

UPGRADE to the Bundle

Crash Course - ASTRONOMY

47 Episode Series Bundle

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Crash Course Astronomy #41: Dark Matter

Name: _____ Date: _____

You can access the video here → <https://youtu.be/9W3RaaWuCaE?si=MOSeQ4XWKhH83mSZ>

1. The kind of matter we can see, like stars and gas, is called _____ matter.
2. Observations show that galaxies rotate in a way that suggests they have more _____ than we can see.
3. The extra invisible material that affects galaxy rotation is called _____ matter.
4. To measure galaxy rotation, astronomers study the _____ shift of gas clouds.
5. The unexpected rotation speeds of galaxies suggest they are embedded in a _____ of dark matter.
6. Galaxy clusters also show evidence of dark matter because their galaxies move too _____ to be held together by visible matter alone.
7. Dark matter does not emit or reflect _____, making it invisible to traditional telescopes.
8. A possible candidate for dark matter is the hypothetical particle called an _____.
9. Axions have _____, so large clouds of them can exert gravitational effects.
10. Axions do not interact strongly with _____ matter, allowing them to pass through it undetected.
11. According to Einstein's theory, massive objects can bend light by warping _____.
12. This bending of light due to gravity is called _____ lensing.
13. The _____ Cluster provides strong evidence for dark matter through observations of colliding galaxy clusters.
14. Maps of distorted background galaxies show that most of the mass in galaxy clusters lies around the _____, not in the gas between them.
15. About _____ percent of the matter in the universe is dark matter, not the normal matter we are made of.

Crash Course Astronomy #41: Dark Matter KEY

1. The kind of matter we can see, like stars and gas, is called **normal** matter.
2. Observations show that galaxies rotate in a way that suggests they have more **mass** than we can see.
3. The extra invisible material that affects galaxy rotation is called **dark** matter.
4. To measure galaxy rotation, astronomers study the **Doppler** shift of gas clouds.
5. The unexpected rotation speeds of galaxies suggest they are embedded in a **halo** of dark matter.
6. Galaxy clusters also show evidence of dark matter because their galaxies move too **quickly** to be held together by visible matter alone.
7. Dark matter does not emit or reflect **light**, making it invisible to traditional telescopes.
8. A possible candidate for dark matter is the hypothetical particle called an **axion**.
9. Axions have **mass**, so large clouds of them can exert gravitational effects.
10. Axions do not interact strongly with **normal** matter, allowing them to pass through it undetected.
11. According to Einstein's theory, massive objects can bend light by warping **space**.
12. This bending of light due to gravity is called **gravitational** lensing.
13. The **Bullet** Cluster provides strong evidence for dark matter through observations of colliding galaxy clusters.
14. Maps of distorted background galaxies show that most of the mass in galaxy clusters lies around the **subclusters**, not in the gas between them.
15. About **85** percent of the matter in the universe is dark matter, not the normal matter we are made of.

15 Questions

Answer Key Included

Save 85% per worksheet!