

# Rocks & Minerals

## Division C

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# EVENT DESCRIPTION

- A team of up to 2 will demonstrate knowledge of rocks and minerals
- Writing implements, fingernails, hand lenses, and resources are allowed
- Test format will be stations
- HCl will *not* be used during testing
- Samples will be taken from the official NSO list, unless otherwise noted



# EVENT TOPICS

- Specimen identification
- Rock cycle
- Properties of minerals
- Mineral groups
- Economic importance
- Formation and properties of igneous, sedimentary, and metamorphic rocks
- Clues to past environments
- Composition and structure of minerals
- Bowen's reaction series



# 2007 Official Science Olympiad Rock and Mineral List

- Specimens must be taken from this list
- Exception: Tournament Directors may include up to five additional specimens important to their own state
- Teams must be notified six weeks before the tournament



# Minerals

- Similar to last year's list
- Albite [Plagioclase] became Albite [Plagioclase Group]
- Feldspar [Orthoclase] became Feldspar [Orthoclase Group]
- Tourmaline became Tourmaline Group
- Quartz [Chert/Flint] became Chert in the Rocks list
- Magnetite (spelling)



# Rocks

- Igneous rocks are unchanged
- Metamorphic rocks are unchanged
- Sedimentary rocks:
  - Chert has been added
  - Dolomite rock may also be called Dolostone
  - Lignite has become Lignite Coal



# OUTLINE

- A sample outline has been provided as a suggestion of how to cover the material
- Find what works for your group
- Look in texts, on internet, find syllabi from fellow teachers or online
- Make sure all of the topics are covered



# Minerals

- Definition
- Organization
- Properties
- Origins
- Economic uses



# Rocks

- Definition
- Rock cycle
- Igneous rocks
- Sedimentary rocks
- Metamorphic rocks
- Past environments
- Economic uses



# COACHING TIPS

- Practice! A lot!
- Weekly quizzes
- Arranging specimens
- Charts
- Diagrams
- Binders
- Resources
- Mnemonic aids



# Practicing

- Give lots of quizzes – even if they're only 5 samples!
- Have kids make quizzes
- Use flash cards
- Have samples available at every practice and whenever kids want to study (study hall?)
- Have kids quiz each other and ask associated questions
- Play pictionary, hangman, charades, anything



# Weekly Quizzes

## Start easy

Azurite, biotite, calcite, copper, galena, graphite, malachite, pyrite, sodalite, sulphur, granite, pumice, conglomerate, lignite coal, fossiliferous limestone

## End hard

Albite, apatite, aragonite, beryl, bornite, calcite, celestite, dolomite, alabaster gypsum, halite, onyx quartz, milky quartz, tremolite, quartzite, marble



# Arranging Specimens

- By hardness
- By metamorphic grade
- By sedimentary grade
- In groups
  - By composition
  - By crystal structure
  - By origin
  - By economic use



# Charts

- Have the team make charts for anything you or they can think of!
- Physical properties, origins, economic uses, etc.
- Excel is good for these
- Combine charts
- Color code
- Laminate



# Diagrams

## Igneous features

Batholiths, dikes, sills, etc.

Bowen's reaction series

## Metamorphic features

regional vs. contact metamorphism

temperature/pressure graph

## Sedimentary features

large scale – formations, strata

small scale – cross bedding, ripple marks, etc.



# Binders

- Each student should make his/her own binder
- They must be familiar with it and *speedy*
- Organization is key
- Provide notes and handouts, but the best binders have things the students have found on their own
- Tabs and colored handouts help
- Have binder checks and quizzes



# Resources

- The student binder is the most important!
- A guidebook with which the students have practiced
- Text of your choice
- Additional miscellaneous resources
  - Rock and Mineral list, colored and laminated
  - Periodic table
  - Charts and diagrams



# Mnemonics

- Lists:
  - Common crustal elements by weight:  
OSiAlFeCaNaKMg
- Sentences:
  - Mohs Hardness Scale – “Two Girls Came From Alaska Feeling Quite Troubled”
- Root words:
  - Albite -- Albino



# MAKING TESTS

- Choose specimens that have typical characteristics
- Put one or more specimens per station
- Pair supplemental questions with specimens
- Provide information if necessary (HCl, hardness, etc.)
- Provide equipment if necessary (hand lens, magnet, etc.)
- Label so specimens can't be mixed up!
- Try to cover all topics reasonably evenly
- Work out the traffic pattern and label it
- Indicate tiebreakers, but include them in the regular score
- Optional – include a section students can work on without being at a station
- Clearly convey expectations at beginning of test



# PUTTING TOGETHER A TEAM

- Have more than 2 students per team practicing
- Pair your strengths (both identification and concepts)
- Have students practice together
- Choose which resources will be used
  - Make sure they fit in the 12"x12"x3" box
- Be sure the students will support each other
  - Both students should contribute
  - If one is more dominant in the event, he/she should be a mentor, not just take over



# TEST-TAKING STRATEGIES

- Know the event! (rules and format)
- Know the subject! (concepts and identification skills)
- Talk quietly (the competition may be listening)
- Divide the work
- Don't mix up the specimens
- Don't leave your resources behind
- Don't panic if a station is left unfinished
  - Take notes and try to finish while at another station



# RESOURCES

- Rock & Mineral Guide
  - Try several to see what the students like
  - One or two might fit in the 12"x12"x3" box
- Suggestions
  - National Audubon Society Field Guide to North American Rocks and Minerals
    - ISBN 0-394-50269-8
  - Smithsonian Handbooks: Rocks & Minerals by Chris Pellant (also called Eyewitness Handbook or DK)
    - ISBN 1-56458-061-x
  - A Field Guide to Rocks and Minerals by Frederick H. Pough (Peterson Field Guides)
    - ISBN 9780395910962 or 039591096X



# RESOURCES

- Text
  - Aim for high school or freshman college level
- Suggestions
  - Putnam's Geology by Birkeland & Larson
    - ISBN 0195055179
  - The Earth Through Time by Harold Levin
    - ISBN 0-7216-5735-4
  - Earth by Press & Siever
    - ISBN 0-7167-1743-3
  - Exercises in Physical Geology by Hamblin & Howard
    - ISBN 013144770x
  - Manual of Mineralogy by Hurlbut & Klein (advanced level)
    - ISBN 0-471-80580-7



# RESOURCES

- Other suggestions
  - Quick Study BarChart: Rocks & Minerals
    - ISBN 157222561-0
  - Periodic Table
    - laminated
  - 2007 NSO Rocks & Minerals list
    - laminated
  - Geologic map of your state
  - Don't forget the websites at <http://www.soinc.org/events/rocksnmin/index.htm>
  - Bowen's reaction series - <http://gly1000-01.su01.fsu.edu/ig/lg8.html#HERE>



# RESOURCES

- Places to find samples to study:
  - High school geology classes
  - Local colleges or universities (geology or education departments)
  - Local rockhound societies or individuals
  - State Geological Surveys
  - Swap sets with other schools to vary samples



# SUMMARY

- Assemble and get to know the resources
- Practice identification
- Assemble teams that can work together
- Keep a sense of humor
- Have fun! Rocks are cool!

