

The WebQuest Model

Introduction:

The WebQuest concept was developed in 1995 at San Diego State University by Bernie Dodge and Tom March. It came about as the result of thousands of schools being internet connected with no agreed upon terminology for the kinds of instructional activities the schools were creating. They saw a need to define these learning environments and defined one as a WebQuest and developed a set of desirable attributes for this newly defined activity.

Since it was first developed, the WebQuest model has been incorporated into hundreds of education courses around the world. WebQuests provide an authentic, technology-rich environment for problem solving, information processing, and collaboration. This inquiry-based approach to learning makes excellent use of internet-based resources by involving students in a wide range of activities.

The Significance of the WebQuest:

According to Dr. Judi Harris, “Information is public. It doesn’t become knowledge until we make it private.” WebQuests focus students on analysis, synthesis, and evaluation of *information* as students work collaboratively to solve a real world problem or complete a task. Each team member assumes roles that best represent some aspect of reality. Students engage in problem-solving investigations to construct their own *knowledge*.

Discussion:

The WebQuest is defined by Bernie Dodge as, “An inquiry-oriented activity in which most or all of the information used by learners is drawn from the Web. WebQuests are designed to use learners’ time well, to focus on using information rather than looking for it, and to support learners’ thinking at the levels of analysis, synthesis, and evaluation.” What makes WebQuests so appealing is that they provide structure and guidance for both students and teachers.

All WebQuests should include the same basic elements to achieve clarity of purpose and efficiency (maximum use of time and computers). The basic elements or critical attributes are listed as follow:

1. **Introduction:** The introduction sets the stage and provides some background information.
2. **Task:** The task should be interesting and doable.
3. **Information Resources:** This element includes such resources as web documents, experts available via e-mail or conferencing, searchable databases on the net, and books and other documents physically available in the learner’s environment.
4. **The Process:** This element clearly describes the steps for the learner to accomplish the task.

5. **Guidance:** This step describes how to organize the information acquired by using guiding questions, or directions to complete organizational frameworks such as timelines, concept maps, or cause-and-effect diagrams.
6. **Conclusion/Evaluation:** This step brings closure to the activity, reminds the learner what he has learned and encourages him to extend the experience into other domains.

Some non-critical attributes of WebQuests include group activities, motivational elements such as role-playing, a possible scenario to work within, or simulated e-mail persons to communicate with. WebQuests can be designed within a single discipline or they can be interdisciplinary.

There are at least two levels of WebQuests that should be distinguished from one another. They are as follows:

Short Term WebQuests: The instructional goal of a short term WebQuest is knowledge acquisition and integration. The learner will deal with a significant amount of new information and try to make sense of the information. It is designed to be completed in one to three class periods.

Longer Term WebQuest: The instructional goal of a longer term WebQuest is extending and refining knowledge. In the longer term WebQuest the learner analyzes a body of knowledge deeply, transforms it in some way, and demonstrates an understanding of the material by creating something that others can respond to either online or in real time. This level of WebQuest will usually take between one week and one month in a classroom setting.

To help students and teachers to develop excellent WebQuests, Bernie Dodge developed a system that includes five guiding principles. He describes these principles in an article he wrote entitled "Five Rules for Writing a Great WebQuest". He uses the acronym FOCUS to illustrate his guiding principles. They are as follows:

1. Find Great Web Sites -

Master a search engine: AltaVista, Google and Northern Light are at the top of the list

Probe the deep Web: Includes archives of newspaper and magazine articles, databases of images and documents, directories of museum holdings and more

Don't lose what you find: Backflip allows you to log in from any computer to look at and add to your list of bookmarks

2. Orchestrate Learners and Resources -

Organizing resources: Make good use of every computer you have

Organizing people: Critical attributes of a successful cooperative learning environment include positive interdependence, promotive interaction (students help teach and applaud one another as they work through problems), individual and group accountability, interpersonal and small group skills and group processing

3. Challenge Your Learners to Think –

Taking your learners to task: Tomorrow’s adults will need to analyze and synthesize information to succeed in most professions and to participate fully as citizens. Use tasks that engage students in problem solving, creativity, design and judgment.

Design: Be creative and use a design task where students are creatively working in teams, researching and learning to compromise

Journalistic tasks: Learners take on a persona and create a news account or simulated diary as if they were in a particular time and place.

