

Name: _____ Date: _____

Answer Key: Stellar Cartography: Mapping Cosmic Structures for 9th Graders

Analyze the distribution of dark matter and galactic morphology across 10 critical thinking questions focusing on the Large Scale Structure of the cosmos.

1. Which component acts as the invisible 'scaffolding' of the universe, providing the gravitational pull necessary for galaxies to cluster along filaments?

Answer: B) Dark matter

Dark matter does not emit light but exerts massive gravitational influence, guiding the formation of the 'cosmic web' filaments where galaxies reside.

2. Edwin Hubble's observations of the 'Redshift' in distant light spectra confirmed that the universe is currently static and unchanging.

Answer: B) False

Redshift indicates that galaxies are moving away from us, proving that space itself is expanding rather than remaining static.

3. The Andromeda Galaxy is currently on a collision course with our Milky Way; this type of galaxy interaction is known as a galactic _____.

Answer: B) Merger

A galactic merger occurs when the gravitational fields of two galaxies cause them to collide and eventually combine into a larger structure.

4. Which of the following galaxy types is characterized by an older population of stars and a lack of active star-forming gas and dust?

Answer: C) Elliptical galaxies

Elliptical galaxies have used up most of their gas and dust, resulting in a population of older, redder stars and very little new star formation.

5. A Light Year is a measurement of time, representing the duration it takes for a star to complete its life cycle.

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Answer: B) False

Despite the word 'year,' a light year is a measure of distance—specifically, the distance light travels in one Earth year.

6. What is the primary force responsible for pulling gas and dust together to initiate the birth of the very first galaxies?

Answer: B) Gravity

Gravity is the fundamental force that causes matter to clump together to form stars, planets, and galaxies.

7. Dark _____ is the mysterious form of energy that astronomers believe is causing the expansion of the universe to accelerate.

Answer: C) Energy

While dark matter acts as a glue, dark energy acts as a repulsive force that speeds up the expansion of the universe.

8. The Sombrero Galaxy (M104) is an example of an Irregular galaxy because it lacks a clear nucleus.

Answer: B) False

The Sombrero Galaxy is actually a spiral galaxy (specifically Unbarred) known for its large central bulge and distinct dust lane.

9. What do astronomers call the vast, empty spaces in the cosmic web that contain very few, if any, galaxies?

Answer: C) Voids

Voids make up the majority of the volume of the universe, existing as the empty pockets between galactic filaments.

10. The Milky Way is classified specifically as a _____ spiral galaxy because of the straight line of stars and gas cutting through its center.

Answer: B) Barred

A 'bar' is a central feature found in many spiral galaxies, including our own, that channels gas toward the galactic center.