Master Materials List

Italicized entries indicate items not available from PASCO. NOTE: These activities may also require protective gear for each student (for example, safety goggles, gloves, apron, or lab coat).

Teachers can conduct some lab activities with sensors other than those listed here. For assistance with substituting compatible sensors for a lab activity, contact PASCO Teacher Support (800-772-8700 inside the United States or http://www.pasco.com/support).

Lab	Title	Materials and Equipment	Qty
Kindergarten – First Grade			
1	**Heavy and Heavier** Use a force sensor to learn about the property called weight that can be measured, and to recognize that an object's weight is not necessarily related to its size.	Data Collection System PASPORT Force Sensor with hook installed Container (bucket or basket) to attach to the force sensor hook Toy car, truck, or other vehicle Balloon, inflated and tied Apple, potato, or other small fruit or vegetable Melon, eggplant, or other large fruit or vegetable Polystyrene (foam) packing material, picnic cooler, or purchased polystyrene craft material, as large as possible String, to hang the container on the force sensor hook	1 1 1 1 1 1 1 1 Several pieces
2	**Near and Far** Use a motion sensor to describe the position of an object as being near or far from another object and to recognize that an object in motion changes its position.	Data Collection System PASPORT Motion Sensor Large playground ball Meter stick	1 1 1 1
3	**Mixing Water** Use a temperature sensor to understand that mixing hot and cold water results in a new temperature that is between the hot and cold.	Data Collection System PASPORT Temperature Sensor Small paper cups (2) Large paper or plastic cup Ice water, approximately 5 °C Warm water, approximately 40 °C Towels	1 1 2 1 200 mL 200 mL Several

4	**Light and Dark** Use a light sensor to determine how light is related to what the students see.	Data Collection System PASPORT Light Sensor PASPORT Sensor Extension Cable Strips of construction paper, 3 cm × 8 cm (1 in. × 3 in.), different colors or colored wooden craft sticks	1 1 1 1
5	**Exploring Temperatures** Use a temperature sensor to explore temperature changes to observe the property of temperature, and to learn that temperature is a measure of how hot or cold something is compared to a standard scale (has both teacher demonstration and student groups). **Teacher Demonstration**	Mobile Data Collection System PASPORT Temperature Sensor Mobile Data Collection System PASPORT Temperature Sensor Bag of clothing, warm- and cold-weather clothing Large outdoor thermometer Paper meter (construction paper or paper plates and a brad) Paper thermometer (can be written on) Thermometer, oral	1 1 Variety 1 1 1 1
6	**Hot and Cold** Use a temperature sensor to observe the property of temperature, and that this property can be measured using a thermometer or temperature sensor.	Data collection system PASPORT Temperature Sensor Buckets or containers for ice cubes and bottles Towels Ice cubes Plastic water or soda bottles filled with warm water (no warmer than 30 °C or 86 °F), tightly capped	1 1 2 Several Several Several
7	**Weather Instruments** Use a weather sensor to make measurements to determine weather conditions and to develop the language for describing weather conditions.	Mobile Data Collection System PASPORT Weather Sensor PASPORT Sensor Extension Cable Leaf Feather	1 1 1 1 1

Grade 2 – Grade 3			
8	**Freezing and Melting Water** Use a temperature sensor to measure the temperature of water in different forms and to learn that water can exist in different forms and can be changed from one form to another by heating or cooling.	Data Collection System PASPORT Temperature Sensor Ice cubes weighing 0.5 g or less Small paper cup Snack size plastic bag, re-sealable, 16.5-cm × 8.25-cm Tape Spoon Rock salt-ice bath (ice to fill a utility tub half full; 300–400 g of rock salt, tap water to cover ice) Paper towels Water Projection system (for the teacher only) Ice chest (for the teacher only)	1 1 Enough to half-fill the paper cup 1 1 1 piece 1 2–3 per class 1 per student 15 mL 1 1
9	**Conservation of Matter** Use a force sensor to determine that the weight of a whole object is the same as the sum of the weight of each part that makes up the whole object.	Data Collection System PASPORT Force Sensor, with hook attached Bag to attach to force sensor hook Objects of varying weights, 1 to 5 pounds such as a textbook, bottle of water, large box of crayons, hand weight, an orange, a hammer Flashlight (containing D batteries) Object made of parts, 1 to 5 pounds, such as a student backpack, a lunch box, a large bolt with a nut and washer attached, tool box Projection system (for the teacher only)	1 1 1 4 1 1 1
10	**Hunting with Light** Use a light sensor to compare how organisms, including humans, are able to see and compare that to what an electronic light sensor can detect. **Teacher Demonstration**	Data Collection System PASPORT Light Sensor Paper, solid colors Tissues Paper, plain white Crayon, dark colored Large eye diagram (photocopy) Large pictures of animal eyes (photocopy)	1 1 3 per group 1 per person 2 per person 1 1 1
11	**Investigating Sound Levels** Students recognize that continuous sound is made by vibrating objects, and can be described by its pitch and volume. Students explore different continuous sounds by studying the changing volume	Data Collection System PASPORT Sound Level Sensor PASPORT Sensor Extension Cable Sheet of paper to make a sound tube, 21-cm × 28-cm (8.5-in. × 11-in.)	1 1 1 1

