

PBL @ Willowick Middle



Project Based Learning
Problem Based Learning
STEM
Capstone Development

What is PBL?

PBL can stand for one of two things:



Project Based Learning

or

Problem Based Learning



Project Based Learning

In **PROJECT** Based Learning, students work on a specific, larger-scale challenge.

Often the final product is a piece of technology that solves a problem.

Or the product meets certain requirements or parameters.

The final product may also be a presentation or a proposal.



Problem Based Learning

In **PROBLEM** Based Learning, students need to figure out how or why something works.

A simple example could be something like an algebra problem

More complex, it can be inquiry-based.

Students are presented with a scenario they don't understand, but need to explain.

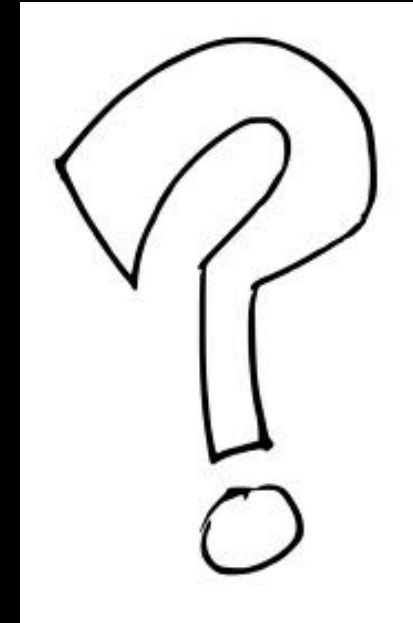
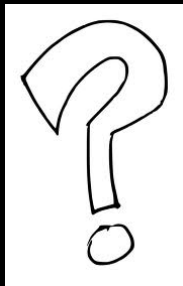
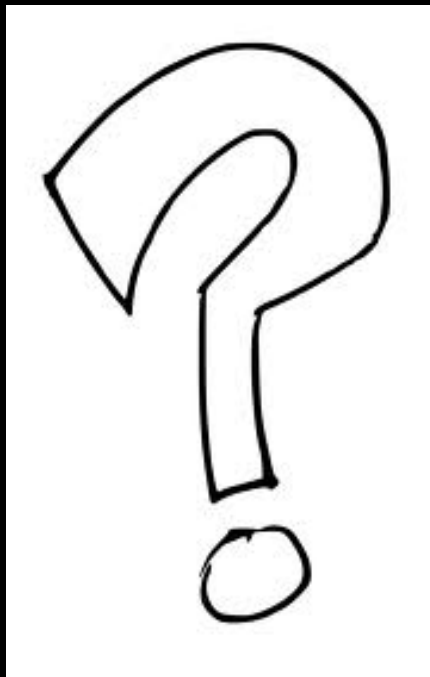
Often, problem based learning requires students to meet the challenge of a project based activity.



Why PBL?

Working on a PBL offers students the opportunity to immediately apply the academic standards they are learning rather than waiting years to use them.

Many PBL's also require students to apply knowledge from different subject areas at once, allowing them to learn the academic standards in an integrated rather than compartmentalized way.



History of PBL @ WWK

2012-2013



WWK introduced its Science Academic Challenge (SAC).

2013-2014



WWK enhanced its Science Academic Challenge by adding a Mathematics component (SMAC).

2014-2015



In addition to SMAC, design challenge activities were introduced in all 8th grade science classes.

2015-2016



In addition to SMAC and design challenges, our first project based learning opportunity is being introduced to all Willowick Middle students.

Science Academic Challenge (SAC)

Optional, after-school program offered to 8th grade students

Each of the 6 sessions focuses on a different science topic.

Students work in teams to engineer a piece of technology to meet the requirements of a challenge.

Average participation in 2012-2013 was about 80 students.

In 2013-2014, it was about 110 students.

In 2014-2015, it was more than 140 students.

The program will be offered again in the Spring of 2016.

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Science & Math Academic Challenge (SMAC)



Some Past SMAC Topics

Water Pressure Bottle Rockets

Balloon-Powered Race Cars

Making Cream Cheese

Egg Drop

CSI: Fingerprints/Handwriting

Pendulums

Marble Roller Coaster

Logic Amazing Race

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Design Challenges

Beginning last year, ALL 8th grade Science students participated in design challenges in their regular scheduled classes.



- Similar to SMAC program
- 1-2 challenges per month
- Sometimes also requires research in addition to Math and Science

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Teacher Training in PBL



Willowick Middle School currently has the most STEM and PBL trained staff in the district (second only to the School of Innovation).

THREE TIES-trained School of Innovation Staff Members

SIX PBL-trained staff

3-day PBL training @ at Inventor's Hall of Fame School

ALL teachers 2 PBL training sessions

Also hosted by Inventor's Hall of Fame Staff

What is a Capstone Project?

A capstone project is an enhanced PBL.

A larger challenge that is posed to the students.

It may require multiple problem-based and/or project-based activities.

It lasts longer than a typical 1-2 day design challenge.

Can last from 2 weeks to 2 months,
depending
on size of the challenge.

Different learning standards that are relevant
to the completion of the project are taught in
each subject area.

Often, students are required to work in teams.



Capstone Projects @ WWK this year.

ALL Willowick students will participate in at least one PBL/Capstone project during the 2015-2016 school year.

For our first capstones, most will last about 2 to 3 weeks.

Each grade level be offered a different challenge.



6th Grade Capstone

Monday, November 23rd through Friday, December 18th

They're calling it *Finding the Flu*.

The big question: **What healthy measures or behaviors can we incorporate in school to increase attendance during flu season?**

The staff is meeting Wednesday, November 18th to film their **roll out**.

The students' final projects will be to make a **Public Service Announcement** that helps answer the big question.

Some subject area connections include:

Science - Cells and Bacteria

ELA - Synthesize research from all subjects' content & assemble

PSA's



7th Grade Capstone

In September, students were given a survey.

They indicated a capstone topic that would be of interest to them.

Students are going to look at new options for extracurricular activities.

To offer more variety that appeals to more students' interests.

Some aspects students need to consider include

Describe the activity.

Explain how the activity is implemented by other schools.

Gauge Willowick students' interest level in these activities.

Logistics, materials needed, costs, how many teaching staff

needed

The final project is a proposal students will make to Ms. Rodman.

8th Grade Capstone

They will look at affordable ways to keep Willowick Middle cool on hot days.

Some aspects students need to consider include:

Explaining the problem in a quantitative way.
Classroom Temperatures, Nurse Visits, Absences

Health risks from exposure to excessive heat.

Propose solutions to keep the building cool.
A/C, ceiling fans, planting tall bushes or shade trees

Logistical considerations

Costs of implementation, maintenance, etc.

Estimated effectiveness of the solution

The final product: proposal made by students to an administrator

