

2023 Academic Super Bowl  
Senior English  
Study Guide  
The Age of Exploration



- I. Drama - 40%
- A. *The Tempest* by William Shakespeare, Folger Shakespeare Library  
ISBN 9 78073 482837
- II. Novel - 40%
- A. *Caleb's Crossing* by Geraldine Brooks  
ISBN 978-0-14-312107-7
- III. Poetry - 20%
- A. "Eagle Poem" by Joy Harjo  
<https://www.poetryfoundation.org/poems/46545/eagle-poem>
- B. "Ozymandias" by Percy Bysshe Shelley  
<https://www.poetryfoundation.org/poems/46565/ozymandias>
- C. "The Author to Her Book" by Anne Bradstreet  
<https://poets.org/poem/author-her-book>
- D. "You Laughed and Laughed and Laughed" by Gabriel Jibaba Okara  
<https://theafricanbookreview.com/2014/05/09/you-laughed-and-laughed-and-laughed-gabriel-okara/>

Study Outlines are developed from ideas submitted by coaches and question writers.

Please email ideas for the 2024 contest, *The 1980's and 1990's: The End of the Millenium* to Jill Slinker at [jslinker@iasp.org](mailto:jslinker@iasp.org)

2023 Academic Super Bowl  
Senior Fine Arts  
Final Study Guide  
The Age of Exploration



- I. Music - 50%
- A. Basics of Music (50% of music questions)
1. *cantus firmus*
  2. counterpoint (general term and species)
  3. motet
  4. madrigal
  5. mass/Renaissance mass
  6. musical textures (monophony, homophony, polyphony)
  7. vihuela
  8. villancico
- B. Music of Iberia (50% of music questions)
1. Leonora Duarte
  2. Luis de Milán
  3. Cristóbal de Morales
  4. Tomás Luis de Victoria
- II. Visual - 50%
- A. Artists
1. El Greco
  2. Pedro Berruguete
  3. Alonso Sanchez Coello
  4. Diego de Velazquez
  5. Francisco de Zurbaran
  6. Jusepe de Ribera

Sources: Music - *Wikipedia*

All music for the competitions comes from YouTube, except for that of Leonora Duarte, which comes from *Wikipedia*.

Spanish Painting: 1200-1665 by Emma Hansen

Visual Art: *Spanish Painting 1200-1665* by Emma Hansen (although the question writer used this book, it is not required to purchase for this contest as images may be researched on the web)

Study Outlines are developed from ideas submitted by coaches and question writers.

Please email ideas for the 2024 contest, *The 1980's and 1990's: The End of the Millennium*, to Jill Slinker at [jslinker@iasp.org](mailto:jslinker@iasp.org)

2023 Academic Super Bowl  
Senior Math  
Final Study Guide  
The Age of Exploration



- I. Algebra - 28%
  - A. Rational Functions
    - 1. Simplifying and Basic Operations (+, -, x, /)
    - 2. Asymptotes (slant, vertical, and horizontal)
  - B. Solving Rational Equations and Inequalities
  
- II. Logic and Set Theory - 20%
  - A. Logic
    - 1. Basic definitions: propositions, conditional statements, tautologies, identities, negation
    - 2. Compound statements, converse, contrapositive, conjunction, disjunction, and truth tables
  - B. Set Theory
    - 1. Set properties and definitions
    - 2. Intersection, union, subset, complement
    - 3. Venn diagrams
  
- III. Geometry - 20%
  - A. Volumes
    - 1. Right solids - prism, pyramid, cylinder, cone
    - 2. Frustums of pyramids and cones
    - 3. Spheres
  
- IV. Spherical Trigonometry - 16%
  - A. The spherical triangle - angles and sides
  - B. Parts of a right spherical triangle - Napier's circle
  - C. Parts of oblique triangles, including the ambiguous cases
  - D. Spherical excess and area
  
- V. Enrichment Topics - 16%
  - A. Navigation
    - 1. Latitude and longitude on a sphere
      - a. find positions, distances, and angles
    - 2. History of the "Longitude Problem"
      - a. Contributions of John Harrison
  - B. Gerardus Mercator and the Mercator projection
    - 1. The Mercator 1569 World Map

RESOURCE:

Longitude: The True Story of a Lone Genius Who Solved the Greatest Scientific Problem of His Time by Dava Sobel, 1995, Bloomsbury Publishing Plc.  
ISBN-13 9780802715296

