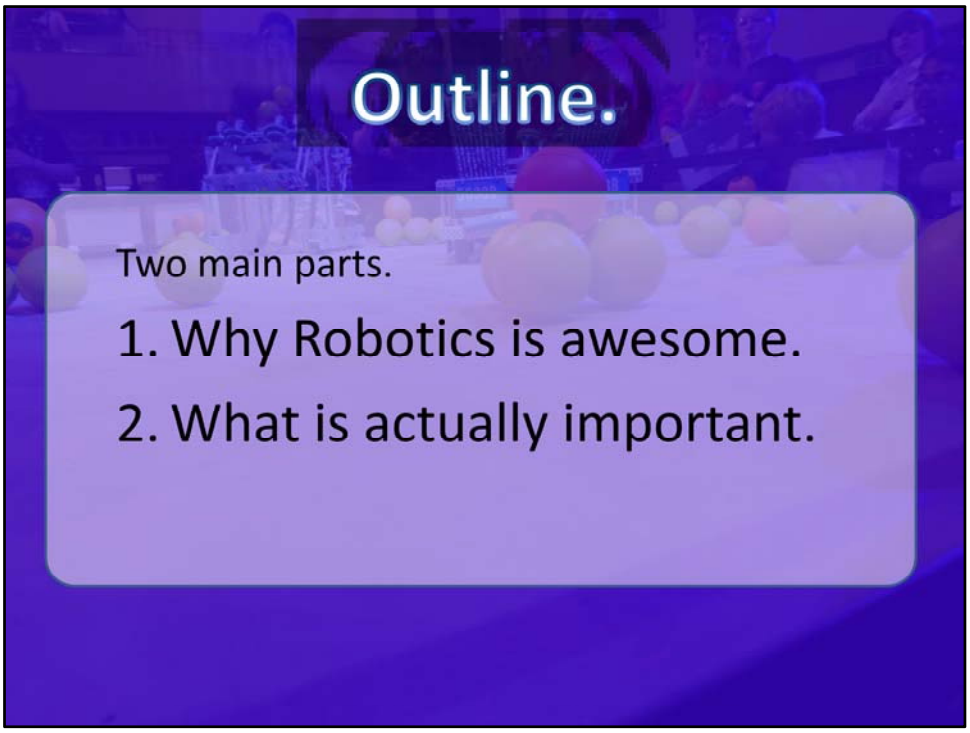

Stretching
Beyond the
Syllabus



Two main parts to the talk; firstly introducing what VEX robotics is about and what is involved. Secondly what is actually important about robotics and how it stretches and challenges students beyond the classroom. Also moving into taking the concepts from an activity like this into the classroom through project based learning.

https://www.youtube.com/watch?v=A8daR6qBw3M

To start, After watching this video what would you design or plan in order to win the game?
Check the next slide for more detail on some of the rules.

What would you do?

Points

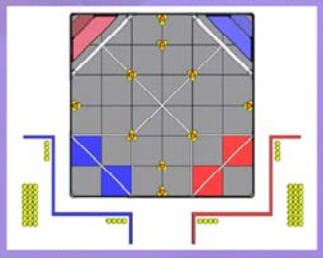
1 point – Ball in low goal
5 points – Ball in high goal
2 point – Bonus ball in low goal
10 points – Bonus ball in high goal
25 point 4"lift
50 point 12"lift
10 point Autonomous bonus

Setup.

- 4 ball preloaded for autonomous.
- 24 driver manual load balls .
- 30 normal balls and 10 bonus balls on the field.

