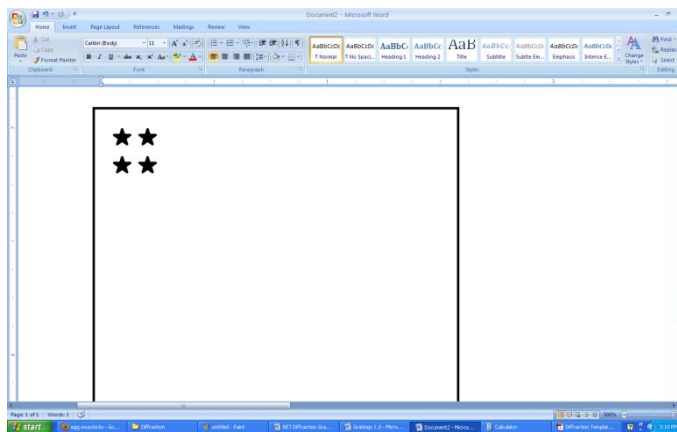


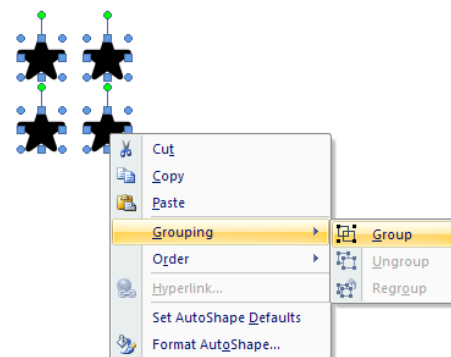
Student Handout: *How to Make Your Own Gratings*

These instructions will show you how to create diffraction gratings using MS Word 2007. All versions of MS Word can do this; however, the steps may be slightly different.

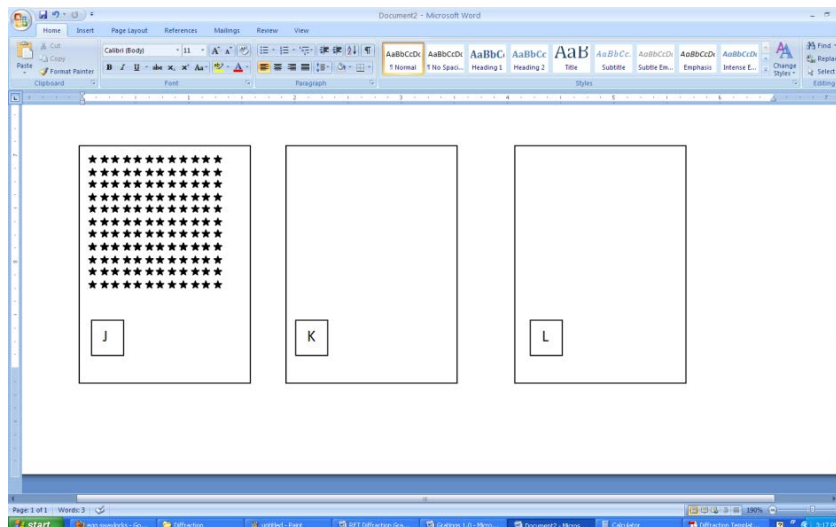
1. Decide what design you want to create. This example makes a pattern of evenly spaced stars. You can try different things, such as changing the spacing, orientation, pattern, or whatever you can think of. Just remember that there should be some repetition to the pattern and that not everything will work.
2. Create a small patch of your pattern. The more you zoom in, the easier it will be. To zoom, press **Ctrl** and use the scroll wheel on your mouse.



