Technology, Techniques, and Tips from Top Teachers.

Project-based Learning: An Introduction

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What is PBL?

Using projects
to enhance student learning
and facilitate the development
of "real-world" skills.

Some Characteristics of PBL

Student-centered learning

Faculty's role is facilitator

Engagement through solving "real-world" problems

Emphasis on development of 21st Century skills

http://bie.org/about/what_pbl
http://www.edutopia.org/pbl-research-learning-outcomes

What are 21st Century Skills?

Critical thinking & problem solving

Application of knowledge

Collaboration

Innovation

Communication skills

Technology skills

Self-direction and Adaptability

Research methodology

Project management

Leadership

Top Ten Things
Employers Look for
in New College Graduates

The ability to **work well in teams**—especially with people different from yourself

An understanding of science and **technology** and how these subjects are used in **real-world settings**

The ability to **write and speak well**

The ability to think clearly about complex problems

The ability to **analyze a problem** to develop workable solutions

An understanding of global context in which work is now done

The ability to be **creative and innovative in solving problems**

The ability to **apply knowledge and skills** in new settings

The ability to understand numbers and statistics

A strong sense of ethics and integrity

From the Association of America Colleges and Universities
(http://www.aacu.org/leap/students/employerstopten.cfm)

What are some Examples of PBL Projects?

Virtual Enterprise

Students form virtual companies to learn about topics like:

Product Development

Marketing

Human Resources

Corporate Organization

Financial Markets

Entrepreneurship

(http://www.ive.cuny.edu/index.php)

Cash for your Clunker

The US government is offering a $3500 or $4500 value towards the purchase or lease of a new car if you trade-in your clunker. Students will investigate this promotion and determine if it is just too good to be true. They must also determine if it is better to purchase or lease the new vehicle.

Catch the Fever

Students investigate the role of microorganisms in causing disease. They also study the impact of a public health infrastructure, along with medical and pharmaceutical advances, on the evolution of microorganisms.

What are Challenges to using PBL?

Coming up with projects

Motivating students

Investing a lot of time

Getting help

Getting Started

Brainstorm with colleagues on possible projects

Involve students in suggesting and defining projects for the course

Reach out to industry or community for support

Build on projects incrementally over time

Ask students to search for a job and learn the skills employers want new employees to have

Investigate tools like Prezi, Google Apps, WordPress

Resources

Buck Institute for Education (BIE) Resources on Project-based Learning (http://bie.org/)

NEA Spotlight on Project-based Learning (http://www.nea.org/tools/16963.htm)

EDUTOPIA Project-based Learning Research (http://www.edutopia.org/pbl-research-learning-outcomes)

Center for Learning and Teaching (http://clt.odu.edu)