2023 Academic Super Bowl  
Senior Science  
Final Study Guide  
The Age of Exploration



- I. Chemistry - 33%
- A. Properties of Metals - know definitions of terms and graph meanings
    - 1. General properties and locations on Periodic Table
      - a. Elasticity
      - b. Stress
      - c. Strain
      - d. Modulus
      - e. Ductility
      - f. Malleability
      - g.  $F = YA\Delta L/L_0$
    - 2. Identify Regions of typical stress/strain curve
  - B. Alloys - Steel, Bronze, Brass
    - 1. Composition
    - 2. Properties
    - 3. How prepared
  - C. Oxidation and Reduction = REDOX
- II. Biology and Environmental Science - 33%
- A. Organizing Life on Earth - The Development of Classification Systems and Systematics
    - 1. Pre-Linnaean
    - 2. Explorations (late 1400s through the 1800s- New Worlds and New Life)
    - 3. Linnaean (1700s - development of relationships by systematically observed similarities)
    - 4. Modern Taxonomy and Phylogenetics
      - a. Looking at relationships between organisms; includes consideration of evolutionary models
      - b. Representing Relationships through display of data in graphical forms
        - 1. Branches, Trees, Shrubs
        - 2. Cladograms and Phylogenetic Diagrams (often called Trees)
  - B. Notable Individuals Associated with the Development of Systematics
    - 1. Basic Biography and Major Works and/or Contributions
      - a. Aristotle (384 BCE - 322 BCE)
      - b. Pliny the Elder (23 - 79 CE)
      - c. Conrad Gessner (1516-1565) also commonly found as "Konrad Gesner"
      - d. Maria Sibylla Merian (1647 - 1717)
      - e. Carolus Linnaeus (1707 - 1778) aka Carl von Linne
      - f. Willi Hennig (1913 - 1976)
- III. Physics - 33% (see 2nd page)

## Physics

### A. Instruments (25% of total of Physics portion)

<https://www.nps.gov/fora/learn/education/navigation-and-related-instruments-in-16th-century-england.htm>

1. Quadrant  
<https://exploration.marinersmuseum.org/object/quadrant/>
2. Astrolabe  
<https://exploration.marinersmuseum.org/object/astrolabe/>
3. Cross Staff  
<https://exploration.marinersmuseum.org/object/cross-staff/>
4. Compass  
<https://exploration.marinersmuseum.org/object/compass/>
5. Hourglass - best description in overview link at top of page
6. Chip log  
<https://www.brightengineering.com/seafaring/60582-what-is-a-chip-log/>  
<https://www.youtube.com/watch?v=OmRtfq50meg>

### B. Applied Problems (75% of total of Physics portion)

1. Latitude determination – Celestial Navigation
  - a) Noon day Sun  
<https://astronavigationdemystified.com/latitude-from-the-midday-sun/>
  - b) Polaris  
<https://astronavigationdemystified.com/latitude-from-polaris/>
  - c) Other stars  
<https://archive.hokulea.com/navigate/latitude.html>
2. Velocity related problems - see any introductory physics textbook
  - a. resolve speed and heading into direction components
  - b. relative velocity problems: including ocean currents

Study Outlines are developed from ideas submitted by coaches and question writers.

Please email ideas for the 2024 contest, *The 1980's and 1990's: The End of the Millenium*, to Jill Slinker at [jslinker@iasp.org](mailto:jslinker@iasp.org)

# 2023 Academic Super Bowl

## Senior Social Studies

### Final Study Guide

The Age of Exploration: The Columbia Exchange



- I. Creating the Homogenocene - 25%
  - A. Christopher Columbus
  - B. Explorers, Conquerors, Kings, Priests, and Entrepreneurs
  - C. American Silver and Early Globalization
  - D. The Columbian Exchange
  - E. Recreating Pangaea
  
- II. The Exchange of Animals - 5%
  - A. Domesticated Animals
  - B. Insects, Worms, and Others
  
- III. The Exchange of Plants - 25%

A. Maize	F. Tobacco
B. Potatoes	G. Wheat
C. Rubber Trees	H. American Foods and Famine
D. Sugar Cane	I. Guano as Fertilizer
E. Sweet Potatoes	J. Modern Agriculture
  
- IV. The Exchange and Mixture of Peoples - 25%
  - A. Indians
  - B. Europeans
  - C. Africans
  - D. Asians
  - E. American Demographics
  
- V. Exchange of Pathogens - 10%
  - A. Human Diseases
  - B. Plant Parasites and Blights
  
- VI. Costs and Benefits of the Columbian Exchange
  - A. to American Indians
  - B. to Europeans
  - C. to Africans
  - D. to East and Southeast Asians

Source: 1493: Uncovering the New World Columbus Created by Charles C. Mann  
First published by Alfred A. Knopf, 2011; Paperback published by Vintage Books, 2012  
Vintage ISBN: 978-0-307-27824-1

Study Outlines are developed from ideas submitted by coaches and question writers.

Please email ideas for the 2024 contest, *The 1980's and 1990's: The End of the Millenium*, to Jill Slinker at [jslinker@iasp.org](mailto:jslinker@iasp.org)