

CCR Standards and Science in GED® Classes

What's assessed and the types and layout of questions

GED® Assessment Guide for Educators

- Your one stop shop for references
 - Overview
 - Item types
 - Item layouts
 - Item samplers
 - DOK
 - Assessment Targets for all content areas
 - Scoring and reporting information

<http://www.gedtestingservice.com/uploads/files/8c13f2e71e85447c9c4caff12b4cf943.pdf>

Factors that influence instruction

- 2014 GED® Science Assessment targets (what students need to know and be able to do to pass the test)
<http://www.gedtestingservice.com/uploads/files/d8bef199afb6e69eda035cb4643cf9d2.pdf>
- 2013 College and Career Readiness Standards (ELA/Literacy & Math)
<https://lincs.ed.gov/publications/pdf/CCRStandardsAdultEd.pdf>
- 2011 The National Research Council's A Framework for K-12 Science Education: Practices, Cross-cutting Concepts and Core Ideas (aka Next Generation Science Standards) <http://www.nextgenscience.org/framework-k%E2%80%9912-science-education>

Shifts / Advances

- ELA/Literacy/Reading Standards Advances
 - Complexity
 - Evidence
 - Knowledge/informational reading
- Science Standards Advances
 - Disciplinary Core Ideas
 - Practices
 - Cross-cutting Concepts

Depth of Knowledge

- Level 1: Recall and reproduction
 - Recall facts, use a well-known formula, perform a routine procedure or process, perform a clearly defined set of steps
- Level 2: Skills and Concepts
 - Explain relationships, examples/non-examples, organize/represent/compare data, make observations, interpret information
- Level 3: Strategic Thinking
 - Interpret information from a complex graph, use reasoning, planning and evidence, justify a response, develop a scientific model, complete a multi-step problem that involves reasoning
- Level 4: Extended reasoning

What is the DOK level?

- What vertical force holds an airplane up?
- Which of the following studies is most likely to yield information that might help to solve the specific problem of freezing whole organs for transplant?
- Choose the image of the organism below that displays a radially symmetrical body plan.

The Scientific Method

- Observe/Research
- Define Problem
- Formulate a Hypothesis
- Gather Evidence/Experiment
- Collect and Analyze Results
- Form a Conclusion

Designing a simple investigation

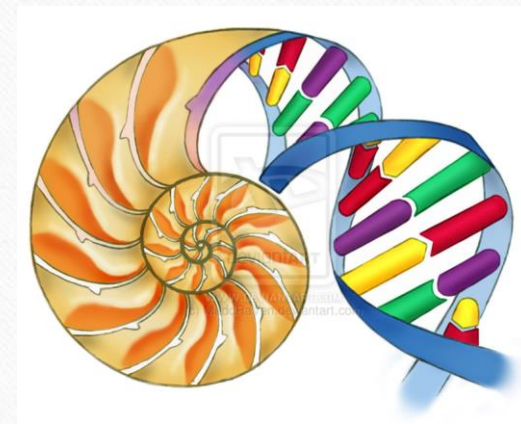
- Investigate changes in states of matter.
 - What do students need to know before beginning?
 - What do they want learn?
 - What do they think will happen?
 - What materials will they need?
 - What data will be collected?

It's not a waste of time to do activities in Science

- The more you DO, the more you LEARN
- Engagement + Purpose = Learning
- Pyramid of Integration
 - Audio (listen, lecture) 5%
 - Visual (see, powerpoint, videos) 10%
 - Info gathering (research) 20%
 - Communication (speaking & listening) 40%
 - Practice & Production (making, doing) 70%
 - Processing, Creating, Applying 90%

Life Science (40%)

- Human Body & Health
- Relationship between Life Functions & Energy Intake
- Energy Flows in Ecologic Networks (Ecosystems)
- Organization of Life (Structure & Function of Life)
- Molecular Basis for Heredity
- Evolution



How to make Life Science come alive

- Conduct an investigation on the impact of exercise on heart rate for people of different genders, ages or body types.
- Have students research the impact of removing a natural predator from an ecosystem.
- Have students collect photos of family members to investigate inherited features.

