Removing Barriers: Leveraging Good Instructional Practices

NATIONAL TITLE I CONFERENCE
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AGENDA

Learning Objective

By the end of the session, participants will be able to describe best practices within the PBL framework in order to implement effective instructional strategies that will improve student learning.

- ❑ Starter: Conversation Toss
- ❑ Mini-Lesson: What is PBL? Why PBL? How do I implement PBL?
- ❑ Work Period: PBL Implementation
- ❑ Closing: Toolbox Takeaways

STARTER

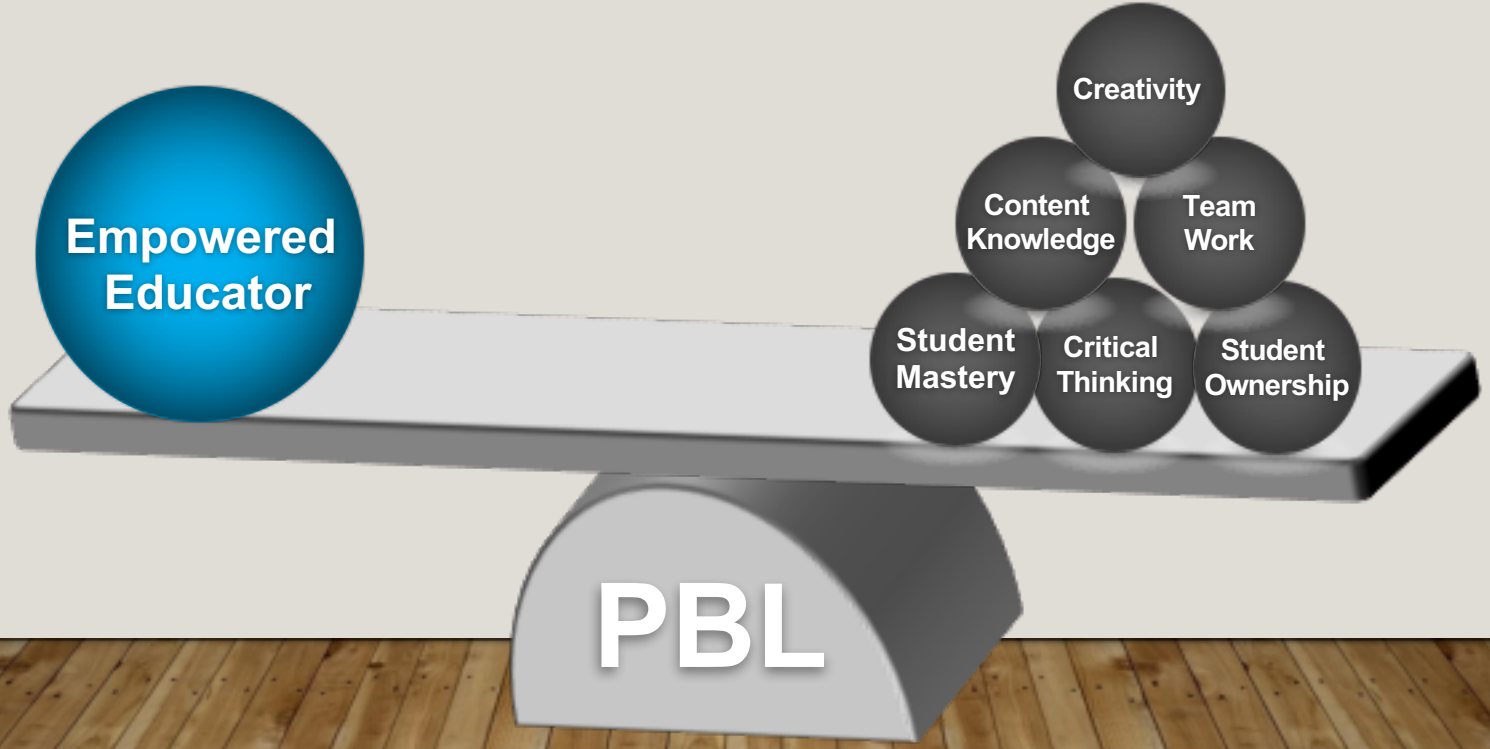
- Silently think about your 8th grade experience in physical science. There were numerous topics discussed related to chemistry and physics.
- Can you recall some of the physics topics discussed?

