

Name: _____ Date: _____

Stellar Scalpels: 10th Grade Galactic Anatomy Quiz

Examine galactic morphology and cosmic expansion to reinforce high school astrophysics concepts through evidence-based analysis.

1. The Sombrero Galaxy (M104) features a prominent dust lane and a massive central bulge. Based on the Hubble Tuning Fork, why is this classified as an Sa spiral rather than an Sc?

- A. It lacks any detectable star-forming regions in its disk.
- B. Its tightness of wound arms and dominant bulge size characterize early-type spirals.
- C. It contains only Population II stars, indicating an elliptical origin.
- D. The presence of a central black hole prevents spiral arm formation.

2. The _____ describes the observed phenomenon where the velocity at which a galaxy recedes from an observer is proportional to its distance.

- A. Doppler Limit
- B. Chandrasekhar Limit
- C. Hubble-Lemaître Law
- D. Event Horizon

3. True or False: According to the Λ CDM model, dark matter acts as the primary gravitational 'glue' that allowed the first large-scale structures to form.

- A. True
- B. False

4. Vesto Slipher's early 20th-century observations of 'nebulae' (later known as galaxies) were significant because they revealed:

- A. Most spiral galaxies are blueshifted and moving toward us.
- B. The chemical composition of stars is identical across all galaxies.
- C. Most distant galaxies exhibit high redshifts, indicating they are moving away.
- D. Galaxies are composed entirely of dark matter with very few stars.

5. The _____ Epoch refers to the period roughly 380,000 years after the Big Bang when photons could finally travel freely through space.

- A. Reionization
- B. Nucleosynthesis
- C. Inflation
- D. Recombination

6. True or False: Elliptical galaxies are generally characterized by active, ongoing star formation and a high abundance of interstellar gas.

- A. True

Name: _____ Date: _____

B. False

7. What is the primary evidence for the existence of the 'Cosmic Web' at a 10th-grade analytical level?

- A. The uniform temperature of the sun across all latitudes.
- B. The distribution of galaxies along filaments separated by vast cosmic voids.
- C. The fact that all galaxies are moving at the same speed.
- D. A physical net of dark energy visible through optical telescopes.

8. The Great Attractor is a gravitational anomaly in intergalactic space that is pulling the ____ and other clusters toward it.

- A. Laniakea Supercluster
- B. Andromeda Nebula
- C. Oort Cloud
- D. Kuiper Belt

9. Why does the 'Heat Death' of the universe theory depend on the continued influence of dark energy?

- A. Dark energy causes the universe to shrink, heating it up.
- B. It provides the fuel needed for stars to burn indefinitely.
- C. It accelerates expansion, eventually isolating galaxies and exhausting usable energy.
- D. Dark energy converts all matter into heavy elements like iron.

10. True or False: Galactic cannibalism refers to the process where a larger galaxy consumes a smaller satellite galaxy through tidal forces.

- A. True
- B. False