Subtext

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The Motivation Gap

...how students live...

...how students learn...
Personalized Instruction

- Enrichment, Intervention, and Remediation
- Student Ownership of Learning
  - Creators and Curators, not just Consumers
- Application of Skills
  - Life-long Learners
  - Reusable Skills
COLLEGE AND CAREER READY STUDENTS

Kindergarten

High School
The ability to effectively communicate orally and in writing
Critical thinking and analytical reasoning skills
The ability to apply knowledge and skills to real-world settings through internships or other hands-on experiences
The ability to analyze and solve complex problems
The ability to connect choices and actions to ethical decisions
Teamwork skills and the ability to collaborate with others in diverse group settings
The ability to innovate and be creative
Concepts and new developments in science and technology

Source: Hart Research Associates, 2010: Raising the Bar – Employers’ Views on College Learning
CCR and CCSS Framework

• How do you know that?

• Which tools did you use to find the answer?
Summary

• Shift the ways we are asking students to think…

• Surface shifts should lead to cognitive shifts…

• Critical need for real-world problems and assessments aligned to CCSS…

• Culture and morale make the work doable…and technology is a real plus!
Focus

• “significantly narrow and deepen the scope of how time and energy is spent in the math classroom”

• First Step? Simply, far fewer topics
• Coherency

• “carefully connect the learning within and across grades”

• “each standard is not a new event, but an extension of previous learning”

• First Step? Intentioned connections with prior learning and future concepts…learning progressions
...we have been teaching mathematics like cleaning out the attic: one box at a time...
http://learningprogressions.wikispaces.com

RESOURCES
Core Progress Learning Progression - Math

**Geometry**
- Number and Operations — Fractions
- Ratios and Proportional Relationships
- The Number System
- Expressions and Equations
- Statistics and Probability
- Functions

- **Operations and Algebraic Thinking**
- **Number and Operations in Base Ten**
- **Measurement and Data**

- **Algebra I**
  - Relationships between Quantities and Reasoning with Equations
  - Linear and Exponential Relationships
  - Descriptive Statistics
  - Expressions and Equations
  - Quadratic Functions and Modeling

- **Geometry**
  - Congruence, Proof, and Constructions
  - Similarity, Proof, and Trigonometry
  - Extending to Three Dimensions
  - Connecting Algebra and Geometry Through Coordinates
  - Circles With and Without Coordinates

*Contains Suggested Skills

**Instructional Resources**
- Khan Academy
- Math Glossary Terms
- Skill Probes

**Cluster**
- Solve real-life and mathematical problems involving angle measure, area, surface area, and volume (Additional)

**Skill Area**
- Perimeter, Circumference, and Area

**Standards**
- CC CCSS.Math.Cont.7.G.B.6 - Solve real-world and mathematical problems involving area, volume and surface area of two- and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms.

- **Write a simple equation for the measure of an unknown angle in a geometric figure**

- **Solve a problem involving the area of a 2-dimensional shape**

- **Determine the 2-dimensional figure that results from slicing a 3-dimensional shape**

- **Solve a problem involving the area or circumference of a circle using the appropriate formula**

- **Relate circumference to the area of a circle**

- **Write a simple equation for the measure of an unknown angle in a geometric figure**

- **Solve a problem involving the surface area or volume of a 3-dimensional object**

*Designates a focus skill
• Rigor is increasing the level of expectation of what you are already doing.

• True – False?
• “Students are expected to have speed and accuracy with simple calculations”

• “Teachers structure class time and/or homework time for students to **memorize**, through **repetition**, core functions…”

• **First step? Emphasize learning math facts to achieve **TOTAL EFFORTLESS RECALL**!**
Deep Understanding

- Hong Kong’s performance on the TIMSS: ½ the concepts of US…
- Coleman, “syncopation”
- “The math level of the SAT is not necessarily high, it’s the syncopation.”
Put Me In, Coach! Getting in the Quantitative Game with Fantasy Football

By PATRICK HONNER and HOLLY EPSTEIN OJALVO

Calculating Car Costs

Use data from The Times's Automobiles section to create a model for how quickly cars lose their value.

Use the Used Car Search to collect price information on specific makes and models of cars. Select your automobile, get your list of prices (for example, there are nearly 20,000 Ford Explorers for sale nationwide), and create a scatter plot with "year" on the horizontal access and "price" on the vertical access.

