

Polymer Science Equipment Specifications

The purpose of this document is to provide school districts a standard purchasing procedures document to use when installing or upgrading computer labs. This document provides minimum specifications for equipment, software, furniture, and so forth. The district will be responsible for purchasing and maintaining all equipment, providing proper security, replacing missing equipment, and providing annual funds for the operation of the program. The district is also responsible for providing site preparation and electrical wiring. Schools that wish to purchase items different from those in this specification document will require written permission from the MDE.

Due to budget constraints, districts are encouraged to use existing hardware, software, and furniture and supplement with new items as needed. For existing items, the MDE will waive the requirement to purchase new items if the existing product meets the minimum specifications listed here. Some items in these specifications are listed as “optional,” and it is at the school district’s discretion whether these items should be purchased.

Important Notes Concerning this Document

- When configuring labs, please refer to both the General Equipment Specifications and Pathway Specific Equipment documents located on the Curriculum Download page. The General Equipment Specifications document contains a list of equipment needed to successfully implement all programs. The Pathway Specific document contains a list of equipment needed for a specific pathway. You will need to order the necessary equipment from both lists in order to implement your program.
- If labs are shared for multiple programs, be sure the minimum specifications are met for all programs.
- Any requests for Apple computers and/or hardware will be handled on a case-by-case basis by the Mississippi Department of Education. Apple should certify that all curricula, hardware, and software will run with items listed elsewhere in this document
- An existing server may be used with approval from local information technology (IT) personnel and the MDE.
- Existing networking equipment may be used if minimum specifications are met.
- Districts that install a wireless lab must gain permission from the MDE. Contact Christy Todd at ctodd@mde.k12.ms.us.
- Districts may choose to purchase switches with fewer than 48 ports, matching the number of ports to the size requirements of the labs. If using a wireless network, wired switch(es) would be shared among labs according to the district's needs.
- Alternate office productivity, keyboarding, creative suite, and/or CAD software may be used upon approval of the MDE. It is recommended that each district investigate existing software licenses to see if these programs may be added.

This equipment specification document contains preferred items as well as an alternate “thin client” option. If the thin client option is chosen, it is imperative that ample Internet access be available as online software is readily used with this option.

Computer Systems and Peripherals

Minimum specifications for lab hardware are based on the current Express Products List (EPL). The Mississippi Department of Information Technology Services (ITS) EPLs have stated dollar spending limits. For instance, for hardware EPLs, the limits are:

- For purchases over \$50,000, the customer MUST solicit quotations from two or more EPL sellers.

- For K-12 Schools, the dollar limitation is interpreted by ITS to be \$200,000 per project per school or campus per fiscal year, with a maximum dollar limitation of \$1,000,000 per school district per fiscal year for a project that spans multiple schools within the district.
- Projects costing in excess of \$200,000 are beyond the scope of this delegated process and subject to full ITS review and authorization. Authorization to exceed the EPL dollar limitation is described in the ITS Procurement Handbook under the EPL Planned Purchase process, article 013-080.
<http://dsitspe01.its.ms.gov/its/procman.nsf/TOC4?OpenView>

Schools that choose to use the ITS EPLs will need to follow the ITS EPL instructions. Schools that choose to advertise for bids are encouraged to use the EPLs to compare prices and quality of equipment submitted on bids.

Inside delivery, installation, and setup must take place by the specified target date. School districts may choose to install the equipment and software themselves or have the EPL vendors perform the installation. If a school prefers that the hardware installation be done by the EPL vendor, the EPL quote must include installation, setup, and training (to be scheduled by each local school district). If a school prefers that the software installation be done by the EPL vendor, the EPL quote must also include pre-loading the software described in Section B “Software,” with the school providing the vendor media and proof of license. Vendors should assume that they will perform hardware and software installation unless otherwise indicated by the school in the quote request.

Vendors must propose systems which are configured with all components provided by the base system manufacturer. If a component is not available from the base system manufacturer, the vendor may propose a compatible third party component only if described in their written proposal. Systems and peripherals must be fully configured prior to shipment.

