

# DESIGNING FOR INTELLECTUAL COHERENCE

## KEY COMPONENTS TO INCLUDE

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## KEY COMPONENTS

- Clear agreement on exit standards
- Standards need to integrate content knowledge & thinking skills and habits of the mind
- Cross-disciplinary discussion should take place
- Curriculum needs to be progressively more challenging intellectually
- Culminating projects need to have intellectual challenge
- Scoring guides will set criteria for key student work

## ENGLISH

- Department needs to agree on texts, purpose of using each, analysis that will be used on each, how they connect, what genres they represent
  - Students need to be taught generalize these skills to new texts
- Agreement on expectations for student writing need to be established with exemplars available
  - Writing should be developed progressively over 4 years
- Guidelines for proofing and editing should be established
  - Students should edit and rewrite regularly
- Students should write in a variety of courses--not just English alone
  - English department can help other subject areas set guidelines

## ENGLISH (CONTINUED)

- Research skills, including formulating questions & developing a plan should be taught
- Students can be taught how to employ supporting evidence, quotations, paraphrasing, citations, etc.
- Overt instruction for avoiding plagiarism is critical
- Lessons on evaluating credibility of sources should be included
- Research papers don't have to be longer, but may be more complex and more frequent
- Evaluations of student writing in particular should be honest and frank without being discouraging

## MATHEMATICS

- Make sure students practice using basic mathematical operations so they use them automatically & consistently, for example:
  - Adding and subtracting fractions
  - Dividing without using a calculator
  - Using exponents & scientific notation
  - Knowing correct order of arithmetic
- Algebra must be understood well enough to apply procedurally & conceptually
  - Students might determine compound interest or solve a time-distance problem, for example

## MATHEMATICS (CONTINUED)

- Basis trigonometric principles need to be understood
  - Know definitions of sine, cosine, and tangent using right angle geometry and similarity relations
  - Recognize graphs of periodic functions
  - Know identities for sum and difference of angles
- Basic understanding of plane and solid geometry
  - Similarity and congruence
  - Techniques for figuring area & perimeter
  - Formulas for volume & surface area of 3-dimensional objects
  - Apply knowledge to real-world applications
  - Understand relationship between geometry & algebra

### MATHEMATICS (CONTINUED)

- Mathematics content area needs to be viewed by student and teacher as a set of tools to the development of mathematical reasoning
- Reasoning skills include formulating inductive and deductive lines of logic
- Students should be able to represent mathematical problems in multiple formats & solve multi-step problems
- Key to college success is being able to make connections between mathematics and other disciplines

### SCIENCE

- Science curriculum needs to be closely connected & integrated with the high school mathematics program
  - Teachers can require application of both subjects to solve a problem.
- Problem solving, knowledge of statistics, knowing how to select appropriate units of measurement, estimating and converting from US to the metric system are essential
- Tools to conduct investigations--the ability to think experimentally and how the scientific process can be employed must be included

### SCIENCE (CONTINUED)

- The role of science in society needs to be a focus. Students need to understand how scientific theory influences how people think & how societies & governments use science as they develop policy
- Labs need to reinforce inquisitiveness and genuine curiosity and not be exercises where the experiments yield one possible result that are written in a lab manual

### SOCIAL SCIENCE

- Coherence in Social Sciences requires extra thought and planning because students usually choose the social science courses they want to take
- Curriculum developers need to insure that in addition to core knowledge all courses include foundational cognitive skills:
  - Reading for meaning
  - Writing frequently
  - Conducting research
  - Interpreting charts & graphs

### SOCIAL SCIENCE (CONTINUED)

- Social Science courses offer opportunities to include the research skills that English courses also include:
  - Formulating and developing research questions
  - Quoting, summarizing, paraphrasing correctly
  - Correct citation of sources
  - Determining credibility of sources
- Analytic thinking is the key cognitive skill in the social sciences
  - Information is not gathered as an end in itself but in the service of the scientific method as practices in the social sciences.