12	**Feeling and Measuring Temperature** Use a temperature sensor to compare the results of measuring temperature to how the temperature feels.	Data Collection System PASPORT Temperature Sensor Thermometer. digital Thermometer, bulb-type Plastic cup, 400-mL or 12-oz Water, cool Water, warm Paper or cardboard sheet for fan (21-cm × 28-cm or 8.5-in. × 11-in.)	1 1 1 1 1 ~100 mL ~100 mL 1
13	**Cars and Heat** Use a temperature sensor to determine how the temperature inside a car parked in the sun compares to the temperature of the air outside the car. **Teacher Demonstration**	Mobile Data Collection System PASPORT Temperature Sensor Shoe box model car, assembled Shoe box Black paper Plastic food wrap to cover the shoe box Paper cup, modified to fit within the shoe box Yarn, cotton balls, other craft supplies Markers, a variety of colors Glue stick Tape Mobile Data Collection System PASPORT Temperature Sensor Projection system Shoe box model car, assembled	 1 1 Enough to line the shoe box 1 1 A variety 1 1 ~30 cm 1 1 1 1
14	**Observing Clouds** Use a weather sensor to show that clouds in the sky have properties that can be observed and described, and that students associate cloud formation with specific weather conditions such as temperature and humidity. **Teacher Demonstration**	Mobile Data Collection System PASPORT Weather Sensor Cloud Types handout PASCO Cloud Finder handout Scissors Glue Paper fastener (brad) Weather Journal handout Tagboard or card stock, 14-cm × 14-cm Compass Ribbon, 12–15 cm long Mobile Data Collection System PASPORT Weather Sensor Glass canning jar, 1-quart Plastic wrap and rubber band Posters or pictures of cloud types, in color Sponge Turkey baster Water, hot Water, ice Wooden stick matches	1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1 20 mL 50 mL 1

15	**Can Plants Survive without Light and Water?** Use a light sensor to explore weather or not plants need light and water to survive and what adaptations help them survive.	Data Collection System PASPORT Light Sensor Ruler	1 1 1
	Teacher Demonstration	Data Collection System PASPORT Light Sensor Potted plants, young plants, all the same kind Roots of plants Leaves of plants, a variety Growing light (optional) Markers Ruler	1 8 A variety A variety 1 A variety 1
	Grade 4 – Grade 5		
16	**Temperature and Change** Use a temperature sensor to determine the effect of temperature on the time it takes for a sugar cube to dissolve or an antacid tablet to react with vinegar.	Data Collection System PASPORT Temperature Sensor Beaker, 250-mL Stir rod Tape, ~3 in. piece Sugar cube Water, room temperature Water, cold Water, hot Beaker, 600-mL Antacid tablet piece, ~ 0.5 g Vinegar, room temperature Vinegar, hot Ice	1 1 1 1 Several 3 300 mL 200 mL 200 mL 1 3 200 mL 100 mL 300 mL
	Teacher Demonstration	Data Collection System PASPORT Temperature Sensor Wooden block Ice cube, 0.5 g or less Tape, ~3 in. piece Balance Projection system	1 1 1 2 1 1 1
	Preparation	Bucket to hold ice water Thermos® Balance	1 1 1