CONVERSATION TOSS:

A Brainstorming Strategy

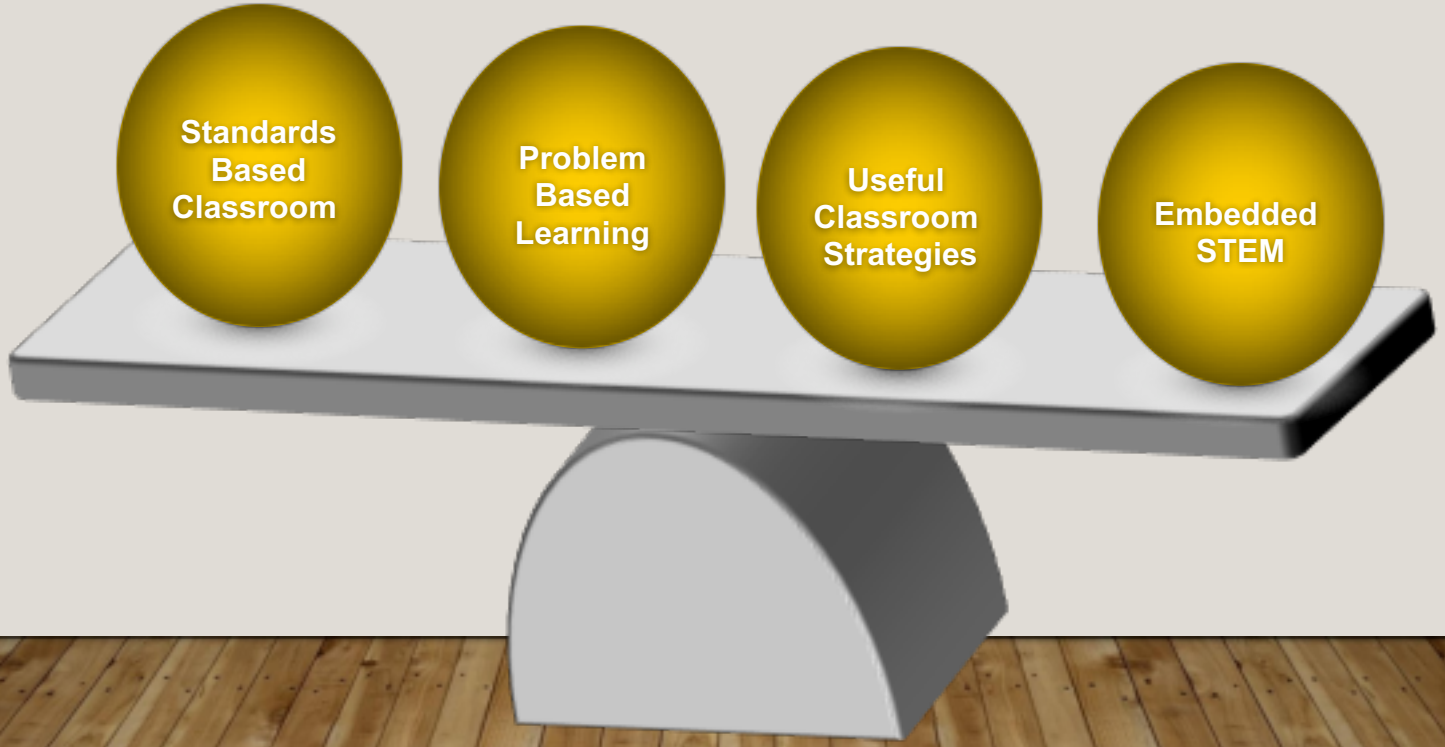
1. Place students in pairs.
2. Students decide who is going to be A (goes first) or B (goes second).
3. Student A has 30 seconds to toss everything they know about the topic into the conversation. Student B, is simply listening and offering supportive facial expressions.
4. After 30 seconds the students switch.
5. At this point, the instructor can have the students record their information and/or share out in a whole group discussion.

