Mobility Challenge (Empathy Experience)

Identify your mobility limitation based on your card, then work with a neighbor to tape your hand

1

2

Our Background

Carole Lee

- Taught chemistry and biology at St. Paul's Convent School, Hong Kong
- Vice-principal of St. Paul's Convent School
- Associate Professor in Elementary Education, University of Maine at Farmington

Susie Dykstra

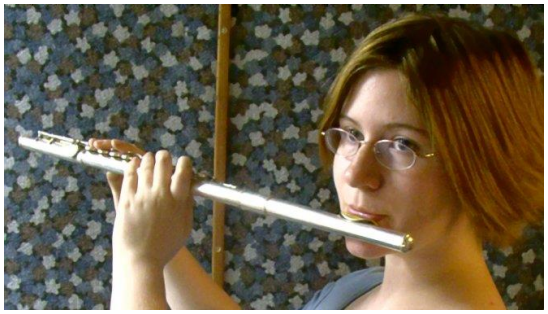
- Cell biologist-turned-science teacher
- Taught physics & biomedical science at Northglenn High School, Colorado
- Director, Teacher Education Accreditation, University of Maine at Farmington

Problem-Based Learning: The Gateway to Student Empowerment

A Speed-Tour of Problem-Based Learning

Limited Mobility Challenge:

Play each musical instrument
with your mobility limitation



Consider:

What can you do?

What can’t you do?

Do we need all of our digits to play these instruments?

Introduction to the Problem

1) Form a team of three people

2) Read through the team roles and select your role

3) Read the invitation letter

PBL Planning Page (10 minutes)

1) With your team, complete the PBL Planning page

PBL Planning Page

2) From the information your team needs to research, what is one topic that you, as a

mechanical engineer
biomedical engineer
physical therapist

will be responsible for learning?

Write this on the back of your role card.

Research for Your Role (15 minutes)

Mechanical Engineer	Physical Therapist	Biomedical Engineer
Station 1: Reverse Engineering	Station 2: Anatomy of the Human Hand	Station 3: Axes of Rotation & Joints

Station Lab Debrief (3-5 minutes)

Return to your team

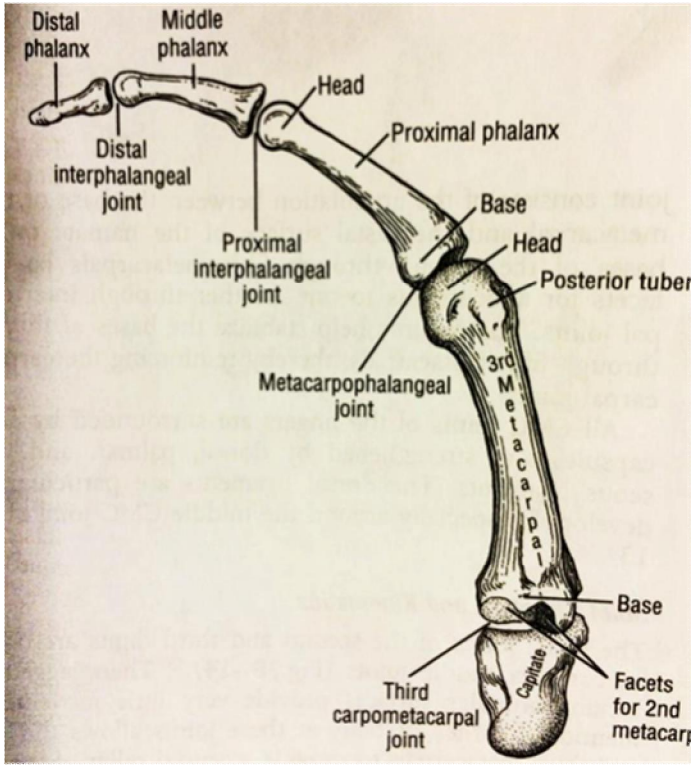
Share 1 significant thing that you each learned from the station lab that will help your team to develop your solution

Animated Finger (15 minutes)

