

Heat and Temperature

Equipment	Quantity required for 20 students working:		Unit cost	Supplier and catalog number	Comments	First use
	together as a class	semi-self paced				
Alcohol burners Burners and stand kit (2 burners & stand) Replacement wicks Ethyl alcohol, denatured (burner fuel)	10 kits 2 pk 12 4.0 L	5 kits 2 pk 12 500 mL	\$13.95 \$4.10 \$23.85 \$ 8.90	Frey 15576468 Frey 15576621 NASCO KM01030M NASCO KM01029M		1.2
Deionized or distilled water	6 gal	6 gal		Local supplier	Deionized or distilled water is best for experiments in which student make numerical measurements (e.g., 1.2, 2.1, 2.2, 2.3, 4.1, 4.5, and 7.1). The instructor should perform the lab to check whether tap water can be used.	1.2
Ring stands Support rings, 5" diameter Wire gauze, 5" x 5"	10 10 2 pk 6	5 5 1 pk 6	\$10.95 \$6.00 \$5.95	Frey 15574176 Frey 15574104 Frey 15574134	See also POM, L&C, Mag, EM, and AbS.	1.2
Test tube clamp, Stoddard's	12 or more	12 or more	\$0.71	NASCO SA04398M	Used to hold hot test tubes.	1.2
Thermometer, red spirit filled -20 to 110 C x 1 C/ 0 to 230 F x 2, 305 mm length, white or yellow back	20	10	2.65,10+ ea. 2.95 ea	Frey 15568961 (white back) Frey 15585027 (yellow back)	See also POM	1.2
Stopwatch/clock					Students can use their own wristwatches as long as they indicate seconds.	1.2
Glassware: Test tubes (25 x 150 mm, Pyrex) stopper size 5 Beaker 250 mL Beaker 150 mL Graduated cylinder (plastic 50 ml) Graduated cylinder, 100 ml x 1.0 (single graduated, educational grade borosilicate) Dropper pipette (3" medicine dropper)	2 pk 72 2 pk 12 2 pk 12 10 4 pk 6 2 pk 12	1 pk 72 2 pk 12 2 pk 12 5 1 pk 6 1 pk 12	\$75.50 \$26.60 \$26.95 \$1.90 \$37.85/1 pk 6 \$28.95/pk for 4 or more pk \$1.95	Frey 15599343 Frey 15593976 Frey 15593973 Delta 53-070-2085 Frey 15599823 Frey 15569723	See also POM. A variety of glassware is used throughout the module. If you have purchased glassware for POM, you have everything you need for H&T. Beakers should be marked so that students can easily estimate volume.	1.2 1.2 4.1 1.2 1.2
Corks, size 10 25 mm top width to 19 mm bottom width	1 pk 100	1 pk 100	\$13.70	Frey 15586704	Optional for use in checkout of Exercise 1.3.	
Ungraduated thermometers, 12.5 cm long	10	10	.95 ea	Frey 15594696		OPT 1.3

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Wood and aluminum blocks about 3" x 3"	2/group 10 groups	2/group 4-5 groups		Local store/stock	Simple scrap blocks are sufficient. Drill a hole in each block to accommodate a thermometer.	1.4
Electric water heater	1	1		Local store/stock	Optional: A large electric coffee maker will provide hot water for an entire class.	OPT 2.1
Styrofoam cups, 6 - 8 Oz	1 pk 50	1 pk 50		Local Store	Used throughout H&T.	.
Aluminum cylinders, 75mm x 25mm	12	6	\$9.15	Delta ESS 16-030-8538	See also Section 12 of POM.	4.1
Balance: Use one of the following: Equal arm balance with mass set and tweezers or Triple beam balance and weight set Use one of the following: (A) Ohaus model (0.1 to 610 g) With weights to extend range to 2610 g (B) Ohaus model (0.1 to 610 g) Requires separate weight set 1-500 g, 2-1000 g weight.	10 10 1 1 1	10 10 1 1 1	\$39.00 \$12.95 \$104.95 \$88.85 28..60	Fisher Sci. Educ. S52021 Frey 15595398 Frey 15572090 Frey 15572096 Frey 15595797	See also POM. Students can use double pan or triple beam balances. If the class has completed <i>Properties of Matter</i> , they can use the analytical double pan balances they calibrated in that module.	4.1
Thread	1 spool	1 spool		Local store/stock		4.1
Washers, plated steel flat 1" Outside diameter, 0.4" inside diameter, 0.1" thick	10 groups 5/ group 50 washers	5 groups 5/group 25 washers		Local store/stock	See also Kin.	4.5
Variable control hot plate 120 V, 1100 Watts AC.	10	5	\$50.95	Frey 15565573		7.1
Ice cubes					Make ice cubes with distilled or deionized water, if possible.	7.1
Funnel, long stem Kimax heavy wall 75 mm diameter x 150 mm stem	1 pk 12	1 pk 12	\$53.85	Frey F20085	Funnels can be used throughout the module and are necessary for Experiment 7.1.	7.1
Iron cans	10	5		Local store/stock	Tuna, small vegetable cans may be used.	7.3
Beaker Tongs, plain jaws	10	5	\$4.85	Frey 15563588	See also POM.	7.3