Worthington Schools

"Understanding the Changing Science Curriculum"

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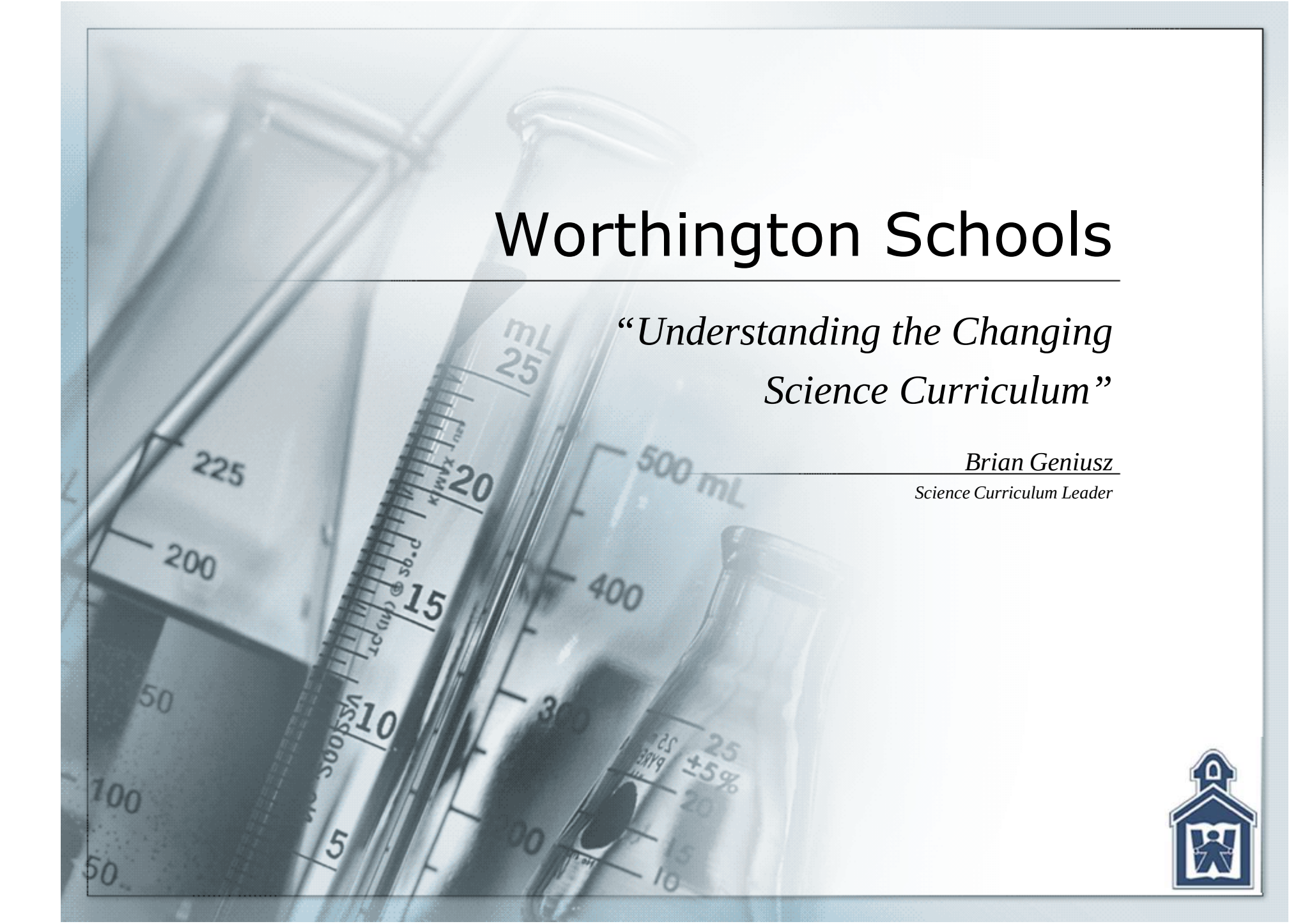