Persuasion amid controversy: Look for authentic controversies in the world as a model around which to organize the study of a topic

4. Use the Medium –

People: Ask-an-expert sites, ePALS to connect to other schools, e-mail links

Conversation: QuickTopic is a site that allows one to add an interactive form to any Web page in a matter of seconds

Selective Glitz: The Earthcam site will help you find Webcam views for any topic, take advantage of audio, video, and images when appropriate

5. Scaffold High Expectations –

Reception Scaffold: Provides guidance in learning from a given resource and retaining what was learned such as observation guides, tips on how to conduct interviews, and online glossaries and dictionaries

Transformation Scaffold: Learners transform what they read into some new form using comparing and contrasting, finding patterns among a number of similar objects of study, brainstorming, inductive reasoning, and decision making

Production Scaffold: Learners create things they have never created before with the help of templates, prompted writing guides, and multimedia elements and structures

Summary:

Bernie Dodge and Tom March among others have developed many useful tools for developing exemplary WebQuests. There are templates for developing WebQuests, rubrics for evaluating them, best examples of WebQuests, lists of WebQuests by grade level and subject, WebQuests about WebQuests (for the purpose of finding best examples of WebQuests), and more. I have provided examples of Bernie Dodge’s rubric, a template, an example of a WebQuest about WebQuests, examples of secondary and elementary WebQuests and a web site for a very excellent tenth grade level World History WebQuest. *The Webquest Page* is an excellent web

site that provides everything a teacher needs to know and where to get it in developing and finding WebQuests for use in the classroom, rubrics for evaluation, templates, etc.

The **WebQuest** model continues to evolve and more and more excellent WebQuests are being developed all the time. Using the guidelines and materials developed by Bernie Dodge and Tom March will help you develop your own WebQuest or evaluate another that you might want to use.

References:

<http://www.iste.org/L&L/archive/vol28/no8/featuredarticle/dodge/index.html>

http://edweb.sdsu.edu/courses/edtec596/about_webquests.html

<http://eduscapes.com/tap/topic4.htm>

These three sites include information used in the introduction.

http://www.techlearning.com/db_area/archives/WCE/archives/guhlin3.htm

This web site includes the quote by Judi Harris.

<http://edweb.sdsu.edu/webquest/overview.htm>

The definition used for WebQuest can be found at this site.

<http://edWeb.sdsu.edu/Webquest/searching/specialized.html>

This site includes the basic elements of the WebQuest.

http://edweb.sdsu.edu/courses/edtec596/about_webquests.html

Some non-critical attributes and terms for short and long WebQuests can be found at this site.

<http://www.iste.org/L&L/archive/vol28/no8/featuredarticle/dodge/index.html>

“Five Rules for Writing a Great WebQuest” by Bernie Dodge

There are many web resource links at this site.

<http://eduscapes.com/tap/topic4.htm>

This is the Special Search Engines and Directories site.

www.backflip.com

This is the Backflip (bookmark server) site.

<http://ttt.teachtheteachers.org/projects/Pwalker2/index.htm>

This site includes an example of an excellent tenth grade level World History WebQuest.

<http://edweb.sdsu.edu/webquest/webquestrubric.html>

This is the web site for the rubric provided as an example.

<http://www.esc20.net/etprojects/templates/twebquests.html>

This is the web site for the template provided as an example.

<http://edweb.sdsu.edu/webquest/webquestwebquest-hs.html>

This is the web site for the WebQuest for WebQuests by Bernie Dodge.

<http://edweb.sdsu.edu/webquest/webquest.htm>

The WebQuest Page

<http://projects.edtech.sandi.net/chavez/batquest/navigator.html>

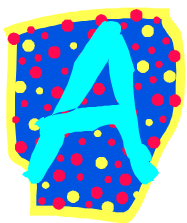
This is the site for the example of an elementary level WebQuest, “Bat Quest”.

<http://www.itdc.sbcss.k12.ca.us/curriculum/biodesigns.html>

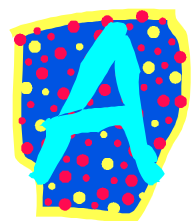
This is the site for the example of a secondary level WebQuest, “BioDesigns, Incorporated”.

This paper was written by Maxine Grim
For the course EDC385G Multimedia Authoring
At the University of Texas at Austin

All examples are included on the following pages:



A Rubric for Evaluating WebQuests



The WebQuest format can be applied to a variety of teaching situations. If you take advantage of all the possibilities inherent in the format, your students will have a rich and powerful experience. This rubric will help you pinpoint the ways in which your WebQuest isn't doing everything it could do. **If a page seems to fall between categories, feel free to score it with in-between points.**

	Beginning	Developing	Accomplished	Score
Overall Aesthetics (This refers to the WebQuest page itself, not the external resources linked to it.)				
Overall Visual Appeal	0 points There are few or no graphic elements. No variation in layout or typography. OR Color is garish and/or typographic variations are overused and legibility suffers. Background interferes with the readability.	2 points Graphic elements sometimes, but not always, contribute to the understanding of concepts, ideas and relationships. There is some variation in type size, color, and layout.	4 points Appropriate and thematic graphic elements are used to make visual connections that contribute to the understanding of concepts, ideas and relationships. Differences in type size and/or color are used well and consistently. See Fine Points Checklist .	
Navigation & Flow	0 points Getting through the lesson is confusing and unconventional. Pages can't be found easily and/or the way back isn't clear.	2 points There are a few places where the learner can get lost and not know where to go next.	4 points Navigation is seamless. It is always clear to the learner what all the pieces are and how to get to them.	
Mechanical Aspects	0 points There are more than 5 broken links, misplaced or missing images, badly sized tables, misspellings and/or grammatical errors.	1 point There are some broken links, misplaced or missing images, badly sized tables, misspellings and/or grammatical errors.	2 points No mechanical problems noted. See Fine Points Checklist .	
Introduction				
Motivational Effectiveness of	0 points The introduction is purely factual, with	1 point The introduction relates somewhat to	2 points The introduction draws the reader into	

