

**Pixie** to practice writing and fluency as they retell stories, explain abstract concepts, and illustrate word problems.

**Frames** to write and narrate biographies, develop news broadcasts, and demonstrate complex science processes.

**WebBlender** to develop digital portfolios documenting learning performances and reflections.

## LEARNING AND INNOVATION SKILLS

*Creativity and Innovation, Critical Thinking and Problem Solving, Communication and Collaboration*

Tech4Learning's open-ended tools require students to think creatively as they develop, implement, and effectively communicate new ideas to others. Having students create with video, audio, text, and images provides an opportunity to exercise higher-order thinking skills. Students must critically evaluate both content and media as they frame, analyze, and synthesize information to solve problems and answer questions.<sup>3</sup>

For example, students can use:

**Pixie** to write, illustrate, narrate, and share their ideas for a new invention.

**Frames** to develop public service announcements on current social and cultural issues.

**WebBlender** to participate in civic discussions through a web-based position paper.

1. Lehrer, R. (1993). Authors of knowledge: Patterns of hypermedia design. In S. P. Lajoie & S. J. Derry (Eds.), *Computers as Cognitive Tools* (pp. 197-227). Hillsdale, NJ: Lawrence Erlbaum.

2. Newmann, F. M. (1996). *Authentic achievement: Restructuring schools for intellectual quality*. San Francisco: Jossey-Bass.

3. Jonassen, D. H., & Reeves, T. C. (1996). Learning with technology: Using computers as cognitive tools. In D. H. Jonassen (Ed.), *Handbook of research for educational communications and technology* (pp. 693-719). New York: Macmillan.





## INFORMATION, MEDIA, AND TECHNOLOGY SKILLS

*21st century citizens must employ critical thinking skills related to information, media, and technology*

Building with technology engages students and connects them to their learning.<sup>4</sup> Using Tech4Learning tools, students learn to organize, manage, and evaluate information to create a product, promoting them from information consumers to media producers.

For example, students can use:

**Pixie** to share their ideas through comics, trading cards, ebooks, and digital stories.

**Frames** to develop digital videos, podcasts, time lapse videos, and Flash animations.

**WebBlender** to develop interactive products, digital portfolios, and web sites.

## LIFE AND CAREER SKILLS

*Flexibility and Adaptability, Initiative and Self-Direction, Social and Cross-Cultural Skills, Productivity and Accountability, Leadership and Responsibility*

Project learning with Tech4Learning tools requires students to employ flexibility and adaptability as they reevaluate their work throughout the project process, becoming self-directed learners as they produce quality results.<sup>5</sup> Working in diverse teams to complete a project on time and meeting assessment requirements helps to build leadership, responsibility, social skills and cultural awareness.

ProjectLearn Academies help educators implement 21<sup>st</sup> century skills through project learning.

Project learning that supports 21<sup>st</sup> century student outcomes require a significant investment in teacher preparation and training. Tech4Learning's **ProjectLearn Academy** is designed to provide a strong foundation in designing technology-infused project learning into the classroom. A ProjectLearn Academy immerses participants in a project learning environment where they learn to successfully design, manage, and implement project work in the classroom.

4. Means, B., Blando, J., Olson, K., Middleton, T., Morocco, C.C., Remz, A.R., & Zorfass, J. (1993, September). Using technology to support education reform. Washington, DC: U.S. Department of Education, Office of Educational Research and Improvement. Available on-line: <http://www.ed.gov/pubs/EdReformStudies/TechReforms/>

5. Knowlton, D. (2003). "Preparing Students for Educated Living" in Knowlton, D. & Sharp, D., Eds. (2003). Problem-based Learning for the Information Age. San Francisco: Jossey Bass.



Tech4Learning is a professional development affiliate of the Partnership for 21st Century Skills, an advocacy group working to ensure every child's success as citizens and workers in the 21st century. For more information, visit: <http://www.21stcenturyskills.org>

For more information, visit [www.tech4learning.com](http://www.tech4learning.com)

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In *Classroom Instruction that Works* (ASCD, 2001), Robert Marzano, Debra Pickering, and Jane Pollock examine decades of research and distill the results into nine teaching strategies that have a significant, positive impact on student learning. Tech4Learning’s open-ended creativity tools can be applied in almost any grade and subject area to support these nine instructional methods.