Brainstorming Instructions

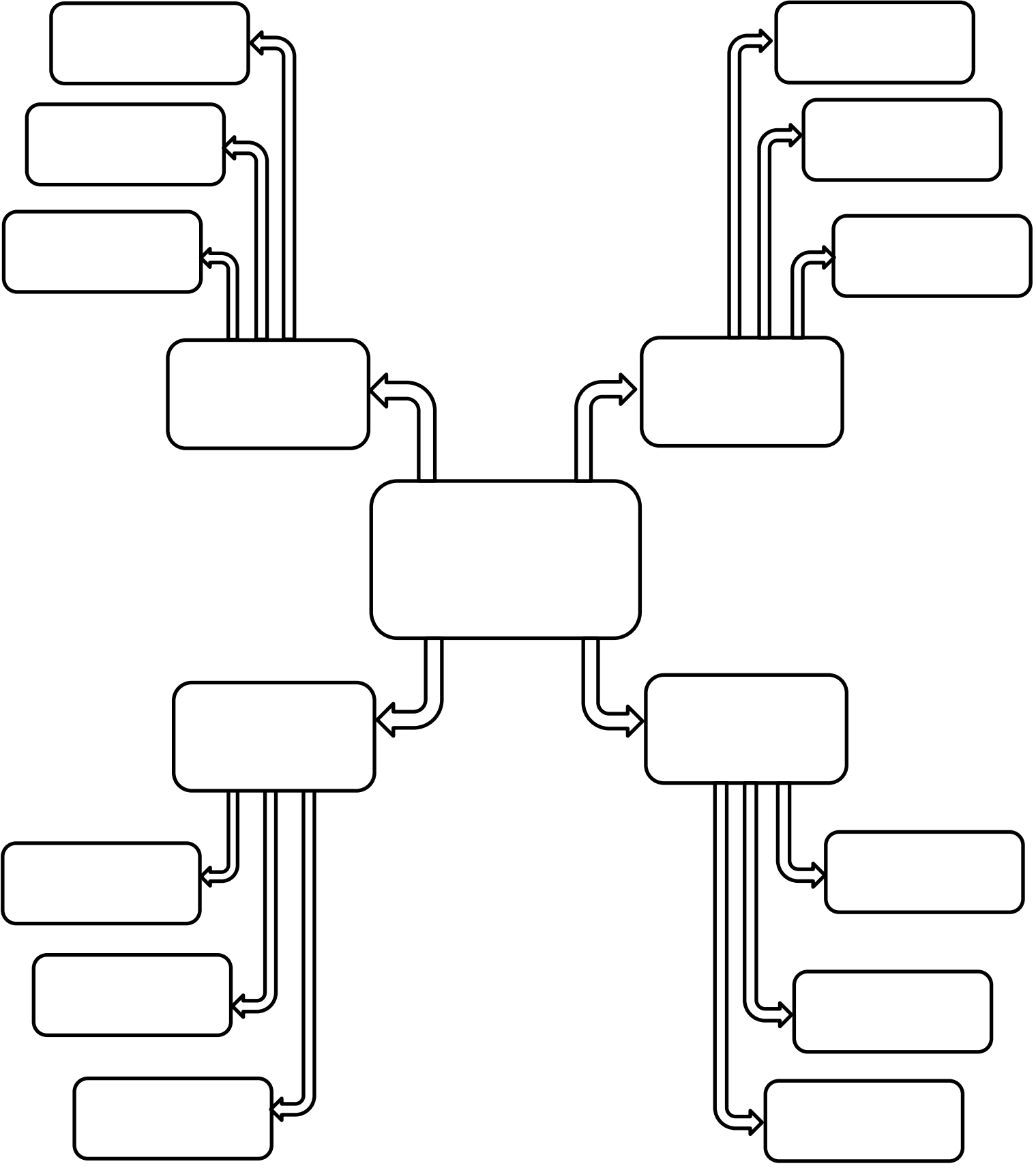| Worksheet	Instructions
Blank Page	Uses: General brainstorming
	This flexible approach supports most types of brainstorming techniques. Begin by writing down your topic, concept, or challenge, and then use any combination of approaches such as mind mapping, outlines, doodling, storyboarding, etc. to document your ideas. Continue to add every idea that you can come up with and then see which words reinforce each other or lead to new ideas.
Two-Tier Mind Map	Uses: General brainstorming
	This approach provides a template to do basic mind mapping. Begin by adding the topic, idea, or challenge to center shape of the mind map. Starting brainstorming about specific ideas or concepts that apply to the central topic and add your thoughts to the next level of shapes. After adding four unique ideas, expand on each with more details or proposed solutions.
Compare and Contrast	Uses: General brainstorming to compare options or ideas
	Define two possible solutions or ideas that you want to compare. Above the "Option 1" and "Option 2" columns of the worksheet, add brief titles for each idea or solution.
	Next add either challenges or characteristics that might apply if you choose either of your options. List these in the "Challenge/Characteristic" column. Example characteristics or challenges could be cost, time to complete project, relevance to course objectives, etc.
	For both columns "Option 1" and "Option 2", add the relevant challenge or characteristic that applies to each option.
	Use the resulting comparisons to refine your options, select one, or possibly move to another idea.
Analytical	Uses: General brainstorming to compare pros and cons of solutions or ideas
	Begin by adding any of the different ideas that you have into separate rows of the "Option" column of the worksheet. As an example, these ideas could be proposed project ideas for a course.
	Next add potential pros and cons to each of the ideas to their respective "Pros" and "Cons" column.

	Compare the pros and cons for all of the ideas to refine, select or move forward.
Think, Pair, Share	Uses: General brainstorming in pairs or groups
	This worksheet is designed for two individuals but it can be used in groups with more members.
	On their individual worksheet, each member adds the specific ideas and challenges to investigate to the "Topic" column of the worksheet.
	While still working individually, each member adds their own thoughts on how to address the topic in the "My Thoughts" column of their own worksheet.
	After a brief time, the members work as a team to review each other's ideas and add notes from the other members to the "Other's Thoughts" column of the worksheet.
	Finally the group decides as a team which ideas they will share with the rest of the class. While items to share would likely be common ideas from the team members, the group discussion also allows members to refine their ideas. Document these in the "Thoughts to Share" column.
KWL	Uses: Planning and reflection on learning a new topic or skill
	The brainstorming activity spans the period before and after a project or task has been completed.
	Before beginning a task, add a list of items that you already understand about the topic in the "What do I know?" column of the worksheet.
	Next add a list of items that you would like to learn during the task into the "What do I want to know?" column.
	Save your worksheet.
	After completing the task, list what you have learned from completing the task in the "What did I learn column".
Project Ideas	Uses: Brainstorming to develop project concepts for a course
	List some course objectives from your class in the "Course Objectives" column of the worksheet.

	Next list potential project ideas that would allow students to meet the course objectives in the "Project Ideas" column of the first table. Now list real-world skills that your students should be able to demonstrate after completing the course in the "Real-world skills to learn" column of the second table. For each real-world skill, list potential projects that would help students master those skills in the "Project Ideas" column of the second table. Finally, look for common project ideas between the two tables.

Challenge/Characteristic	Title 1: Option 1	Title 2: Option 2

Option	Pros	Cons

Think, Pair, Share - Brainstorming Worksheet

Topic	My Thoughts	Other's Thoughts	Thoughts to Share

What do I know?	What do I want to know?	What did I learn?

Course Objectives	Project Ideas

Real-world skills to learn	Project Ideas