Test the finger bones and identify the four that are the correct for a human finger

Develop design for building and controlling a 2D animated finger

Build prototype of your animated finger model



Animated Finger: Share Out

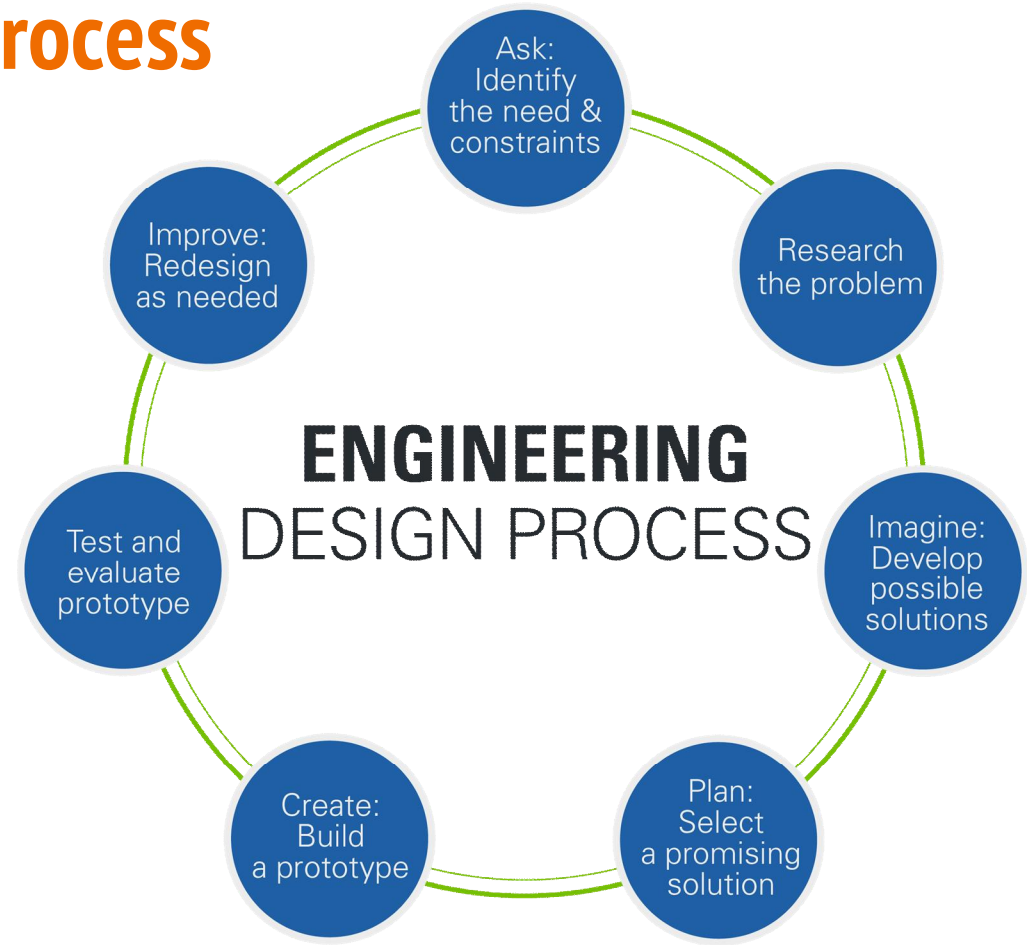
Please share your design & reasoning

Put on Your Teacher Hat!

Why did we do each of these activities?

