

Favorite Experiments in Physics and Physical Science

Materials List

Part 1: Experiments for *Introductory Physics* and *ASPC*

		Quantity	Source	Cost
Experiment 1 - The Pendulum Lab				
1	nylon string	1 meter		
2	large paper clip	1		
3	large washers (1 or 2")	3	hardware store	.50
4	meter stick, broom handle or similar item	1		
5	duct tape or masking tape	1		
6	clock with sweep second hand or stop watch	1		
Experiment 2 - The Soul of Motion Lab				
1	bathroom scales (old-fashioned style with dial)	2		\$15
2	vehicle (pick-up truck, Kia Soul or other)	1		
3	30' measuring tape or similar	1	hardware store	\$10
4	stop watch	1		\$5
5	duct tape	1		
<i>(additional optional equipment if digital readers are used)</i>				
6	PASPORT 2-Axis Force Platform, PS-2142	2	pasco.com	\$459
7	Xplorer GLX	2	pasco.com	\$389
8	Force platform handle set, PS-2548	2	pasco.com	\$39
9	Force platform support rack (constructed of ordinary lumber. See illustrations for construction suggestions)		Hardware store	\$15
Experiment 3 - The Hot Wheels Lab				
1	Hot Wheels track (Builder Essential Gravity Pack)	1	Walmart or toy store	\$4
2	Hot Wheels or Matchbox cars	1 to 3		\$3-\$10
3	Track support frame (optional). Aluminum angle bar commonly available or wooden jig available from Novare .		Hardware store Novare Science & Math	\$12
4	stop watch	1		\$5
5	meter stick or machinist's rule	1		\$3
6	triple-beam balance, such as # 02-7600	1	arborsci.com	\$89
7	carpenter's level	1	Hardware store	\$10
8	sheets of paper (for leveling)			
9	masking tape	1 roll		
<i>(additional optional equipment if digital timer is used)</i>				

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10	Combination digital timer and photogates such as #P4-1450	1	arborsci.com	\$279
11	support stand, such as #66-4220	2	arborsci.com	\$18
12	clamp holder, such as #66-8290	3	arborsci.com	\$17

Experiment 4 - DC Circuits (per group)

1	DC power supply, such as #P4-3450 . Discussion provided for using batteries as a low-cost alternative	1	arborsci.com	\$100
2	digital multimeter, such as # EL-DIGMULT	1	hometrainingtools.com	\$13
3	breadboard and wire kit, such as Twin Industries TW-E41-102B (stock no. 70012449 from Allied Electronics)	1	alliedelec.com	\$18
4	banana plug, such as the Emerson Connectivity Solution 108-0302-001 eg. 70090314	2	alliedelec.com	\$2
5	precision resistors, 1.1k, 1.5 k, 2.0 k, 4.7 k. (These should be 1% tolerance such as the metal film resistors available from Allied Electronics stock no. 70183632 , 70183635 , 70183637 , and 70183646)	1 each	alliedelec.com	\$1.00

Experiment 5 - The Solubility Lab (per group)

1	beaker, 250 mL, Item# CE-BEI0250	2	hometrainingtools.com	\$5
2	graduated cylinder, 100 mL, Item# CE-CYPP100	1	hometrainingtools.com	\$5
3	triple-beam balance, such Product # 02-7600	1	arborsci.com	\$89
4	laboratory scoop, such as Item# CE-SCOOP	2	hometrainingtools.com	\$2
5	beaker tongs such as Item# CE-TONBEAK	1	hometrainingtools.com	\$6
6	thermometer, such as Item# ME-THER30A	1	hometrainingtools.com	\$3
7	Bunsen burner, or alcohol burner item# CE-LAMP2	1	hometrainingtools.com	\$6
8	ring stand such as Item# CE-STAN5X8	1	hometrainingtools.com	\$13
9	iron burner ring, 3 inch, Item# CE-RING3	1	hometrainingtools.com	\$6
10	burner pad, 4 inch wire gauze, Item# CE-GAUZE4	1	hometrainingtools.com	\$2
11	gas hose (if Bunsen burner is used)	1		
12	disposable weigh tray, Model No. BS-WHDSAL3	1 pack	hometrainingtools.com	\$8
13	table salt (non-iodized), approx 200 g			
14	table sugar, approx 200 g			
15	distilled water, approx 400 mL			
16	paper towels			
17	stir rod (if magnetic stirrers not used) Item# CE-STIR10	2	hometrainingtools.com	\$1

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18	laboratory striker or butane lighter (most convenient are the lighters made for use with outdoor gas cooking grills) Item# CE-LIGHTER	1	hometrainingtools.com	\$4
19	safety goggles or glasses, one pair per student, Item# CE-GOGGLIF		hometrainingtools.com	\$4

optional equipment

20	magnetic stirrer, such as Item# CE-MAGSTIR	1	hometrainingtools.com	\$90
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Experiment 6 - The Density Lab