Use the graph and your data to explore questions like "How much value does a used car lose per year?" and "When does an automobile depreciate fastest?" Use technology like a graphing calculator or a computer spreadsheet to generate a possible function that models this data. Use the model to project the value of a new car two, three or ten years from now. Set up equations to solve questions like "After how long will the car be worth 50 percent of its original value?"

Ratchet up the reality and complexity by compensating for the differences in new car prices and inflation. Go deeper by exploring questions like "Do SUVs lose value faster than sedans?" and "Which cars are the best long-term investments?"
N Ways to Apply Algebra With The New York Times

By PATRICK HONNER
…with Dan Meyer’s Three Act Tasks and MARS Tasks

- **Three Act Tasks**
  - Middle School
  - Algebra I and II
  - Geometry

- **MARS Tasks**
  - Algebra
  - Geometry
• Teach for Transfer
Horseshoes in Flight
Student Activity Sheet

As shown in the graph, the height of a thrown horseshoe depends on the time that has elapsed since its release. (Note that this graph of the horseshoe’s height is parabolic, but it is not the same as the graph of the horseshoe’s flight path.)

The height of the horseshoe (measured in feet) as a function of time (measured in seconds and represented by the variable $t$) from the instant of release is

$$1 \frac{3}{16} + 18t - 16t^2.$$ 

The expressions (a)–(d) below are equivalent:

(a) $1 \frac{3}{16} + 18t - 16t^2$

(b) $-16(t - \frac{19}{8})(t + \frac{1}{8})$
• Students learn about fractal geometry by reading Ivars Peterson and Nancy Henderson’s *Math Trek: Adventures in the Math Zone* and then generate their own fractal geometric structure by following the multistep procedure for creating a Koch’s curve. [RST.6–8.3]
Literacy is the shared responsibility of every teacher in the building.
Building Knowledge in the Disciplines

- **Balance your Reading Lists**

- 70/30

- **Appendix B** – Exemplars and Performance Tasks for each grade level...valuable to all content areas...

- Build on and activate prior knowledge
• Understand the different skills involved...
• Students analyze Thomas Jefferson’s Declaration of Independence, identifying its purpose and evaluating rhetorical features such as the listing of grievances. Students compare and contrast the themes and argument found there to those of other U.S. documents of historical and literary significance, such as the Olive Branch Petition. [RI.11–12.9]

• Students cite specific textual evidence from Annie J. Cannon’s “Classifying the Stars” to support their analysis of the scientific importance of the discovery that light is composed of many colors. Students include in their analysis precise details from the text (such as Cannon’s repeated use of the image of the rainbow) to buttress their explanation. [RST.9–10.1].
The Gates Project -- Central Park, New York City -- Art -- Mathematics -- Science

“The Gates will be a golden ceiling creating warm shadows. When seen from the buildings surrounding Central Park, The Gates will seem like a golden river appearing and disappearing through the bare branches of the trees and will highlight the shape of the footpaths. The luminous moving fabric will underline the organic design of the park, while the rectangular poles will be a reminder of the geometric grid pattern of the city blocks around the park.” -- Christo and Jeanne-Claude

The official title -- "The Gates, Central Park, New York, 1979-2005" -- refers to the artists' conception of the idea 26 years ago. Celebrated artists Christo and Jeanne-Claude unfurled THE GATES, PROJECT FOR CENTRAL PARK 1979-2005, on February 12. On Friday, February 11 at the top of the gates, were bundled up, 1,089,882 square feet of saffron fabric. On Saturday, February 12 the cocoons were opened to reveal fabric panels hanging seven feet above the ground.

The Gates Project is not just a great Art Exhibit; it is an opportunity for teachers to integrate Art with Mathematics and Science.
Regular practice with complex text

ATOS for Text

This option works best for short stories, magazine and newspaper articles, test items, and other classroom materials.

Submit Text
Engage with Complex Texts…and Academic Language

Academic Language
Academic Vocabulary

• By “focusing strategically on comprehension of pivotal and commonly found words and less on esoteric literary terms, teachers constantly build students’ ability to access more complex texts across the content areas.”
• What is the First Step?
WHICH WORDS MATTER?

