

EETC  
EDUCATION COMMITTEE  
RECOMMENDED-TOOLS/ EQUIPMENT/FACILITY LIST  
REVISED MARCH 23, 2009

**GENERAL CLASSROOM ENVIRONMENT CONSIDERATIONS**

**1. The lecture/reading area should be typical of any room used for similar activity in academic subject classes.** It is desirable that this area be in a separate room from where lab activities take place. *One large room for lab work and lecture/reading does work well if it is built to the same standard as the academic facilities in the school.*

**2. Class size should be no larger than twenty students!** *Eighteen students* is an ideal load.

**3. The lab activity area, in the past called the “shop”, should have the general appearance and environment of a chemistry or physics classroom. The lab should be constructed exactly as other classrooms in the school.** It should be heated and air conditioned, have tile floors and a ceiling height equal to that of other school classrooms. A roll up door of the type found in typical repair shops is desirable but not required. Standard classroom double doors will satisfy most equipment and human considerations. A sink for group hand washing and cleanup is required. *A converted auto shop with open beam 20-foot ceilings is the norm in education. Half of this room can serve as a lab; the remaining area can be used as a classroom.*

**4. Safety and environmental requirements meeting federal, state and local code standards must be satisfied for this teaching area!** *A few examples are: First Aid Kits, Hazmat Information Center, OSHA approved used oil storage, emergency exit signs, room exits that meet code, fire extinguishers, safety eye wash, emergency shower, OSHA approved gas cans, safety glasses, ear plugs.*

**5. If engines are to be test run in the lab area a commercial venting system for exhaust control should be installed.** There are some very fine overhead systems, which can be removed and/or relocated with little trouble. **Stay away from exhaust systems which are installed in the floor!** These systems are very costly and require a long-term commitment to a particular location. Of course a venting system is not required if engines are test run out side of the classroom. *Exhaust systems purchased with automobiles in mind work well but are really overkill for outdoor power equipment usage.*

**6. The work/storage benches should be made from heavy gauge steel (10 gauge works well).** The work area on the bench top should be at least 8 square feet, measured a minimum of 2 feet by 4 feet. This work area should be covered with a thick pad (silicone rubber for example) to minimize noise and damage to lab work. Three sides of the work area should have metal risers (4” high is recommended), which keep parts from falling to the floor. The work area height should be about 41” from the floor; this is very comfortable for standing type lab work. Locked storage areas should provided for student work, these can be at a separate location or under each work area. Each storage area should be at least 2 feet deep, 4 feet wide and 17” high. *Workbenches of this type and height with storage may have to be designed and fabricated by a vendor or at a school site. Steel workbenches are available from many vendors and are designed for many applications in a “shop” environment.*

## **TOOL AND EQUIPMENT**

**NOTE: All of the information given below is based on students working in groups of two at a workstation.**

One engine is required per workstation. **We recommend four stroke horizontal crankshaft air-cooled gasoline engines** made by our industry EETC member companies. These engines have a mounting base that keeps them from tipping over while students are performing disassembly and assembly operations. The mounting base can also be used to secure the engine with C-clamps or bolts for test running. **Vertical crankshaft engines**, the type used on rotary lawn mowers, **are very hard for students to work with in the lab**. Special flywheels, plates and mounting fixtures are needed to work on and run these engines. Try to stay with the horizontal crankshaft engines if possible.

A tool pack is required and can be shared by two workstations. It is not necessary to have one tool pack for every workstation. On the other hand, one tool pack for three or four stations does not work well!

### **TOOL PACK RECOMMENDATIONS**

- Combination wrench set that includes sizes from 1/4" to 1"
- Standard screwdriver set
- Phillips screwdriver set
- Nut driver set that includes 1/4" to 1/2" and 5mm to 15mm
- Ratchet wrench set that includes 1/4", 3/8", and 1/2"
- Ratchet extension set that includes 1/4", 3/8", and 1/2"
- 1/4" Drive standard and deep sockets set that includes sizes 5/32" to 9/16" and 5mm to 14mm
- 3/8" Drive standard and deep sockets set that includes sizes 3/8" to 1" and 6mm to 22mm
- 1/2" Drive standard socket set that includes sizes 3/8" to 1-1/4" and 7/16" to 27mm

## TOOL AND EQUIPMENT CONSIDERATIONS (CONT)

A tool panel with general and special purpose tools will service classes up to 20 students. We find that it is not cost effective to have complete sets of these tools at each workstation.