If a warranted defect is found in an item, that item must be repaired or replaced on-site within five working days of notification. A toll-free or local telephone number with a 24-hour response time must be provided for troubleshooting purposes. In the event that a component must be returned to the manufacturer for warranted repairs, a replacement will be provided by the vendor. Charges for shipping and handling of the component and its replacement must be borne by the vendor during the on-site warranty period. All warranty repairs made to the system during the warranty period must maintain full compatibility of the system with installed software. Any components found to be defective must be replaced with the same brand and model or its successor.

If the school district chooses not to use the ITS EPLs, the Vendor Certification for IT Equipment and software Statement must be signed by the bidder and returned with the bid. Districts may exercise the option of having all items bid and installed in the specified configuration by a single vendor or multiple vendors. All upgrades are to be installed and operational by the Target Date.

NOTE: If labs are shared for multiple programs, be sure the minimum specifications are met for all programs. Schools may choose wired or wireless labs. They may also choose to use standard computers or the thin-client option.

NOTE: The use of specific vendor brands or manufacturer’s model numbers is for the purpose of describing standards of quality, performance, and/or desirable characteristics and is not intended to limit or restrict competition. Item numbers which include multiple items may be purchased as a group or can purchased separately.

Item Num bers.	Description	Qty
1	<p>Air compressor Minimum Specifications Air compressor must produce 80 to 100 psi. Consult local building and school codes concerning installation location, size of tank, and electrical requirements. Note: Polymer Science classroom/labs can purchase this item or air may be supplied from an air compressor in a nearby classroom/lab</p>	1
2	<p>Composites Hardware items ECI Composites Hardware Kit or equal. Minimum Specifications</p> <ul style="list-style-type: none"> • 1-1,000 mL Polymethylpentene Plastic Beaker • 2- 8-in. wooden hand screw clamp • 2- 1-in. paint brushes 	1
3	<p>Supply Items ECI Composites Supply Items or equal. Minimum Specifications</p> <ul style="list-style-type: none"> • 4 – 500 mL Acetone • 1 – 10 sq ft Bleeder cloth • 80 board 1/4 in. x 1 1/2 in. x 20 in. • 3 Foam, rigid, 1/2 in. x 1 in. x 3 in. • 1 Glass fiber Mat 40 sq ft • 3 boxes of disposable gloves 100 per pkg • 3 quarts of white glue • 1–4-sq ft honeycomb • 1 - square yard release film • 30 plastic molds • 1 pk of graph paper (100 sheets) • 1 bag of Plaster of Paris 15 lb • 1 roll Polyethylene film • 2 – 1-qt containers of Epoxy curing agent • 2 – 1-qt containers of Epoxy Resin • 1 box of stir sticks (500 count) • 1 roll of Sealant tape 	1
4	<p>Flammables Cabinet Minimum Specifications</p> <ul style="list-style-type: none"> • 45-gal. floor model • 2-in. floor spill retention trough • Cabinet joints rabbeted for maximum strength and durability • Adjustable shelves • Wooden Construction • Exterior: 43 in. W x 18 in. D x 44 3/4 in. • Interior: 41 in. W x 15 1/8 in. D x 42 in. H 	1

Item Num bers.	Description	Qty
5	Fume Hood Minimum Specifications <ul style="list-style-type: none"> • 36 in. • Motor Blower Set • Vapor Proof light and adjustable Sash • Exterior 38 1/4 in. W x 23 1/4 in. D x 48 in. H • Working area 31 3/4 in. W x 22 1/2 in. deep • Blower specifications: 115 V, 60 cycle, 930 CFM@.25 static pressure 	1
6	Fume Hood Base Cabinet Minimum Specifications <ul style="list-style-type: none"> • 36 in. • Trespa work surface • Hinged doors and one adjustable shelf • Exterior Dimensions: 38 1/2 in. W x 29 3/4 in. H x 21 in. Deep 	1
7	Fume Hood Accessories Minimum Specifications <ul style="list-style-type: none"> • Water outlet with gooseneck faucet • Gas Outlet, single service mounted • Cabinet base laboratory oval cup sink (Chemical and corrosion resistant) 	1
8	Safety Shower Minimum Specifications <ul style="list-style-type: none"> • Ceiling mount or wall mount • Water flow pressure at least 20 psi 8-in. diameter column of water • Floor drain recommended • Chain and pull rod to activate water 	1
9	Eye Wash Station Minimum Specifications <ul style="list-style-type: none"> • Hands free • Must wash both eyes simultaneously • ANSI Z358.1 certified • Contains bowl • Even flow of water 	1
10	Fire Extinguisher Minimum Specifications <ul style="list-style-type: none"> • ABC dry chemical • 10-lb chemical weight 	1
11	Goggle Sanitizer Minimum Specifications <ul style="list-style-type: none"> • 36 capacity • 15-min timer • High-intensity ultraviolet light bulb • 24-gauge steel • Dimensions: 28 1/2 in. H x 26 1/4 in. W x 10 1/4 in. D 	1