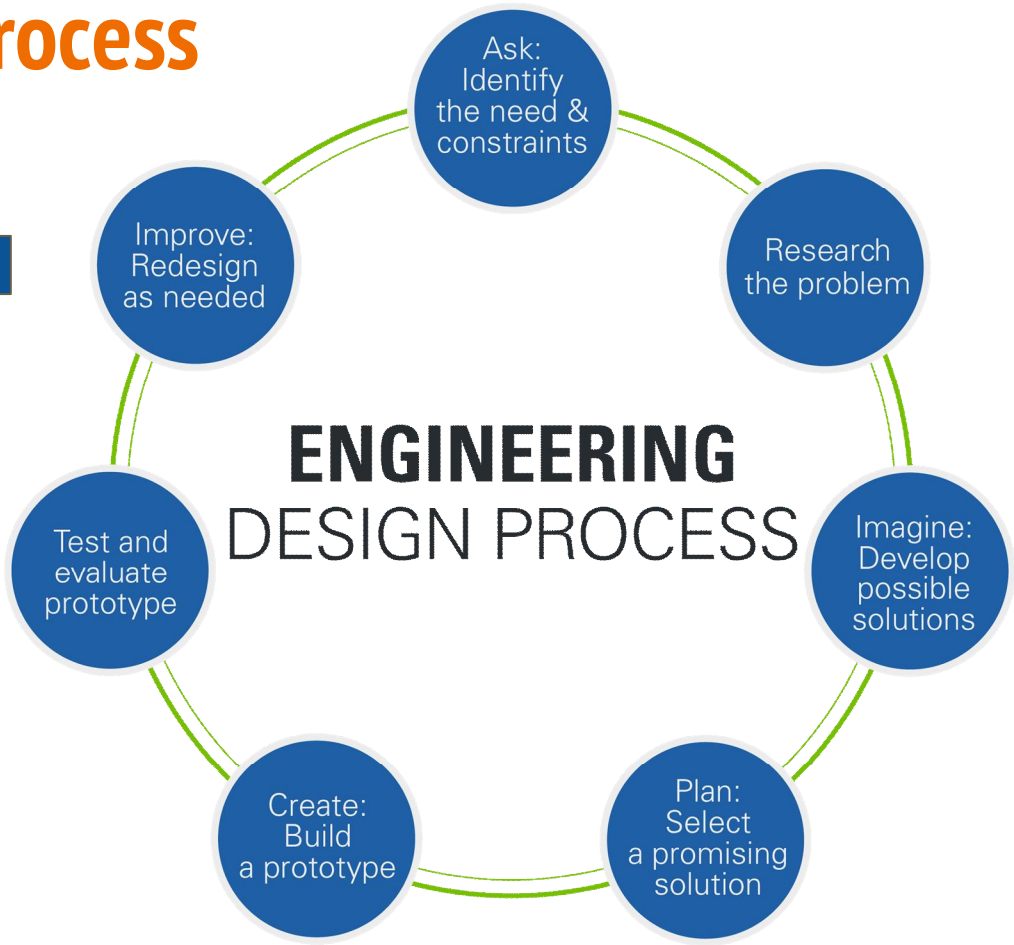
How do they fit within the PBL experience?

Engineering Design Process



Engineering Design Process

Presenting Solution to Authentic Audience



Presentation / Solution

How will your students share their solutions with an authentic audience?

Community partners & stakeholders

- Partner with local organizations, companies, and government
- Recruit volunteer evaluators
  - Experts and professionals
  - Peers/other student groups
  - College students
  - Parents in related professions

Presentation / Solution

How will your students share their solutions with an authentic audience?

Presentation Styles

Keynote Address

Traditional slide show presentation

Elevator Pitch

Brief 30 second to 2 minute summary of key ideas

Pecha Kucha

20 seconds per slide x 20 slides. Slides move on a timer.

Panel Session

Students answer questions as part of a panel

Poster

Students present a poster that documents work/findings/solution

Testimony/Debate

Students engage in verbal exchange providing claim, evidence and reasoning

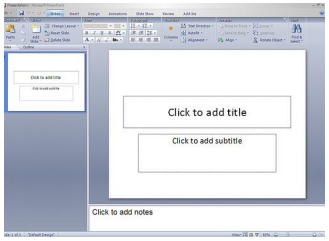
Presentation / Solution

How will your students share their solutions with an authentic audience?