LEVERAGING GOOD INSTRUCTIONAL STRATEGIES



Session Goals:

Leveraging Good Instructional Practices



Collect Best Practices to Add to Your Teacher Toolbox

WHAT IS PROBLEM BASED LEARNING?

PROBLEM BASED LEARNING(PBL)

- Instructional strategy used to increase problem solving and critical thinking skills in medical students
- Centered around an ‘ill-structured’ problem that generates student interest

(Allen, Duch, Groh, Watson, & White, n.d.; Chin & Chia, 2004; Edens, 2000; Hmelo-Silver, 2004; Stepien & Gallagher, 1993; Torp & Sage,2002; Ward & Lee, 2004)

PROBLEM BASED LEARNING(PBL)

- Learner-centered
- Empowers learners
  - Conduct research
  - Develop knowledge and skills to solve a real-life problem
  - Allows students to learn while probing for solutions

WHY PROBLEM BASED LEARNING?

REVIEW OF LITERATURE

- **Advantages of PBL**
  - increases motivation
  - makes learning relevant to the real world
  - promotes higher-order thinking
  - encourages “learning how to learn” (students generate problem solving strategies)

(Chin & Chia, 2004; Sungar, Tekkaya, & Geba, 2006; Tarhan & Acar, 2007; Ward & Lee,2004)

REVIEW OF LITERATURE

- **Disadvantages of PBL**
  - Requires skills in Socratic inquiry, conflict resolution, classroom management, resources and assessment
  - Assistance needed to make the transition from imparter of knowledge to the facilitator of learning
  - time consuming

(Chin & Chia, 2004; Sungar, Tekkaya, & Geba, 2006; Tarhan & Acar, 2007; Ward & Lee, 2004)

HOW DO I IMPLEMENT PBL?

IBLDP

PBL Framework

- Case **I**ntroduction - Article/Video
- **B**ox Chart - Interact with Reading
- **L**earning Issues - Research
- Engineering **D**esign Process
- **P**resentation

INFORMATION INTRODUCTION

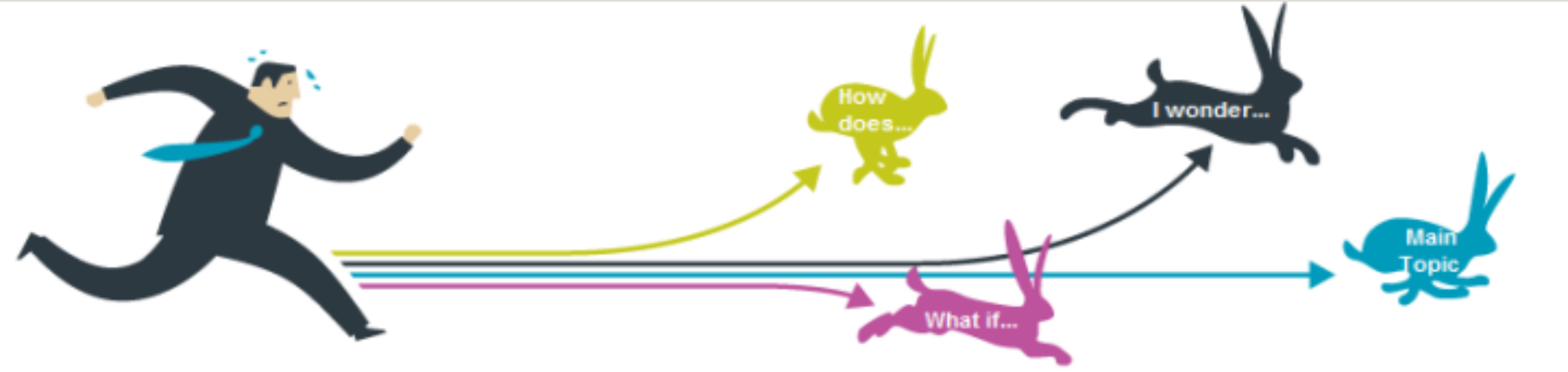
- Current Event
- Article
- Historical Text
- Dialogue
- Video
- Picture