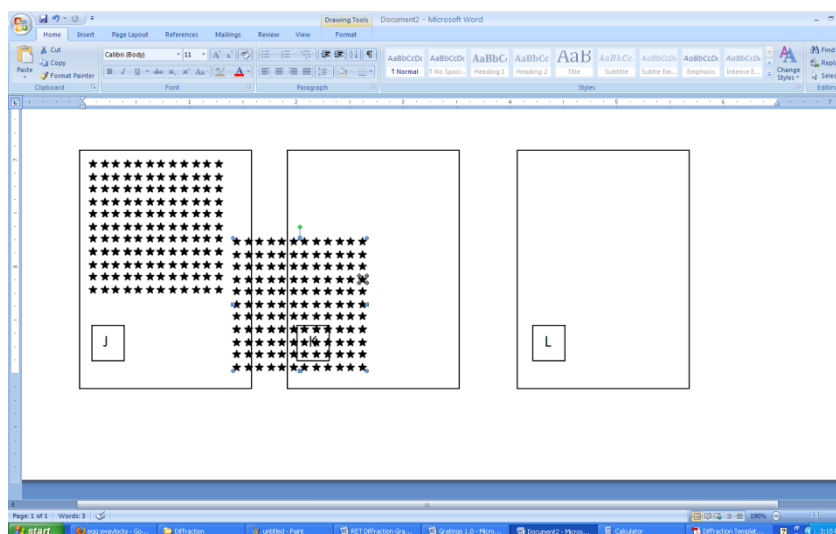
3. Hold **Shift** while clicking all the parts of your pattern, so that you select everything.
4. **Right click** on the selected items. Select **Grouping** ⇒ **Group** from the drop-down menu.
5. Use **Ctrl+c** to **copy** the group and **Ctrl+v** to **paste** it next to your original pattern.
6. You can now create a new group that contains all 8 stars.
7. Paste that group so you have 16 stars.



8. Continue steps 1–6, until most of the box has been filled with your pattern.

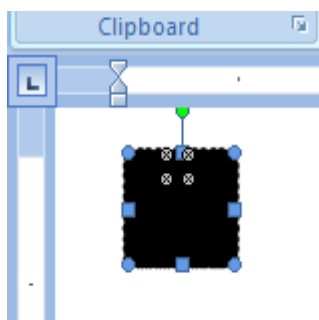


9. Select your entire pattern and copy it again. Then paste it next to the original pattern.



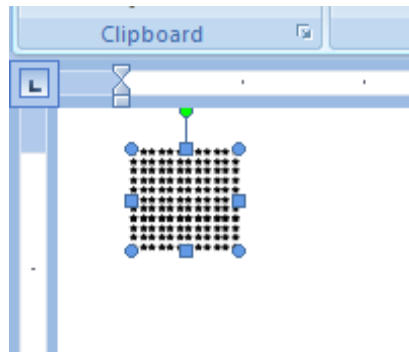
10. Resize the pattern by dragging the edges inward until the pattern is approximately ¼ inch on each side. Use the rulers on the top and bottom of the screen for comparison. You will need to zoom in to really see your pattern at this size.

- a. If your pattern blurs together, you can often fix it by selecting the object and right clicking. Select **Format Object** from the drop down menu and change the **Weight** to **0 pt**.

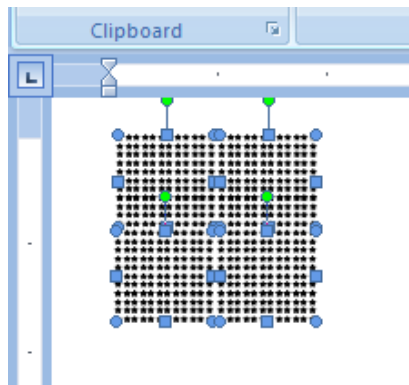


- b. You should be able to see your pattern when zoomed in as far as possible.

- c. If you are using a very small pattern, it might look a little different now. You might see ripples or lines of light and dark that should not be there. Ignore them. The monitor has a difficult time presenting these patterns clearly at such a small size. Also, some of these patterns can create an optical illusion.



- d. The new pattern is small enough to cause diffraction, however, it can be difficult to hit with a laser. It's better to make 3 more copies and place them side-by-side to make a larger cube.



- e. Move this cube underneath the larger image of your pattern so that you remember what it looks like, and you are ready to make another pattern.