Teaching Strategy	Supporting use of Tech4Learning Tools
<b>Identifying Similarities and Differences</b>  <i>Representing similarities and differences in graphic or symbolic form enhances students’ understanding of and ability to use knowledge.</i>	<p>Using <b>Pixie</b>, students can complete comparing and sorting Activities from the library or use Venn Diagram templates to show similarities and differences on any topic.</p> <p>Using <b>Frames</b>, students can create digital stories that compare topics such as ancient cultures (Greece vs. Rome), scientific processes (mitosis vs. meiosis), and similar stories (myths and tall tales).</p>
<b>Summarizing and Note Taking</b>  <i>Summarizing involves deleting, substituting, and evaluating information, and requiring students to engage in detailed analysis of the content.</i>	<p>Using <b>Pixie</b>, students can use activities such as “5 W’s” or “Parts of a Story” that ask them to summarize, use the text and paint tools to retell a story, or create comics and trading cards that summarize information.</p> <p>Using <b>Frames</b>, students can develop animations and digital stories that show the sequence of events in a story, historical event, or scientific process.</p> <p>Using <b>WebBlender</b>, students can develop interactive timelines that showcase key events in a person’s life or historical events.</p>
<b>Reinforcing effort and providing recognition</b>  <i>Keeping track of effort and recognizing progress helps students realize the importance of effort and changing their beliefs to emphasize effort.</i>	<p>Using <b>Pixie</b>, teachers can create newsletters and podcasts of notable classroom events and use templates to develop certificates that highlight student effort and recognize progress and achievement. Students can publish their work as podcasts, videos, and electronic books for an audience beyond the classroom.</p> <p>Using <b>Frames</b>, teachers and students can create podcasts and classroom newscasts of notable classroom events and achievements.</p> <p>Using <b>WebBlender</b>, students can develop digital portfolios of learning progress that include reflections on personal and academic growth. Teachers can create newsletters and publish podcasts of notable classroom events and achievements.</p>
<b>Homework and Practice</b>  <i>Homework and practice provide students with an opportunity to extend and reinforce their learning beyond the classroom.</i>	<p>Using <b>WebBlender</b>, teachers can create classroom web sites with additional activities for practice and homework assignments.</p>





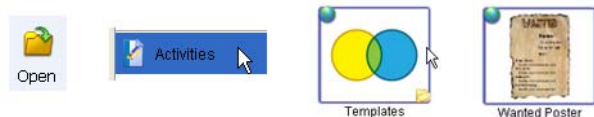
<b>Nonlinguistic representations</b>  <i>Creating nonlinguistic representations of knowledge requires students to organize and elaborate on information.</i>	<p>Using <b>Pixie</b>, students can illustrate diagrams (life cycles, parts of cell) and visual representations of texts they are reading, create comics to represent content and perspective through pictures, and use the Stickers as virtual manipulatives to represent math concepts like counting, fractions, geometry, and graphing.</p> <p>Using <b>Frames</b>, students can use the illustration tools to design animated graphs, science processes, patterns, and chronology.</p> <p>Using <b>WebBlender</b>, students can use tables and stickers to build pictographs and other visual graphs.</p>
<b>Cooperative Learning</b>  <i>Working and learning in heterogeneous groups builds academic and 21<sup>st</sup>-century skills.</i>	<p><b>Pixie, Frames, and WebBlender</b> - The open-ended nature of all Tech4Learning tools supports cooperative learning by providing a platform for students to build on their strengths as they divide into roles and show understanding and ideas through illustrations, writing, and audio. Students can apply all of these skills in individual work that can be combined into a group or class project.</p>
<b>Setting objectives and providing feedback</b>  <i>Goals should not be too specific and should be easily adaptable to students own objectives.</i>	<p>Using <b>WebBlender</b>, students can develop digital portfolios based on learning goals, including both student and teacher reflection.</p>
<b>Generating and testing hypotheses</b>  <i>Guiding students through generating and testing hypotheses and asking them to clearly explain their hypothesis and conclusions.</i>	<p>Using <b>Pixie, Frames, and WebBlender</b>, students can clearly communicate their ideas, hypotheses, and conclusions using images, text, video, and narration.</p>
<b>Questions, cues, and advance organizers</b>  <i>Helping students use what they already know to enhance their learning on a topic.</i>	<p>Using <b>Pixie</b>, teachers and students can complete a KWL or KWHL Activity template on a topic they are studying.</p>

