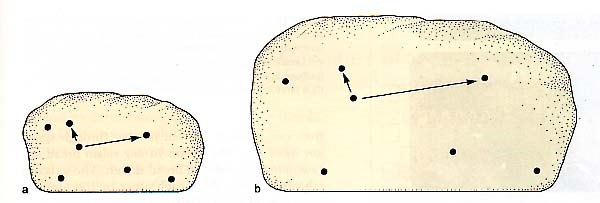
**Science 10 Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_Date: \_\_\_\_\_**

**Exploring the Universe.**

**Explaining the Universe.**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ discovered that all galaxies are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from each other
* According to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the universe is believed to have begun during an unimaginably rapid expansion of a tiny volume of space, about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. All the matter in the universe is thought to have been created at that moment.
* Early **\_\_\_\_\_\_\_\_\_\_\_\_\_** were able to observe outer space by using the best instruments of the time, early**\_\_\_\_\_\_\_\_\_\_\_\_.**
* With the development of more powerful telescopes in the 1920’s, suddenly more **\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_** were discovered.
* Celestial bodies is a general term for all the objects in the sky, including the **\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_,** \_\_\_\_\_\_\_\_\_\_, and **\_\_\_\_\_\_\_\_\_\_\_\_.**
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ an American astronomer was the first one to identify \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ besides the Milky Way. He estimated the distance from earth to \_\_\_ different galaxies.

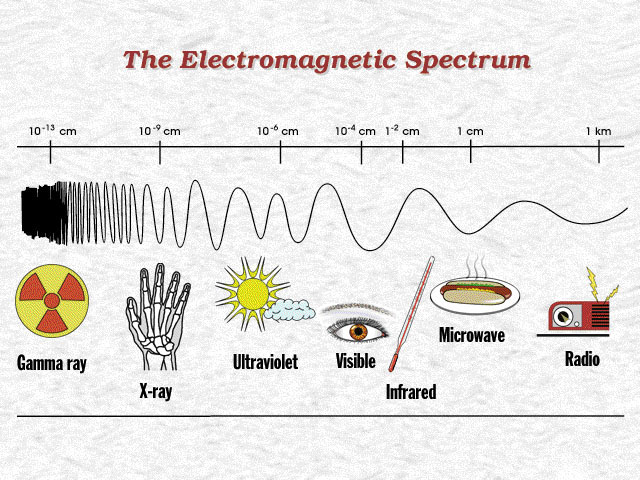
**Hubble's Proposal**

* Hubble proposed that the universe \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The galaxies which are further away from Earth are moving apart \_\_\_\_\_\_\_\_\_\_\_\_\_\_ than those closer to Earth. He used the analogy comparing an uncooked loaf of raisin bread to one that is put into the oven. As the dough rises the raisins (galaxies) are moving further away from each other.

**Red Shift Analysis**

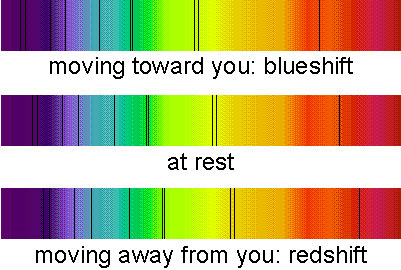
* Edwin Hubble figured out that \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ were moving away from the earth at a certain speed, which was proportional to the distance from earth. He did this based on his understanding of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Electromagnetic Waves**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ is only one form of energy that reaches the earth from distant stars (sun). Many other forms of energy with various wavelengths can be measured. These range from \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ to the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ which are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

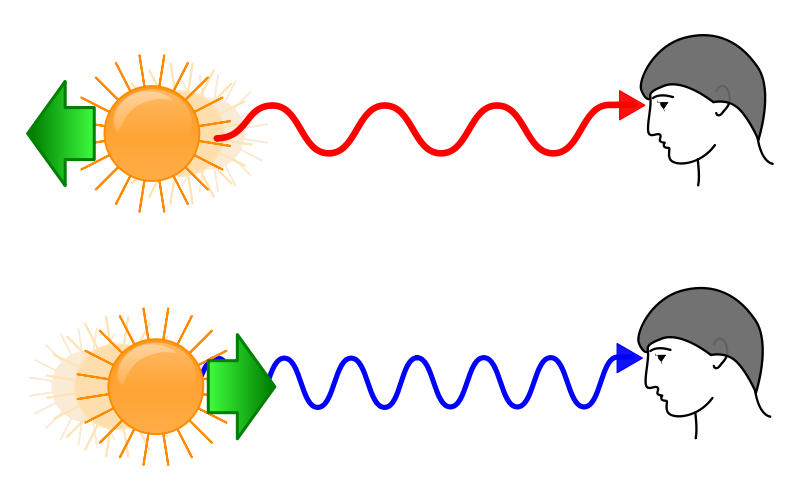
**Special Patterns**

* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ splits into the different lengths of colour when passed through a \_\_\_\_\_\_\_\_\_\_\_\_. This is called the\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. Light from distant stars can be collected and divided into individual spectral patterns. A \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ will show the spectral pattern in a \_\_\_\_\_\_\_\_\_\_ in a certain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.