BOX CHART

Facts	Questions
Actual events or statements that can be taken from the case that are content related	Things that spark your curiosity, that might not be answered through research
Hypotheses	**Learning Issues**
Predictions about the case	Topics that can be researched that will extend learning and assist in solving the problem

LEARNING ISSUES

- Research
- Differentiation
- Peer and Expert Discussion



DESIGN

- Engineering **D**esign Process
  - Identify the Problem/ Develop Idea
  - Carousel Walk Feedback from Peers I
  - Model (Electronic Simulation/Prototype)
  - Carousel Walk Feedback from Peers II
  - Test
  - Redesign

PRESENTATION

Student Products

- Prototypes
- Models
- Public Service Announcements
- Proposals
- Powerpoint Presentations
- etc.

NEXT GENERATION SCIENCE STANDARDS

HS-PS3-3 Energy

Design, build, and refine a device that works within given constraints to convert one form of energy into another form of energy.*

HS-PS2-1 Motion and Stability

Analyze data to support the claim that Newton's second law of motion describes the mathematical relationship among the net force on a macroscopic object, its mass, and its acceleration.

MS-PS2-2 Motion and Stability

Plan an investigation to provide evidence that the change in an object's motion depends on the sum of the forces on the object and the mass of the object.

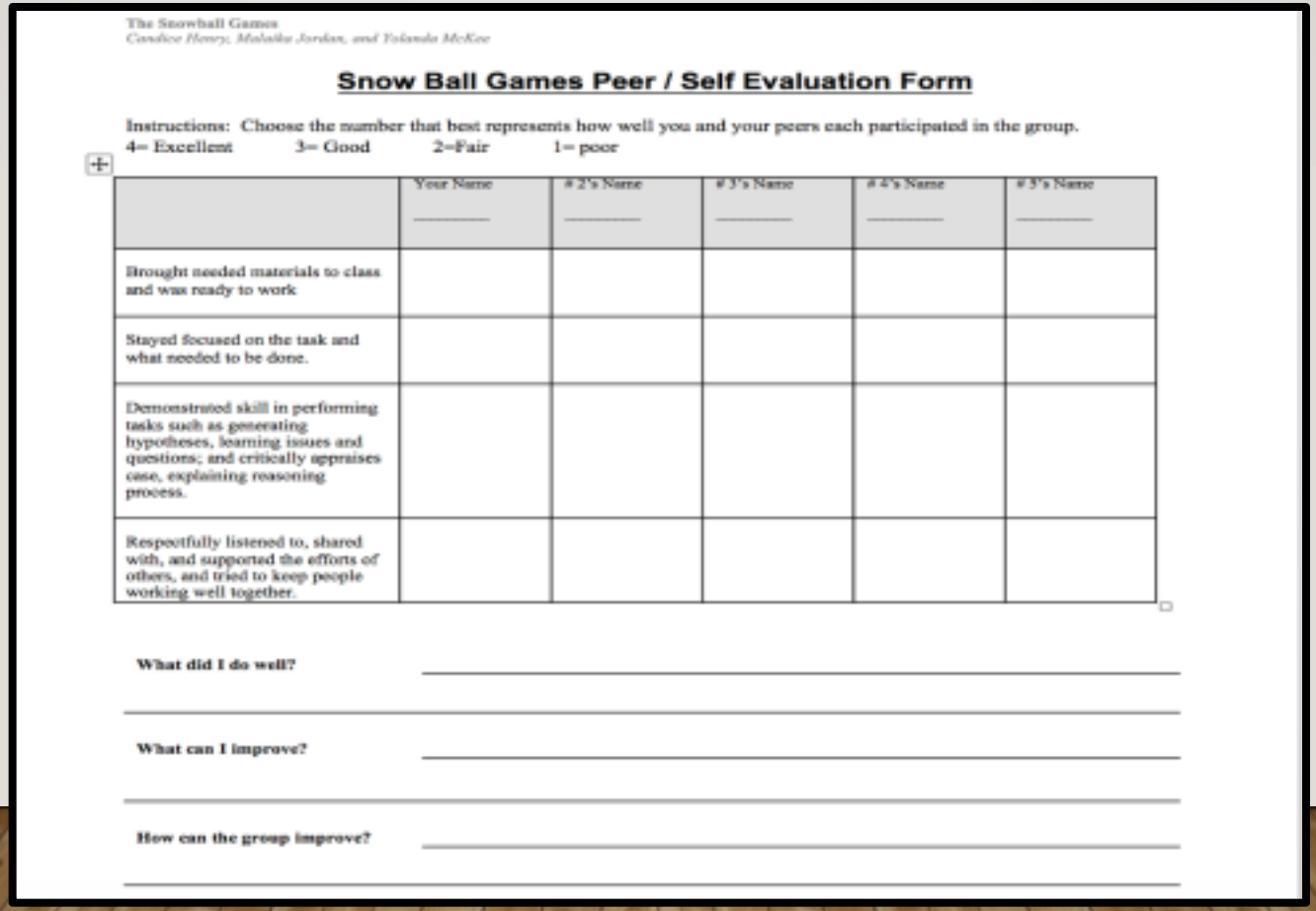
MS-PS3-5 Energy

Construct, use, and present arguments to support the claim that when the motion energy of an object changes, energy is transferred to or from the object.

WORK PERIOD: PBL IMPLEMENTATION

Snowpocalypse

COLLABORATION RUBRIC



The Snowball Games
Candice Henry, Malaika Jordan, and Yolanda McKee

Snow Ball Games Peer / Self Evaluation Form

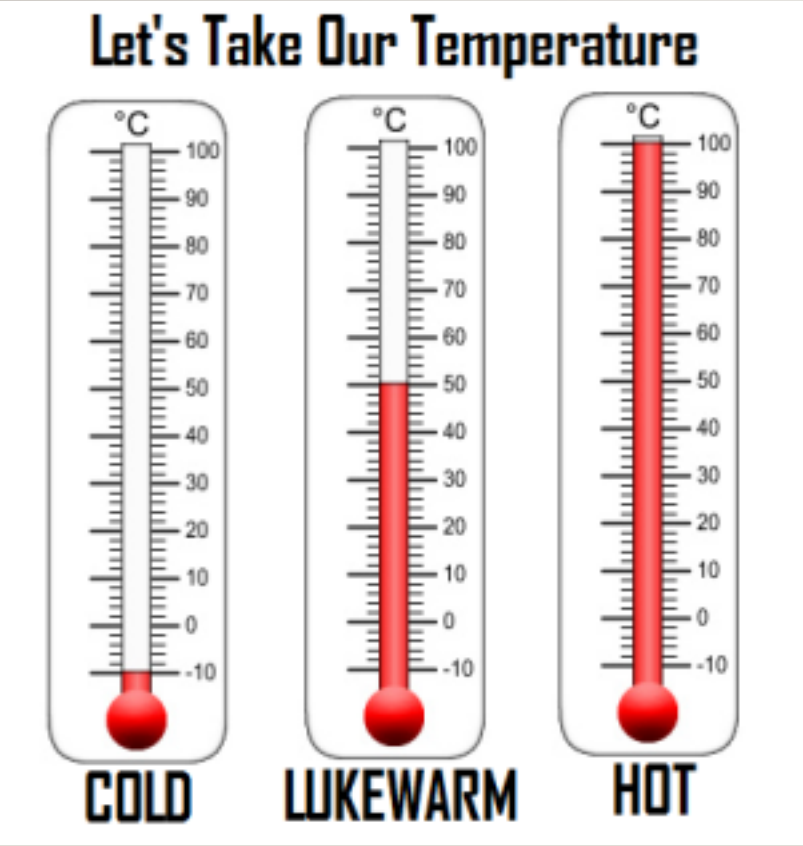
Instructions: Choose the number that best represents how well you and your peers each participated in the group.
4= Excellent 3= Good 2=Fair 1= poor

