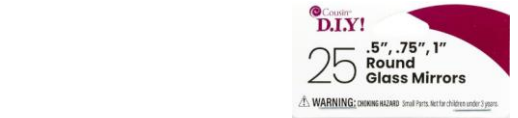
Instructions to Assemble the Magnetometer

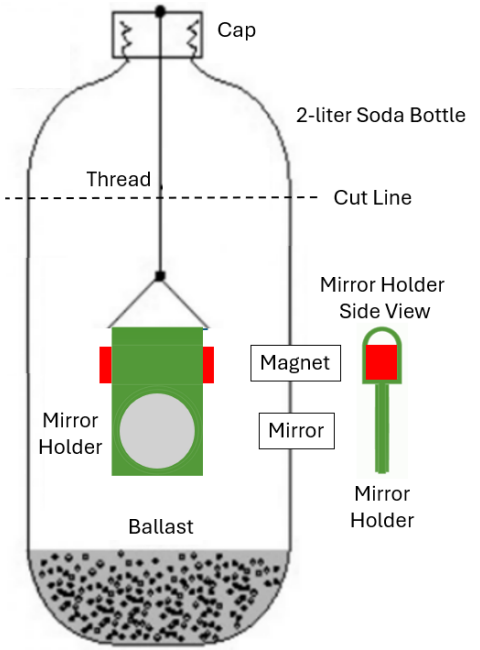
Parts Needed:

- Part printed from the 3D Printer Model in the STL File.
- A mirror (I used the 1-inch size from this package).
- A magnet (I used one of the agnets from this package: hand2mind Red Ceramic Bar Magnets, 1.5 Inch, Product Dimensions: 1.5"L x 1.5"W x 1.5"Th).
- Ballast for the soda bottle. (sand, small pebbles, etc.)
- Superglue (brand is not important).
- Thread.
- Tape.
- Clear 2-litre soda bottle with cap and vertical sides.
- Awl to puncture the center of the soda bottle cap.
- Blade to cut the soda bottle.



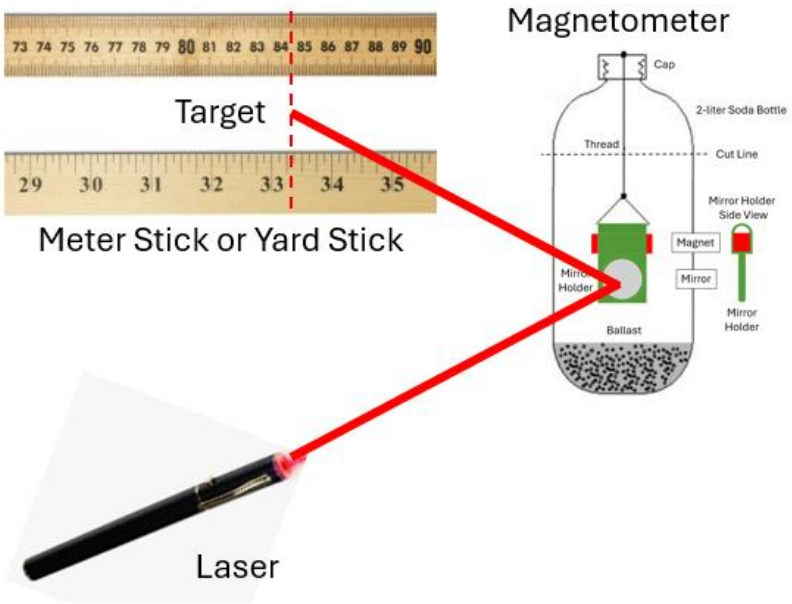
<u>The Construction Process:</u>

1. Cut the soda bottle near the top, where the sides become vertical.
2. Put ballast in bottom of the soda bottle.
3. Download the Zip File.
4. Extract the STL File for your 3-D printer.
5. Note which end of your magnet is “N” (north). This will point to the north Magnetic Pole inside your Magnetometer.
6. Glue the magnet in the top part of the holder. You should be able to see the “N” and the “S” on the magnet.
7. Glue a mirror onto the side of the magnetometer that will be facing the target. To be safe, you can always glue mirrors onto both sides of the holder.
8. Thread the thread through the top part of the mirror holder, above the magnet, and tie it into a triangle.
9. Thread the thread through the hole in the soda bottle cap.



10. Screw the cap onto the soda bottle.
11. Adjust the mirror so that it hangs straight and is not touching the sides of the soda bottle.
12. Tape the two parts of the bottle together to resemble the original bottle.
13. Adjust the length of the thread inside the soda bottle so that the mirror holder hangs freely at the height you need.
14. Tape the end of the thread to the outside of the soda bottle.

Set Up and Use of Your Magnetometer:



1. Magnetometer should be somewhere it will not be disturbed and on a hard surface.
2. The laser needs to be mounted so that you can press the on button without disturbing the laser.
3. The target will either be to the east or west of the magnetometer.
4. Angle between the incoming and outgoing laser light should be about 20 degrees.
5. Distance from the magnetometer to the target should be a multiple of 57 in any units:
    - 57 inches if you are using a yard stick.
    - 57 centimeters if you are using a meter stick.
6. Distance from the laser to the magnetometer is not important.
7. Adjust the parts so that:
    - The laser beam hits near the center of the target.
    - The laser beam hits near the center of the mirror.
8. Ideally you would like to take measurements hourly, 24-hours every day. This is not practical. You may miss some of the peaks. Once a day is sufficient.
9. Record the date, time, and value from the yard or meter stick.