**Cosmological Red Shift**

* Edwin Hubble noticed that the light of the galaxies he was studying showed spectral lines that were shifted toward the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* This \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ occurs because of the light’s wavelengths becoming \_\_\_\_\_\_\_\_\_\_\_\_.
* This is an indication the galaxies are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from us.
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ call this the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, which is evidence for the theory explaining the early universe.



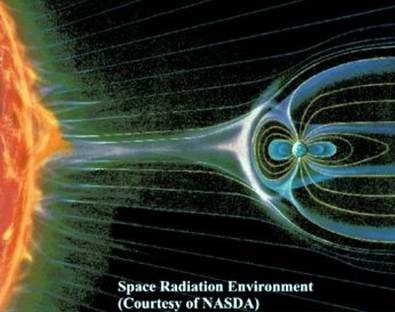
* A red shift means the wave length is getting longer, and the start is moving away from us.
* Blue shift is the opposite; the star is getting closer

**Big Bang Theory**

* Today the most widely supported theory is that approximately \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ years ago an unimaginably tiny volume of space suddenly and rapidly expanded to immense size.
* In that time all the matter and energy in the universe was formed. This is known as the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

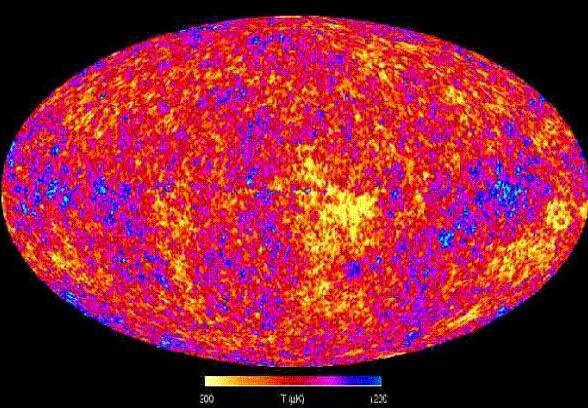
**Cosmic Background Radiation**

* In 1963 two astronomers \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_were monitoring microwave radiation in space. To their surprise they kept receiving background “\_\_\_\_\_\_” or signal interference. Their conclusion was they were actually detecting \_\_\_\_\_\_\_\_\_\_\_

\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. They believe this was radiation \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ from the Big Bang expansion.

**Additional Supporting Evidence**

* Strongest evidence to date comes from the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. The left over radiation from the earth’s expansion due to the Big Bang forms \_\_\_\_\_\_ and \_\_\_\_\_\_\_\_ indicating the age since the expansion took place. The reds indicate hotter temperatures and the blues represent cooler temperatures which indicates the \_\_\_\_\_\_\_ since expansion.



**Trying to Simulate THE BIG BANG THEORY**

* What is a "\_\_\_\_\_\_\_\_\_"?
* Quarks are thought to be smaller \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ that make up \_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Scientists are trying to learn more about these sub atomic particles by attempting to smash them in a sophisticated \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* By firing protons at each other they are attempting to smash apart these particles.
* Scientists believe that studying these particles will help them understand how protons and neutrons were \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Galaxies**

* Galaxies are collections \_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ held together by \_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* Scientists believe there are about \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of these structures in our universe.

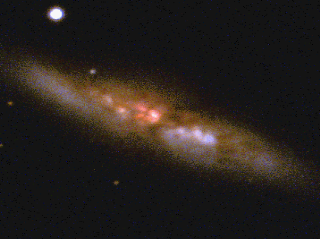


* There are \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ or galaxies: a) \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, b)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, c)\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ where our sun is located is a spiral galaxy.

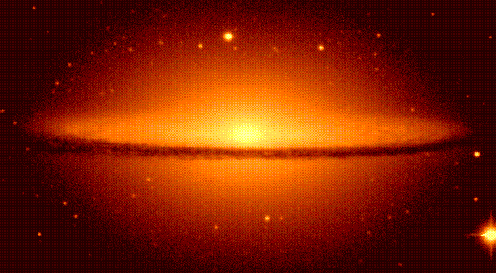


**Galaxy Shapes**

* Spiral
* These appear like \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ with many long arms spiralling out from the center.
* The center bulge is made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ formed long ago, while the circling disc is made up of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. This area is called the \_\_\_\_\_\_\_\_.
* Elliptical
* These galaxies contain some of the \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in the universe. They range in shape from football field to a cigar.
* Over \_\_\_\_\_\_\_\_ of the galaxies are elliptical and many are also the \_\_\_\_\_\_\_\_\_\_\_\_\_\_.



* Irregular
* These are made up of a micture of \_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_. They \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ have distinguishing shapes like the elliptical or spiral galaxies.



**Other Differences Between Galaxies**

* Galaxies can also \_\_\_\_\_\_\_\_ in \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_, \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_ they spin.
* These differences are determines by;
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
* \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Some galaxies grow into \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ while others remain \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

**Star Clusters**

* One type is called a "\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_". These are composed of as many as \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ held together by their mutual gravity in a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.
* The other type is called an “\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.” These only contain between a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ of stars.

