

# Instrument Construction: Transparency

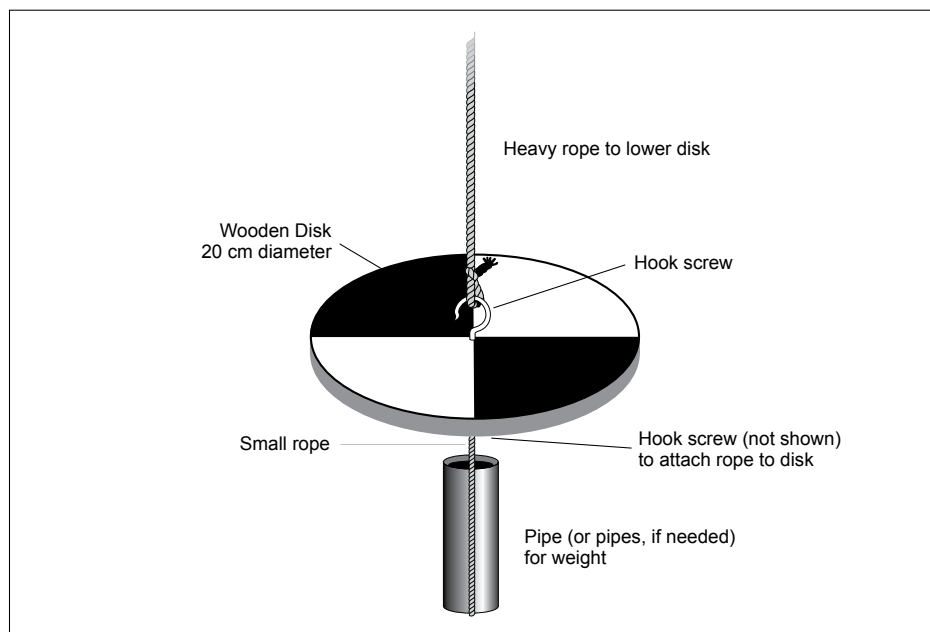
## Instructions for Making a Secchi Disk to Measure Water Transparency

### Materials

- Wooden disk (20 cm diameter)
- Paint (black and white)
- 2 hook screws (2-3 cm)
- Pipe(s) for weight
- 5 meters rope (or more, depending on depth of water)
- Meter stick
- Permanent, waterproof markers (black, red, blue)
- Short piece of rope (approximately 50 cm - 1 m)

### Directions for Construction

1. Divide top of wooden disk into four equal quadrants. Draw lightly in pencil 2 lines crossing at a 90 degree angle to identify the quadrants.
2. Paint two opposite quadrants in black and the other two in white.
3. Screw a hook screw into the top center and bottom center of the disk. Tie the 5-m (or longer) rope through the screw in the top of the disk.
4. Tie the short piece of rope through the screw on the bottom of the disk. String the rope through the pipe. Tie a large knot at the bottom of the pipe so that it does not fall off when hanging vertically underneath the disk.
5. Measure and mark the rope above the top part of the disk with a black marker every 10 cm.
6. Measure and mark every 50 cm up from the disk with a blue marker and every meter with a red marker.





# Instrument Construction: Transparency

## Instructions for Making a Transparency Tube to Measure Water Transparency



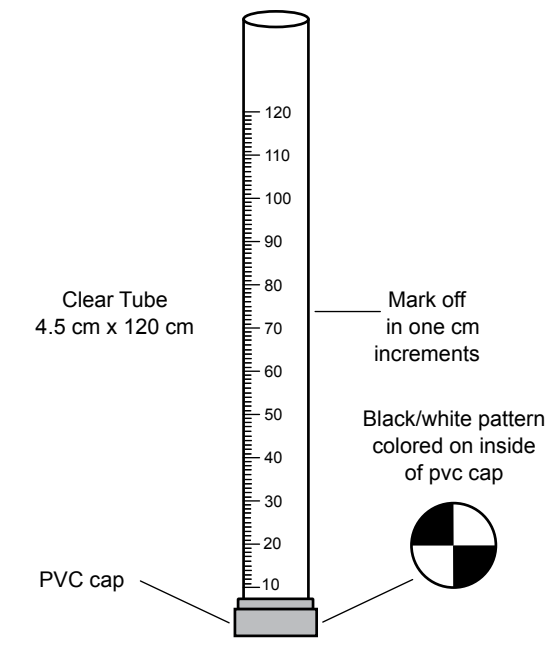
### Materials

- ❑ Clear tube (approximately 4.5 cm x 120 cm)
- ❑ Permanent, waterproof black marker
- ❑ PVC cap (to fit snugly over one end of tube)
- ❑ Meter stick (or meter tape)



### Directions for Construction

1. On the bottom of the inside of the PVC cap, draw a Secchi disk pattern (alternating black and white quadrants) with the black permanent marker.
2. Put the PVC cap over one end of the tube. Cap should fit tightly so water cannot leak out.
3. Use the marker and meter stick to draw a scale on the side of the tube. The bottom of the inside of the PVC cap where the Secchi disk pattern is drawn is 0 cm. Mark every cm up from that point.
4. A shutoff valve can be installed near the bottom of the tube to allow water to escape in a controlled manner; this would resemble commercially-available transparency tubes.



## **Frequently Asked Questions**

### **1. How much weight do I need on my Secchi disk?**

Use enough weight so that the disk will be pulled vertically down under the water.

### **2. How long should the rope be on the Secchi disk?**

The length of the rope will depend on how clear your water is and from where you are measuring. If you are measuring from a dock or bridge, for instance, extra rope may be needed to reach the water surface. If your water tends to be murky and you are measuring from near the surface, you may not need more than a couple of meters of rope.

### **3. Where do I find a long, clear tube for my transparency tube?**

Many hardware stores carry long tubes for protecting fluorescent light bulbs. These are inexpensive and make excellent transparency tubes. If these are not available, any long, clear plastic tube of the appropriate size can be used. Length of tube is more important than diameter.

### **4. What do I do if my tube leaks around the cap?**

If your tube leaks, use waterproof silicone caulk to seal around the cap.

### **5. Is it acceptable to make a small hole in the transparency tube near the bottom, fill the tube with water, then slowly release water until the disk at the bottom appears?**



This method is acceptable, if the reading is made quickly. It is recommended that a small shutoff valve be installed at the bottom of the tube; This would allow you to control the release of water from the tube.

Particles settle quickly, especially if they are being pulled down by water being released at the bottom. The reading must be made before particles settle and obscure the disk. These tubes should be emptied and rinsed between readings to be sure no particles remain on the bottom to affect the next reading.

### **6. Can a transparency tube be longer or shorter than 120 cm?**

The tube should be within a few centimeters of the 120 cm standard. Some schools might test waters that never have a transparency greater than 20 centimeters, and for them there is no need for the longer tube. Others might have waters that are always >120 cm and need a longer tube to indicate the greater transparency. The standard distance of the eye to the disk (120 cm), however, should be maintained to standardize the measurement.