1	graduated cylinder, 250 mL Item# CE-CYPP250	1	hometrainingtools.com	\$20
2	beaker, 400 mL, Item# CE-BEI0400	1	hometrainingtools.com	\$5
3	triple-beam balance, such #02-7600	1	arborsci.com	\$89
4	aluminum samples, 3/4 in x 3/4 in angle, various lengths, 4.5 in to 7.5 in	4	hardware store	\$5
5	PVC samples, 1/2 in schedule 40; various lengths, 3.0 in to 6.0 in	4	hardware store	\$5
6	paper towels			
7	tap water			

Part 3: Experiments for *Physics: Modeling Nature*

Experiment 1 - The Bull's-Eye Lab

1	steel ball, 1 inch diameter, such as # P1-5003	1	hometrainingtools.com	\$2
2	laboratory support rod or ring stand Item# CE-STANDA	1	hometrainingtools.com	\$18
3	small clamp such as #DWHT83139	1	Hardware store	\$11
4	shelving support rail eg. #FG4A6901WHT	1	Hardware store	\$6
5	stop watch	1		\$5
6	masking tape	1		\$1
7	plumb bob such as Model # 908	1	Hardware store	\$5
8	6' nylon string			
9	meter stick	1		
10	carpenter's level	1	Hardware store	\$10
11	target (photocopies)		see p. 177	
12	carbon paper (one sheet for class)	1	Office supply store	

Experiment 2 - The Friction Challenge (per team)

1	brass plate, 10 in x 4 in x 5/16 in (approx.)	1	industrialmetalsupply.com	
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2	brass flat bar, 1 in x 1 in x 1.25 in (approx.)	1	industrialmetalsupply.com	
3	waterproof polishing paper in four grades: 120-C, 220-A, 320-A, and 400-A, such as part nos. 19823, 19808, 19798, and 19795	1 ea	abrasivesales.com	
4	cleaning cloths			
5	nylon cord			
6	WD-40 spray silicon lubricant			
7	triple-beam balance, such #02-7600	1	arborsci.com	\$89
8	other standard lab equipment such as pulleys, table clamps, mass sets, adjustable ramp with angle gauge, timing equipment and measurement tools		read the experiment procedure to decide which of these you want to use.	

Experiment 3 - Rotational Kinetic Energy

1	steel ball, 1 inch diameter, such as # P1-5003	1	hometrainingtools.com	\$2
2	shelving support rail eg. #FG4A6901WHT	1	Hardware store	\$6
3	stop watch (only if digital timing system is not available, item #14)	1		\$5
4	masking tape			
5	carpenter's level	1	hardware store	
6	track support frame (described in experiment, made of aluminum stock)	1		
7	J.B. Weld epoxy adhesive		hardware store	\$4
9	meter stick	1		
10	drafter's triangle	1	hardware store	
11	copy paper (for leveling)			
12	micrometer	1	hardware store	\$20
13	dial caliper, Model No. T9F534164	1	hardware store	\$25

optional equipment if digital timer system is used:

14	Combination digital timer and photogates such as #P4-1450	1	arborsci.com	\$279
13	support stand, such as #66-4220	2	arborsci.com	\$18
14	clamp holder, such as #66-8290	3	arborsci.com	\$17

Experiment 4 - Calorimetry

1	aneroid dry calorimeter, such as #CE-CALORIM	2	arborsci.com	\$12
2	specific heat cylinders, such as this set	2 or 1 set	onlinesciencemall.com	\$20
3	thermometer	3		\$3
4	needle-nose pliers	1	hardware store	\$15
5	laboratory oven (or household oven)			
6	freezer			

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7	fishing line			\$1
8	triple-beam balance, such as #02-7600	1	arborsci.com	\$89
9	J.B. Weld epoxy adhesive			\$4

Experiment 5 - Sound

1	sound level meter, such as #P7-7700	1	arborsci.com	\$99
2	piezo siren, such as Radio Shack Model 273-079	1	radioshack.com	\$7
3	measuring tape		hardware store	\$5
4	lantern battery, 6V	1	hardware store	\$11
5	duct tape		hardware store	
6	copper tubing, 1/2 inch x 6 feet long. Any other lightweight pole or pipe will work just as well.		hardware store	varies
7	alligator clip test lead, 36 in, such as Allied Stock No. 70209822 (this stock number includes a pair of leads, one red and one black) such as SKU143292	2	banggood.com	\$2
8	folding step stool	1		
9	disposable ear plugs, available at drug stores, or industrial style such as Grainger Item No. 6XF60	1 set per person	grainger.com	\$4