

Fun Internet Resources and the Galaxy Zoo

<http://www.astronomy.ohio-state.edu/~denney/InquiryAstronomyLessons/index.html>

Hands-On Activity Resources

- Astronomical Society of the Pacific:
<http://www.astrosociety.org/education/activities/handson.html>
- Nebraska Astronomy Applet Project (fun online experiments) <http://astro.unl.edu/naap/>

Educational Resources

- Astronomical Society of the Pacific:
<http://www.astrosociety.org/education/resources/resources.html>
- Ask an Astrophysicist:
http://imagine.gsfc.nasa.gov/docs/ask_astro/ask_an_astronomer.html
- NASA Quest challenges (web based interactive projects): <http://quest.arc.nasa.gov/>
- Astronomy Picture of the Day:
<http://antwrp.gsfc.nasa.gov/apod/>

NASA Educators Page

- Teaching materials broken down by grade level
- Fun images
- Kids' Club
- <http://www.nasa.gov/audience/foreducators/index.html>

Minorities in Science

- The Faces of Science: African Americans in the Sciences:
<https://webfiles.uci.edu/mcbrown/display/faces.html>
- Minorities in Science: Guide to Reference Resources:
<http://www.lib.lsu.edu/hum/mlk/srs119.html>

Women in Astronomy

- A resource guide to prominent women in astronomy in the past and present (requires some legwork):
http://www.astrosociety.org/education/resources/womenast_bib.html
- Brief biographies of some prominent female astronomers:
<http://astro.berkeley.edu/~gmarcy/women/history.html>

Astronomy vs. Astrology

- Astronomers do not study horoscopes!
- Discussing the difference between the two fields can be useful for explaining the scientific method
- A fun and clear website explaining the difference between astrology and astronomy:
<http://www.astrosociety.org/education/astro/act3/astrology.html>

Just for Fun

- A discussion of misleading science in movies:

<http://www.badastronomy.com/bad/movies/index.html>

and tv:

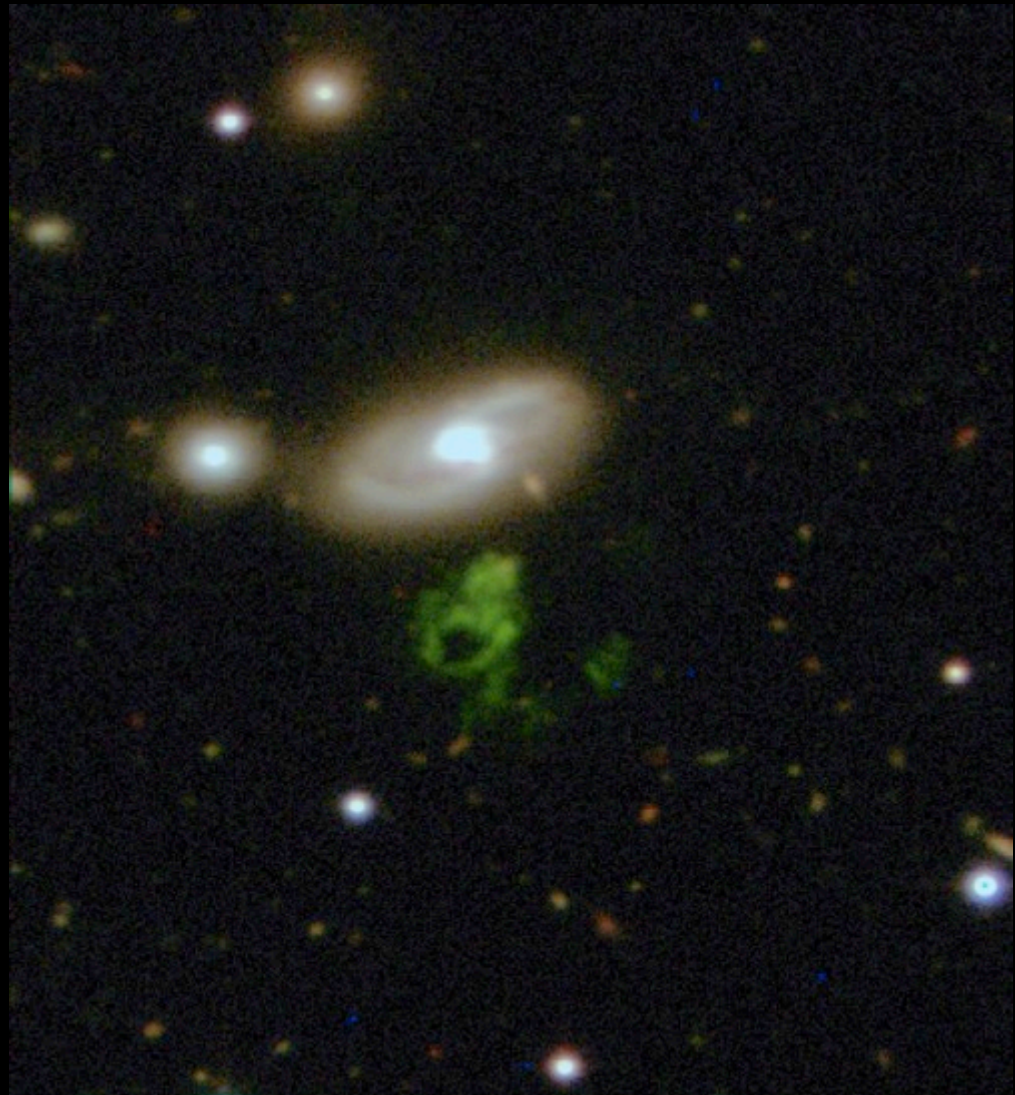
<http://www.badastronomy.com/bad/tv/index.html>