Introduction	no appeal to relevance or social importance OR The scenario posed is transparently bogus and doesn't respect the media literacy of today's learners.	the learner's interests and/or describes a compelling question or problem.	the lesson by relating to the learner's interests or goals and/or engagingly describing a compelling question or problem.	
Cognitive Effectiveness of the Introduction	0 points The introduction doesn't prepare the reader for what is to come, or build on what the learner already knows.	1 point The introduction makes some reference to learner's prior knowledge and previews to some extent what the lesson is about.	2 points The introduction builds on learner's prior knowledge and effectively prepares the learner by foreshadowing what the lesson is about.	
Task (The task is the end result of student efforts... not the steps involved in getting there.)				
Connection of Task to Standards	0 points The task is not related to standards.	2 point The task is referenced to standards but is not clearly connected to what students must know and be able to do to achieve proficiency of those standards.	4 points The task is referenced to standards and is clearly connected to what students must know and be able to do to achieve proficiency of those standards.	
Cognitive Level of the Task	0 points Task requires simply comprehending or retelling of information found on web pages and answering factual questions.	3 points Task is doable but is limited in its significance to students' lives. The task requires analysis of information and/or putting together information from several sources.	6 points Task is doable and engaging, and elicits thinking that goes beyond rote comprehension. The task requires synthesis of multiple sources of information, and/or taking a position, and/or going beyond the data given and making a generalization or creative product.	

			See WebQuest Taskonomy .	
Process (The process is the step-by-step description of how students will accomplish the task.)				
Clarity of Process	0 points Process is not clearly stated. Students would not know exactly what they were supposed to do just from reading this.	2 points Some directions are given, but there is missing information. Students might be confused.	4 points Every step is clearly stated. Most students would know exactly where they are at each step of the process and know what to do next.	
	Scaffolding of Process	0 points The process lacks strategies and organizational tools needed for students to gain the knowledge needed to complete the task. Activities are of little significance to one another and/or to the accomplishment of the task.	3 points Strategies and organizational tools embedded in the process are insufficient to ensure that all students will gain the knowledge needed to complete the task. Some of the activities do not relate specifically to the accomplishment of the task.	6 points The process provides students coming in at different entry levels with strategies and organizational tools to access and gain the knowledge needed to complete the task. Activities are clearly related and designed to take the students from basic knowledge to higher level thinking. Checks for understanding are built in to assess whether students are getting it. See: <ul style="list-style-type: none"> • Process Guides • A Taxonomy of Information Patterns • Language Arts Standards and Technology • WebQuest

			Enhancement Tools <ul style="list-style-type: none"> • Reception, Transformation & Production Scaffolds 	
Richness of Process	<p>0 points</p> <p>Few steps, no separate roles assigned.</p>	<p>1 points</p> <p>Some separate tasks or roles assigned. More complex activities required.</p>	<p>2 points</p> <p>Different roles are assigned to help students understand different perspectives and/or share responsibility in accomplishing the task.</p>	
<p>Resources (Note: you should evaluate all resources linked to the page, even if they are in sections other than the Process block. Also note that books, video and other off-line resources can and should be used where appropriate.)</p>				
Relevance & Quantity of Resources	<p>0 points</p> <p>Resources provided are not sufficient for students to accomplish the task.</p> <p>OR</p> <p>There are too many resources for learners to look at in a reasonable time.</p>	<p>2 point</p> <p>There is some connection between the resources and the information needed for students to accomplish the task. Some resources don't add anything new.</p>	<p>4 points</p> <p>There is a clear and meaningful connection between all the resources and the information needed for students to accomplish the task. Every resource carries its weight.</p>	
Quality of Resources	<p>0 points</p> <p>Links are mundane. They lead to information that could be found in a classroom encyclopedia.</p>	<p>2 points</p> <p>Some links carry information not ordinarily found in a classroom.</p>	<p>4 points</p> <p>Links make excellent use of the Web's timeliness and colorfulness.</p> <p>Varied resources provide enough meaningful information for students to think deeply.</p>	
<p>Evaluation</p>				

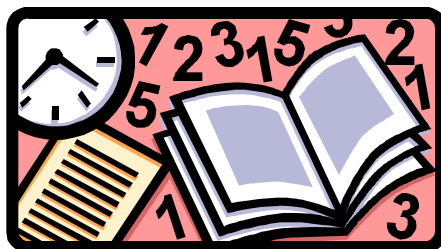
<p style="text-align: center;">Clarity of Evaluation Criteria</p>	<p>0 points</p> <p>Criteria for success are not described.</p>	<p>3 points</p> <p>Criteria for success are at least partially described.</p>	<p>6 points</p> <p>Criteria for success are clearly stated in the form of a rubric. Criteria include qualitative as well as quantitative descriptors.</p> <p>The evaluation instrument clearly measures what students must know and be able to do to accomplish the task.</p> <p>See Creating a Rubric.</p>	
	<p>Total Score</p>			

Original WebQuest rubric by [Bernie Dodge](#).