Item Num bers.	Description	Qty
12	Fire Blanket with Case Minimum Specifications <ul style="list-style-type: none"> • Dimensions: 6 ft x 5 1/2 ft • Fire retardant treated woolen 	1
13	Respirators Minimum Specifications <ul style="list-style-type: none"> • Double filter • NIOSH approved • Filters acid fumes, organic solvent vapor, and dust 	1
14	CNC Machine Isel model X Carve or equal Minimum Specifications <ul style="list-style-type: none"> • With stand • With software • With accessories • With Rail Kit, support extrusions, brackets and hardware • Core Components • 240V • Spindle and Mount • Controller Kit • High-power motion controller kit • 750mm <ul style="list-style-type: none"> • Motor Kit • Waste Board Kit • Side Board Kit • Drag Chain Kit • Homing Switch Kit • Toolkit • Clamp Set • Digital Calipers • End Mill Starter Set • Bit Set for Wood and Plastic • Bit Set for Fine Detail Engraving • High Speed Steel 2 Flute Upcut Spiral • Bit Set for Soft Metals • Carving Bit Super Pack • Starter Material Bundle 	1
15	Manual Injection Molding Machine Minimum Specifications <ul style="list-style-type: none"> • Teflon Coated Ram and Heater Block • GFI Safety Switch • 110 VAC • 2/3 oz shot capacity 	2

Item Num bers.	Description	Qty
16	Air Powered Injection Molding Machine Minimum Specifications Note: The unit requires an 80- 100 PSI compressor that is not included. <ul style="list-style-type: none"> • Teflon Coated Ram and Heater Block • GFI Safety Switch • 110 VAC • 2 oz shot capacity • Ram Speed Control • Electronic Heat Control • Built-in Air Oiler • 15,000-lb capacity mold clamp 	1
17	Blow Molding Machine Minimum Specifications <ul style="list-style-type: none"> • Teflon Coated Ram and Heater Block • GFI Safety Breaker • 110 VAC • 1,000 W • Onboard inflation Compressor 	1
18	Thermoforming Machine Minimum Specifications <ul style="list-style-type: none"> • 10 x 14 in. part size • 3 way switch • 110 VAC • Even Heat Circulator 	2
19	Wing Cutter Minimum Specifications <ul style="list-style-type: none"> • Stainless Steel Construction • 16 x 2 x 6 in. working area • 110 VAC 	1
20	Strip Heater Minimum Specifications <ul style="list-style-type: none"> • 48 in. Long Capacity • Ability to bend 1/2 in. thick material • 110 VAC • Heavy duty metal construction 	1
21	Rotational Molding Oven Minimum Specifications <ul style="list-style-type: none"> • Dual Rotational Unit • Steel Gear Drive Unit • 110 VAC • Quick Disconnect Mold Holders 	1

