

Name: \_\_\_\_\_ Date: \_\_\_\_\_

## Mapping the Nexus of Interdisciplinary Science: An 11th Grade Challenge

Synthesize knowledge across thermodynamics, bioinformatics, and geophysics to solve complex problems at the intersection of traditional scientific silos.

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**1. A researcher is applying the principles of fluid dynamics to model the flow of magma within the Earth's mantle to predict seafloor spreading. Which interdisciplinary field does this work primarily represent?**

- A. Biochemistry
- B. Geophysics
- C. Astrophysics
- D. Quantum Mechanics

**2. The study of the chemical processes within and relating to living organisms, such as the metabolic pathways of extremophiles in hydrothermal vents, is known as \_\_\_\_\_.**

- A. Organic Chemistry
- B. Physical Chemistry
- C. Biochemistry
- D. Geochemistry

**3. True or False: Materials Science is considered a purely physical science, as it excludes the study of biological structures or chemical synthesis.**

- A. True
- B. False

**4. When an oncologist uses radioactive isotopes to target and destroy malignant tumors, which two major branches of science are being integrated for medical application?**

- A. Zoology and Meteorology
- B. Botany and Geology
- C. Physics and Biology
- D. Astronomy and Chemistry

**5. A scientist calculating the escape velocity of a spacecraft leaving a planet's atmosphere while accounting for gravitational pull is working in the field of \_\_\_\_\_.**

- A. Nuclear Physics
- B. Classical Mechanics
- C. Microbiology
- D. Petrology

**6. In the emerging field of Astrobiology, what is the primary objective of scientific inquiry?**

- A. Mapping the tectonic plates on Mars

Name: \_\_\_\_\_ Date: \_\_\_\_\_

- B. Synthesizing inorganic compounds for battery storage
- C. Investigating the origins and potential for life in the universe
- D. Measuring the luminosity of distant supernovae

**7. True or False: Thermodynamics, a branch of physics, is essential for understanding how energy transfers occur within biological ecosystems and chemical reactions.**

- A. True
- B. False

**8. The use of computational algorithms and statistical models to analyze massive datasets of genomic sequences is known as \_\_\_\_\_.**

- A. Ecology
- B. Bioinformatics
- C. Optics
- D. Paleontology

**9. A researcher analyzing the isotopic composition of 'paleo-ice' trapped in glaciers to reconstruct Earth's atmospheric history 100,000 years ago is practicing:**

- A. Applied Physics
- B. Paleoclimatology
- C. Evolutionary Biology
- D. Inorganic Chemistry

**10. True or False: Theoretical Science focuses primarily on the practical application of existing technology rather than the development of new mathematical proofs and models.**

- A. True
- B. False