*The tool panel should be in a locked cabinet. All tools are checked out and checked in from this cabinet to specific students.*

### TOOL PANEL RECOMMENDATIONS

- (2) Torque wrench 40 - 200 in-lb
- (2) Torque wrench 40 - 100 ft-lb
- Micrometer 0 - 1", 1"- 2", 2"- 3", 3"-4"
- Adjustable ignition tester
- Spark plug gap gauge
- (4) Valve spring compressors
- (2) Piston ring compressors
- Flat gauge set .0015 - .040"
- Long flat gauge set.006" - .040"
- Telescoping gauge set
- Neway valve seat cutter kit
- Tachometer
- Carburetor float setting tool
- File
- Hammer
- Ball peen hammer
- Compothane ball peen hammer
- Dead blow hammer
- Gasket scraper
- Spark plug socket (3/4" & 13/16")
- (2) Large C clamps
- Metal cutting saw
- Seal driver set
- Oil seal protector set
- Assorted pullers
- 1/2" drive socket set - 3/8" – 1-1/4"
- 1/2" drive ratchet wrench
- Flywheel strap wrench
- Flywheel knock-off tool set

### OTHER

1. Classroom set of text books
2. Classroom set of factory repair manuals
3. Microfiche machine and computer for parts/repair
4. Valve grinding machine **for valve faces and stems**
5. Oil and gas container safety storage cabinets
6. Parts washer/cleaner
7. Gas container and oil container
8. Hazmat storage for oil and chemicals
9. Electrical test tools
10. Computer with internet access
11. Software for parts ordering and service tickets

## TOOL AND EQUIPMENT CONSIDERATIONS (CONT)

Special purpose tools for the tool panel are available from EETC member companies. In many cases these tools can be purchased through a local distributor at very reasonable prices. Below is a partial listing of special purpose tools by company and catalogue number. Please note that there may be duplication of tools; it is not intended to have the same tool from different sources unless it is unique to a particular manufacturer. For example, each manufacture may have their own flywheel puller. This is a basic list, if the school will be working with larger engines, it is recommended that the school obtain a list from that particular manufacturer.