The Galaxy Zoo

- Over a million galaxies
- Sloan Digital Sky Survey (SDSS)
 - 2.5m Robotic telescope in New Mexico
- [http://www.galaxyzoo.org/
how to take part](http://www.galaxyzoo.org/how_to_take_part)
- Other projects related to SDSS:
<http://cas.sdss.org/dr5/en/proj/teachers/>
 - Range of grade levels

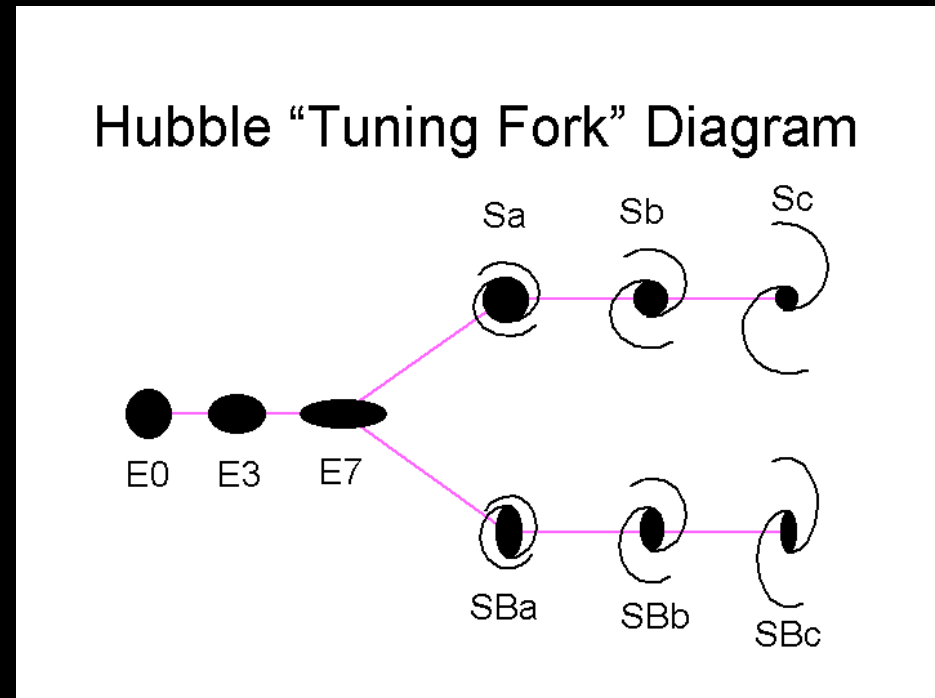
The Galaxy Zoo: Science!