17	**The Water Cycle** Use a weather sensor to measure the conditions in a water cycle model. **Teacher Demonstration**	Data Collection System PASPORT Weather Sensor PASPORT Sensor Extension Cable Utility lamp with clip (with a 60-W or 75-W incandescent bulb) Scissors Clean 2-L soda bottles Ice cubes Transparent packing tape Meter stick Data Collection System PASPORT Weather Sensor PASPORT Sensor Extension Cable Scissors Ice cubes Permanent marker, black or dark color Assembled water cycle tower Clean 2-L soda bottles Razor blade or sharp knife Transparent packing tape	1 1 1 1 1 3 ~350 mL ~2 m 1 1 1 1 1 ~350 mL 1 3 ~2 m
18	**Conductor or Not** Use a voltage sensor to test the conductivity of different materials.	Data Collection System PASPORT Voltage Sensor AA-cell battery fully charged Holiday mini-light bulb with wire ends stripped Alligator clips Wire, 20 cm, with stripped ends Masking tape Paper clip Penny Plastic spoon Eraser Piece of chalk Clay	1 1 1 1 2 2 ~30 cm 1 1 1 1 1 1
19	**Electric Circuits** Use a voltage sensor to measure the voltage across elements in series and in parallel in an electric circuit.	Data Collection System PASPORT Voltage Sensor AA-cell battery Miniature holiday light bulbs with stripped wire ends Masking tape, Wide rubber band Alligator clip or other pieces of wire with stripped ends	1 1 2 2 ~30 cm 1 2
20	**What is an Electromagnet?** Use a voltage sensor to determine the strength of an electromagnet with different numbers of coils and different magnitude of the voltage source.	Data Collection System PASPORT Voltage Sensor AA-cell battery Paper clip Alligator clip Scissors Masking tape Large iron nail, 3 to 4 inches long Insulated bell wire, 22 to 26 gauge with ends stripped of insulation for 5 cm	1 1 2 10 to 15 2 1 ~20 cm 1 1 m

21	**Determining Sound Levels** Use a sound level sensor to measure the sound levels from different objects, to determine the source of sound, and to find the relationship of vibration to sound level.	Data Collection System PASPORT Sound Level Sensor Balloon, cut open to make a drumhead Can opener (teacher use only) Drinking straw Notebook or copy paper Paper clip Paper or plastic cup, 350-mL (12-oz) Paper towel Pliers (teacher use only) Rubber band Scissors Square plastic food storage container, 1-qt Tin can, open at both ends Water	1 1 1 1 1 3 to 4 sheets 1 1 2 to 3 sheets 1 2 to 3 1 1 1 ~300 mL
22	**Keeping Warm** Use a temperature sensor to understand which materials conduct heat and which don't, and why they do or don't.	Data Collection System PASPORT Temperature Sensor Cup with cold water Cup with hot water Funnel Insulating clothing materials such as cotton, Polartec®, and wool Paper towels Rubber band (optional) Tape (optional) Test tube rack Test tubes Water, hot Data Collection System PASPORT Temperature Sensor Clothing items, articles of wool, synthetic fleece such as Polartec, real or synthetic fur, down, cotton, and polyester or acrylic fibers; a mitten and a glove Projection system	1 1 1 1 1 A variety 2 to 3 1 Several pieces 1 2 ~500 mL 1 1 A variety 1

23	**Heating Land and Water** Use a temperature sensor to determine a property of materials that allows some to heat up faster than other materials and then draw conclusions about water's influence on a region's climate.	Data Collection System PASPORT Temperature Sensor Construction paper, skin-tone (8 cm × 12 cm) (3 in. × 5 in.) Dry sand and other materials, such as grass, dirt, foil, waxed paper, wood, chocolate, milk, material, glass, ground charcoal, paint, or any other materials that would provide a variety of textures and surfaces Meteorology records on the Internet Meter stick Petri dish or small shallow dish or jar lid Scissors Table or stool to clamp lamp Utility lamp with clip, 75 W, 100 W, or sunlamp Water, room temperature World map or globe	1 1 1 40 mL to 50 mL A variety 1 2 1 1 1 40 mL to 50 mL 1

24	**Chemical Reactions** Use a temperature sensor to measure the change in temperature as two substances chemically react.	Data Collection System	1
		PASPORT Temperature Sensor	1
		Sugar cube	1
		Beaker half full of water	1
		Steel wool, ~1 g	2
		Beaker	Any size
		Cracker on a paper towel	1
		Bowl, big enough to hold water from beaker half full of water	1
		Balance (optional)	1
		Water	200 mL
		Beaker, 250-mL	2
		Beaker, 50-mL	1
		Stir rod	1
		Plastic spoon	1
		Tape	1 roll
		Sugar	5 g
		Alum	5 g
		Ammonia	30 mL
		Paper towel	1
		Tincture of iodine	15 drops
		Cracker	1
		Sugar cube	1
		Cheese	Any amount
		Notebook paper	Any amount
		Potato slice	Any amount
		Paper towel	Several
		Steel wool, ~1 g each2	2
		Distilled white vinegar with 4 to 8% acidity	75 mL
		Baking soda	~2 g
	Teacher Demonstration	Beaker half full of water	2, any size
		Stir rod	1
		Plastic spoon	1
		Effervescent antacid tablet	1
		Table salt	5 g
		Balance (optional)	1