### INDUSTRY SPECIAL PURPOSE TOOLS

#### Tecumseh Products (now Certified Parts Corporation)

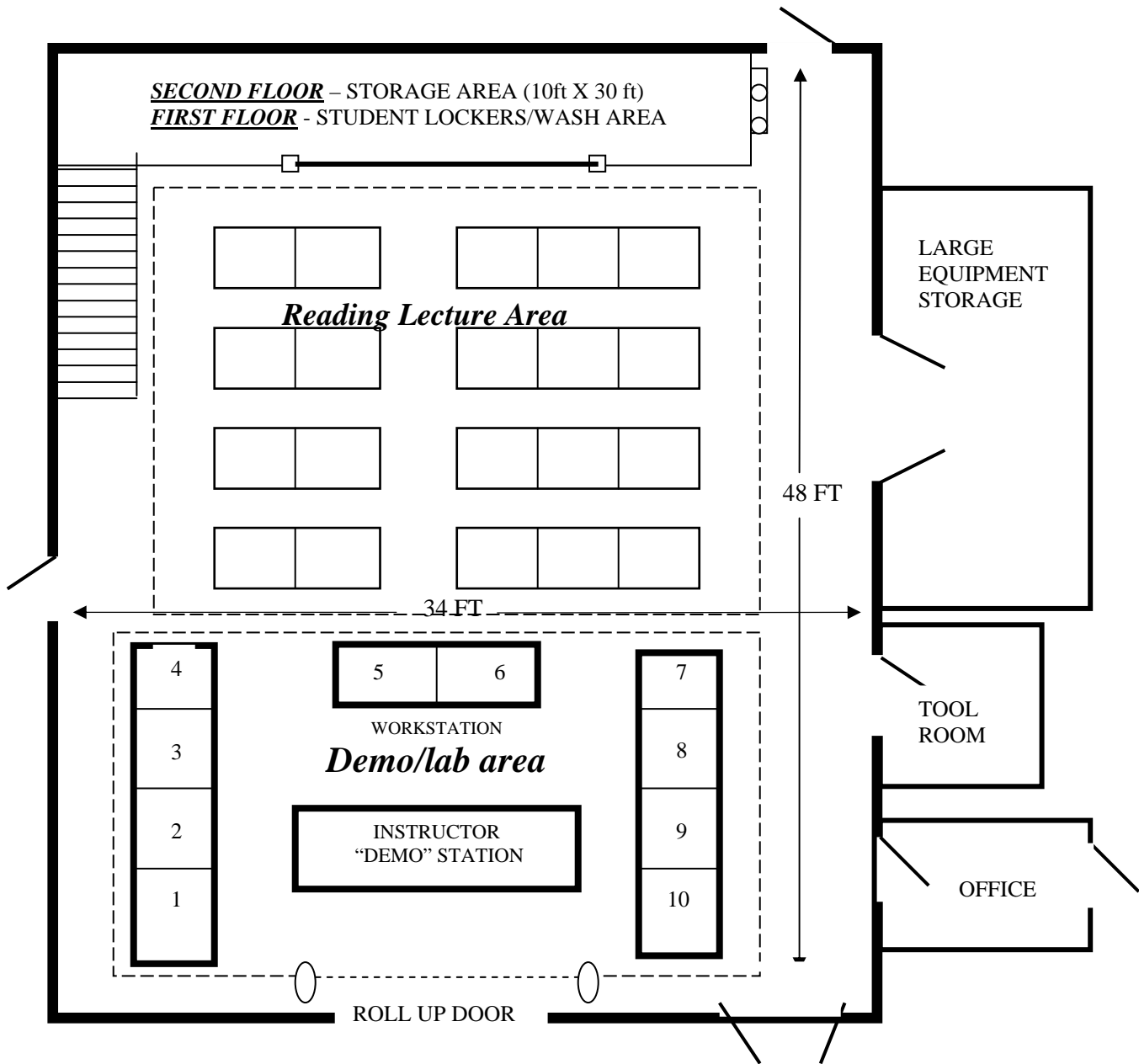
- Leak Down Pressure Test Kit #670340
- Oil Vacuum Pump #670354
- Oil Vacuum Reservoir for pump #670367
- Set of Tecumseh repair manuals #691630
- Microfiche Card Set #693030 (1990 to date), 696498 (1962-1990), 693634A (Prior to 1962)
- Valve Refacer Kit #670348
- Digital Multimeter #670349
- Strap Wrench #670305
- Float Set Tool #670377
- Tachometer #670156
- Oil Seal Driver #670270
- Oil Seal Driver Protector various selected from #670260 through #670310
- Oil Seal Remover #670287, #670288, #670289, #670290, and #670312
- Air Gap Gauge #670297
- Valve Seat Cutter Kit #670347
- Telescoping Gauge Set #670357
- Assorted Flywheel Pullers #670306
- Long Flat Gauge #670361
- Spark Plug Gap Gauge #670256
- Ignition Tester #670366
- Micrometer 0" to 1" #670350
- Micrometer 1" to 2" #670351
- Torque Wrench (inch pound) #670363
- Flywheel Knockout Puller #670103
- Flywheel Knockout Puller #670169
- Flywheel Knockout Puller #670314
- Fly Wheel Puller #670218 & #670306
- Flywheel Tool #670217
- Strap Wrench #670305
- Bushing Tool Kit #670161, #670165, #670246
- Valve Lapping Tool #670154
- Alignment Tool #670298
- Dial Indicator #670241
- Spark Plug Taper Gap Gauge #67025

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#### Briggs & Stratton

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|--|------------------------------------|
| Ignition Tester #19368                   | Leak down Tester #19413            |
| Digital Tachometer #19389                | Set of repair manuals              |
| Tachometer #19200                        | Microfiche Card Set #MS-6224       |
| Carburetor Adjustment Screwdriver #19263 | Microfiche Card Set #MS-6225       |
| Carburetor Nozzle Screwdriver #19280     | Piston Ring Expander #19340        |
| Dial Caliper #19199                      | Piston Ring Compressor #19070      |
| Starter Clutch Wrench #19244             | Ring Compressor #19230             |
| Flywheel Holder #19167                   | Tang Bender #19229                 |
| Flywheel Strap Wrench #19433             | Brake Band Adjustment Gauge #19256 |
| Valve Spring Compressor #19063           | Valve Lapping Kit #19258           |
| Flywheel Puller #19069, #19165, #19203   | Valve Lapping Compound #94150      |
| Torque Wrench In. Lbs. #19393            | Valve Guide Lubricant #93963       |
| Torque Wrench Ft. Lbs #19434             | Valve Guide Repair Kit #19232      |
| Telescoping Gauge #19404                 | Valve Seat Cutter Kit #19237       |
| Digital Multimeter #19390                | Valve Guide Repair Kit #19269      |

*DESIGN CONSIDERATIONS*  
**OUTDOOR POWER EQUIPMENT LAB**



***LECTURE/SEATING AREA FOR 20 STUDENTS***  
***LAB WORK/DEMO AREA FOR 20 STUDENTS***  
***(Minimum combined lab/lecture area - 51 square feet per student)***