

Galaxies and The Hubble Deep Field

○ Composition of the Galaxies

- Billion of Stars.
- (Likely many Planets.)
- Lots of Gas, Molecules.
- Lots of Dust.
- Dark Matter.

○ Types of Galaxies

- spiral
- elliptical
- irregular



Spiral Galaxy NGC 1232 - VLT UT 1 + FORS1

ESO PR Photo 37/09 (23 September 1998)

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○ Activities

Activity 1

Counting the Galaxies in the Hubble Deep Field.

Activity 2

Classifying and Identifying the galaxies in the Hubble Deep Field.

Counting the Galaxies in the Hubble Deep Field

1. Which Camera Are You Using?

- Camera A
- Camera B
- Camera C

2. Which Cell Are You Using?

- a 1
- b 2
- c 3
- 4

3. How Many Galaxies is there in this Cell?

→

4. How Many Galaxies Did Your Buddy Find?

→

5. Finding How Many Galaxies There Might Be in the Universe

Multiply your number of Galaxies found by 3.5×10^8 to obtain an estimation of the number of galaxies in the Universe:

$$\boxed{} \times 3.5 \times 10^8 = \boxed{}$$

Your Hubble Deep
Field Cell Number
of objects

Number of Galaxies
in the Universe

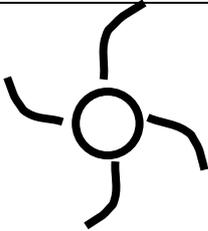
(This multiplication gives in fact a *lower limit* of the Number of Galaxies in the Universe, and assumes that galaxies are distributed uniformly in the sky.)

Classifying and Identifying Galaxies in the Hubble Deep Field

1. Which Camera Are You Using?

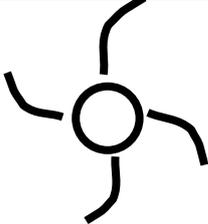
- Camera A
- Camera B
- Camera C

2. Classify and Identify the Objects in the Image

					Irregular
Blue					
White					
Yellow					
Red					

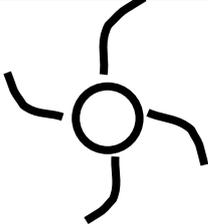
3. Compare Your Results with Your Buddy

Astronomers' Chart Camera A

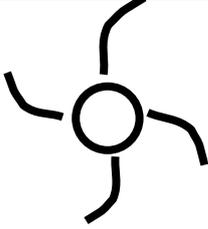
					Irregular
Blue	-	-	-	10	2, 6
White	1	4	5, 8	3, 14	9
Yellow	15	12	7, 13	-	-
Red	-	-	-	-	11

Adaptation from STScI's Amazing Space: <http://amazing-space.stsci.edu/resources/explorations/hdf>

Astronomers' Chart Camera B

					Irregular
Blue	-	-	-	28, 29	18, 23
White	17, 26	-	19, 25	21	-
Yellow	-	-	-	22, 24, 37	-
Red	-	16	20, 30	-	-

Astronomers' Chart Camera C

					Irregular
Blue	35	-	-	-	32, 43
White	-	36	34	-	33, 38, 40
Yellow	-	41	-	31	-
Red	-	44, 45	37	39, 42	-