Item Num bers.	Description	Qty
22	Foundry Oven Minimum Specifications <ul style="list-style-type: none"> • 1900 + Degree Ability • GFI Safety Switch • 110 VAC • Temperature Control Knob 	1
23	Process Videos on VHS or DVD Minimum Specifications <ul style="list-style-type: none"> • Vacuum Forming • Injection Molding • Blow Molding • Rotational Molding • Casting • Expanded Foam Molding 	1 ea
24	Injection Molding Kit Minimum Specifications <ul style="list-style-type: none"> • Suitable for Injection Molding Machines listed • Molds (Screwdriver, Front/Rear Dragster Wheels) • 100 Screwdriver Blades • 25-lb HDPE Pellets • 25-lb Styrene Pellets • 4 Color Powder Pigments (Red, blue, green, and yellow) • Needle Nose Pliers • Utility Knife • Video: Simply Put Injection Molding 	1
25	Blow Molding Kit Minimum Specifications <ul style="list-style-type: none"> • Compatible with Blow Molding Machine Listed • 25-lb LDPE Pellets • 8-oz Powder Pigment • Mold Set (Bottle and Cap) • Can of Mold Release • Needle Nose Pliers • Utility Knife • Video: Simply Put Blow Molding 	1
26	Rotational Molding Kit Minimum Specifications <ul style="list-style-type: none"> • Compatible with Rotational Oven Listed • 25-lb LDPE Powder • 8-oz Powder Pigment • 1 Set of Hot Mitts • Measuring Set • Cast Aluminum Molds (3.5-in. Ball, 5-in. Football, 6-in. Pig) • Can of Mold Release Spray • Video Simply Put Rotational Molding 	1

Item Num bers.	Description	Qty
27	Vacuum Forming Kit Minimum Specifications <ul style="list-style-type: none"> • Compatible with Thermoforming Machine Listed • High Impact Polystyrene Sheets 14 x 20 (quantity 20) • Molds (Horseshoe, Horse, Football Helmet, 3/4 Gothic Letters, 3/4 Gothic Numbers) • 4 Tubes Rub-n-Buff Highlighter • Video: Simply Put Vacuum Forming 	1
28	Hot Glue Guns Minimum Specifications <ul style="list-style-type: none"> • Dual Temperature • Use Standard Hot Glue Sticks 7/16 in. Diameter • Nozzle Replacement Capability 	12
29	Hot Glue Gun Nozzle Assortment Minimum Specifications <ul style="list-style-type: none"> • 3 pack • Suitable for Large Glue Gun 	1
31	Digital Balance Minimum Specifications <ul style="list-style-type: none"> • 400 x 0.1 g Capability • Battery and AC Capability • Stainless Steel Balance Tray 	6
32	Kevlar Cutters Minimum Specifications <ul style="list-style-type: none"> • Cuts Kevlar and Fiberglass • Ergonomic Design • 8 oz weight • Operates on Rechargeable Battery or AC • Includes Rechargeable Battery, Charger, Transformer, AC Adaptor, and Instructions 	6
33	Filter Masks Minimum Specifications <ul style="list-style-type: none"> • Comfortable and Well Fitting • Rated for Organic Vapors • Note: Not for use with Urethanes 	15
34	How Its Made Complete 8 Season DVD Set <ul style="list-style-type: none"> • All eight Seasons of How Its Made on DVD • Covers Materials Made Using Each Processing Technique 	1
35	Spray Gun Minimum Specifications <ul style="list-style-type: none"> • Usable for Gelcoat and resins • Can be used for Sandblasting • 110 VAC 	2

Item Num bers.	Description	Qty
36	Air Chopper Gun Minimum Specifications <ul style="list-style-type: none"> • Gear Reduced Air Chopper • Greater Volume Control at Lower RPMs • 110 VAC 	2
37	Hot Knife Master Kit Minimum Specifications <ul style="list-style-type: none"> • Cuts Both Expanded Foam and Extruded Foam • 110 VAC 	1
38	Plastic Welder Minimum Specifications <ul style="list-style-type: none"> • Controlled Heat 800 W • Cool to the Touch Barrel • 120 VAC • Pressure Switch • Infinite Heat Settings • Air Regulator and Filter • Tacking Tip • Automatic Speed Tip • Tray • Carrying Case • Welder Guide Book 	1
39	Heat Gun Minimum Specifications <ul style="list-style-type: none"> • 750-1,000 degree F Capability • Storage Case • Deflector, reflector, spreader nozzles • 120 VAC 	2
40	Copper Boiler Minimum Specifications <ul style="list-style-type: none"> • 13 Gallon Capacity • Even Heat Conduction • Fits Large Expanded Bead Molds 	4
41	Styrofoam Cutter Minimum Specifications <ul style="list-style-type: none"> • 12-in. Nichrome Wire Element • Shapes Styrofoam, Beadboard, and HD Styrofoam • 110 VAC Heavy Duty Grounded Plug • Stainless Steel Box 	2
42	Two Burner Hot Plate Minimum Specifications <ul style="list-style-type: none"> • Closed Element • Individual Temperature Control • 110 VAC 	6

