HUBBLE DEEP FIELD
The Most Important Image Ever Taken

View the Video

http://www.youtube.com/watch?v=fgg2tpUVbXQ

UNDERSTANDING THE DISCOVERY

1. **How faint are the farthest objects?**

   The Hubble observations detected objects as faint as 30th magnitude. The faintest objects the human eye can see are at sixth magnitude. Ground-based telescopes also can detect 30th-magnitude objects. Those objects, however, are so dim they are lost in the glare of brighter, nearby galaxies.

   Searching for the faintest objects in the Ultra Deep Field is like trying to find a fly on the Moon. Light from the farthest objects reached the Hubble telescope in trickles rather than waves. The orbiting observatory collected one photon of light per minute from the dimmest objects. Normally, the telescope collects millions of photons per minute from nearby galaxies.

2. **How many orbits did it take to make the observations?**

   It took 400 orbits to make the observations.

3. **How many exposures were needed to make the observations?**

   The Hubble telescope's Advanced Camera for Surveys' wide-field camera snapped 800 exposures, which equals two exposures per orbit. The exposures were taken over four months, from Sept. 24, 2003 to Jan. 16, 2004.

4. **How much viewing time was needed to make all the exposures?**

   The 800 exposures amounted to about 1 million seconds or 11.3 days of viewing time. The average exposure time was 21 minutes.

5. **How many galaxies are in the image?**

   The image yields a rich harvest of about 10,000 galaxies.

6. **How many colors (filters) were used to make the observations?**

   The colors used were blue, green, red, and near-infrared. The observations were taken in visible to near-infrared light.

7. **If astronomers made the Hubble Ultra Deep Field observation over the entire sky, how long would it take?**

   The whole sky contains 12.7 million times more area than the Ultra Deep Field. To observe the entire sky would take almost 1 million years of uninterrupted observing.

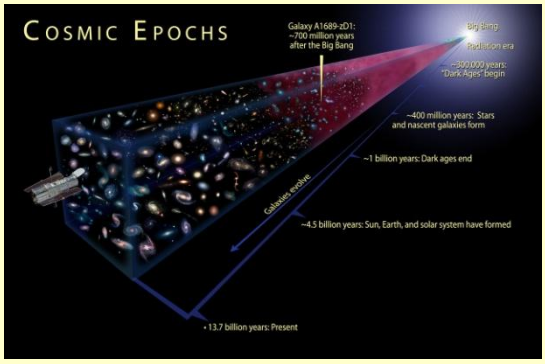
8. **How wide is the Ultra Deep Field's slice of the heavens?**

   The Hubble Ultra Deep Field is called a "pencil beam" survey because the observations encompass a narrow, yet "deep" piece of sky. Astronomers compare the Ultra Deep Field view to looking through an eight-foot-long drinking straw.

   The Ultra Deep Field's patch of sky is so tiny it would fit inside the largest impact crater that makes up the face on the Moon. Astronomers would need about 50 Ultra Deep Fields to cover the entire Moon.

9. **How sharp is Hubble's resolution in pinpointing far-flung galaxies in the Ultra Deep Field?**

   Hubble's keen vision (0.085 arc seconds.) is equivalent to standing in Piazza Venezia and seeing the date on a five-cent coin at a distance of 400 metres away at the Colosseum!



Tasks

1) The narrator says (after about 60 seconds) that "*we just end up with a blank stare on our face*". What does this expression mean and what is he referring to?

2) After about 1 min 20 sec, the narrator says "I*t's all too easy to be caught up in our everyday stuff*". What does this mean?

3) What does "*at a glance*" mean which the narrator uses after about 2 minutes?

4) "*The results were nothing less than humbling on a universal scale*" - 2 min 15 sec. What does this expression mean and what is he referring to?

5) What does this video tell us about Man and his place in the Universe?