Marzano, Robert J., Debra J. Pickering, and Jane E. Pollock. (2001). Classroom Instruction That Works. Association for Supervision and Curriculum Development, Alexandria, VA.



You can use the Wanted Poster template in the activities to design your own wanted poster.

Click the **Open** button on the toolbar. At the dialog, click the **Activities** button in the list on the left.



Double-click to open the **Templates** folder and then double-click the **Wanted Poster** activity.

Decide who it is that is wanted. An element on the periodic table?  
A predator? The antagonist in a fable?

Use the Paint tools and stickers to add their picture.

Add text to the existing fields to identify the known aliases, last seen location, known associates, and favorite saying!



Pixie lets you easily capture your picture and place yourself in a far off country, head back in time, or transform yourself into an animal!



Open an image you have taken with a digital camera or click the **Stickers** tab above the editing panel and click the **DV Camera** button.

Click a shape button to change the shape of the area that will be captured.

Click and drag the zoom slider to control your camera's zoom.

When you see the picture you want to take, click the **Capture** button.

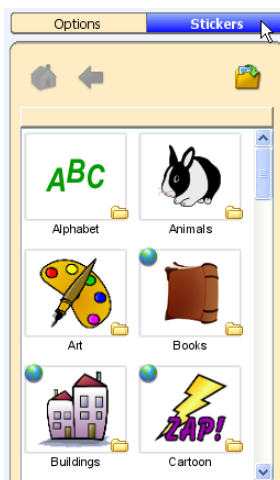
Use the **Paint Tools** to add a historical costume, change yourself into an animal, or become a character in a book you are reading!

Click the **Text** tool to write a story about your new role.

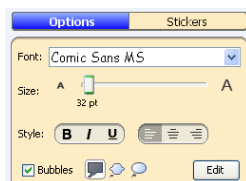




Pixie lets you easily create comics by combining paint tools, stickers, and text and then printing through Share.



Design your first panel. Click the **Stickers** tab on the right to find characters and objects. There is a special set for comics in the Cartoon folder!



Click the **Text** tool. Type your text into the text box.

To change it into a conversation bubble, click the **Options** tab on the right and click the bubble you want to use.



Click the **New** button and use the tools to create each panel. Then, click the **Share** button on the toolbar.



Arrange your panels in the correct order and click the **Print** button. At the Print Options, choose **Comic 4** or **Comic 6** to print all of the pages onto one sheet like a comic.

You can use Pixie to create an enhanced podcast, with pictures to accompany your narration. Use the **Paint** tools on the left or add clip art from the **Stickers** tab on the right to design your Pixie page.



Click the **Arrow** tool on the tool palette.



Click the **Record** button in the lower left corner to add the narration you want to hear when this image is displayed. Your podcast might illustrate how to solve a word problem, summarize events in your classroom this week, review a piece of literature, or more.



Click the **New** button to open a new blank Pixie page. Create each image you want to show and record narration for each page.

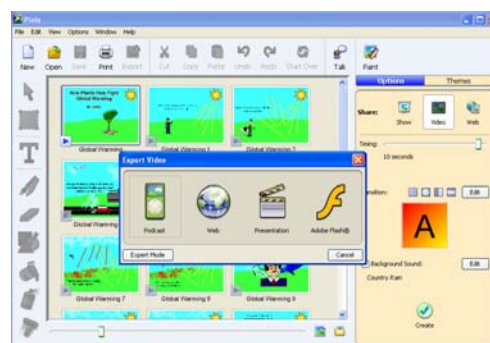


Click the **Share** button on the toolbar. You will see the images of your podcast. Click and drag to put them in the correct order.



