

# **History of Science B/C (2026-27)**

1. **DESCRIPTION:** Participants will be assessed on their understanding of the development of scientific thought and discovery in various scientific fields. Emphasis will be placed on major milestones, historical figures, and cultural contexts in various scientific disciplines.
2. **A TEAM OF UP TO:** 2 **APPROXIMATE TIME:** 50 minutes
3. **EVENT PARAMETERS:** Each team may bring one 8.5" x 11" sheet of paper that may contain information on both sides in any form and from any source. One un-annotated copy of the event rules is also permitted.
4. **THE COMPETITION:**
  - a. Teams will be given a written test that may consist of, but is not limited to, multiple choice, free response, and/or stations.
  - b. The test will consist of questions from the following areas:
    - i. Chronology: Participants may be asked to sequence major scientific milestones/discoveries.
      - i. These events are not limited to items on the provided lists, however, they should be sequenceable based on competitors' knowledge of scientific progression and trends (see sample question 1).
    - ii. Knowledge of landmark experiments/discoveries (see list provided) with emphasis on attribution, year, methods, past influences, cultural context, and relevant details/distinctions.
      - i. Knowledge of the subject of the discovery (e.g. basic familiarity with the mechanism of Nystatin, common uses of X-rays, etc.).
      - ii. Knowledge of underlying principles/theories regarding the experiment
      - iii. Knowledge of impact of these scientific discoveries on later developments (e.g. Mendel's pea plant experiments influencing later work on inheritance).
    - iii. Knowledge of influential figures (see list provided) with emphasis placed on their discoveries, writings, scientific background, scientific/mathematical contributions/impacts, and influences on later scientific developments.
      - i. Competitors will not be tested on purely civic, personal, or non-scientific biographical information (e.g. birth/death dates, family genealogy, details of formal schooling/degrees, military service, religious/political affiliations, awards/honors (excluding the Nobel Prize), etc.).
      - ii. Competitors will not be tested on non-scientific contributions, including those made to practical philosophy, theology, arts, literature, etc.
    - iv. Knowledge of major inventions and their inventors (see list provided) with emphasis on year, inventor's scientific background, broad scientific impacts, applications, cultural context, and, if applicable, basic mechanisms of production, process, and/or function.
      - i. Knowledge of prior influences contributing to the invention.
      - ii. Knowledge of major improvements and later developments pertaining to the invention (e.g. other forms of electron microscopes that were developed later).
    - v. Primary source analysis: Given an excerpt from scientific literature or communication, competitors may be asked to identify the author, subject, and other relevant information.
      - i. This primary source is not limited to items on the provided lists, however, important source details should be reasonably deducible from the text utilizing competitors' conceptual knowledge and context clues derived from topics covered within the event (see sample question 5).
5. **SCORING:**
  - i. Highest score wins.
  - ii. Selected questions may be used as tiebreakers.

**PROVIDED LISTS: (\*Indicates new for 2026-2027)**

**List of Landmark Experiments/Discoveries:**

1. Cavendish experiment\*
2. Eddington experiment\*
3. Gregor Mendel's pea plant experiments
4. Frederick Griffith's experiment\*
5. Oil drop experiment (Millikan & Fletcher)
6. Rutherford scattering experiments
7. Trinity nuclear test
8. Discovery of bacteriophages - *Frederick Twort, Félix d'Hérelle\**
9. Discovery of electromagnetic induction - *Michael Faraday*
10. Discovery of the helical structure of DNA - *James Watson and Francis Crick*
11. Discovery of nuclear fission - *Otto Hahn, Fritz Strassmann, Lise Meitner, and Otto Robert Frisch*
12. Discovery of nystatin - *Elizabeth Lee Hazen and Rachel Fuller Brown\**
13. Discovery of pulsars - *Jocelyn Bell Burnell\**
14. Discovery of reverse transcriptase - *Howard Temin, David Baltimore\**
15. Discovery of X-rays, *Wilhelm Röntgen\**

