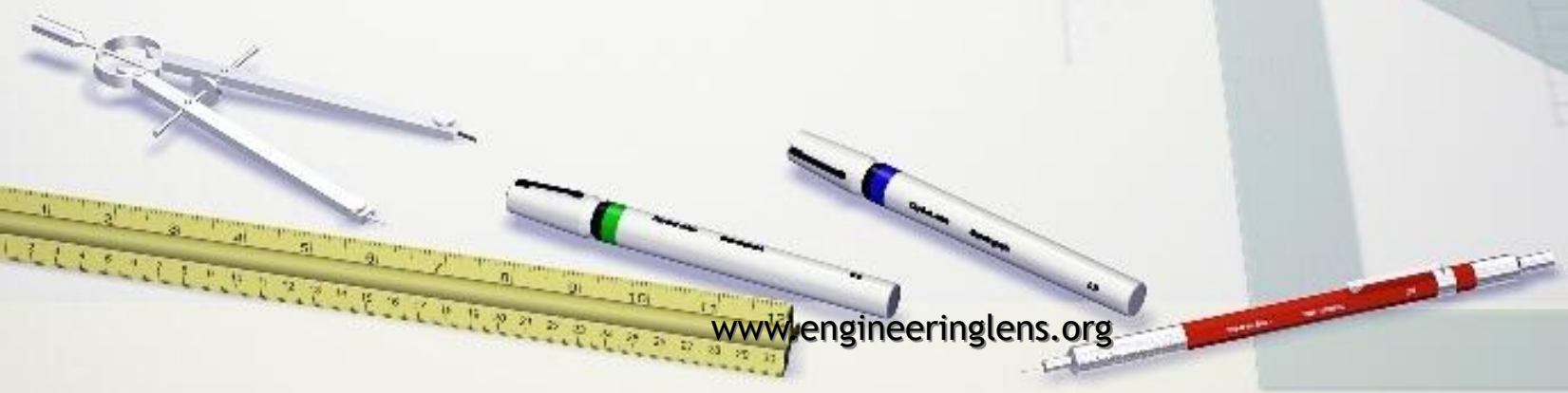
Integrating Engineering Design and Thinking Skills into PreK-5 grade interdisciplinary education

August 6th, 2010

- Bill Wolfson
- Karen DeRusha
- Stacy Newman

'Those who do nothing are never wrong.' Theodore de Bouville



Agenda

- Build sketch models
- Presentation of Lessons & Design Solutions
- Implementation Considerations
- Review: What have we learned?
- Other applications of “Design Thinking”
- Final Reflections
- Celebration

Build Sketch Models!

Presentation of Lesson Plans & Design Solutions

- Brief synopsis of story
- Learning objectives for your lesson plan & assessment method
- Description of curriculum connections and/or curricular constraints
- needs/problems discussed & some of generated solutions
- Presentation of solution sketch/model and description of how it works
- Please reflect on the process of creating your lesson plans. Would you approach this differently next time? How?

Implementation Considerations

- How would you set your students up to work successfully in teams?
- How would you introduce “engineering” to students?
- How would you introduce the design process?
  - How many steps, which ones, etc.
- How would you introduce methods such as “brain-writing” to students?
- Other considerations to be successful?

Intrinsic motivation … Judith Dodge

Teach students to work cooperatively with others.

Give students a voice in classroom decisions.

Provide opportunities for students personal growth

Teach to a variety of learning styles

Provide students with choices

Use a variety of instructional strategies

Offer fun activities that inspire creativity and reduce stress

Four Psychological needs that drive all humans in addition to the need for survival… Glasser

Need	
To belong	Choice of working alone or with others
For power	Put students in charge of what activity to complete
For freedom	Put students in charge of what activity to complete
For fun	Offer creative ways to show-what-they know

Review: What have we learned?

- Recall the activities we have done and the thinking strategies we have used in this course
- Explain how you could use these in your classroom?
- How else can you apply these strategies in your classrooms?

Strategy/Tool Usage

Strategy/Tool	Use/Purpose/Application
6 Hats	• To teach children abut different ways of thinking • Directs & focuses thinking • Interdisciplinary problem-solving tool • Use at Open Circle time; introduce one hat at a time • Use with professional groups/colleagues • Group problem-solving • Especially good for discussing controversial issues
Definitions/ Job Roles -engineers, scientists, mathematicians, artists	• Draw pictures of each (beginning/end of yr) • Eliminate stereotypes; provide a deeper understanding • How they relate to one another & what they do
Other….	

Design view of engineering

Why Design in your classroom?

Are you looking for new ideas and methods to engage your students? Design makes any subject immediately relevant to students by directly relating to their real-life experience. How can architecture, environment, product, graphic, and media design enhance the teaching of any subject, including mathematics, science, environmental studies, language arts, history, and art? Design-based learning allows you to easily incorporate diverse learning styles.

Incorporating Design Thinking into your classroom reinforces and refines these skill sets:

- inquiry and project-based learning
- Creative and critical thinking skills
- experimentation with multiple ways of problem solving
- visual literacy
- innovation and invention
- team building and collaboration
- identifying authentic real-world tasks and challenges

Design projects

- When teaching facts, create situations in which this knowledge may be put to use in problem-solving.
- Take special days like Valentines Day and create a project design around it.
  - Building a card (need, research, design, evaluation)

Class project

What do you do in your classroom that touches on some of the aspects of design?

As an example, you have your students help you design the layout of the room.

Other applications of "design thinking"

- What are some other activities/projects that you might use in your classrooms (other than using stories) to foster "design thinking"?

Plan for the beginning of the year

Teams choose a picture book and begin to design a lesson plan for an introduction to the literature design process for the beginning of the year

Celebration

- Final feedback sheet
- Celebration (Teams give rewards to their members)

'To be a teacher you must be a prophet - because you are trying to prepare people for a world thirty to fifty years into the future.' Gordon Brown MIT

Failure is a dress rehearsal for success.

I am always struck by James Dyson's claim that he built 5,127 prototypes before he got it right. This reminds me of IDEO's philosophy of "fail early and often to succeed at the end". Dyson argues that there is more we can learn from failures than from successes.

Post Assessment survey

Last Class Reflection

End
Thank you