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## THERMOMETERS

Small, inexpensive (\$6.95/dozen), plastic-backed thermometers may be purchased from several suppliers listed in this section. Because the backing is flexible plastic, the glass will snap easily, creating a safety hazard. You might glue wooden tongue depressors or popsicle sticks to the back of the plastic to make them rigid. In both plastic- and metal-backed thermometers, the glass containing the red solution tends to slip up and down against the scale printed on the holder. Let them all sit out overnight on a desk so that they should read the same. Slip the glass up or down until they do show the same temperature. Use a more expensive and accurate thermometer for an idea of what the correct temperature is. When they all read about the same, attach them permanently to the backing with a big drop of strong, fast drying glue.

## BALANCES

A simple balance with a stick and two pans which sits level when empty is adequate for these activities. There are several kinds made of wood or plastic that sell for about \$15. More expensive balances which actually weigh things can also be used, but you will have to teach the students how to use them. It is much easier for elementary students to weigh things with a spring scale.

## SPRING SCALES

Two kinds of spring scales are commonly sold in science supply catalogs. They range in price from \$6-15 each. The cheaper scales that weigh up to 250 grams work well for the activities in this curriculum. (We prefer the Ohaus 250 gm spring scale over others.) You will have to teach the students how to interpolate between the numbers on the scale. The scales come without pans. Purchase the smallest aluminum pie tins (about 5 in across) from the housewares section of the grocery store or use the pans from individual chicken pot pies. Punch three holes equally spaced around the rim. Tie three 2 ft long strings through the holes and pull them up above the pan. Tie an overhand knot in the strings about a foot above the pan so that they are of equal length. Then tie another overhand knot about one inch above the first and cut off the remaining string. The pan **MUST** be suspended from the **TOP LOOP** top, not through one of the strings below in which case everything will be dumped out when the scale is lifted.

## MEASURING TIME

Digital watches that read in seconds are becoming very cheap. Send out a call for old ones that are collecting dust in a drawer because the band broke and it is cheaper to get a new watch than a band. The lithium batteries are good for 5 years or more whereas the bands break quite fast. Keep an eye out for a sale. Many children have watches that read in seconds and even have functions like alarms and timers. I found that the students in our class were much better at working their digital watches than I was so I delegated all time-keeping. Regardless, the children may require a review of the methods used to subtract one time from another.

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## MEASURING VOLUME

Clear plastic measuring cups may be found in the grocery store housewares section. These cups have both metric and English markings. Many scientific supply houses offer metric volumetric measuring devices which are made of plastic. Neither of these sorts of items would be acceptable for real scientific research because they cannot be sterilized. They are perfect for elementary/middle school classroom use as you should not be using any toxic compounds. They will not break easily and will last for years. They may not be perfectly accurate, but will be fine for your purposes. Some new cups are even designed to nest.

