Integration 101

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Integration

- What is it?
  - *What do you think? Share an idea or experience with an elbow partner*
  - *A working premise*
- Why do it?
  - Increasing relevance
  - Increasing rigor

The process: Preparation

- Looking at content standards
- Identifying content essential questions
- Finding commonalities between content areas
- Developing an enduring understanding per term

English Language Arts

Content Focus

- Poetry Out Loud
- Memorization/ Recitation
- Tone
- Literary Analysis
- On Demand Essays
- Presentation Skills
- Narrative Essay

English Language Arts

Essential Questions

- To what extent does audience or narrator affect the form and content of a message?
- How does culture influence language and literature?
- How does literature inspire change?
- What is the relationship between an author and his audience, subject, voice, occasion, and purpose?

Content Area Connections

- Social Studies: Scientific revolution and enlightenment – changing models
- Science: Using models of geologic systems
- Math: Using models for extrapolation, conjecture, and proof
- ELA: Audience/narrator affect on the form and content of a message
- CAD: Apply information/design criteria to a new or existing design or model

Enduring Understanding

- Models can be modified to reflect new understandings

The process: Picking a Project

- Tweaking existing projects
- Specifying end products
- Develop rubrics

Integrated Project Example

The National Park Service has provided funding to create roadside interpretative trail markers for people driving from Montana to Washington through the Missoula Flood region.

- Social Studies: Locate geographical feature on map using current technology
- Science: Create a PowerPoint on a specific geologic feature.
- ELA: Write a historical marker for the Great Missoula Flood.

The process: Timeline

- Consider scope and sequence of each course
- Look for natural fit for introduction lesson
- Identify *linked* lessons
- Develop sequence of project lessons

The path forward

- Provide scenario, rubrics, and timeline
- Teachers meet regularly to review progress/adjust timeline
- Check on student progress at scheduled intervals
- Create opportunities for purposeful connections between content areas throughout the project

Processing Pause

- Please take a moment to record ideas and/or questions on sticky notes (one per note)
- I will collect the questions to help inform instruction for the remainder of the presentation

Challenges and Options

What if…

- I don't share all the same students with any other teacher?
- I don't have common planning time with my integration partner?
- ?

Example Project: The Truss

- Big ideas: Models can be modified to reflect new understandings
- Essential questions:
  - Math: How do models allow us to prove that something is true?
  - Science: How do we use models in scientific inquiry?
  - Tech/Eng: How can we use models to test our designs?

Enduring Understandings

- **Enduring Understanding:** Humans create and use models to represent our experiences and share an understanding of reality.
- **Enduring Understanding:** Models can be modified to reflect new understandings
- **Enduring Understanding:** We evaluate and select models to better predict and guide our decisions.

Truss Scenario for Students

- Design, build, and test a new truss design that is less expensive to manufacture, but is still structurally sound and include a right triangle, a parallelogram, at least two congruent triangles, and two similar triangles.
- Apply a load to test your truss strength.
- Write a technical report to communicate your findings to your client.

Truss Project Scenario

(for student)

Project Requirements for Designing Roof Trusses

- The Tate Construction Company has hired the Brazil-Tilson Architecture Firm to design a new truss that is structurally sound and economical. Mrs. Tilson, your boss, has assigned you the job of working with Mr. Brazil to design this truss. He explained that, due to the economy, less people are building new houses. This means less trees are being logged which drives up the price of lumber making it important to be frugal with resources. To complicate matters, fifty years ago, when the logging industry was booming, loggers did not have the foresight to plant trees where they harvested. As an architect, this means that lumber is not available to span long distances; and the available lumber is expensive.

- Costs are too high to continue using outdated truss designs. Instead, it is up to your team to design, build, and test a new truss design that is less expensive to manufacture, but is still structurally sound. You will need to consider cost of materials, cost required to make complex cuts, and the structural integrity of the truss. Also, the truss must span a distance of at least 32 feet, and include a right triangle, a parallelogram, at least two congruent triangles, and two similar triangles. The model is to be built at a ":1' scale. You must submit an excel spreadsheet of your final costs. The team with the best cost to strength ratio wins the contract.

- You will need to construct two identical trusses to be tested together. It's a *roof* truss, so your overall design should resemble a triangle with a connecting platform no more than 1" from the top. This is where the load will be applied to test your truss strength, so be sure to make this part strong. Use the width of the truss breaking device to determine the spacing between your trusses.

Truss Project Scenario
(Key Points)

Project Requirements for Designing Roof Trusses

- You must design, build, and test a new truss design that is less expensive to manufacture, but is still structurally sound.
- Local lumber resources are lacking.
- The price of lumber is up so be frugal with resources.

- The truss must span a distance of at least 32 feet, and include a right triangle, a parallelogram, at least two congruent triangles, and two similar triangles.
- The model is to be built at a ”:1’ scale.
- Include final costs (Excel spreadsheet).

- The team with the best cost to strength ratio wins the contract.

Curriculum links and deepening student understanding

- Math:
  - Angles
  - Inductive and deductive reasoning (proofs)
  - Using functions to make predictions
- Science:
  - Inquiry process
  - Connection to physics of DNA
  - Evolution analysis via physical structure
- Tech/Eng:
  - Construction of houses
  - Using scale models as prototypes

Student Evidence of Learning

- This is a performance assessment that involves:
  - Researching
  - Writing
  - Calculating
  - Drawing
  - Building
  - Scientific testing

Assessment

- Use your standards
  - Each teacher involved will grade the products in terms of the standards for their class
  - Example: Research report may be graded for science content by the science teacher and organization/conventions by the ELA teacher
  - Reference the project within the questions for a unit assessment (test).

Process Q & A

- What questions do you have about the process of developing a mini-integration?

Project Ideas…oh the possibilities

- Generate data in science/examine in math
- Read a novel in ELA/discuss societal implications in SS
- Write a children's book about a topic (can be ELA/sci or ELA/ss or ELA/anything!)
- Write a procedure/user's guide for any tool used in any class
- Explore the science tied to a social problem

Small Group Practice

- Work together to develop a rough description of a mini-integration opportunity
- Select at least two content areas
  - Social studies
  - English language arts
  - Science
  - Mathematics
  - Technology & engineering
  - Music

Sharing your wonderful work

- Find someone from a different working group
- Share your integrated project idea

Q&A time + Next step

- What questions or comments do you have?
- Consider your coworkers: who might you ask to collaborate in a mini-integration?
- Scale up, modification, and sustainability

Timing

- 10 minutes Process (including working definition of “integration” and explain the planning tool)
- 15 minutes Example: the Truss Project
- 5 minutes Q+A for process
- 15 minutes Small Group Practice
- 5 minutes Sharing with a partner from another group (can discuss product and/or process)
- 10 minutes Q+A

=55 minutes