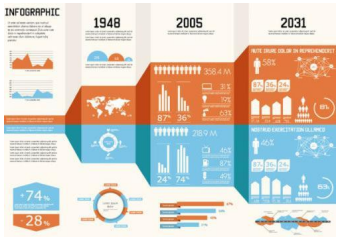
Presentation Formats

Website

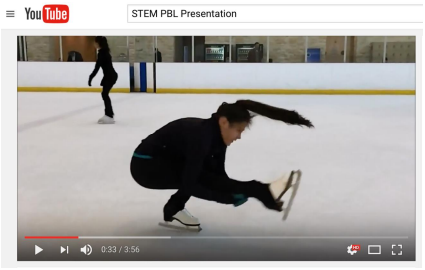
Traditional Slide Show



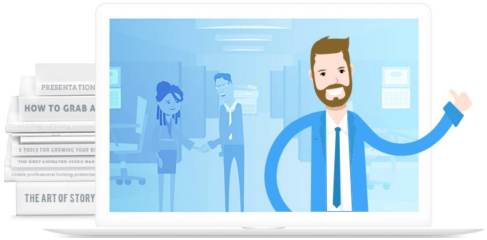
Infographic



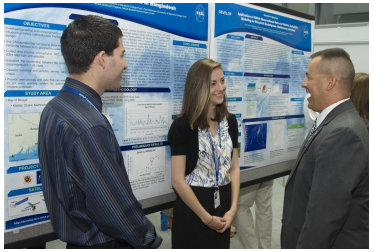
Video



Cartoon Commercial



Poster

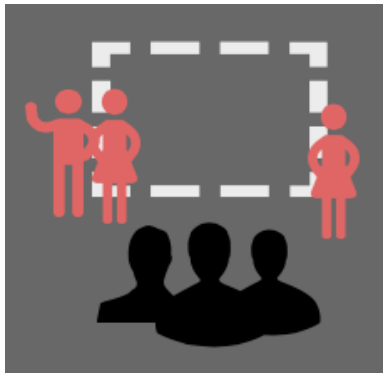


Presentation / Solution

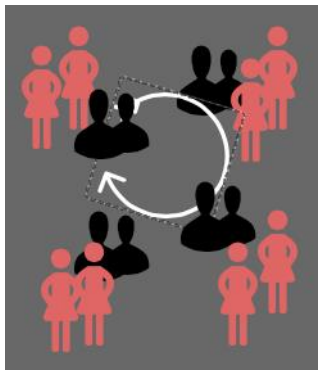
How will your students share their solutions with an authentic audience?

Presentation Structures

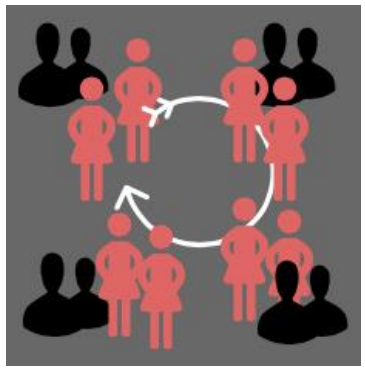
Keynote



Cafe



Shark Tank



Senate Hearing

Scaffolding the Presentation Process

- Authentic audience is high stakes/high accountability
  - Requires rehearsal & feedback
  - Professional Interactions:
    - Introductions/greetings and networking
  - Presentation Skills:
    - Do's and don'ts of clear & engaging presentations
  - Professional Attire

PBL Debrief Experience with Your Team (5 min)

What are the Key Components of Problem-Based Learning?

What did students gain from the experience?

Benefits and challenges involved in this type of learning experience?