Some experts recommend that educators ask themselves a series of questions on how to prioritize vocabulary words in a story they are teaching their students. For example, the class will read a story next week including the words “platypus,” “principle,” and “baby.”

SOURCE: Education Week
• **Tier Two Words for HS**

Tier 1: Basic and General Vocabulary

Tier 2: Across Content Areas; Multiple-Meaning Vocabulary

Tier 3: Low Frequency, Context-Specific Vocabulary
• Merge fiction, non-fiction, documentaries, media…

• Read several items on a single topic…encounter domain-specific words…and tier two words that support complex texts and ideas…across the content areas…

• Organize readings in every subject so each text bootstraps the language and knowledge needed for the next. Gradually, students will be ready for texts of greater complexity.
Extract and Employ Evidence
The Casual Couture of the Average American

INTRODUCTION

This family would never have dreamed of traveling in sweatpants and hoodies. Hulton Archive

It wasn’t long ago that we wore suits and dresses on planes, in restaurants or at the theater. Now for many of us, jeans suffice. There are even office-appropriate yoga pants, while tailored sweatpants made an appearance at Mercedes-Benz Fashion Week last fall.

DEBATERS

The ’60s Changed Everything

JONATHAN WALFORD, FASHION HISTORY MUSEUM

Liberated from stuffy tradition, post-’60s style was reinvigorated at a grassroots level. But soon a disdain for artificiality, a desire for comfort, and just plain slovenliness won out.

Sartorial Decisions Have Repercussions

KAREN J. FINE, FASHION PSYCHOLOGIST

Psychological research confirms not only that we are what we wear, but that we become what we wear. So dress with caution, or a conscience.

Free Your Style, Free Your Thoughts

KRIS GALE, YAMMER

Formal dress puts an emphasis on formality and presentation. But modern business requires information to be rapidly shared with minimal fuss.

Clothes Complete the Brand

TROY ALEXANDER, BLOGGER

How many times have you been called into a meeting or run into an ex? Didn’t you wish you’d been wearing something more put together?
You Like Me! You Really Like Me!

INTRODUCTION

A Times article recently debated whether young people are more narcissistic than previous generations, mentioning Facebook as a possible factor. And a University of Michigan study, published in June, seems to support this theory.

Are social media like Facebook turning us into narcissists?

READ THE DISCUSSION »
## Evidentiary writing

### Distribution of Communicative Purposes by Grade in the 2011 NAEP Writing Framework

<table>
<thead>
<tr>
<th>Grade</th>
<th>To Persuade</th>
<th>To Explain</th>
<th>To Convey Experience</th>
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<tr>
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<td>40%</td>
<td>20%</td>
</tr>
</tbody>
</table>

“Hidden Skills”

• Digital Reading and Writing and CCSS
  – Use Dictionary feature
  – Effectively annotate
  – Respond to online prompts
  – Create, consume, share
  – Highlight and Tag
  – Access and infuse multi-media
    • Enrichment
    • Remediation
Tagging helps in supporting claims and citing evidence…
Sample: Quick Annotation Strategy

- ? = Ask a question
  “The text mentions a the DNA study. What does DNA stand for?”

- !!! = Note an interesting passage
  “I didn’t realize that tapeworms can grow to 23 meters!”

- C = connection to another text or piece of evidence
  “The Ebola virus is like the AIDS virus we read about yesterday because…."

- (check) = Access prior knowledge; I already knew that!
  “I knew that photosynthesis required water.”

- X = Challenge your own thinking, new information
  “I had no idea that Nobel invented dynamite.”

- * = Reason that looks important
  “I’ll need this piece of evidence about Triceratops to support my thesis.”

- "Box it" = Remember words you don't know, are repeated, or you just like
  “I’ve seen the word ignominious several times, and I need to look it up.”
CCSS Strategies in All Content Areas

- Unpack the Standard(s) and determine skills students must master.
- Differentiate instruction with personalized plans for each student.
- Dissect lessons and model how to achieve results.
- Provide complex texts and vocabulary instruction across all content areas.
- Model writing daily and provide all forms throughout the curriculum.
- Require justification and evidence for answers.
- Infuse instruction with cross-curricular concepts to embed key ideas and vocabulary.
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