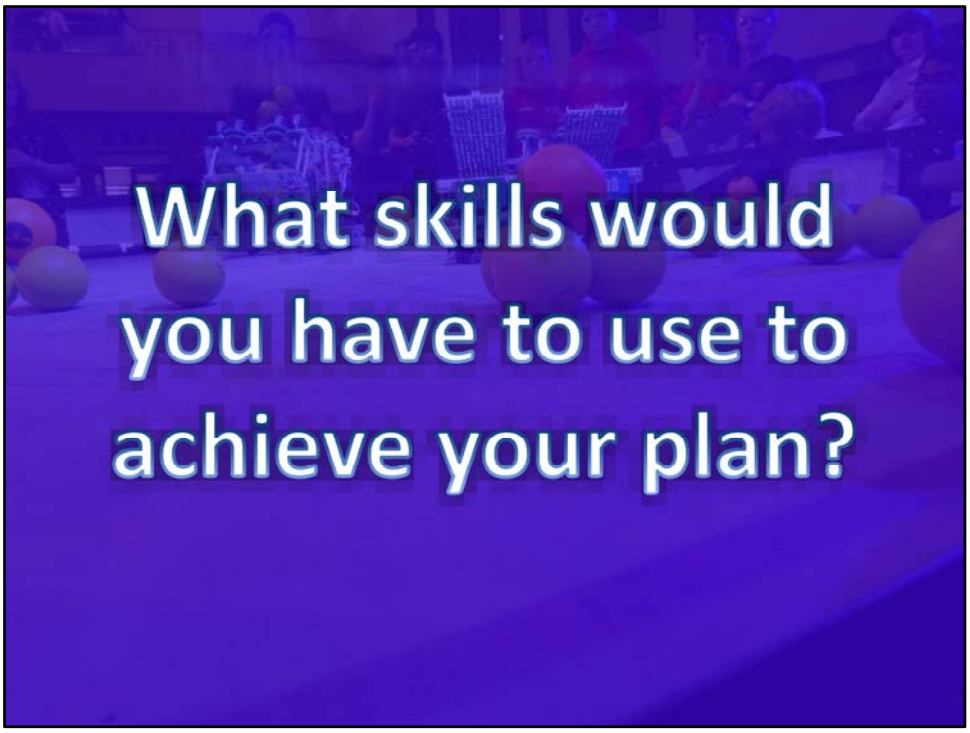
Main rules.

- Robots start in coloured start zone and can't exceed 18"cube size.
- The robot may not extend beyond 18" till the last 30 seconds in order to lift.
- No part of the robot can detach.
- A maximum of 12 motors may be used.



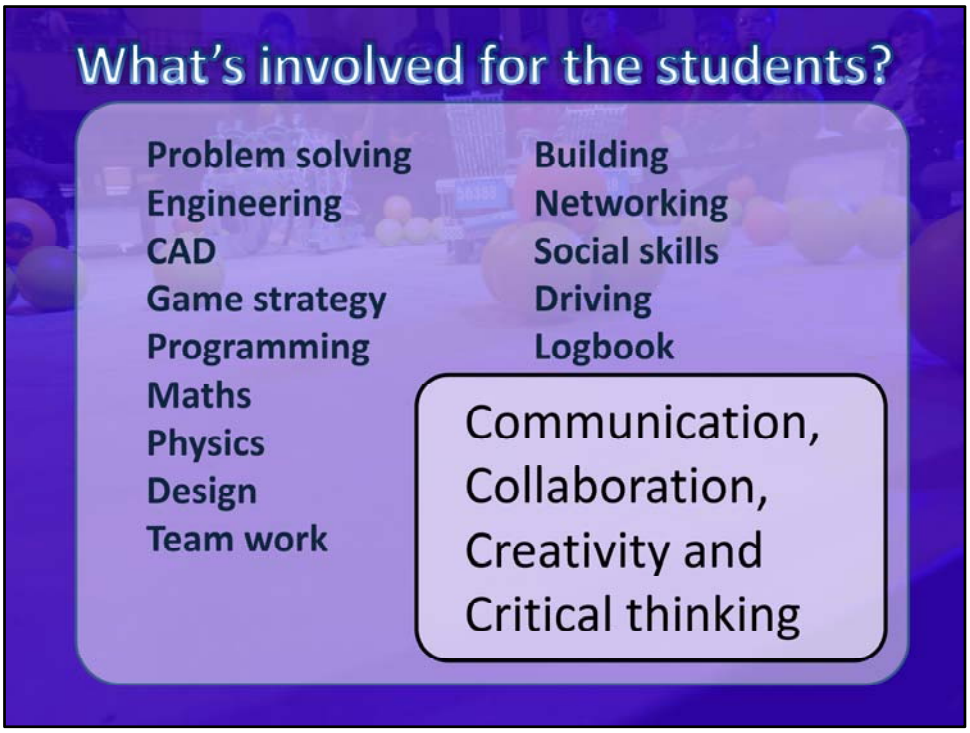
What would your strategy be to score the most points in 2 minutes?
How would you accomplish this?