Science Curriculum K-8

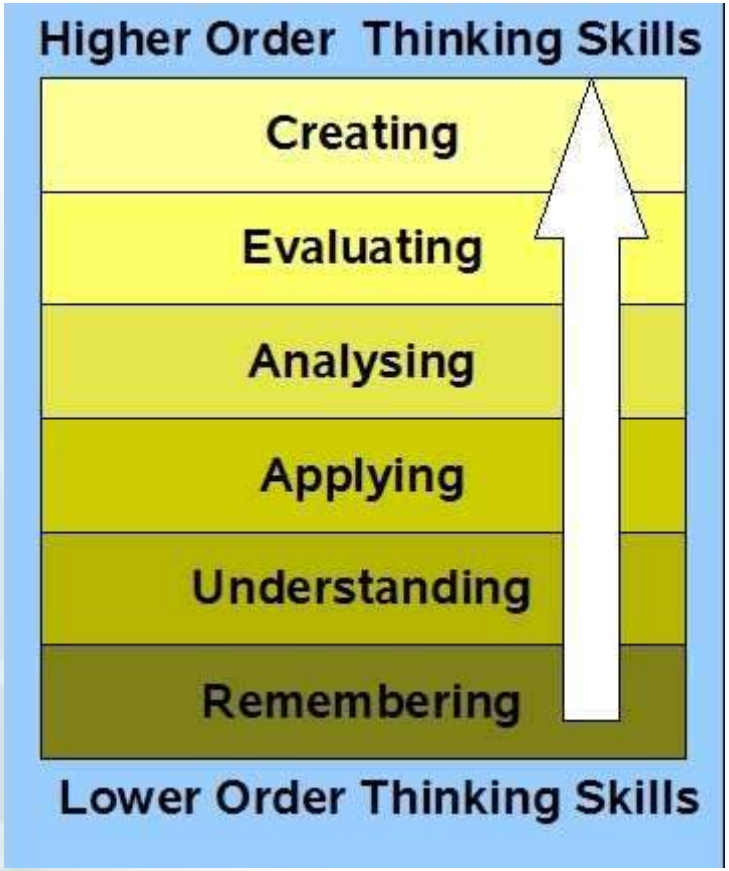
- Earth and Space Science
- Life Science
- Physical Science

Science Curriculum - High Schools

- P.E.S.S. → Physical Science
- B.E.S.S.→ Biology
- Additional versions available:
  - Honors
  - S.T.E.M.

How is the Science Curriculum Changing?

- Ohio's New Learning Standards: K-12 Science
- More Rigorous
- Higher Order Thinking Skills



How is the Science Curriculum Changing?

- **Inquiry and Application** - Scientific inquiry is a powerful way of understanding science content. Students learn how to ask questions and use evidence to answer them. In the process of learning the strategies of scientific inquiry, students learn to conduct an investigation and collect evidence from a variety of sources, develop an explanation from the data, and communicate and defend their conclusions.

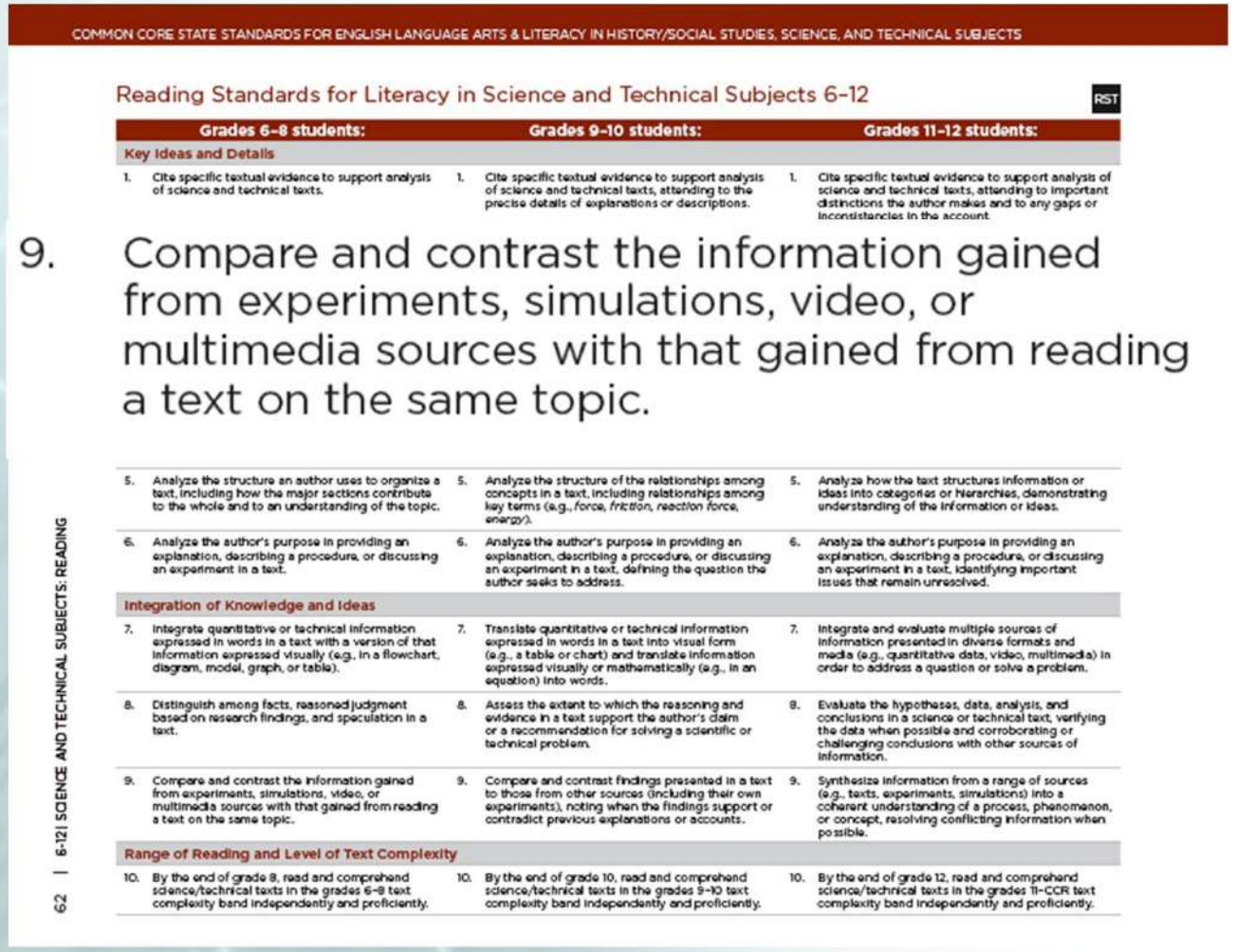
How is the Science Curriculum Changing?

