What's the Frequency, Roy G. Biv?

Procedure

1. Decide who will be the Data Keeper, the Materials Manager, and the Time Keeper.
   - Data Keeper / Reader
   - Materials Manager / Checker
   - Time Keeper / Facilitator
2. Materials Manager retrieves all materials listed from teacher. Reader should read all directions.

   Materials:

Red, Green and Violet colored pencils	Meter stick
Manila folder	Scissors
Masking tape	140cm adding machine tape

3. Recorder should draw a vertical line about 20 cm from the beginning of the adding machine tape and label it "Start". With the metric ruler, make a point 100 cm from the starting point. Draw a vertical line and label it "End". Cut the tape off of the roll leaving about 20 cm space between "End" and where you cut.
4. Recorder should draw a vertical line 20cm from the beginning of the adding machine tape and label it "**Start**".
5. Recorder should draw a vertical line 100cm away from the start line and label it "**End**". There should still be 20 cm left over.
6. Recorder should draw three evenly spaced lines along the tape from "**Start**" to "**End**". The top line should be red and should be drawn 1cm down from the top. The middle line should be green and should be drawn 3cm down from the top. The bottom line should be violet and should be drawn 5 cm down from the top.

   Note: **The Time Keeper/ On Task Coordinator should continually keep everyone focused in order to complete this lab. He or she may also share in the completion of the tasks.**

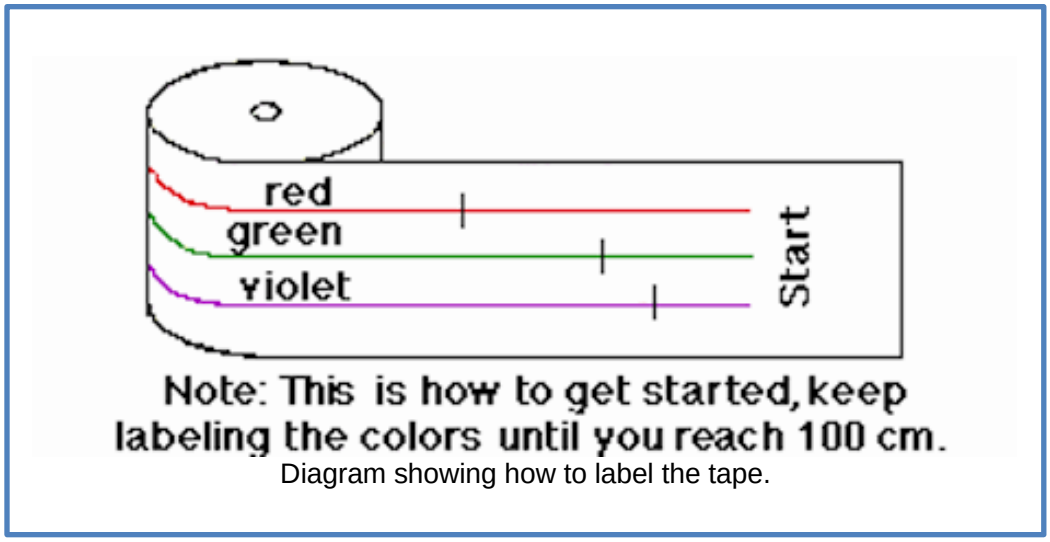

Diagram showing how to label the tape.

7. Recorder - Divide the red line every 14cm and mark darkly with the red colored pencil every 14cm.
8. Recorder - Divide the green line every 10cm and mark darkly with the green colored pencil every 10cm.
9. Recorder - Divide the violet line every 8cm and mark darkly with the violet colored pencil every 8cm.
10. Materials Manager fastens the marked adding machine tape to a pencil using masking tape.
11. Recorder cuts a manila folder along its crease. Then cuts a rectangle out of the center of one of the long sides. This rectangle should be about 10 cm high and 5 cm wide as shown below.