Click the **Video** button on the Options panel and then click the **Create** button at the bottom of this panel.

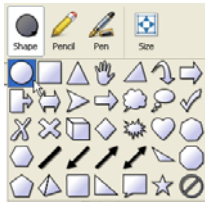
Click the Podcast option to export your work as a podcast!





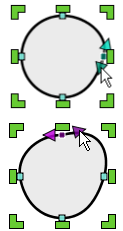


You can draw your own illustrations and characters with the drawing tools in Frames.



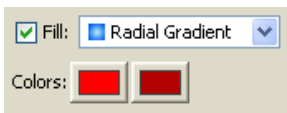
Click the **Shape** tool on the toolbar. You will see a panel with lots of different shapes. Click the shape you want to draw.

Click and drag on the canvas to draw a shape.



You will see nodes around the shape. Click and drag a **node** to change the shape. Click a node and click and drag the **blue node handles** to change the direction of the stroke through this node.

Double-click a **node** and click and drag the **purple node handles** to change the direction of the stroke on either side of this node. Adjust the nodes and handles to get your shape looking the way you want.

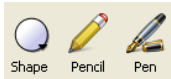


Use the **Fill** options in the Options panel to change the fill of the shape.

Use the other drawing tools like the **Pencil** tool to add more pieces to your shape and complete your masterpiece.



You can use the drawing tools in Frames to create original cel animations!



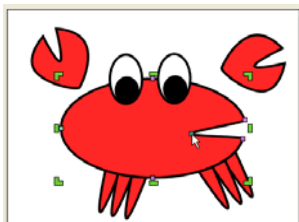
Use the **Drawing** tools on the toolbar to design your first frame. Use the **Shape** tool to draw existing shapes, the **Pencil** tool to draw freehand, and the **Pen** tool to draw nodes.



When you have finished designing this frame, click the frame in the **Storyboard** panel on the left.

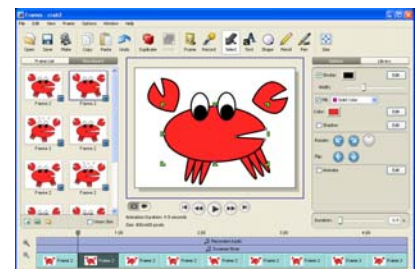


Click the **Duplicate** button on the toolbar. This will create a second copy of the frame. You will see this frame in the **Storyboard** panel.



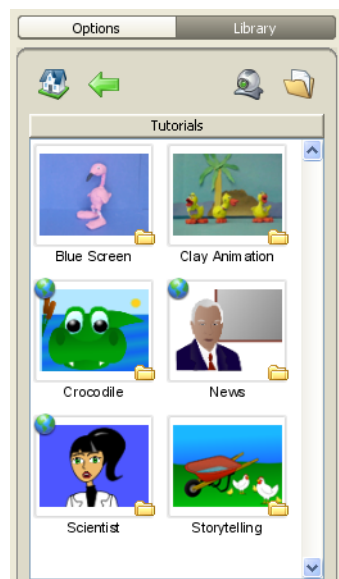
Click a shape you have drawn and change the nodes, node handles, location, or rotation to make this frame unique. Repeat to create the cels of your animation.

Use the Frames tools to record narration and add a title, transitions, and a soundtrack!





You can use the tutorial images in Frames to create animated news broadcasts, public service announcements, claymations, and more.



Click the **Library** tab on the right. Double-click the **Tutorials** folder to open it. You will see several different folders of images. (You may have to scroll down to see the Tutorials folder.)

Click and drag a folder to the workspace in the middle. You will see all of the frames in the Frame List/Storyboard on the left.

To make a character talk, **Shift-Click** a group of frames and click the **Duplicate** button on the toolbar.

Use the Frames tools to record narration and add a title, transitions, and a soundtrack!