Item Num bers.	Description	Qty
43	Portable Flocking Unit Minimum Specifications <ul style="list-style-type: none"> • Operates from AC or 3 Single Cell 1.5-V batteries • Built in Electrostatic Generator • 110 VAC • Variable Size Applicator Cups 	1
44	3D Printer Afinia H-Series 3D Printer or equal Minimum Specifications <ul style="list-style-type: none"> • 245 x 260 x 350 mm, • 5" cubed printing envelope, • accuracy within .15 mm, • compatible with Mac and PC, • easy-to-use interface for laying out, orienting, duplicating, and scaling designs, • design files created using variety of online software, • automatic calculation and placement of removable support material 	1
45	Polymers Hardware Package Minimum Specifications <ul style="list-style-type: none"> • Mold, Clip • Mold, Dip • Mold, RTV, w/Base • Storage Foam for Polymers Hardware Package 	1 each per lab station
46	Station Tools Kit Minimum Specifications <ul style="list-style-type: none"> • Caliper, Vernier, Precision, Metal • Two Clamps, "C" 3 in. • Clamps, Test Tube • Cutter, Galss, Fletcher • Drill Bit, 1/8 in. • Drill Bit, 1/16 in. • File, Triangular, 6 1/2 in. • Forceps (Tweezers) • Lens, Hand, 4-in. Glass Lens • Knife, Utility • Pliers, needle Nose • Ruler, Wood, 30 cm • Scoopula, Stainless Steel • Scissors, 8 in. • Screwdriver, slotted • Screwdriver, Phillips, #2 • Stir Rod, Stainless Steel, 8 in. • Tongs Beaker • Tongs, Crucible • Wire Cutter/Strippers • Storage Foam for Tools 	1 per lab station

Item Num bers.	Description	Qty
47	Solids Hardware Package Energy Concepts or equal Minimum Specifications <ul style="list-style-type: none"> • Aluminum plate, 1/8 in. x 6 in. x 6 in. • Clamp, Ring Support, 2 in. • Clamp, Ring Support, 4 in. • Glass Sandwiches (Microscope slides) • Mirror, Acrylic Plane • Screen, Gauze • Spheres, Polystyrene, 1 1/2 in., set of 17 (recommend one per student) (price given for individual balls) • Steel balls, 9 mm • Triangle, Clay 2 in. 	1 each per lab station
48	Laboratory and Safety Equipment Kit Energy Concepts or equal Minimum Specifications <ul style="list-style-type: none"> • Balance, Digital (Two recommended, one included in kit) <ul style="list-style-type: none"> • 300 g x 0.1 g minimum capacity • Balance, Triple Beam (1) • Bottle, Polypropylene, 1 L (4) • Fire Blanket with Hanger (1) • First Aid Kit (1) Steel Case • Gloves, heat Resistant, Pair (2) • Mechanical Testing Apparatus (2) • Bottle Jack w/Gauge (2) 20 T capacity Handle included • Microscope, Dissecting (1) • Solder Iron (recommend one per station, three included in kit) 60 W • Solder Iron Stand (recommend one per station, three included in kit) 	1 per lab
49	Molecular Modeling Kit Minimum Specifications <ul style="list-style-type: none"> • Individual Student Kit • Construct 3-D models of chemical compounds. 	1 per student
50	Pliers, Needle nose, standard	1 per lab station
51	Scissors, standard office type	5
52	Drawing Leads, calibrated Minimum Specifications <ul style="list-style-type: none"> • pencil sets • Should have hardness levels of 3B, 2B, B, HB, F, H, 2H at minimum 	3