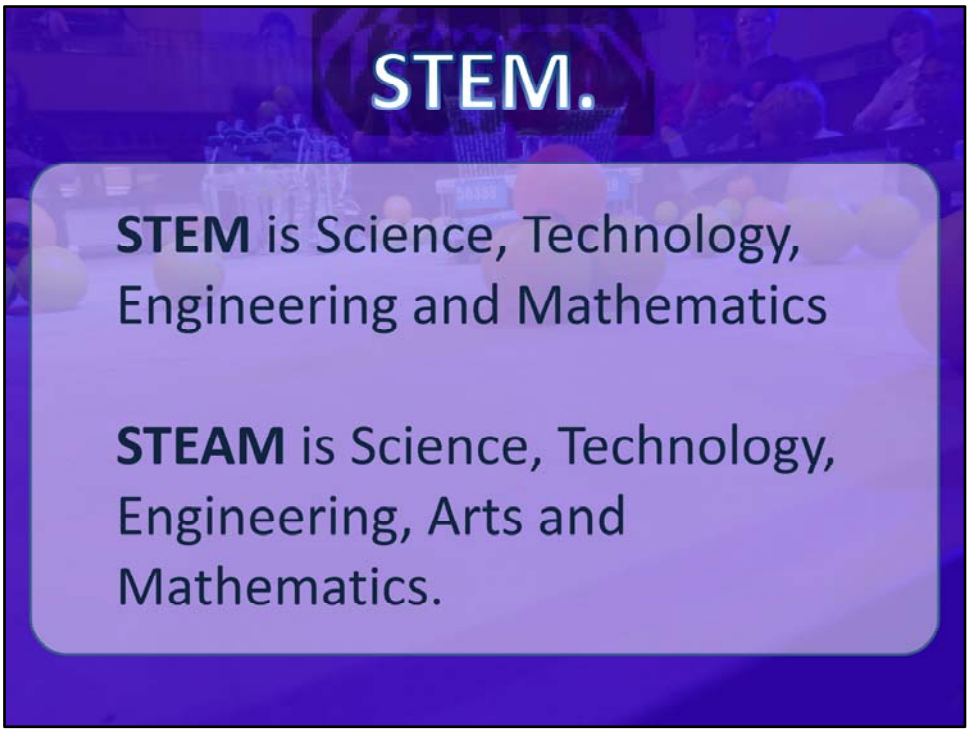
There are more in-depth rules the VEX website.
http://www.vexrobotics.com/vexedr/competition/competition-resources


What skills would you have to use to achieve your plan?

http://www.vexrobotics.com/vexedr/competition
https://player.vimeo.com/video/141680596

Takes a little more than just building a robot. A lot more depth of concepts behind the robot, engineering logs, communication with other teams and collaboration. The competition is designed to get teams working with each other.


What's involved for the students?
Problem solving
Engineering
CAD
Game strategy
Programming
Maths
Physics
Design
Team work
Building
Networking
Social skills
Driving
Logbook
Communication,
Collaboration,
Creativity and
Critical thinking