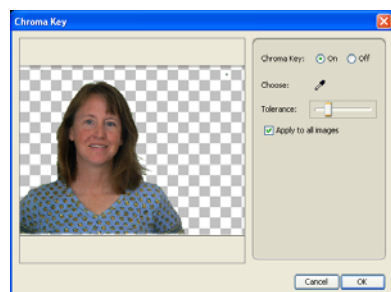
## Tech4Learning - Frames: Use the Chroma Key

You can use the Chroma Key feature in Frames to place yourself in a different culture or back in time, in a digital story or animation.



Camera

Take a picture of yourself in front of a green screen or solid color background. Click the **Library** tab to add this image to Frames or use the **Add a Frame from a File** button at the bottom of the Frame List/Storyboard.



Go to the **Edit** menu and choose **Chroma Key**. At the dialog, turn the chroma key **On** and use the **Eye Dropper** tool to choose the color you want removed. Click the **OK** button.

Click the **Library** tab and double-click the **Pics4Learning** folder. Find an image you want for a background, right-click it, and choose **Set Frame Background**.



Use the Frames tools to record narration and add a title, transitions, and a soundtrack!



## A vertical collage of 18 images, including portraits of children and adults, a map of Africa, a White House report, a cartoon of a woman, a hurricane, a cartoon of a man, a Channel 15 news graphic, a quote, a beach scene, a cartoon of a woman pointing to a map of Egypt, and a cartoon of a man.

## 4th Grade

Comic-con is looking to expand their fan base to American history buffs. They are looking to highlight a series of animated comics of regional Civil War events at their next annual convention in San Diego, California. You are to create an animated comic on **how the events in Arizona affected the outcome of the Civil War.**

Economic, social, and cultural changes transformed the U.S. into a world power during the late 1800's to early 1900's. The Arizona governor is looking to educate his staff on the economic development of Arizona during this time period. From the point of view of one of these historical figures: *Geronimo, Manuelito, W.P. Hunt, Sharlot Hall, Charles Poston, or a Buffalo Soldier*; create a political commercial on an innovation that helped Arizona's growth and economy.

You have been hired as part of a team from Arizona's State Historical Society to film a television documentary about Arizona's transition from territory to statehood. Discuss in chronological order the events that took place for Arizona during the transitional period.

Google is looking to enhance their maps site to include short animations for each states physical and human features. Your team's task is to construct an animated map of these features to aide tourists in making decisions on which places to visit in your state. Include distances of these features from the 3 major cities in Arizona: Phoenix, Flagstaff, and Tucson along with characteristics of the features.

Human cultures, their nature, and distribution affect societies. Arizona's statewide real estate agency is looking for a way to have people relocate to the state. They find it important to reflect on the history of growth of the state as well as the cultural characteristics of Arizona's diverse population. **How did the building of transportation routes affect human settlement and economic development in major Arizona cities?**

You are part of a small team hired by The History Channel to film a historical docudrama on the effects of European exploration, trade, and colonization on other parts of the world. Your team will focus on one of the following: *sea routes to Asia, increased power of European countries, trade between Europe, Africa, and the Americas, triangular trade, or the introduction of disease to indigenous people*. Create an animation on your assigned event explaining the impact it had on the world.

Intense internal conflicts typically lead to the radical overthrow of traditional governments and with that new political and economic systems are created. The Smithsonian Institution is creating a new virtual exhibit for one of their museums in Washington D.C. Your team has been designated to create an animation comparing and contrasting the causes and outcomes of the American Revolution with the Mexican Revolution of 1910.

You are a merchant traveling the Silk Road in northern China during the Han Dynasty. Along the way you meet many interesting people and trade for goods from around the world. Document the story of your adventures in a narrative to share with generations of people to come. **What was life like along the Silk Road?**

You have been hired as part of a team to film a television documentary on the geography of ancient Egypt and the Near East. **How did geography affect daily life?** Choose to focus on one of these three ancient civilizations: Egypt, Kush, or Canaan.