This is Version 1.03. Modified by Laura Bellofatto, Nick Bohl, Mike Casey, Marsha Krill, and Bernie Dodge and last updated on June 19, 2001.

This rubric can be found at the following web site:

<http://edweb.sdsu.edu/webquest/webquestrubric.html>



A Template

Put the Title of the Lesson Here

A WebQuest for xth Grade (Put
Subject Here)

Designed by

Put Your Name Here

Put Your E-mail Address Here

Put some interesting graphic representing the content here

[Introduction](#) | [Task](#) | [Process](#) | [Evaluation](#) | [Conclusion](#) | [Credits](#) | [Teacher Page](#)

Introduction

This document should be written with the student as the intended audience. Write a short paragraph here to introduce the activity or lesson to the students. If there is a role or scenario involved (e.g., “You are a detective trying to identify the mysterious poet.”) then here is where you’ll set the stage. If there’s no motivational intro like that, use this section to provide a short advance organizer or overview. Remember that the purpose of this section is to both prepare and hook the reader. It is also in this section that you’ll communicate the Big Question (Essential Question, Guiding Question) that the whole WebQuest is centered around.

The Task

Describe crisply and clearly what the end result of the learners’ activities will be. The task could be a:

- problem or mystery to be solved;
- position to be formulated and defended;
- product to be designed;
- complexity to be analyzed;
- personal insight to be articulated;
- summary to be created;
- persuasive message or journalistic account to be crafted;
- a creative work, or

- anything that requires the learners to process and *transform* the information they've gathered.

If the final product involves using some tool (e.g., HyperStudio, the Web, video), mention it here. Don't list the steps that students will go through to get to the end point. That belongs in the Process section.

The Process

To accomplish the task, what steps should the learners go through? Use the numbered list format in your web editor to automatically number the steps in the procedure. Describing this section well will help other teachers to see how your lesson flows and how they might adapt it for their own use, so the more detail and care you put into this, the better. Remember that this whole document is addressed to the student, however, so describe the steps using the second person.

1. First you'll be assigned to a team of 3 students...
2. Once you've picked a role to play...
3. ... and so on.

Learners will access the on-line resources that you've identified as they go through the Process. You may have a set of links that everyone looks at as a way of developing background information, or not. If you break learners into groups, embed the links that each group will look at within the description of that stage of the process. (Note, this is a change from the older WebQuest templates which included a separate Resources section. It's now clear that the resources belong in the Process section rather than alone.)

In the Process block, you might also provide some guidance on how to organize the information gathered. This advice could suggest to use flowcharts, summary tables, concept maps, or other organizing structures. The advice could also take the form of a checklist of questions to analyze the information with, or things to notice or think about. If you have identified or prepared guide documents on the Web that cover specific skills needed for this lesson (e.g. how to brainstorm, how to prepare to interview an expert), link them to this section.

Evaluation

Describe to the learners how their performance will be evaluated. Specify whether there will be a common grade for group work vs. individual grades.

	Beginning 1	Developing 2	Accomplished 3	Exemplary 4	Score
Stated Objective or Performance	Description of identifiable performance characteristics reflecting a	Description of identifiable performance characteristics reflecting	Description of identifiable performance characteristics reflecting	Description of identifiable performance characteristics reflecting the	

	beginning level of performance.	development and movement toward mastery of performance.	mastery of performance.	highest level of performance.	
Stated Objective or Performance	Description of identifiable performance characteristics reflecting a beginning level of performance.	Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.	Description of identifiable performance characteristics reflecting mastery of performance.	Description of identifiable performance characteristics reflecting the highest level of performance.	
Stated Objective or Performance	Description of identifiable performance characteristics reflecting a beginning level of performance.	Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.	Description of identifiable performance characteristics reflecting mastery of performance.	Description of identifiable performance characteristics reflecting the highest level of performance.	
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Stated Objective or Performance	Description of identifiable performance characteristics reflecting a beginning level of performance.	Description of identifiable performance characteristics reflecting development and movement toward mastery of performance.	Description of identifiable performance characteristics reflecting mastery of performance.	Description of identifiable performance characteristics reflecting the highest level of performance.	
Stated Objective or Performance	Description of identifiable performance characteristics	Description of identifiable performance characteristics	Description of identifiable performance characteristics	Description of identifiable performance characteristics	

Performance	reflecting a beginning level of performance.	reflecting development and movement toward mastery of performance.	reflecting mastery of performance.	reflecting the highest level of performance.	
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Conclusion

Put a couple of sentences here that summarize what they will have accomplished or learned by completing this activity or lesson. You might also include some rhetorical questions or additional links to encourage them to extend their thinking into other content beyond this lesson.

Credits & References

List here the sources of any images, music or text that you're using. Provide links back to the original source. Say thanks to anyone who provided resources or help. List any books and other analog media that you used as information sources as well.