- World's largest database of galaxy shapes
 - Shifted astronomer's assumptions of color and shape
- Determined that there is no preferred direction for galaxy spirals
- Bizarre and unexplained objects!
 - Hanny's Voorwerp



Types of Galaxies

- Elliptical
 - E0 (circular) to E7 (flattened)
- Spiral
 - Bulge, disk, halo
 - Ordinary (S) vs. Barred (SB)
- S0 between E7 and Sa
 - Have bulge, disk, no spiral structure
- Irregular



Types of Galaxies

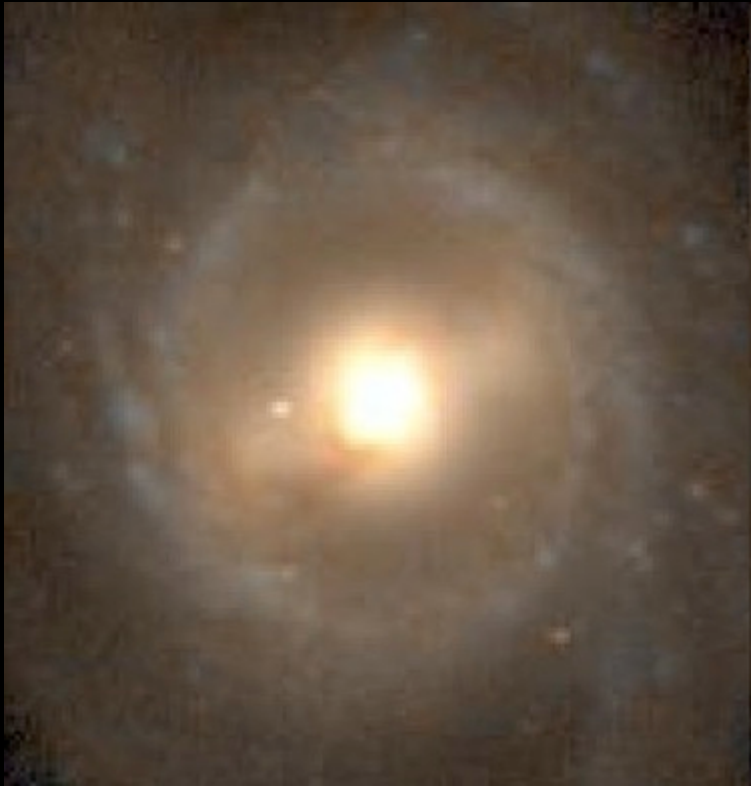


M87 E1



M100 Sc

Types of Galaxies



NGC 3351 SBb



LMC Irregular

Classifications

- Shape
 - Smooth or with Features?
 - How Round?
 - Edge on?
 - Bulge at center?
 - Spiral pattern? How tight? Number of Arms?
 - Bar feature through center of galaxy?
 - How prominent is the bulge?
 - Irregularities?
- Color
- Direction of Spiral

Getting Started

The screenshot shows a Mozilla Firefox browser window displaying the Galaxy Zoo Hubble website. The page title is "Galaxy Zoo: Hubble - How To Take Part". The browser's address bar shows the URL "http://www.galaxyzoo.org/how_to_take_part". The website header includes the text "Galaxy Zoo is a ZOO NIVERSE project" and "...just like MOON ZOO". The main navigation menu includes links for Home, The Story So Far, The Science, How To Take Part, Classify Galaxies, Forum, Zoo Media, Blog, FAQ, and Contact Us. Below the navigation menu, there are sub-links for "Clumpy Galaxies" and "Hubble Gravitational Lenses".

A blue banner at the top of the main content area contains the text: "If you took part in Galaxy Zoo 2, then you'll find much that is the same as before. To skip to the new part of the tutorial, [click here](#)".

How To Take Part

Galaxy Zoo: Hubble Tutorial

Your job is very simple! When classifying you will be shown an image of a galaxy and be asked a series of questions about it. All you need to do is to look for features that mark out different types of galaxy and answer the questions as well as you can. This is a job that humans are much better at than computers, so most of the questions should be fairly easy. If you find it hard to decide upon the answer to a particular question, don't worry! There often won't be a 'correct' answer. Just pick the one that seems best and move on to the next question. By looking at all the answers given for each galaxy the Galaxy Zoo scientists will be able to work out which is most likely to be the right one, and how sure we can be about it. Your individual opinion is extremely important to making that possible.

