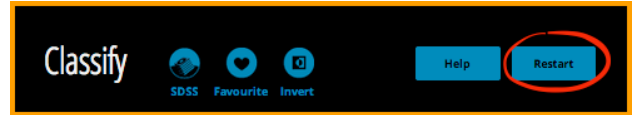# Zookeeping – Examples From the Galaxy Zoo

Here is an example of one series of questions the Galaxy Zoo might ask you about a galaxy. Remember, many more people are going to be asked to look at the same galaxy. Be thoughtful, but there is no need to spend a long time debating your answers. Besides, you can always choose to restart.

Tools to Help You Classify

Don't forget that **Invert** may help you see details in the galaxy images.

Consult **Help** frequently to stay clear about what the questions are really asking you to think about.

Stepping Through the Questions

Each galaxy will have its own questions associated with it. This depends on the source of the image and how you answer each question. No matter what question you are presented with, the steps are the same:

a. Read the question and the answer choices
b. Consult **Help** to view examples
c. Make a choice

As we go through the example, remember that you will have the **Help** section to coach you when you are on your own. We will not be looking at the **Help** text and images as part of our example.

Star or Artifact - How do we know it's a galaxy anyway?

Remember, when you are looking through very large telescopes, most of what you see are galaxies. The pictures at the left show you how bright stars appear in the Galaxy Zoo. What you are seeing is a result of bright light bouncing around the inside the telescope and too much light hitting the camera.

The Galaxy Zoo computers use step-by-step series of commands and calculations that are referred to as **algorithms** to choose galaxies for you to analyze. There are many different kinds of algorithms. Because of the way bright starlight spreads out in some images, the algorithm for choosing galaxies in the Galaxy Zoo sometimes includes bright stars. It is your job to identify these mistakes by selecting **Star of artifact.**

Other things that are not galaxies

Occasionally, you may also see bands of bright light crossing the image. These are made by rapidly moving objects such as satellites or meteors. They appear as different colors because of the way the camera is constructed to capture color images, not because the object is that color.
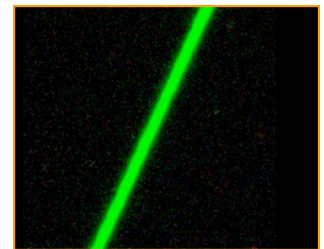
The top image is evenly bright indicating that a meteor was recorded as it burned up in the atmosphere. The other two are different examples of satellites wobbling in their orbits. Notice the beaded patterns of brightness.

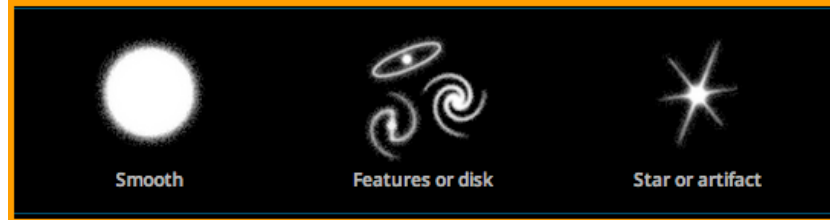Patterns like these are identified as **artifacts**.

Example -

Let's look at a rather tricky galaxy.

The first question you see will always be the same:

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

Just like a road going down a steep hill can still be smooth, a galaxy can have a bright center and still be classified as **Smooth**. Any feature that stands out or breaks up the image should cause you to choose **Features or disk**. Also, smooth does not mean it has to be round, as we will see. Our galaxy is **not** smooth, so we choose **Features or disk** for our answer:

The next question asks you to consider:

Could this be a disk viewed edge-on?

You answer **Yes** if the shape is very thin, often with a bright bulge. As always, take a look at the help information for examples. For our galaxy the answer is **No**.

The next thing the Zoo wants to know is if the object has a **bar**.

Is there any sign of a bar feature through the center of the galaxy?

Help is there to explain terms that are new. A bar is just what it sounds like. If you see a band of some kind running through the middle of your galaxy, check **Yes**. Don't be concerned about the angle of the bar. Our galaxy has a faint bar.

We are next asked:

Is there any sign of a spiral pattern?

This is a great example of how both options seem reasonable. When viewed carefully, there appears to be some faint evidence of a spiral, but you might wonder: Is that really a spiral? Look at **Help** and decide. This time we answer **Yes**. (This is a great example of why Galaxy Zoo asks many people to classify the same galaxy.)

The next question:

How tightly wound do the spiral arms appear?

As always, consult **Help** and make a choice. This time **Loose** seems to be an easy pick.

Now, it's time to count the arms:

How many spiral arms are there?

When you make your decision, keep in mind that we decided our spiral arms were loose. The example images are much tighter. Do your best, and do not worry if they don't look exactly like the pictures.


This galaxy appears to have two spiral arms.

Bright centers that you see in many galaxies are referred to as bulges. They are important features to astronomers. The next question asks you to make a judgment about the presence of a bulge.

How prominent is the central bulge, compared with the rest of the galaxy?

This question is not easy. If you remember that **No bulge** is the same as saying there is no bright spot and that **Dominant** bulges stand out as a major feature, you should be able to do a good job with this question. Remember, you are working as a team with many other Zooites to refine the description of this same galaxy.
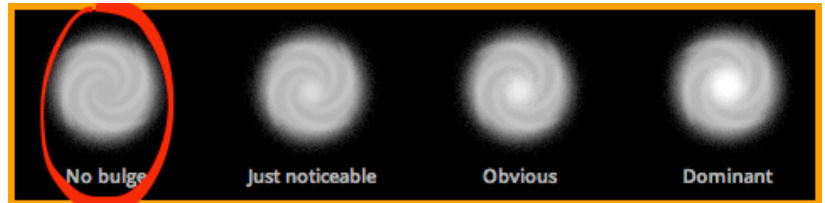
Any type of galaxy can have something about it that is a little different. A final question, which you will often see, asks you to describe anything that is unusual about the galaxy:

Is there anything odd?

Answering **Yes** brings up the following choices.

This is the place where you get the chance to alert scientists to one or more unusual features that are difficult for computer algorithms to identify. Don't forget to check **Help** for examples of each category. Select as many features as you think apply, and then click **Done.**