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99 Problems? PBL Can Help

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Introduce Yourselves! (On Name tags)

- Name
- Grade and Subject you teach/focus
- What is one thing you learned to do really well in life?

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Problem Based Learning

a ***student-centered, inquiry based*** instructional approach utilizing a ***real-world, ill-defined (messy)*** problem to both introduce and explore specific content.

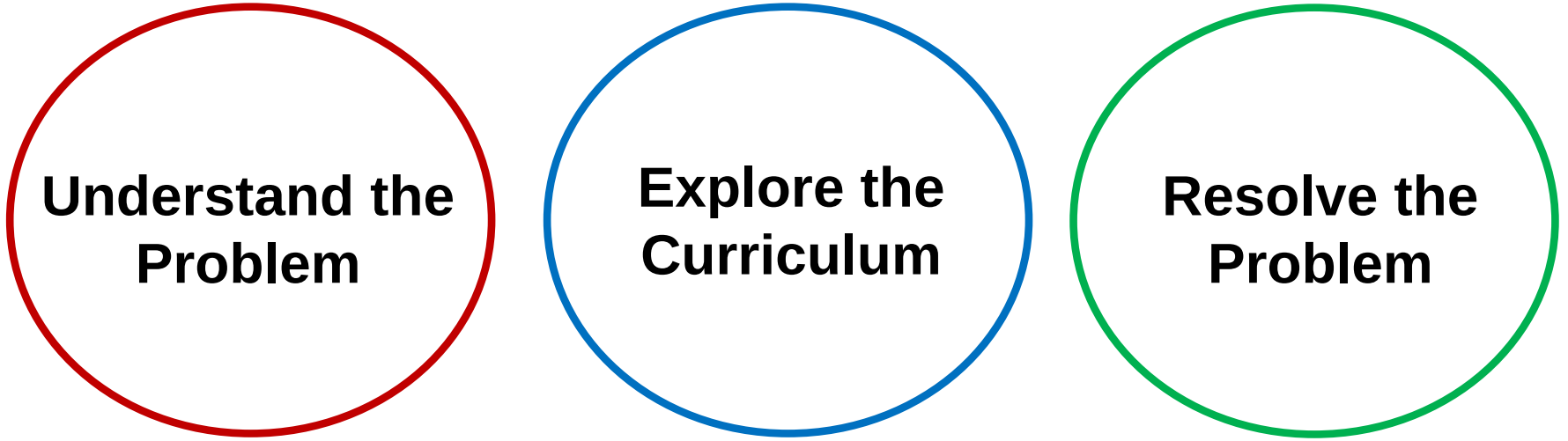
Defining Problem Based Learning

- ***Student-Centered:*** *students chart their own course of learning, with the responsibility for learning centered on the student and not on a teacher's instruction.*

- ***Inquiry-Based:*** *student learning is facilitated through questioning and through the development and exploration of their own questions, not through direct instruction.*

- ***Ill-Defined, Messy Problem:*** *Real-world problems are typically integrative. There are multiple possibilities for solutions, and multiple routes for exploration of the content.*

Steps of a PBL
(Student Perspective)



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Let's Experience PBL

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Immerse in the Student Experience

Dear students,

I am [*place personal information here*].

I have heard that you are studying water and habitats in your classes, and I would like your help with a related issue that affects the Chicago region. Beach closures due to low water quality have been a long-standing problem in Illinois. In 2012, a reported 33 out of 40 beaches that were monitored had instances of beach actions (either contamination advisories or closures). During the swim season, these closures and advisories affect the general economy. Summer beach activity generates approximately $35 a day per individual, which has been estimated to result in an economic loss of approximately $37,000 a day.

While the economic side is important to the city, the environmental state of the lake is the larger concern. Water conditions are currently monitored by assessing various water quality measurements, such as the levels of E.Coli bacteria, clarity, pH levels, etc. Several water quality pollutants can cause health issues. Also, bacterial growth can be impacted by other pollutants and can affect not only the human population, but also the organisms that live in and depend upon the water in this Great Lake.

There may be multiple reasons for the increase of harmful pollutants in this water habitat, but we have yet to identify the exact source or sources of pollution. We are curious to understand the conditions that lead to the pollution of the lake.

As we currently are struggling to identify the sources of pollution to the water habitat, we are at a loss as to how to prevent it from reoccurring. We need help in determining from where the pollution might arise. Finding appropriate solutions to prevent, or decrease, the effects of this pollution on our lake and beach habitats is important, as well. Any help that you and your classmates can offer with this obstacle is greatly appreciated. I will be available to see and hear your assessments and solutions on [redacted]

Thanks for your help with this problem.

Please read along with the copy of the letter provided to you

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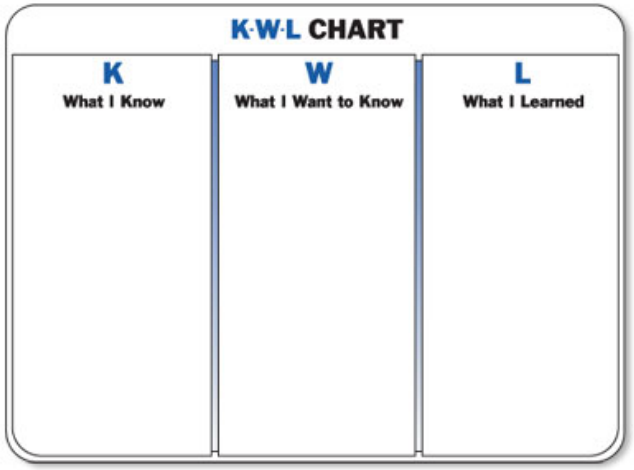
Let's Discuss...