**List of Influential Figures:**

1. Aristotle (384 BC-322 BC)\*
2. Sadi Carnot (1796-1832)\*
3. George Washington Carver (c. 1864-1943)\*
4. Subrahmanyam Chandrasekhar (1910-1995)\*
5. Marie Curie (1867-1934)
6. Leonhard Euler (1707-1783)\*
7. Alexander Fleming (1881-1955)
8. Léon Foucault (1819-1894)\*
9. Tetsuya Fujita (1920-1998)\*
10. Galileo Galilei (1564-1642)
11. Ibn al-Haytham (Alhazen) (c. 965-c. 1040)\*
12. Dorothy Hodgkin (1910-1994)\*
13. Lord Kelvin (William Thomson) (1824-1907)
14. Johannes Kepler (1571-1630)
15. Hans Krebs (1900-1981)\*
16. Antoine Lavoisier (1743-1794)\*
17. Joseph Lister (1827-1912)
18. Ada Lovelace (1815-1852)
19. Charles Lyell (1797-1875)\*
20. Dmitri Mendeleev (1834-1907)\*
21. Isaac Newton (1643-1727)

22. Louis Pasteur (1822-1895)
23. Linus Pauling (1901-1994)\*
24. Cecilia Payne-Gaposchkin (1900-1979)\*
25. Frederick Sanger (1918-2013)
26. Alfred Wegener (1880-1930)\*

**List of Major Inventions & Inventors:**

1. Airplane (Wright Flyer) - *Orville and Wilbur Wright\**
2. Bessemer process - *Henry Bessemer*
3. Commercial microwave oven - *Percy Spencer*
4. CRISPR-Cas9 - *Jennifer Doudna and Emmanuelle Charpentier\**
5. Electromagnet - *William Sturgeon*
6. Electron microscope - *Ernst Ruska and Max Knoll*
7. Haber process - *Fritz Haber*
8. Hard disk drive - *IBM*
9. Kevlar - *Stephanie Kwolek*
10. Leyden Jar - *Ewald Georg von Kleist, Pieter van Musschenbroek\**
11. Liquid-fueled rocket - *Robert Goddard\**
12. Mercury thermometer - *Daniel Fahrenheit\**
13. Nitroglycerin - *Ascanio Sobrero*
14. Pendulum clock - *Christiaan Huygens*
15. Polio vaccine - *Jonas Salk\**
16. Scuba (Aqua-Lung) - *Émile Gagnan and Jacques Cousteau\**
17. Steam locomotive - *Richard Trevithick\**
18. Teflon - *Roy Plunkett\**
19. Telephone - *Alexander Graham Bell\**
20. Vulcanized rubber - *Charles Goodyear*

### **SAMPLE QUESTIONS:**

1. Sequence the following events in chronological order:
  - a. Charles Darwin's *On the Origin of Species* published
  - b. Watson & Crick discover the structure of DNA
  - c. The first sheep, 'Dolly', is cloned
  - d. Penicillin discovered by Alexander Fleming
  - e. Gregor Mendel publishes his work on plant hybridization
  - f. Meselson-Stahl experiment conducted
2. Answer the following questions concerning the Eddington experiment:
  - a. In what year was it conducted?
  - b. What two British astronomers organized this experiment?
  - c. On what astronomical phenomenon did the researchers base their experiment?
  - d. This experiment helped to validate what theory proposed by Albert Einstein?
3. Answer the following questions about the English mathematician, physicist, and astronomer Isaac Newton:
  - a. In what book did Newton introduce his laws of motion and universal gravitation? (Latin or English title)
  - b. As outlined in the aforementioned book, describe Newton's first law of motion (paraphrasing okay).
  - c. Newton's work with celestial mechanics is based upon what astronomer's laws of planetary motion?
  - d. According to Newton's Law of Cooling, what is the primary factor that determines the rate at which an object loses or gains heat?
4. Answer the following questions about electron microscopes:
  - a. What year did Ernst Ruska win the Nobel Prize in Physics?
  - b. As opposed to the transmission electron microscope that Ruska helped build, what other type of electron microscope was invented by Manfred von Ardenne? (list one of the two)
  - c. What property of electrons allows for a higher resolution than light microscopes?
  - d. Another important development in electron microscopy involves preserving specimens in vitreous ice. What is this type of electron microscopy called?
5. Analyze the primary source excerpt below and answer the following questions:

*I therefore concluded and decided unhesitatingly, that there are three stars in the heavens moving about Jupiter, as Venus and Mercury round the Sun; which at length was established as clear as daylight by numerous subsequent observations. These observations also established that there are not only three, but four, erratic sidereal bodies performing their revolutions round Jupiter...the revolutions are so swift that an observer may generally get differences of position every hour.*

- Sidereus Nuncius, 1610 (The Sidereal Messenger, translated from the orig. Neo-Latin)
- a. To whom is this excerpt attributed?
- b. What invention allowed these observations?
- c. Discuss the mechanism behind this invention in part b.
- d. The names of these four "erratic sidereal bodies" was later given by German astronomer Simon Marius. List these names.