(to play a sound automatically, place a wav file in your folder labeled sound.wav)

Last updated on August 15, 1999. Based on a template from [The WebQuest Page](#)

This template can be found at the following web site:

<http://www.esc20.net/etprojects/templates/twebquests.html>

A WebQuest About WebQuests

Middle School / High School Version

by [Bernie Dodge](#)

Introduction

Since early in 1995, teachers everywhere have learned how to use the web well by adopting the [WebQuest](#) format to create inquiry-oriented lessons. But what exactly is a WebQuest? What does it feel like to do one? How do you know a good one when you see it? In the space of 90 minutes, you're going to grapple with these questions and

more.

The Task

To develop great WebQuests, you need to develop a thorough understanding of the different possibilities open to you as you create web-based lessons. One way for you to get there is to critically analyze a number of webquest examples and discuss them from multiple perspectives. That's your task in this exercise.

By the end of this lesson, you and your group will answer these questions:

1. Which two of example WebQuests listed below are the *best* ones? Why?
2. Which two are the *worst*? Why?
3. What do *best* and *worst* mean to you?


Resources


Here are the sites you'll be analyzing:

- [The Titanic: What Can the Numbers Tell Us?](#) - Use spreadsheets and a database to seek the truth
- [Gallery of Art-i-Facts](#) - Design an art museum wing and select non-Western art to fill it
- [Conflict Yellowstone Wolves](#) - Take a stand on the reintroduction of wolves to Yellowstone
- [The Gilded Age](#) - Create a documentary on this historical period
- [Extra, Extra... Read All About It](#) - Analyze the world of the Great Gatsby

The Process

1. First, each participant will have a hard copy of [the worksheet](#). To answer the questions given above, you'll break into groups of four. Within the group, each of you will take on one of the following roles:

 **The Efficiency Expert:** You value time a great deal. You believe that too much time is wasted in today's classrooms on unfocused activity and learners not knowing what they should be doing at a given moment. To you, a good WebQuest is one that delivers the most learning bang for the buck. If it's a short, unambitious activity that teaches a small thing well, then you like it. If it's a longterm activity, it had better deliver a deep understanding of the topic it covers, in your view.

 **The Affiliator:** To you, the best learning activities are those in which students learn to work together. WebQuests that force collaboration and create a need for discussion and consensus are the best in your view. If a WebQuest could be done by a student working alone, it leaves you cold.



The Altitudinist: Higher level thinking is everything to you. There's too much emphasis on factual recall in schools today. The only justification for bringing technology into schools is if it opens up the possibility that students will have to analyze information, synthesize multiple perspectives, and take a stance on the merits of something. You also value sites that allow for some creative expression on the part of the learner.



The Technophile: You love this internet thang. To you, the best WebQuest is one that makes the best use of the technology of the Web. If a WebQuest has attractive colors, animated gifs, and lots of links to interesting sites, you love it. If it makes minimal use of the Web, you'd rather use a worksheet.

2. Individually, you'll examine each of the sites on the list of resources and use the worksheet to jot down some notes of your opinions of each from the perspective of your role. You'll need to examine each site fairly quickly. Don't spend more than 10 minutes on any one site.
3. When everyone in the group has seen all the sites, it's time to get together to answer the questions. One way to proceed would be to go around and poll each team member for the best two and worst two from their perspective. Pay attention to each of the other perspectives, even if at first you think you might disagree with them.
4. There will probably not be unanimous agreement, so the next step is to talk together to hammer out a compromise consensus about your team's nominations for best and worst. Pool your perspectives and see if you can agree on what's best for the learner.
5. One person in each group should open up SimpleText or Inspiration to record the group's thoughts.
6. When debriefing time is called, use this file to speak from as you report your results to the whole class. Do you think the other groups will agree with your conclusions?

Conclusion

Ideally, this exercise will provide you with a larger pool of ideas to work with on your final project. The best WebQuest is yet to be written. It might be yours!

Written by [Bernie Dodge](#). Last updated on April 29, 2001

This WebQuest about WebQuests can be found at the following web site:

BAT QUEST

IN SEARCH OF STELLALUNA



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YOUR TASKS

PROCESS

EVALUATION

CONCLUSION

RESOURCES

TEACHER PAGE

<http://projects.edtech.sandi.net/chavez/batquest/stella.html>

[Danice Von Feldt-Vo](#)

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Introduction

Stellaluna became lost from her mother when she was a baby. She did not get a chance to learn about who she was. Stellaluna feels very sad because she is not like her bird friends. Stellaluna is a very unique mammal with special gifts.

Let's help Stellaluna learn more about being a bat. It will be your quest to learn the facts about bats. You can help teach Stellaluna and others about the special qualities of being a bat.

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Your Tasks

After reading the book, work alone or with a partner to find out more information about bats. You will investigate:

- the different types of bats
- how bat mothers care for their babies
- echolocation
- unique bat characteristics
- why bats are important to the world



The Process: You will have five different jobs before you become a super bat expert. Click on any of these tasks in any order. Download the task sheets, they will help you learn.

