

Module 8 – Exploration
Problem-Solving Activity: Galactic Evolution

Name _____
Group Name _____
Period _____

In this activity you will use a computer simulation to observe changes in a large collection of gravitationally-bound objects that represents a galaxy. The software that you will use is called *GalaxSee*.

Instructions:

1. Open the *GalaxSee* application.
2. Enter your name when prompted. Click enter.
3. On the screen, you will see a small box titled “Info”. This box shows information about the Galaxy about to be displayed.
4. On the menu bar, click on “Galaxy” and go to “Galaxy Setup”.
5. Make the distribution “Disk”, the number of stars “512”, the star mass “1”, and the rotation factor “0”.
6. Under “Galaxy”, go to “Scale” and make sure it is “Galactic”
7. Again under “Galaxy”, go to “New Galaxy”
8. There should be a galaxy displayed on your screen at this point.
9. You will notice that on the menu bar there are now more choices. Play around with the choices under “View” and “Action” so you can see what each choice does.
10. Whenever you are ready, go to “Galaxy” again and go to “Run” to begin the simulation.
11. You may not notice much at first, but your “Info” box will now be showing a number of changes, and you will notice the objects in your galaxy moving around.
12. You can grab and spin the galaxy with your mouse, but it won’t continue to change until you make it come to a complete stop.
13. In the “Info” box under “simulation data” you will see a number next to MYR. That means millions of years. You are watching the galaxy change as millions of years go by right before your eyes.

Answer the following questions about your simulation:

1. In general, what happens to the object in your galaxy as time goes by?

2. How has the galaxy changed after 5 billion years? After 10 billion years?

3. How would you classify your galaxy according to its shape?
4. Do you think this is an accurate representation of a real galaxy? Why or why not?
5. Under “Galaxy”, go to “Model Settings” and change “Dark Matter” to the maximum amount. Under “Galaxy Setup”, change the rotation factor to the maximum. Then go to “New Galaxy” and run the simulation. Wait 13 billion years and describe how this galaxy is different from your first galaxy.
6. Go to “Galaxy Setup” and make changes to your galaxy. Write down your changes here (the changes will not take effect until you click “New Galaxy” and run it).
7. Describe your new galaxy after 5 billion years and after 10 billion years.
8. Is this galaxy a better or worse representation than your previous galaxies? Explain.
9. How were your simulations similar to a real galaxy?
10. Suggest some ways in which this simulation could be improved.