	Your Name _____	# 2's Name _____	# 3's Name _____	# 4's Name _____	# 5's Name _____
Brought needed materials to class and was ready to work					
Stayed focused on the task and what needed to be done.					
Demonstrated skill in performing tasks such as generating hypotheses, learning issues and questions; and critically appraises case, explaining reasoning process.					
Respectfully listened to, shared with, and supported the efforts of others, and tried to keep people working well together.					

What did I do well? _____

What can I improve? _____

How can the group improve? _____



Go to

join.quizizz.com

THE PRODUCT DESIGN

Authentic Assessment

Materials

- 4 Large Marshmallows
- 4 Small Marshmallows
- 5 Skewers
- Spoon
- Rubber Bands
- Measuring Tape
- Masking Tape
- Bowl

CATAPULT DESIGN

4Cs – Critical Thinking, Communication, Collaboration, Creativity

Use the information and learning issues that you researched from the scenes to design a catapult that can help your team win the snowball fight against the Spring Road kids.

- You will be given bamboo skewers, masking tape, large marshmallows, small marshmallows, a spoon, and rubber bands to create your catapult.
  - What is the problem to be solved?
  - What are some solutions to the problem?
  - Create a sketch of your catapult design.
  - Use your materials to build a prototype of your design.
  - Test your prototype.
    - It must be able to launch the small marshmallows over the 1.5 foot fortress and land in an 8 x 8 inch square, from the launching point 3 feet away *(your rulers are only in centimeters and millimeters, don't forget to convert)*
  - Re-Design your prototype to meet the given constraints if needed

Product/Summative Assessment

The Snowball Games Rubric

LET THE SNOWBALL GAMES COMMENCE!!!

May the odds forever be in your favor.

Product Reflection

Reflection

- at least 4 paragraphs (the use of diagrams are strongly encouraged)

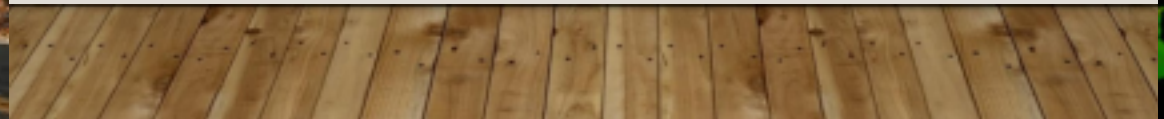
Based upon what you have learned, discuss the results of your snowball fight as it relates to:

- Accuracy and precision
- Projectile motion with regards to gravity, trajectory, and the horizontal and vertical component
- The difference between potential and kinetic energy
- The Law of Conservation of Energy (what happens to the catapult throughout the snowball launch)
- Energy Transformation
- The points on the horizontal component of the projectile in which the snowball will have the most and least potential and kinetic energy
- How do simple machines work to magnify force?
- What changes if any would you make to your catapult? Why or why not?

FORMATIVE ASSESSMENT

Four Corners
Formative Assessment Strategy

In what Corner would you place yourself in terms of being able to implement a Problem Based Learning case?



EXIT TICKET: TOOLBOX TAKEAWAYS

WRITE A NOTE TO YOURSELF ABOUT TODAY'S SESSION

- ❑ IN THIS SESSION I LEARNED...
- ❑ ONE THING I MUST REMEMBER IS...
- ❑ I CAN APPLY THIS BY…

THANK YOU

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