Appendix 3A
Pinhole Viewer

1. Make a loop of tape so the sticky side is on the outside. Stick this to the round piece of construction paper.
2. Put the taped circle in the cup that is not cut and use a pencil to press it into the bottom of the cup until the tape sticks.
3. Take the arc-shaped piece of construction paper. Note the notched cuts on one side. Fold that side in a bit up to the notches.
4. Roll the arc-shaped piece of construction paper up with the notched side folded to the inside, and place it inside the cup. Release the paper to let in unroll a bit, and then tape it to the cup.
5. Use a pen to make a hole in the bottom of the cup from the inside, through the construction paper. Ask for help if you need it.
6. Tape the wax paper over the cut bottom of the other cup. Try to keep the wax paper as smooth as you can.
7. Put the cup with the wax paper into the cup with the black construction paper.
8. Look through the top of the inner cup at a brightly lit object – we will show you where to look. Ignore the bright light coming through the hole and concentration on the colors and patterns you see on the wax paper “screen.” Draw or describe what you see. Can you
recognize what you are looking at? Is it upside down or right-side up?

9. What happens to the picture when you move the screen farther back from the hole by pulling the cup out?

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10. Let’s try to see how the viewer works. On every part of the screen we see the color of the light that hits that part. Suppose you are looking at a tree. Color the trunk of the tree brown and the leaves green. Draw a green ray of light that starts at the leaves and goes through the hole to the screen in the picture. Draw a brown ray of light that starts at the trunk and goes through the hole to the screen. Look where these rays hit the screen. Draw the picture of the tree on the screen as we would see it.
11. Below we have moved the screen back farther from the hole. Draw the light rays again, and draw the tree as we would see it. What happens to the picture when we move the screen farther back?