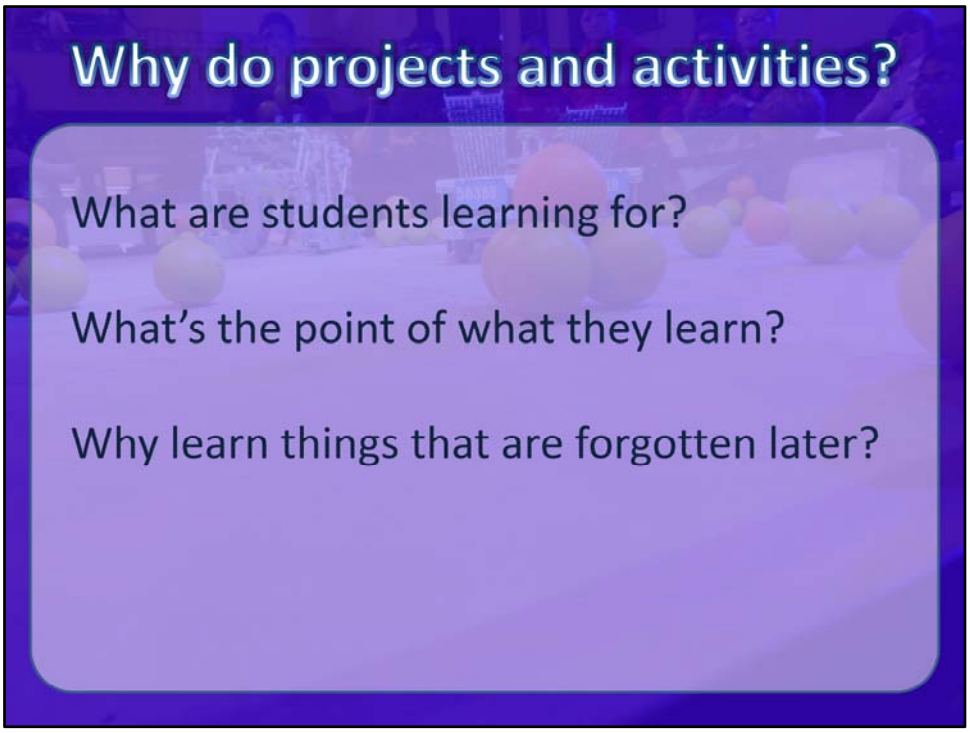


Science, Technology, Engineering and Mathematics—STEM, and therefore, STEM education—are vital to our future—the future of our country, the future of our region and **the future of our children.** Besides, STEM is everywhere; it shapes our everyday experiences.

Have you considered how often we experience STEM in our lives? **Science** is our natural world— sun, moon and stars…lands and oceans…weather, natural disasters, the diversity of nature, animals (large, small, microbial)…plants and food…the fuel that heats our homes and powers transportation…The list is almost endless. In today's world, **technology** means computers and smartphones, but it goes back to television, radio, microscopes, telegraph, telescopes, the compass, and even the first wheel. Yes,**engineering** designs buildings, roads, and bridges, but it also tackles today's challenges of transportation, global warming and environment-friendly machines, appliances and systems. We only have to look around to see what improvements to our lives and our homes have been engineered in the last decade alone. We encounter **mathematics** at the grocery store, the bank, on tax forms, in dealing with investments and the family budget. Every other STEM field depends on mathematics. STEM is important, because it pervades every aspect of our lives.


What projects could you do?
Robotics, Cardboard coding, Make make, Raspberry pi coding, High altitude balloons, Greenpower, Eco projects, Bloodhound, Crest, Film Club, Youth Parliment, Student voice, School magazines, Community support, Sport leaders, Maths Leaders, Young enterprise, Social enterprise, Educational competitions...


What is
actually
important?



1. Assessment or Life?
2. Knowledge, Skills, confidence/courage and Curiosity
3. Learning to Learn
4. To love learning.
5. Learning skills and problem solving?
6. Application of knowledge.

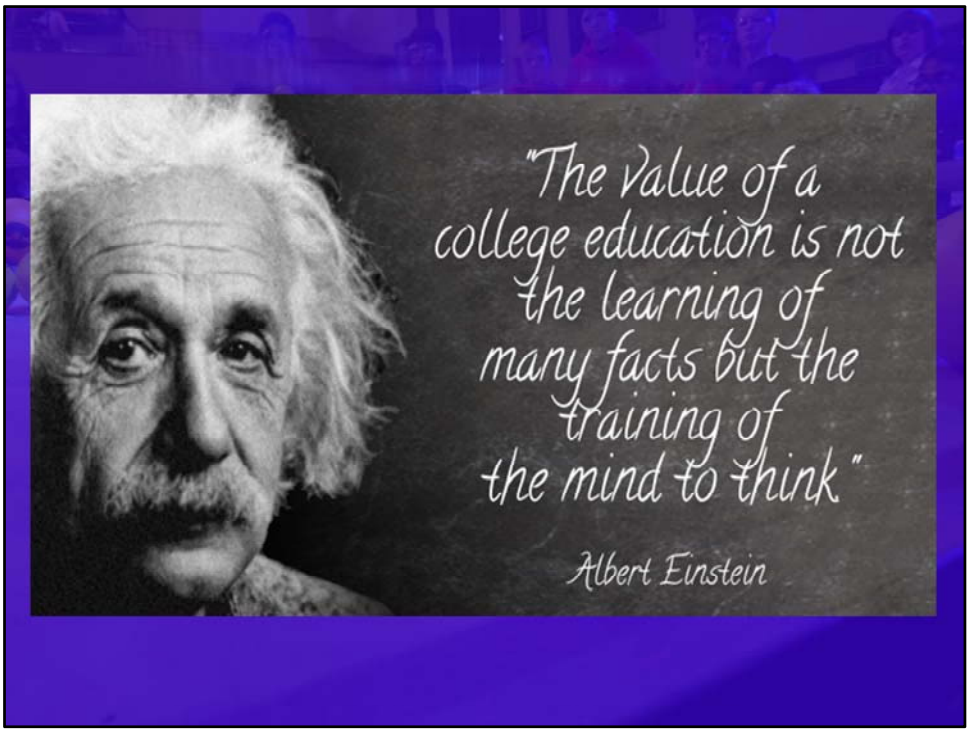

Key Aspects
• Autonomy
• Engagement
• Application
• Learning for a goal

What is learning.

