**The Universe Guided Notes**

**Guided Notes: Galaxies**

**Big Idea:** The universe contains billions of \_\_\_\_\_\_\_\_\_\_ held together by gravity.

**Key Concepts:**

* There are three main types of galaxies:
  + \_\_\_\_\_\_\_\_\_ galaxies - shaped like a pinwheel with a bright center and arms
  + \_\_\_\_\_\_\_\_\_ galaxies - oval shaped, containing older dimmer stars
  + \_\_\_\_\_\_\_\_\_ galaxies - no distinct shape, mixture of old and new stars
* The \_\_\_\_\_\_ \_\_\_\_ is a spiral galaxy that contains over 200 billion stars, including our sun.
* Most galaxies are grouped into clusters like the \_\_\_\_\_\_\_\_ Group that the Milky Way belongs to.

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**Real World Examples:**

1. Looking at the night sky, you can see the \_\_\_\_\_\_ \_\_\_\_\_ galaxy as a hazy band of stars.

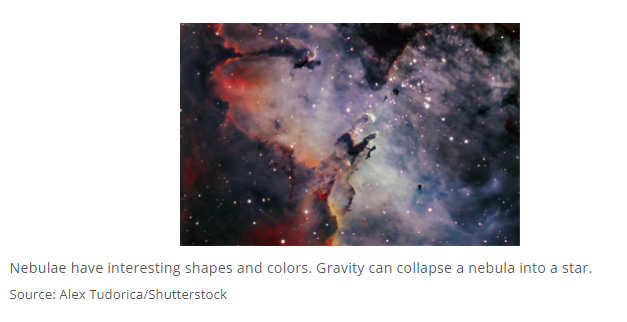
2. The universe is mostly \_\_\_\_\_\_\_\_ space, with galaxies making up only about 5% of it.

**Guided Notes: Characteristics of the Universe**

**Big Idea:** The \_\_\_\_\_\_\_\_\_\_\_\_\_ universe includes all objects that can be observed and detected.

**Key Concepts:**

* Our \_\_\_\_\_\_\_\_\_\_ system contains the Sun and all objects orbiting it, including planets and moons.
* \_\_\_\_\_\_\_\_\_\_\_ are clouds of gas and dust where new stars are formed.
* A \_\_\_\_\_\_\_\_\_\_ is a huge group of stars held together by gravity.
* Stars go through a life cycle of formation, main sequence, and eventual \_\_\_\_\_\_\_\_\_ (explosion or white dwarf stage).
* \_\_\_\_\_\_\_\_\_\_\_\_ are rocky objects orbiting the Sun.
* \_\_\_\_\_\_\_\_\_\_\_\_ are frozen objects made of dust, gases and ice that develop tails when passing close to the Sun.
* \_\_\_\_\_\_\_\_\_\_\_ are space rocks that create streaks of light when passing through Earth's atmosphere.

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**Real World Examples:**

1. The \_\_\_\_\_\_\_\_\_ Space Telescope has allowed scientists to observe distant galaxies and stars.

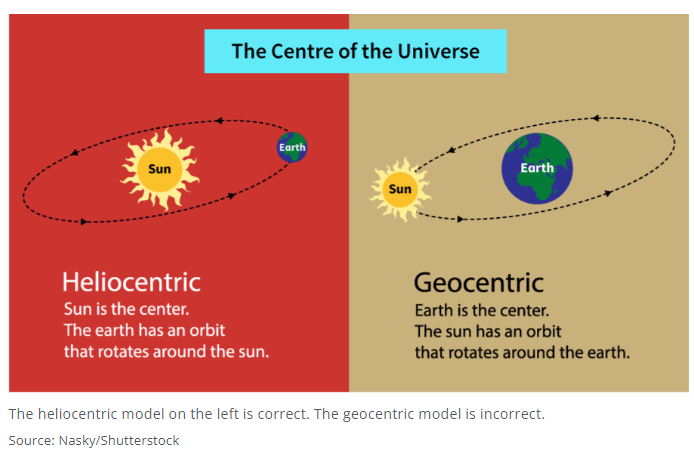
2. Meteor showers like the \_\_\_\_\_\_\_\_\_\_ occur when Earth passes through the debris trail of a comet.

**Guided Notes: Theories about the Universe**

**Big Idea:** The widely accepted \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ \_\_\_\_\_\_\_ proposes that the universe began as an extremely hot and dense single point that rapidly expanded outward around 13.7 billion years ago.

**Key Concepts:**

* In ancient times, the \_\_\_\_\_\_\_\_\_ model proposed that Earth was the center of the universe.
* The \_\_\_\_\_\_\_\_\_\_\_\_ model, originally proposed by \_\_\_\_\_\_\_\_\_\_ placed the Sun at the center, with planets revolving around it.
* \_\_\_\_\_\_\_\_\_\_ discovered galaxies moving away from each other, supporting an expanding universe.
* Cosmic \_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ pervading space provides evidence of the Big Bang.
* The early universe was an extremely hot dense state with hydrogen and \_\_\_\_\_\_\_\_\_\_\_ as the dominant elements

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**Real World Examples:**

1. \_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_ discovered the Andromeda Galaxy was not a gas cloud, but a distant galaxy, realizing there were many galaxies beyond the Milky Way.
2. In 1964, researchers accidentally detected \_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ while studying the Milky Way, which matched predictions of residual radiation from the Big Bang.