- [Different Types of Bats](#)
- [Bat Families](#)
- [Bat Echolocation](#)
- [Bat Characteristics](#)
- [Letter to Stellanuna](#)



1. Stلالuna is one type of bat, a megabat. Bats can be first classified into two groups, megabats and microbats. Then there are several different types of bats within these two groups. Choose who will investigate the megabats and who will investigate the microbats. Click on the paper for your task sheets and click on the megabat and microbat buttons for more information.



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2. Stلالuna had a loving mother. You will work with your partner and complete the assignment together. Your job is to find out how bat mothers care for their babies until they are able to be on their own. Click on the mother bat for information and the baby bat for the task sheet.



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3. Bats can fly at night and not get hurt. Investigate their special gift called echolocation. Your job is to discover how echolocation works. Could you use echolocation to see in the dark like bats do? Click on the bat to find out. Click on the paper for your task sheet.



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4. Bats are unique mammals. Discover all about their special traits and how they help our world.

After you become a "Bat Master", investigate why people are afraid of bats. How could you change the minds of people who are afraid of bats so they might like bats?



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5. Write a letter to Stellanuna and explain to her why she is so special. This is your opportunity to show that you are a bat expert!



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Evaluation

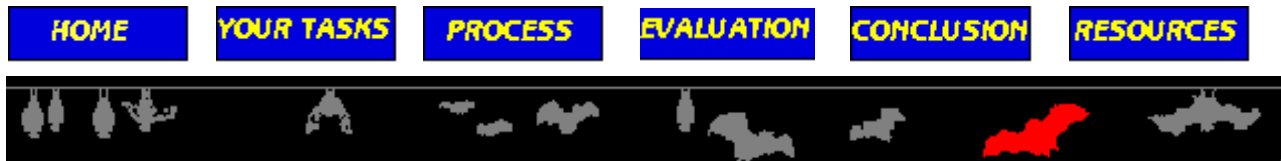
You and your partner can earn up to 75 points on this webquest. You will find a graphic organizer to complete tasks 1, 2, 3, 4, and 5. Each task can earn up to 10 points. The letter to Stellanuna is

most important! You can earn up to 25 points. Each task has a graphic organizer, directions and grading rubric. You can decide how many points you can earn. You will help grade your own work.

65-75 points	54-64 points	47-53 points	40-46 points
Excellent work! You're a whiz kid and bat expert, keep it up!	Great work! You really know your bat facts, bat master.	Very Good work! You have helped Stellanuna be proud	Good work! Now go out there and teach others about bats.

✿Remind your teacher to give you the "[Certificate of Accomplishment](#)" after you complete this webquest, you deserve it!

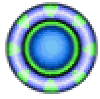
Note: In Windows click on the link with the right mouse button select "Save Target As..." to download. In MacOS, put your mouse cursor over the link, then hold the mouse button down for few seconds and you will see a popup menu. Select the choice "Save Image as..." from that menu to download.



Conclusion

Now that you have become a bat expert, visit these fun and exciting sites. You can learn even more about bats or play bat games and make bat

art. Maybe you would like to build a bat house in your backyard!



Crossword
Puzzle



Stellaluna on line



Bat Quiz

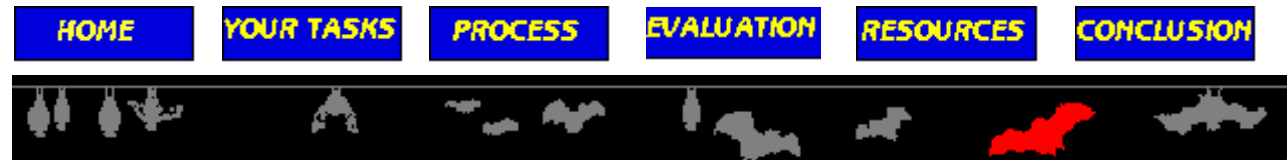


Build A Bat House



Bat Games

Based on a template from [The Webquest Page](#).



Resources

If you just can't get enough of bats, keep on learning. Visit your local library and check out these books:

Also, visit these excellent sights.

Basically Bats Home: <http://karst.lads.com/BasicallyBats/index.html>

Bat World: <http://www.saluki.com/bats/>

Bats, Bats Everywhere: <http://members.aol.com/bats4kids/index.htm>

Bats as Kids: <http://members.aol.com/obcbats/batsaskids.html>

Bats are Beaut: <http://users.mildura.net.au/users/dgee/>

Enjoy!

Last updated October 2, 1999

BioDesigns, Incorporated

(a genetic engineering project)

[Notes to the Teacher](#)



IT'S ALIVE!!

You are a part of a four person genetics engineering team, working for BioDesigns, Inc. The president of BioDesigns, Ms. Bio, calls a meeting for all engineers.

"This company has been losing money steadily for the last 18 months! We haven't had a money making idea since we invented the seedless watermelon. If we don't have a product on the market within 6 months, we're going to be out of business!"