Physical Science (40%)

- Conservation, Transformation and Flow of Energy
- Work, Motion and Forces
- Chemical Properties and Reactions Related to Living Systems



Making Physical Science come alive

- Drop balls of different sizes and densities
- Investigate how simple machines work
- Experiment with different parts in solution (solubility)

Earth and Space Science 20%

- Interaction between Earth's Systems and Living Things
- Earth and its System Components and Interactions
- Structures and Organization of the Cosmos



Making Earth & Space science come alive

- Have students research the effects of major weather events that have been in the news such as Hurricane Katrina or Superstorm Sandy.
- Investigate significant physical features on the earth such as the Grand Canyon, the Himalayas, or the ocean trenches to describe the variety of features and how they came to be.
- Have students model the structures and distances in the solar system.

That's a lot of content!!

- Focusing themes
 - Human Health and Living Systems
 - Energy Related Systems
- Practices
 - Universal
 - Cross-cutting
 - Content neutral

Focusing themes

- Designed to represent a wide range of important concepts and ideas
- Focus on a distinct sub-set of ideas within each content topic
- Human Health and Living Systems
 - Human body and health, structure of life, heredity, evolution
 - Chemical properties, chemical reactions in living things
 - Interaction of earth and living things
- Energy and Related Systems
 - How energy flows in ecosystems, food as energy
 - Work, motion and forces
 - Structure and organization of the cosmos

Focusing Themes sort

Human Body and Health

Conservation, transformation and flow of energy

Evolution

Heredity

The earth

The cosmos

Chemical properties in living systems

The Practices

- Comprehending Scientific Presentations
- Investigation Design (experimental and observational)
- Reasoning from Data*
- Evaluating Conclusions with Evidence
- Working with Findings
- Expressing Scientific Information
- Scientific Theories*
- Probability and Statistics*

*High Impact Indicators

Science Practices specific to Science

- SP.1. Comprehending Scientific Presentations
- SP.2. Investigation Design (Experimental and Observational)
- SP.6. Expressing Scientific Information
- SP.7. Scientific Theories

Science Practices with broad generalizations

- SP.3. Reasoning from Data
- SP.4. Evaluating Conclusions with Evidence
- SP.5. Working with Findings
- SP.8. Probability and Statistics

Interpreting graphics

- Collecting, organizing, displaying and interpreting data is a critical skill
- Science content frequently presented in pictures/photos, diagrams and models
- http://oceanservice.noaa.gov/education/pd/climate/teachingclimate/using_graphical_data.pdf activities for creating pie, line, bar and scatter plot graphs
- http://www.sciencebuddies.org/science-fair-projects/project_data_analysis.shtml
Science Buddies has checklists for graphs

Online science experiment simulations

- <https://phet.colorado.edu/> Free educational **simulations** covering a diverse topics designed by the University of Colorado available in various languages.
- <https://www.csun.edu/science/software/simulations/simulations.html> Cal State Northridge. Simulations and animations, library of Internet resources for scientific reasoning, problem-solving and research skills
- <http://www.weareteachers.com/blogs/post/2012/12/18/10-interactive-science-simulations> We are Teachers. Handpicked science simulations and simple experiments online.

Bang for your buck

- Test items always align a practice with content
- With so much content to choose from, limited class time is well spent equipping students with skills and strategies (practices) that will be used across all content
- Half of the test items will have a textual or graphic stimulus to inform two or three items (GED Testing Service, 2010. Assessment Guide for Educators, 2.40)

Instructional implications

- Instruction needs to be more than read the content and answer questions.
- Look for opportunities for inquiry: open-ended questions with multiple possible answers.
- Set up learning stations to help cover more content and have students share what they learned.

A few parting hints

- Spend some time on the Science Practices in each lesson.
- Use the content to provide a context.
- Model and scaffold to build student confidence and skills so that each student is equipped with strategies to tackle a question even if their content knowledge is weak.
- Use Science content regularly when teaching Reading objectives.

Questions?

- I will respond to any of the questions that were entered into the chat box feature during the presentation

- Please take an evaluation survey on this presentation:

<https://www.surveymonkey.com/r/ECAAdultEd1516>