You are a traveler (a merchant, a scholar, or some other interesting and realistic character) to the Songhai empire during the rule of Askia Mohammad Toure (1493 - 1538 c.e.). During this time, the empire is experiencing a golden age, a time of great prosperity and achievement. You want to describe your most exciting and interesting experiences in a travel journal. **How is the time of Askia Mohammad a golden age?**

Pretend that you lived many years ago among the Maya, Aztecs, or Incas. Become the main character in “a day in the life” story and write a narrative about a series of events that happens in one of these three civilizations. Your narrative should clearly address this question: **What was daily life like in your civilization?**





## 8th Grade

### Strand 1: World History: Concept 8: **World at War**

The United States Holocaust Memorial Museum would like to educate the public about how personal responsibility affects everyone. The museum is looking for you to create a digital story educating others on how ethical and personal choices can create a rippling impact throughout society. Your digital story should be from the viewpoint of one of the following individuals during the Holocaust: perpetrator, victim, bystander, or sympathizer.

### Strand 1: World History: Concept 8: **World at War**

Global events, economic issues and political ideologies ignite tensions leading to worldwide military firestorms and diplomatic confrontations in a context of development and change. World War II helped to reshape the world and its political views during the 20th-century. CNN is looking to expand their web site with informational animations on different political structures and the impact they have on a country. Create an animation comparing and contrasting the political ideologies of Fascism and Nazism and the cause they had on WWII.

### Strand 2: World History: Concept 3: **Contemporary World**

You have been hired by the Smithsonian Institution for the next installment in the US National Museum. The installment is to cover the 20th century. In order to convince the Smithsonian trustees that your choice is the best, you will create a persuasive animation for their next meeting. What events during the 20th century signaled a change in social and economic conditions for the USA?

## More to Explore

### Digital Storytelling

Digital storytelling can be very powerful for students, addressing various types of learning styles and modalities. Digital storytelling provides meaning to learning through the use of auditory, visual and kinesthetic skills. Students are required to use higher-order thinking skills in the creation of their stories.

Digital storytelling can be used in the classroom in a myriad of ways. Telling personal stories helps students learn about voice in a narrative form, as well as first-person perspective. Since modern communication involves "writing" with pictures and music, having students create digital stories helps them build these critical skills.

You can also use digital storytelling to address curriculum areas beyond language arts and media literacy. For example, students can retell an event from the life of a famous person they are studying to help us understand why this person acted the way they did. They can take the voice of a drop of water and show its progression through the water cycle or path through a watershed. Younger students can become an animal and discuss habitat, food, predation, and other life cycle issues. Public service announcements can be used as both a persuasive writing exercise and a way to address science content, such as health or conservation.

**Language Arts:** Biographies, Video Poetry, Myths and Legends

**Math:** Using Logic to Solve Problems, Geometry in the World around Us, Math Helps Us Do...

**Science:** Journey through the Life Cycle, An Animal's Perspective, Birth of an Invention

**Social Studies:** Eyewitness to History, Community Tours, Veteran Interviews

[www.recipes4success.com/digitalstorytelling](http://www.recipes4success.com/digitalstorytelling)

## Resources That Can Help



**[www.thecreativeeducator.com](http://www.thecreativeeducator.com)**

Creative Educator magazine features articles on project-based learning, stories from educators, high-level lesson ideas, software tips, and more.



**[connect.tech4learning.com](http://connect.tech4learning.com)**

Join like-minded educators from around the world to explore how a blend of technology, creativity, and curriculum can inspire 21st-century students!



**[www.recipes4success.com/lessons](http://www.recipes4success.com/lessons)**

The lessons at Recipes4Success include a step-by-step process for teachers and students, downloadable templates and examples, links to tutorials and references, and correlations to standards.



**[tradingpost.tech4learning.com](http://tradingpost.tech4learning.com)**

Want to find new ideas? Search the Trading Post for Pixie Activities, WebBlender templates, Twist designs, and more, or share your own lesson ideas!



**[www.pics4learning.com](http://www.pics4learning.com)**

Pics4Learning contains over 20,000 free copyright-friendly pictures you can use in educational projects.