25	**Weather Station** Use a weather sensor to measure temperature, dew point, humidity and atmospheric pressure over a period of time and determine any correlation between the data collected to observable weather conditions. **Teacher Demonstration**	Mobile Data Collection System PASPORT Weather Sensor PASPORT Sensor Extension Cable USB flash drive Weather Journal White plastic milk container with lid, 1.89 liter (0.5 gallon) Index card cut to 2-cm × 6-cm 3-meter wooden stake Hammer Duct tape Masking tape Plastic utility tub Brick String Computer with Internet weather websites bookmarked Computer overhead projection system Grounded outdoor extension cord Clouds poster Weather maps Utility knife	1 1 1 1 1 1 1 1 1 1 1 1 1 1 m 1 1 1 1 Several 1
26	**Dew and Frost** Use a fast-response temperature sensor and a model to simulate the weather conditions responsible for the formation of dew and frost.	Data Collection System PASPORT Fast Response Temperature Sensor PASPORT Weather Sensor Beaker, 250-mL or cup or jar of similar size Stirring stick or spoon Crushed ice Water, distilled Salt Rubber band Soda bottle terrarium Data Collection System PASPORT Temperature Sensor Potting soil Gravel, vermiculite or perlite Large bowl to mix the soil Pie pan Plastic storage bag, gallon sized, re-sealable Soda bottle, clear, cleaned, 2-L Small plants of the same variety Scissors Tape Water, warm Dry ice, broken up Tongs for handling the dry ice	1 1 1 1 1 180 mL 125 mL 20 mL 1 1 1 1 500 mL 200 mL 1 1 1 1 3 1 Several pieces 100 mL 1 block 1

27	**Microclimates** Use a weather sensor to compare the temperature and humidity of various sites and determine the reason for any variations. **Teacher Demonstration**	Mobile Data Collection System PASPORT Weather Sensor Notebook and pencil Data Collection System PASPORT Temperature Sensor PASPORT Weather Sensor Ecochamber or terrarium or house plants	1 1 1 each 1 1 1 1
28	**How a Greenhouse Works: Light** Use a temperature sensor to determine how light or brightness depends on the angle at which the sun's light strikes the surface of the ground and how this changes throughout the day.	Data Collection System PASPORT Light Sensor Reflector lamp or desk lamp with 60-watt incandescent light bulb Shoebox or cardboard box of comparable size White legal size typing paper, white butcher paper or white bulletin board paper, 21 cm × 28 cm (8.5 in. × 11 in.) Clear or transparent plastic wrap, 30-cm (12 in.) Wax paper, 30-cm (12 in.) Glad Press 'N Seal® Wrap, 30-cm (12 in.) Any other translucent material, such as parchment paper, paper towels, or sheer material, 30-cm (12 in.) Scissors Protractor Pencil Transparent adhesive tape Metric ruler and a meter stick	1 1 1 1 2 to 3 sheets 1 piece 1 piece 1 piece 1 piece 1 1 1 ~30 cm 1
29	**How a Greenhouse Works: Heat** Use a temperature sensor to measure the heat generated in a model greenhouse by altering the types of material that light passes through.	Data Collection System PASPORT Temperature Sensor Greenhouse models from the "How a Greenhouse Works: Light" activity Light source such as a swivel desk lamp or reflector lamp with a 60-watt incandescent bulb Electric heating pad Scissors Metric ruler or meter stick Adhesive tape Clear plastic wrap, 30-cm (12 in.) Wax paper, 30-cm (12 in.)	1 1 1 1 1 1 ~30 cm 1 piece 1 piece

Activity by PASCO Sensors

This list shows the sensors and other PASCO equipment used in the lab activities.

Items Available from PASCO	**Activity Where Used**
Data Collection System	1, 2, 3, 4, 6, 8, 9, 10, 11, 12, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 26, 27, 28, 29
Mobile Data Collection System	5, 7, 13, 14, 25, 27
PASPORT Fast Response Temperature Sensor	26
PASPORT Force Sensor	1, 9
PASPORT Light Sensor	4, 10, 15, 28
PASPORT Motion Sensor	2
PASPORT Sensor Extension Cable	4, 7, 11, 17
PASPORT Sound Level Sensor	11, 21
PASPORT Temperature Sensor	3, 5, 6, 8, 12, 13, 16, 22, 23, 24, 26, 27, 29
PASPORT Voltage Sensor	18, 19, 20
PASPORT Weather Sensor	7, 14, 17, 25, 26, 27