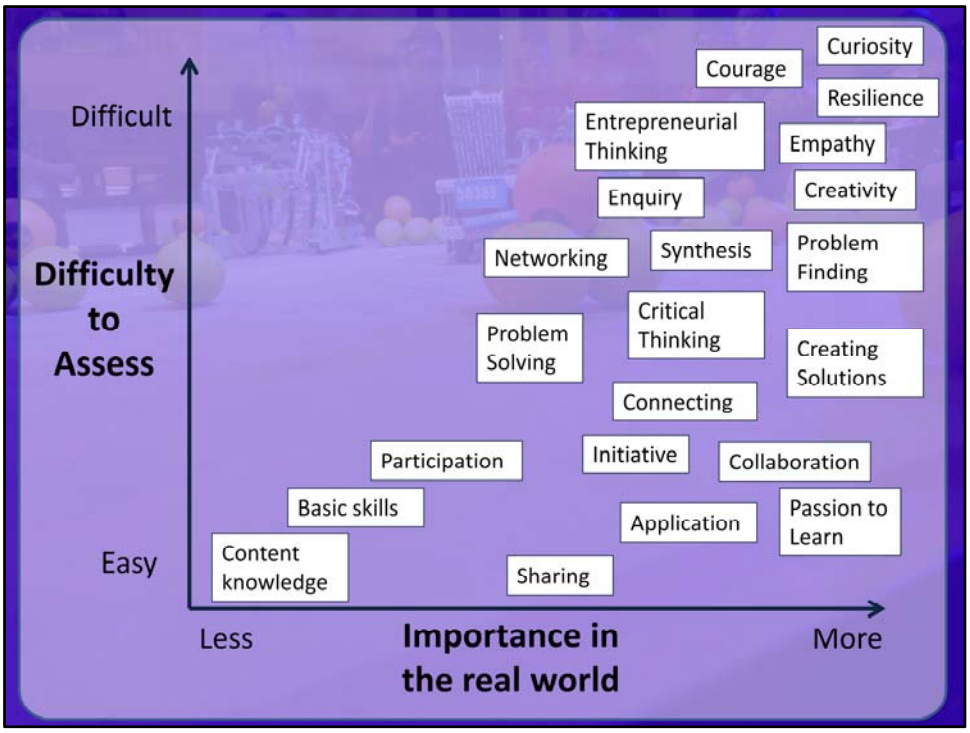
Learning is simply a process through which we gain knowledge about particular stuff.

→ As we gain knowledge about something, we can utilize it, not only for our benefit but also we can help others.
→ Experimenting with our knowledge brings us different experiences, which will make you wise.
→ Becoming wise is definitely an achievement which will make you happy.
→"Success is not the key to happiness, Happiness is the key to success ". - Albert Schweitzer

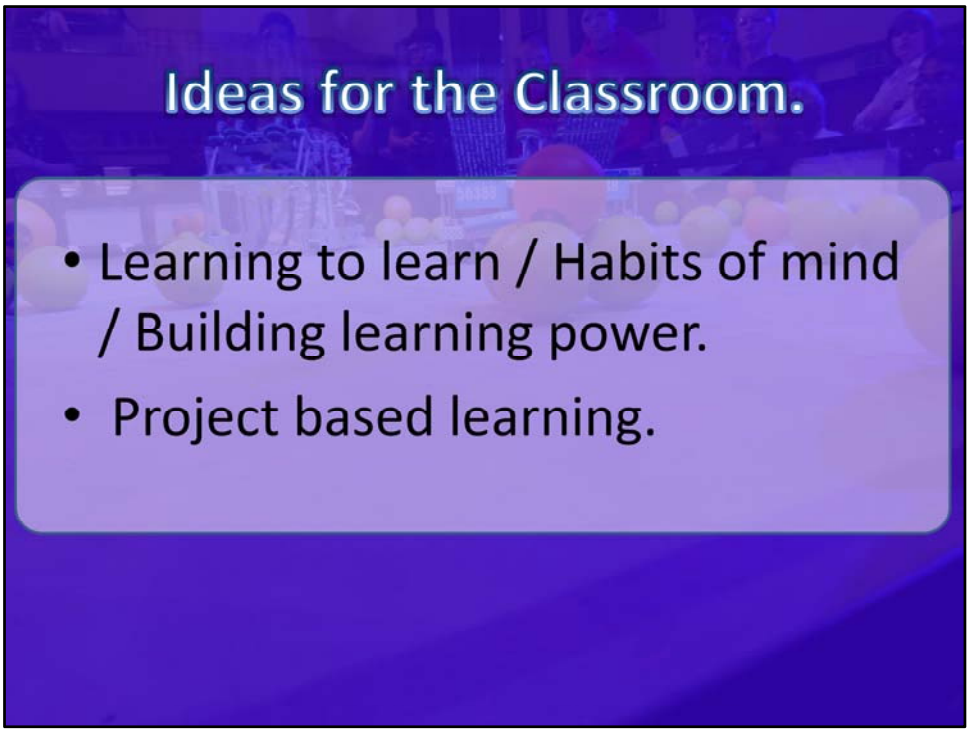
Also, it's not something to prove. It's for your own benefit.