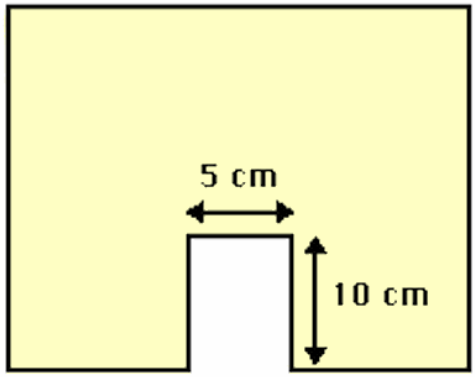

Diagram showing the cutout on the manila folder should look.

12. Materials Manager sets the manila folder with the cut out on the table, supporting it with the four books as shown in the diagram below. Now s/he feeds the end of the adding machine tape through the narrow space between the manila folder and the two back books until "Start" appears in the middle of the opening in the manila folder.

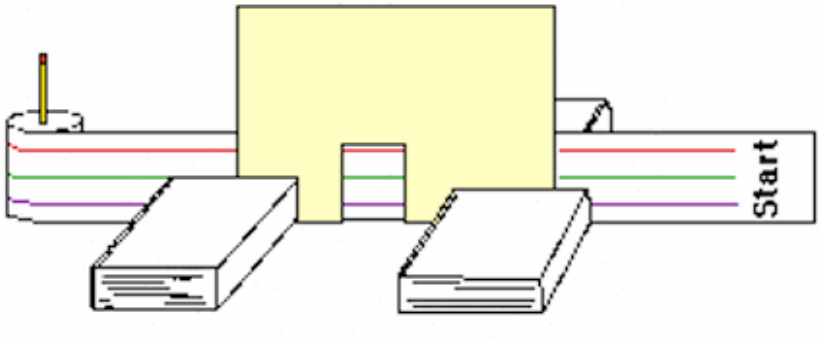

Diagram showing the setup for this lab.

13. Recorder takes the Data Table and sits in front of the tape and manila folder model.

14. Time Keeper calls "start" and begin timing as he or she slowly pulls the tape along. S/he should try to pull the tape at about the same speed for every trial!

15. Recorder tallies in the appropriate box on the data table every time s/he sees a wavelength mark. When "End" appears, s/he tells the Time Keeper to stop timing.

16. **Trial Run (Use the Red Colored Line):**
    - One person will keep track of time. They will begin timing as they slowly pull the tape through the folder at a consistent speed. Make sure to note down the time when you are done.
    - One person will hold the pencil steady during the run.
    - One person will be a recorder and keep a tally of the wavelength marks as they become apparent.

17. **Trial 1 (Red Line):**
    - Use the same setup as above.
    - Be sure to pull the tape at a slow consistent speed.
    - Make sure to record the time and to tally the number of wavelength lines seen.

18. **Trial 2 (Green Line):**
    - Use the same setup as in the Trial Run.
    - Be sure to pull the tape at a slow consistent speed.
    - Make sure to record the time and to tally the number of wavelength lines seen.

19. **Trial 3 (Violet Line):**
    - Use the same setup as in the Trial Run.
    - Be sure to pull the tape at a slow consistent speed.
    - Make sure to record the time and to tally the number of wavelength lines seen.

20. MAKE SURE EVERYONE IN THE GROUP HAS FILLED IN THE DATA ON THEIR OWN DATA SHEETS SO THEY CAN ANSWER THE FOLLOW-UP QUESTIONS INDIVIDUALLY.

21. Determine the average number of wavelengths seen for each of the colors. **Do not use the Trial Run data**. To find the average, add the three totals and divide by three. EACH PERSON RECORDS THE DATA ON THEIR OWN DATA TABLE.

22. Determine the frequency for each of the colors. **Do not use the Trial Run data**. To find the frequency, divide the average for each color by the time. Note: frequency is defined as the number of wavelengths passing a given point per second. EACH PERSON RECORDS THE DATA ON THEIR OWN DATA TABLE.

23. EACH PERSON RETURNS TO THEIR OWN SEATS TO ANSWER THE REMAINING QUESTIONS.