Item Num bers.	Description	Qty
53	Marble Set Minimum Specifications <ul style="list-style-type: none"> • Three large marbles per set • Must be smaller than 1 in. in diameter 	3
54	Nails Minimum Specifications <ul style="list-style-type: none"> • 1.5 in. long 	1 pkg
55	PVC Pipe Minimum Specifications <ul style="list-style-type: none"> • 1 in. diameter • 4 ft length 	3
56	Glass Jars Minimum Specifications <ul style="list-style-type: none"> • 120 mL • Contain lids 	24
57	Drill Press Minimum Specifications <ul style="list-style-type: none"> • 10 in. minimum • Adjustable depth stop • Depth adjustments system • Bump off switch 	2
58	Cordless Drill Minimum Specifications <ul style="list-style-type: none"> • 12 V • Variable speed • Keyless chuck • Rechargeable battery included • With charge station/cords 	1
59	Rotary Tool Set Dremel or equal Minimum Specifications <ul style="list-style-type: none"> • Cordless Rotary Tool • 10.8 V • Li-ion battery included • Charger included • Accessory kit included • case 	1
60	Drill Bit Set Minimum Specifications <ul style="list-style-type: none"> • Minimum 10-piece set (1/16 in. smallest) • Bit bar or storage box included • Steel or titanium bits 	1
61	Butane Burner Kit	1
62	Buret Clamp	1
63	Cloth Gloves	2
64	Hot Plate	1
65	Lab Aprons	2

Item Num bers.	Description	Qty
66	50 g Mass	3
67	500 g Mass	3
68	Meter Stick	1
69	Polarizing Film Set	1
70	Safety Goggles	2
71	Ring Stand	1
72	Striker	1
73	Electronic Thermometer	1
74	Storage Foam for special equipment	1
75	Time clock with Wall Rack for time cards	1
76	Band/Table saw	1
77	Bench grinder/polisher	1
78	Hydraulic press	1
79	Sander, belt/disc	2
80	Scroll saw	1
81	Tool set and tool box (Craftsman)	1
82	Microscope with TV	1
83	Microwave oven	1
84	Rotisserie	1
85	Chemistry lab equipment	1
86	Vacuum system	1
87	Sink	1

Item Num bers.	Description	Qty
88	<p>Metals and Ceramics Package Paragon Xpress-E14a Front-Loading Kiln with metals and ceramics package or equal</p> <p>Minimum Specifications</p> <ul style="list-style-type: none"> • 80MM Rolling Mill • Draw Plates • Draw Tongs • Heat Conductivity for Metals Demonstrator • Ball and Ring Demonstrator • Bimetallic Strip Demonstrator • Large Ceramic Assay Crucibles • Raku Tongs • Heat Resistant Gloves and Hood • Bar Mold • Stainless Steel Beaker 1000 to 4000 mL • Stainless Steel Stirring Rod • Glass Grinder • Conductivity Probes • Carbon Stirring Rod • Melting Crucible • Sinker Mold • Engraver • Crucible Tongs • Glass Running Pliers • Copper Tweezers • ECI Powder Metallurgy Lab Package • Pattern shears • 2-Part Ceramics Mold 	1
89	<p>36" Wide-Format Printer HP DesignJet T520 ePrinter or equal</p> <p>Minimum Specifications</p> <ul style="list-style-type: none"> • 36" large-format printer • color • ink-jet • A0 • ANSI D • Roll (36 in x 150 ft) • 2400 x 1200 dpi • up to 0.6 min/page (mono) / up to 0.6 min/page (color) • USB • LAN • power supply 	

Other ITEMS

1. Hot Pot II for materials science unit (2)
2. Flat Electric Griddle for materials science unit (1)
3. Bench Vise for materials science and other units (2)
4. Paragon MagicFuse Microwave Kiln Kit (1)
5. Oxy-Acetylene Torch for materials science unit (1)
6. Digital Microscope for materials science and other units (1)
7. Rio Grande Mini Wax Injector for lost wax casting in materials science (1)
8. Hot Plate Stirrer for materials science and other units (2)

Expendable Items

1. Dust masks
2. Lab coats
3. Overalls
4. Soap dispenser)
5. Paper towels
6. Disposable gloves—latex and chemical resistant rubber gloves and welding gloves