- Designing Technological/ Engineering Solutions using Science Concepts
  - Technological Design is to help students learn how to take an idea and then make it happen.

How is the Science Curriculum Changing?

- Demonstrating Science Knowledge
- Interpreting and Communicating Science Concepts
- Recalling Accurate Science

How is the Science Curriculum Changing?



COMMON CORE STATE STANDARDS FOR ENGLISH LANGUAGE ARTS & LITERACY IN HISTORY/SOCIAL STUDIES, SCIENCE, AND TECHNICAL SUBJECTS

Reading Standards for Literacy in Science and Technical Subjects 6–12 RST

Grades 6–8 students:	Grades 9–10 students:	Grades 11–12 students:
Key Ideas and Details		
1. Cite specific textual evidence to support analysis of science and technical texts.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to the precise details of explanations or descriptions.	1. Cite specific textual evidence to support analysis of science and technical texts, attending to important distinctions the author makes and to any gaps or inconsistencies in the account.

9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.

5. Analyze the structure an author uses to organize a text, including how the major sections contribute to the whole and to an understanding of the topic.	5. Analyze the structure of the relationships among concepts in a text, including relationships among key terms (e.g., *force, friction, reaction force, energy*).	5. Analyze how the text structures information or ideas into categories or hierarchies, demonstrating understanding of the information or ideas.
6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text.	6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, defining the question the author seeks to address.	6. Analyze the author's purpose in providing an explanation, describing a procedure, or discussing an experiment in a text, identifying important issues that remain unresolved.
Integration of Knowledge and Ideas		
7. Integrate quantitative or technical information expressed in words in a text with a version of that information expressed visually (e.g., in a flowchart, diagram, model, graph, or table).	7. Translate quantitative or technical information expressed in words in a text into visual form (e.g., a table or chart) and translate information expressed visually or mathematically (e.g., in an equation) into words.	7. Integrate and evaluate multiple sources of information presented in diverse formats and media (e.g., quantitative data, video, multimedia) in order to address a question or solve a problem.
8. Distinguish among facts, reasoned judgment based on research findings, and speculation in a text.	8. Assess the extent to which the reasoning and evidence in a text support the author's claim or a recommendation for solving a scientific or technical problem.	8. Evaluate the hypotheses, data, analysis, and conclusions in a science or technical text, verifying the data when possible and corroborating or challenging conclusions with other sources of information.
9. Compare and contrast the information gained from experiments, simulations, video, or multimedia sources with that gained from reading a text on the same topic.	9. Compare and contrast findings presented in a text to those from other sources (including their own experiments), noting when the findings support or contradict previous explanations or accounts.	9. Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
Range of Reading and Level of Text Complexity		
10. By the end of grade 8, read and comprehend science/technical texts in the grades 6–8 text complexity band independently and proficiently.	10. By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.	10. By the end of grade 12, read and comprehend science/technical texts in the grades 11–CCR text complexity band independently and proficiently.

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Timeline

Science				
2010-11	2011-12	2012-13	2013-14	2014-15
K		New Standards		
1		New Standards		
2		New Standards		
3		New Standards		
4			New Standards	
5			New Standards	
6		New Standards	New Standards	
7			New Standards	
8			New Standards	
9			New Standards	
10			New Standards	
11				New Standards
12				New Standards

How to best prepare students.

The Four Levels of Inquiry and the Information Given to the Student in Each one.

Source: Rezba, R.J., T. Auldridge, and L. Rhea. 1999. Teaching & learning the basic science skills

	Inquiry Level	Question	Procedure	Solution
1	**Confirmation Inquiry** – Students confirm a principle through an activity when the results are known in advance.	✓	✓	✓
2	**Structured Inquiry** – Students investigate a teacher presented question through a prescribed procedure.	✓	✓	
3	**Guided Inquiry** – Students investigate a teacher presented question using students' designed/selected procedures.	✓		
4	**Open Inquiry –** Students investigate questions that are students formulated through students designed/selected procedures.