She then further states that your team has to invent a new, revolutionary, money-making, genetically engineered product, or start looking for new jobs. Your team members include: a geneticist, a biologist, an environmentalist/lawyer, and a economist/ethicist.

The Task

You need to invent a genetically engineered product and then summarize all of your findings and research in a report to Ms. Bio. Answer these questions in your report:

- What plant/animal are you going to genetically alter?
- How will this affect the plant/animal?

- What gene will you have to alter to do this?
- How will this alter the plant/animal's habitat?
- How will this alter the plant/animal's life systems?
- What will be the new scientific name of your species, and where will it fit in the classification of species?
- How will this alteration affect the economics of production, manufacture, or distribution of the product?
- How will this alteration affect the environment?
- What are the ethical ramifications of this alteration?
- How will this alteration be financially profitable?

Include sketches/charts/graphs to help explain your answers to these questions.

The Process

To accomplish this task, consider the following steps:

1. Identify the plant/animal to alter. This may take some brainstorming on your part.
2. Research the plant/animal's genetic structure so you know what gene to change.
3. Research the plant/animal's current structure, and habitat. Research similar plants/animals to decide how your genetic change will affect either or both of these.
4. Research the production and distribution of the product(s) which your plant/animal will be used for. Decide how your genetic change will affect these processes, if at all.
5. Research the environmental impact of your genetic change. Will it change the environment where the plant is grown or the animal is raised? Will it change the environment where the product is manufactured or distributed? Will it change the environment where the product is used?
6. Research the ethics of what you are doing. Is BioDesigns, Inc. going to have trouble getting this alteration approved by the government? Remember, bad publicity could make the profit on this product negligible.
7. Finally, the really, really big question: will this alteration be financially profitable? Research the amount of money that could be made from this genetic alteration. (If you alter something that only five people buy per year, it's probably not worth all of the engineering that will go into it)

Learning Advice

To have a good report for Ms. Bio, you need to be very complete with your information. Make sure you answer all of the questions as fully as possible. Draw sketches of the plant/animal's new physical structure, new internal structure, and new habitat. You can present using a variety of methods; for example: multimedia, role playing, triptychs, video.

In a team of four, you probably want to each take one of the roles given in the introduction. The environmentalist is also a lawyer, and the economist is also an ethicist. As each of you does your research, keep the following advice in mind:

Geneticist: You are going to want the group to invent something that is feasibly possible.

Biologist: You are going to make sure that the group is fully aware of the changes to the habitat and structure of the organism which will be wrought by your decision.

Environmentalist: You will want there to be a minimal negative impact on the environment due to this change. A positive impact on the environment would be even better for you.

Lawyer: We can't break any laws, right?

Economist: You are going to want the group to invent a money-making idea.

Ethicist: You will want the group to be informed on the ethics regarding this alteration.

Resources

Internet Resources:

[Agricultural Genome Information Server \(AGIS\)](#) consists of genome information for agriculturally important (mostly crop and livestock animal species). Some non-commodity species are included as well.

[Biological, Agricultural & Medical Infomine](#) is maintained by U.C. Riverside and includes databases, electronic journals, electronic books, bulletin boards, listservs, online library card catalogs, articles and directories of researchers, among many other types of information.

[BONAP/MIP Botanical Checklist of North America Browser](#) is a searchable database of the flora of North America which can be searched by common name or scientific.

[California Flora Database](#) contains geographic and ecological distribution information for 6,717 California vascular plant taxa, as well as additional habitat information for rare taxa and species of the Sierra Nevada.

[Ethics Center for Engineering & Science](#), located at MIT, is funded by the National Science Foundation. The mission of the Ethics Center is to provide engineers, scientists, science and engineering students with resources useful for understanding and addressing ethically significant problems that arise in their work life.

[Genetic Databases](#) is maintained by the Illinois State Academy of Science and contains selected bird and mammal catalogs, as well as links to other databases.

[Genetics and Ethics Home Page](#) is located at the University of Montreal and contains links to public action groups, legal issues, and more.

[Glossary of Genetics](#) is modified from definitions in the U.S. Congress Office of Technology Assessment document: Mapping Our Genes The Genome Projects: How Big, How Fast?

[IISDnet](#) is the home page of the International Institute for Sustainable Development and promotes development that improves economic efficiency, protects and restores ecological systems and enhances the well-being of people.

[Kingdom Animalia](#) is part of The Animal Diversity Web and is a collection of pictures and information about animals. Information is arranged in a taxonomic hierarchy.

[MedWeb: Bioethics](#) has links grouped by topic, including "genetics and molecular biology".

[Molecular Genetics Jump Station](#) has many links for the molecular geneticist.

[Plant Gene Register Index](#) is maintained by the American Society of Plant Physiologists and is searchable.

[Plant Genome Data and Information Center](#) provides access to a variety of information products and services on all aspects of plant and animal genome mapping.

[The Center For Bioethics](#) has links to advance scholarly and public understanding of ethical, legal, social and public policy issues in health care.

[The Vegetation of Lobo Point and North Wild Horse Mesa, Eastern Mojave Desert, San Bernardino County](#) is a study done to develop a description of the vegetation at these two sites, and relate it to local and regional vegetation. Limited in area, but very complete.