- What do we know about the problem?
- What information do we need to obtain to come up with a best fit solution?



Know	Need to Know

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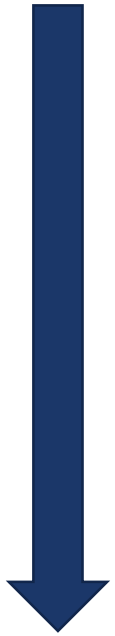
Facilitator *vs.* Student Timing

More Time

Designing the Problem

Focus on the Curriculum

Resolving the Problem



Exploring the Curriculum

Resolving and Understanding the Problem

Designing the Problem

Less Time

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Tips: Designing the Problem

- Backwards Design
  - *Content/ standard -1st Problem relates to outcome*
  - *Assessments - quizzes and tests? YES!*
  - *Activities- Can you anticipate activities and prep for them?*

- Scope/ Length
  - *Time normally spent to cover content*
  - *Local vs. Global issue*
  - *Fictionalized aspects?*

- Involve Community as Experts
  - *Local, Global, Email, Video Chats, School-wide…*

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Tips: Anticipate Student Responses

Anticipated Needs to Know items addressed by unit:

	Need To Know
	• What are pollutants? • What pollutants are affecting Lake Michigan? • Where do these pollutants come from? • What do they do to the lake?
	• How do pollutants move from land to water? • Where is the water going with the pollutants? • Is there a connection between how water cycles through the environment and pollutants?
	• What is water and how does water behave? • What is it about water that makes it behave as it does?

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Tips: Problem Statement

- Have a “gold standard” statement planned, but…
  - Let students generate
  - *May be imperfect, allow for alterations*
  - *Questioning and “Need to Know” charts help*

“How can we (*enter problem to solve*) in such a way that we consider (*enter factors/content/ skills that are of focus*) by (*enter time constraint*)?”

Concept Maps: Map of Possibilities

Problem vs. Standard at the Center

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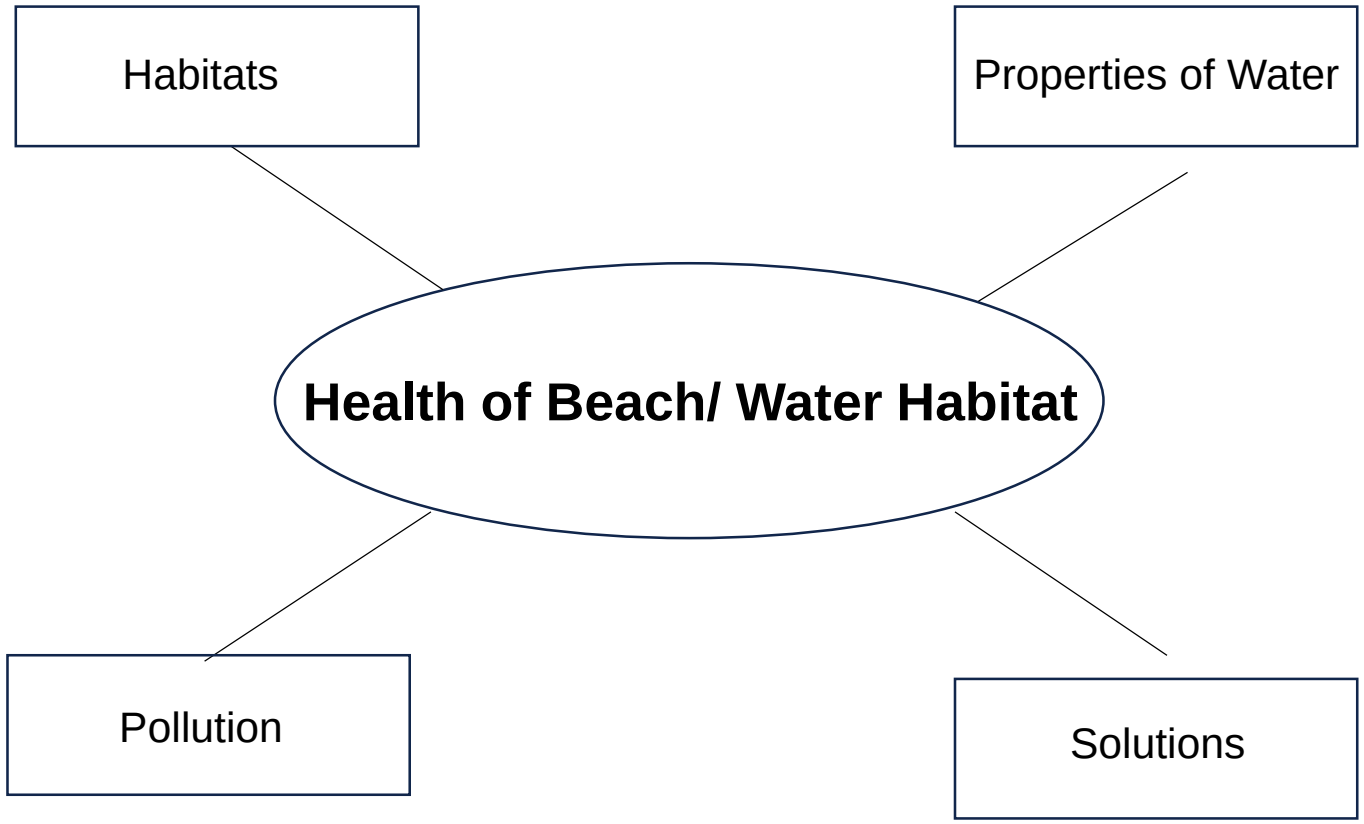
Habitats
Properties of Water
Health of Beach/ Water Habitat
Pollution
Solutions