- The true sign of intelligence is not knowledge but imagination.
- Education is what remains after one has forgotten what one has learned in school.
- It's a miracle that curiosity survives formal education.



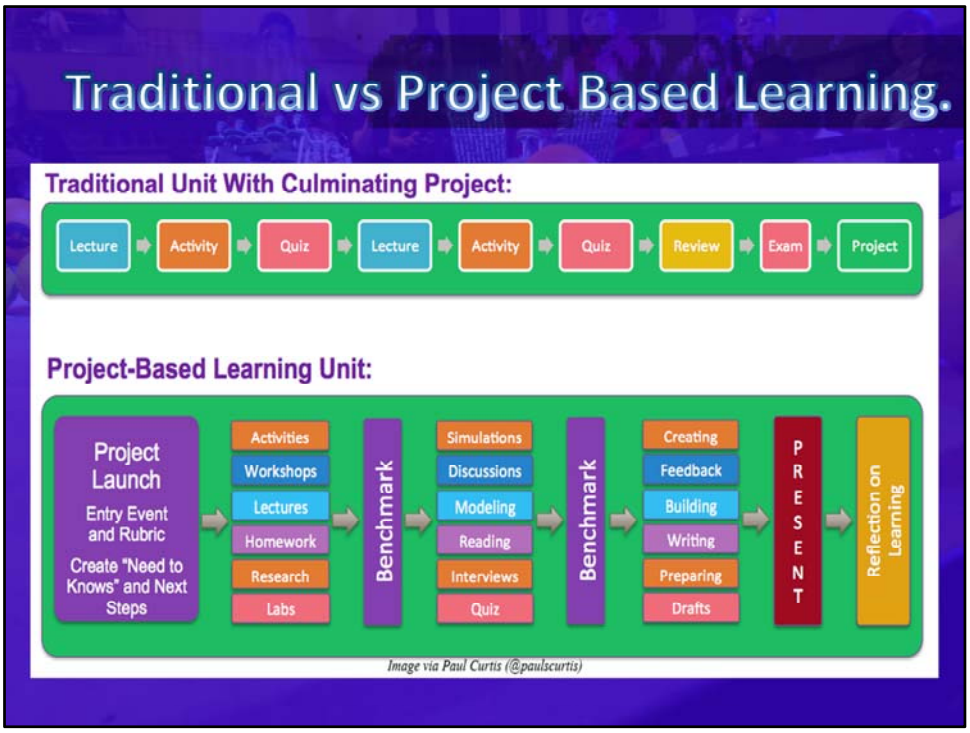
http://dangerouslyirrelevant.org/2012/08/assessing-messy-learning.html
http://willrichardson.com/post/28626310240/the-immeasurable-part-2



A couple of pedagogical ideas that I feel are important in projects and should/could be used in the classroom.

https://storify.com/ProfKarim/habits-of-mind

The point of this idea is to make the students aware of what habits they are using, making them think more about how they are learning.



http://www.teachthought.com/category/learning/project-based-learning/
http://www.teachthought.com/learning/project-based-learning/a-better-list-of-ideas-for-project-based-learning/
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http://www.innovationunit.org/sites/default/files/Teacher's%20Guide%20to%20Project-based%20Learning.pdf
http://bie.org/objects/documents
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http://www.ascd.org/publications/books/106031/chapters/The_Nine_Steps_of_Project-Based_Learning.aspx

Example Project.

- Investigate, evaluate and report on the heat efficiency of new homes being built in Buckingham.
- Knowledge needed...
  - Convection, conduction and radiation.
  - Insulating methods.
  - Specific heat capacity.
  - Investigations of heat transfer and loss.
  - Modelling homes.
  - U-Values.