[The World-Wide Web Virtual Library: Biodiversity, Ecology, and the Environment](#)

[The World-Wide Web Virtual Library: Botany](#)

[The World-Wide Web Virtual Library: Environment](#)

[The World-Wide Web Virtual Library: Forestry](#)

[The World-Wide Web Virtual Library: Genetics](#)

The WWW Virtual Library Project was started at CERN in 1991. Presently, the WWW Virtual Library is maintained by volunteers. All sections of it include extensive lists of resources

[U.S. Environmental Protection Agency](#) contains US environmental law, among other things.

[U.S. Food and Drug Administration](#) contains information on human and animal drugs, foods, toxicology, biologics, and more.

[Yahoo! - Science:Agriculture](#)

[Yahoo! - Science:Biology](#)

[Yahoo! - Science:Biology:Molecular Biology:Genetics](#)

Yahoo! is an Internet search engine that also include pre-made lists on a variety of subjects.

You can always search for more resources yourself. Some of the keywords that were used to find the sites above include: genes, genetics, genomes, ethics, biology, science, botany, agriculture, database, classification, and environment. Here are some Internet search engines to use:

[INFOSEEK GUIDE](#)

[EXCITE](#)

[ALTAVISTA](#)

[LYCOS](#)

[YAHOO!](#)

[MAGELLAN](#)

Evaluation

You will be evaluated on the quality of your research, reasoning and presentation. You need to answer as many of the questions posed as possible, with as much detail as possible. You will also be evaluated on the practicality of your invention.

Here are some points to keep in mind as your present your report:

- Did you identify what plant/animal you altered?
- Did you identify what difference to the plant/animal your alteration would make?

- Did you identify what gene you altered?
- Did you describe with words and sketches how the structure and function of the the plant/animal would be changed?
- Did you describe with words and sketches how the habitat of the plant/animal would be changed?
- Did you create a new scientific name for your plant/animal?
- Did you place your new name in the classification of species and give reasons for that particular placement?
- Did you describe how the genetic alteration would affect the production, manufacture, or distribution of the product?
- Did you describe the effects of this alteration on the environment, either at the habitat, at the manufacturing site, or at the customer site?
- Did you include discussion on the ethical ramifications of your alteration?
- Did you describe how this genetic alteration is going to be profitable?
- Did you use sketches, graphs, charts, video, etc., throughout your presentation to make your points more clearly?

Reflection

How do you feel about the ethical implications of genetic engineering?

Conclusion

After hearing all of the "engineering teams" present their ideas, which do you think is the most realistically possible? On the other hand, which one would be the most financially profitable, regardless of the practicality of the genetic alteration involved. On the third hand (we are talking about genetic alteration, right?), which one would cause the most controversy if it were introduced?

Extension

In the future, genetic engineering will probably become fairly common. What new laws do you think will have to be passed in the future regarding genetic engineering? Also, how will genetic engineering affect the traditional classification of species?

Notes to the Teacher

Lesson Title: BioDesigns, Incorporated (a genetic engineering project)

Curricular Area: Life Sciences

Goal/Purpose: Students will:

- apply the classification of species to an organism
- apply knowledge of genetic and chromosomal structures
- infer changes to habitat and structure of an organism due to genetic changes
- relate scientific knowledge to information from other disciplines
- communicate and work effectively as a team
- communicate scientific ideas and supporting details clearly

Grade Level: 10-12

Length of Lesson: Five to ten class periods, not necessarily consecutive.

Materials: presentation materials of choice

Interdisciplinary Connections: Economics, Ethics, Law, Environmental Science

Teacher Resources:

Science Framework for California Public Schools, California Department of Education, Sacramento, 1990.

[What are some strategies for helping students work in groups?](#) is a well-researched section of "Perspectives of Hands-On Science Teaching", and is about group work in the science classroom.

[What Does Research Say About Science?](#) is an essay published through the North Central Regional Educational Laboratory and focuses on the new directions science classrooms should be going.

[Selected Procedures for Improving the Science Curriculum](#) is an ERIC/SMEAC Science Education Digest. It discusses the current emphases in science education and the related factors influencing science curriculum.

Prerequisite Learning: basic chromosome, DNA, and gene knowledge; basic classification of species knowledge; structures and functions of living things; effective group interaction

Suggestions:

- Consider having your economics teacher, ethics teacher, and/or earth science teacher come to your class as "guest lecturers" to share their expertise.
- Consider giving out the project on the first day in paper format and having students form teams, decide on what organism to alter, and decide how they're going to do their research. Then on the second day, begin with the Internet. My rationale behind this advice is that the students need time to do their team building and decision-making, without the distraction of the computers. Also, without this day of planning, students will be researching without a clear idea of what they are looking for.

Written by [Cynthia Robinson](#), Teacher On Assignment, Chino Unified School District

itdc		curriculum	staff	student
home			development	projects

Questions, comments, and suggestions may be addressed to: itdc@sbcss.k12.ca.us