Below is an explanation of each question, along with a selection of examples which you can use to learn and practice your classifying skills. You should try to understand why we have decided on the answers given for each example. Remember though, there isn't always a clearly correct answer, so don't worry if you occasionally find you would have answered differently. When you've read this tutorial and are feeling confident about your classifying abilities, then you'll be ready to contribute to Galaxy Zoo science!

The questions you see for each galaxy will depend on your answers to the previous questions. We try to avoid asking questions which you can't answer. You can go back if you want to change your mind, but don't spend too much time worrying about any single question or galaxy.

Q: Is the galaxy simply smooth and rounded, with no sign of a disk?

Below the question are three radio button options, each with a corresponding image:

- Smooth: A smooth, rounded galaxy image.
- Features or disk: A galaxy image with a prominent disk or spiral structure.
- Star or artifact: A bright star or artifact image with a red 'X' over it.

For most of the questions we want you to concentrate on the galaxy which is right in the middle of the picture. If the galaxy has just a smooth shape, often which gets brighter towards the middle, you should click **Smooth**. If you can see anything other than a smooth

- <http://www.galaxyzoo.org>
- http://www.galaxyzoo.org/how_to_take_part

Getting Started

Mozilla Firefox

http://www.galaxyzoo.org/classify

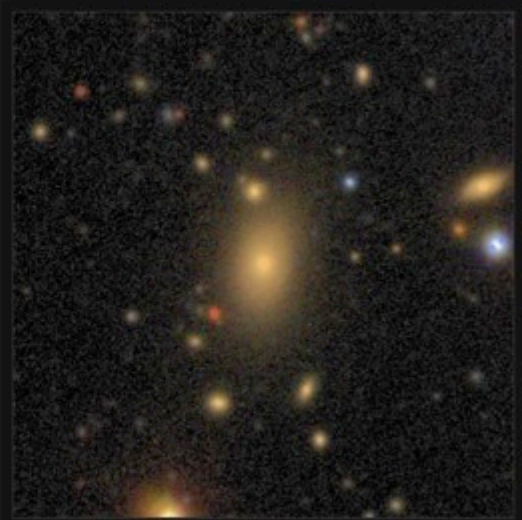
Galaxy Zoo is a ZOO NIVERSE project

...just like MOON ZOO

GALAXY ZOO

HUBBLE

Home How To Take Part My Galaxies Contact Us Register Log In






Invert galaxy image Add to my favourites

Classify galaxies

Answer the question below using the buttons provided.

Is the galaxy simply smooth and rounded, with no sign of a disk?

		
Smooth	Features or disk	Star or artifact

Galaxy Zoo Quick Links

- Classify
- How To Take Part
- Galaxy Zoo Forum
- Galaxy Zoo Blog

Astronomy Links

- Sloan Digital Sky Survey
- SDSS Database Access
- Oxford University
- University of Nottingham

Done

Classifications



Smooth



Features



Star or Artifact



Classification



Round



In Between



Cigar



Classification – Edge On?



YES



YES



NO

Classification



Rounded



Boxy



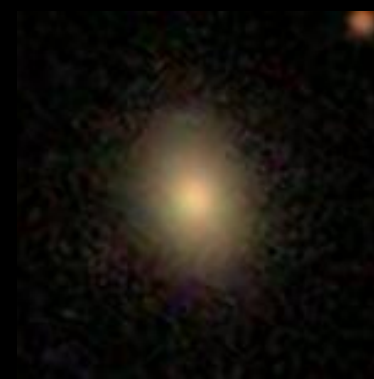
No Bulge



Classification – Spiral Pattern?



YES



NO



YES

Classification – Tightly Wound?



Loose



Tight



Medium

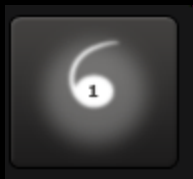


Medium



Loose

Classification



Classification – Central Bar?



Bar



No Bar



No Bar

Classification – Bulge Prominence



Just Noticeable



No Bulge



Obvious



Dominant

Classification – Odd Features



Merger



Ring



Irregular



Lens / Arc

Experiment and Explore!

The logo for the Galaxy Zoo project is a blue circular emblem. Inside the circle, the word "GALAXY" is written in a stylized, blocky font across the top. Below it, the word "ZOO" is written in a similar font. A small blue star is positioned between the two words. The background of the circle is a dark blue gradient with some faint star patterns.

GALAXY
ZOO