

Name Completed Section _____

EARTH AND SPACE SCIENCE - Explaining the Early Universe

1. If you were studying space exploration 100 years ago, you would have been told everything in 'outer space' never changes.

2. Between 1918 and 1929, the development of more powerful microscopes allowed astronomers to see more celestial bodies than they had been able to see before.

3. Celestial bodies is a general term for all objects in the sky, including the Sun, Moon, planets and stars

4. Edwin Hubble was the first astronomer to identify other galaxies besides the Milky Way.

5. He also noticed that all the galaxies he was observing were not staying still. Rather, they were moving away from each other.

6. When Hubble retraced the paths along which these galaxies would likely have moved, it appeared that they had all started moving from the same area in space.

7. Hubble went on to propose that the universe is expanding in all directions. He also suggested that all the galaxies have taken the same amount of time to reach their present positions from an original starting point.

8. To understand this concept, we can use the analogy of raisin bread baking in the oven. As the dough (universe) expands, the distance between all the raisins (galaxies) increases.

Name Completed Section _____

EARTH AND SPACE SCIENCE - Galaxies

1. A galaxy is a collection of stars, gas & dust held together by gravity

2. We live in the Milky Way galaxy.

3. In the year 1925, Edwin Hubble discovered another galaxy. At first he thought he was looking at a nebula (a cloud of gas and dust). The galaxy he identified is now named Andromeda. It is our neighbouring galaxy.

4. Astronomers now estimate that the whole universe contains at least 125 billion galaxies.

5. Most galaxies can be classified according to one of three basic shapes:

1. spiral
2. elliptical
3. irregular

6. Spiral Galaxy

- ❖ When viewed from above it looks like a pinwheel
- ❖ From the side it looks like a paper plate with an orange inserted into its centre
- ❖ The central 'bulge' is made up of stars that formed long ago
- ❖ The disk circling it is made of gas, dust and newly forming stars
- ❖ The Milky Way is a spiral galaxy
- ❖ Earth is located in one of the spiral arms of the Milky Way

7. Elliptical Galaxy

- ❖ Ranges in shape from a perfect sphere to a stretched-out ellipse
- ❖ Some are similar to the shape of a football and others to the shape of a cigar
- ❖ Contain some of the oldest stars in the universe
- ❖ over half of all galaxies are believed to be elliptical
- ❖ The largest galaxies in the universe are elliptical

8. Irregular Galaxy

- ❖ Does not have any regular shape such as spiral arms or an obvious central bulge
- ❖ Are made up of a mix of newly forming stars and old stars

9. Galaxies can also differ in:

- ❖ size
- ❖ mass
- ❖ colour
- ❖ brightness
- ❖ speed of spin

10. These differences are determined by the number of stars, type of stars and the amount and type of gas and dust making up a galaxy.

11. Some galaxies grow into supergiants while others remain small and are classified as dwarfs.

12. In spin, how fast a galaxy revolves determines its overall shape. The more spin a galaxy has, the flatter it will be.

13. Most galaxies contain two distinct formations of stars, called star clusters:

1. globular cluster
2. open cluster

14. Globular Cluster

- ❖ Composed of up to one million stars
- ❖ Held together by their mutual gravity in a spherical shape

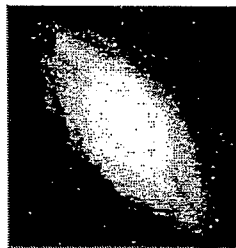
15. Open Cluster

- ❖ Contain from a few hundred to a few tens of thousands of stars
- ❖ More evenly distributed

16. Match the following

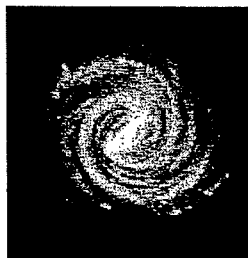
b spiral galaxy

a.



c irregular galaxy

b.



a elliptical galaxy

c.