For Students

For Teachers

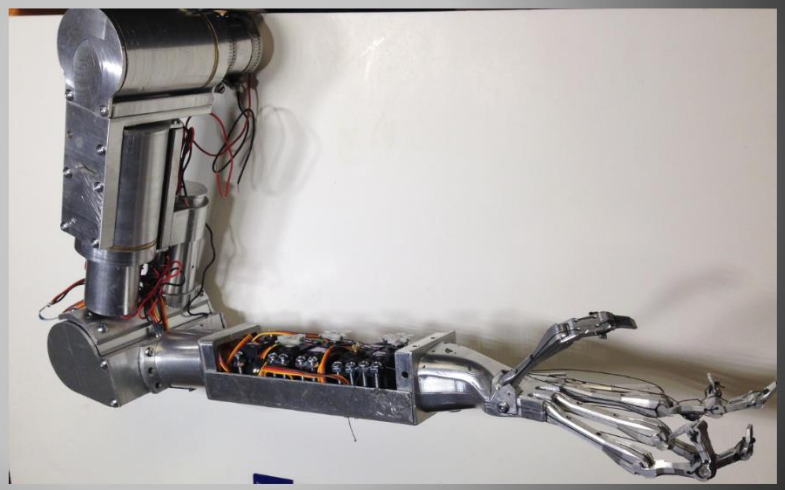
What things do you need to plan in advance in order to implement a PBL?

How would you modify this experience to bring it back to your school?

My own students… Abrar's Arm for his Brother

Prototype Prosthetic Arm

Abdullah Arab
Abrar Satar
Abdulrahman Alamer
Abdulaziz Almushari
Dung Chinh
Mohammed Alyami
Michael Triplett
Saleh Alghams



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My own students…

Jaide

Jaide's Arm

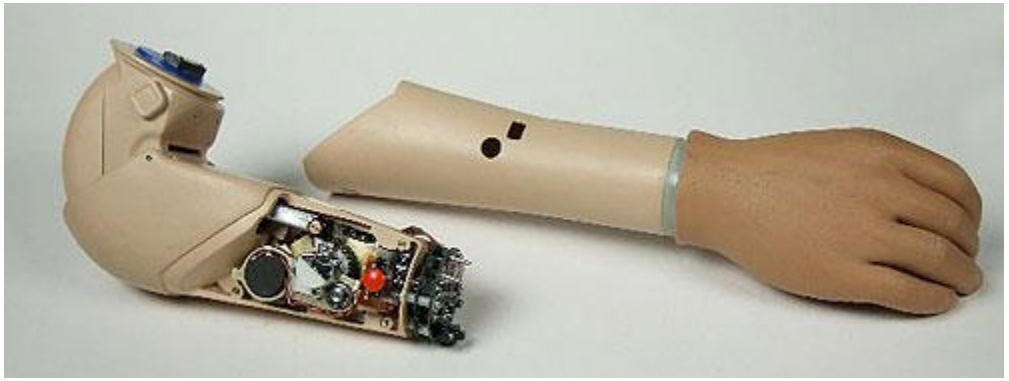


Image from:
http://www.districtamputeecarecenter.com/

My own students…

Jaide

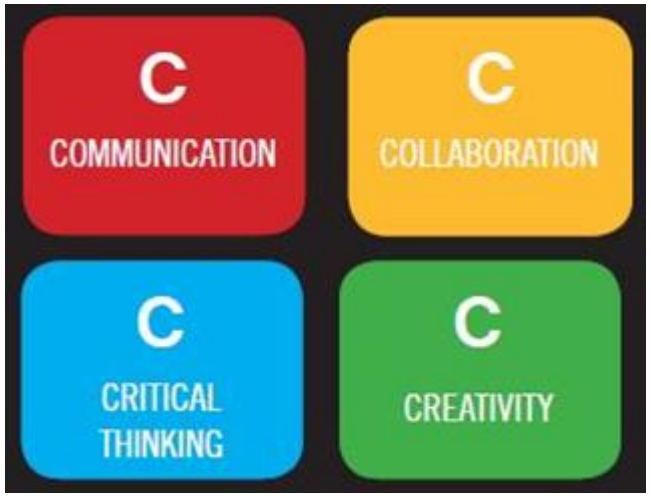
Jai

Image from:
http://www.districtamputeecarecenter.com/

Jaide in Action

What do students gain from PBL in STEM?

- 21st Century Skills (4Cs)
- Agency & Empowerment
- Career Awareness
- Innovative Thinking
- Awareness of content relevance



Questions?

Thank You!!!