# “Gamma-Ray Bursts: Crash Course Astronomy #40”

# Name:

1. Gamma ray bursts are the single most \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ events in our universe.

2. The “Outer Space Test Ban” treaty based the launching of or testing of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ in space.

3. The origin of the first-detected gamma ray bursts was \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

4. Gamma ray bursts (GRB’s) last **SECONDS MINUTES HOURS DAYS**

5. We see GRB’s **ALONG THE PLANE OF THE MILKY WAY** **ALL OVER THE PLACE**

6. GRB’s are so powerful that even \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ couldn’t produce one.

7. The amount of energy in a GRB is equal to \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

8. The supernova that create GRB are so large that they are called \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. There are \_\_\_\_\_\_\_\_\_ groups of GRB. One is created in the explosion of a hypernova and takes a couple of seconds. The other is created in the collision of 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ and lasts just milliseconds.

10. A GRB can be over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ light years away and still hurt us.

11. As of 2015, SWIFT has discovered over \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ GRB’s.

12. Gamma ray bursts are the birth announcements of \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

# “Dark Matter: Crash Course Astronomy #41”

1. Every time we make an astronomical discovery, we find that we are **LESS** **MORE** important.

2. For many galaxies, the farther out from the center you go, the **FASTER** **SLOWER** you are moving.

3. In order for this to happen, there must be an invisible matter out there. It would have to be \_\_\_\_\_\_\_\_\_\_\_\_ times more abundant than the visible matter.

4. This invisible material had been theorized about before. It was coined \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

5. One particle that is predicted to have the properties of dark matter is an \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

6. #5 has mass, so therefore has gravity. **TRUE FALSE**

7. The more massive an object is, the more \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ it has, the more it warps \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_, the more it can warp the path of a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ beam.

8. The simplest explanation of the observations in the Bullet Cluster and others like it is \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_.

9. \_\_\_\_\_\_\_\_\_\_\_\_\_\_% of the stuff in the universe is made up of stuff that we can’t see or directly detect.

10. Dark matter \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ the universe together.