Adequate Arkansas

Science Classrooms, Labs, and

Equipment

To meet STANDARDS

Arkansas Science Teachers Association
The following lists, room designs, and safety considerations represent what is needed in adequate science classrooms and labs for Arkansas schools. These were written by the 2003 Arkansas Science Teachers Association Board.
Adequate Arkansas Science Classrooms, Labs and Equipment K-12

The design of science instructional space dictates to some extent the instructional program that may be carried out therein. Some activities cannot be implemented unless specific safety equipment is available. In the following suggestions for laboratory design, three assumptions have been made concerning instructional care:
1. Each laboratory is a working area designed to provide students with actual experience in scientific activities.
2. Each area must be sufficiently flexible to accommodate future, as well as present instructional needs.
3. Where flexibility is at variance with safety, the safety considerations must predominate.

Laboratory Construction
There are many appropriate laboratory designs. The design should be for the science instruction that will be implemented in the facility. The design should also have the flexibility to accommodate several types of science programs or changes in science programs.

Classroom and Laboratory Size Requirements
Many existing science classrooms and laboratories are smaller than is what is needed. However, new construction should follow the space requirements below.

An adequate science room and lab requires a minimum of 60 ft.² per pupil (5.6 m²), which is equivalent to 1,440 ft.² (134 m²) to accommodate a class of 24 safely in a combination laboratory/classroom in grades 7-12. Maximum of 24 students is recommended for safety reasons (as recommended by professional organizations such as NSTA and ACS).

An adequate science room and lab requires a minimum of 60 ft.² per pupil (5.6 m²), which is equivalent to 1,800 ft.² (168 m²) to accommodate a class of 30 safely in a combination laboratory/classroom in grades 7-12.

A lab requires a minimum of 45 ft.² per pupil (4.2 m²), which is equivalent to 1,080 ft.² (101 m²) to accommodate a class of 24 safely in a stand-alone laboratory in grades 7-12.

A lab requires a minimum of 45 ft.² per pupil (4.2 m²), which is equivalent to 1,350 ft.² (126 m²) to accommodate a class of 30 safely in a stand-alone laboratory in grades 7-12.

Elementary labs should require a 45 ft.² per pupil (4.2 m²), which is equivalent to 1,260 ft.² (118 m²) to accommodate a class of 24 safely in a stand-alone laboratory in grades K-6. Maximum of 24 students for safety reasons in middle level school labs (NSTA recommendation).

In addition, 10 ft.² (0.9 m²) per student is needed for teacher preparation space and for separate storage space (240 ft.² or 22 m², for a class of 24).

Recommended designs can be found in the Laboratory Safety Guide for Arkansas K-12 Schools http://arkedu.state.ar.us/pdf/lab_safe2.pdf.

Specific Lab Requirements
1. Each laboratory unit should have two (2) exits that are not adjacent to each other. Exits into adjoining
classrooms and, where usable, windows may be counted. (National Fire Protection Association-45, 1998).

2. The laboratory should be designed to accommodate only the recommended number of students.

3. The number of designated student laboratory stations installed should determine the occupant load. "Class enrollment should not exceed the designed capacity of the room" (1995 Virginia Science Standards of Learning, K-12 Safety).

4. All electrical installations should conform to the provisions of the national electrical code (NFPA-70, 1998). Electrical outlets on work surfaces where spillage of conducting fluids is expected should be considered extra-hazardous.

5. Provisions should be made to protect gas, water, and electrical outlets from vandalism by students. These services should be available only to students participating in laboratory activities. Students who are in lecture sections or who have been assigned reading or other classroom activities should have seating and work surfaces at a distance greater than arm's length from these services.

6. Work surfaces where caustic or corrosive materials are to be used should be standing height of 36 inches (92 cm).

7. Ventilation for all laboratories shall conform to NFPA-45, 1998. Laboratories without conventional windows should have a source of "make-up air.") Laboratory air should not be re-circulated to other parts of the building by the heating or air conditioning system.

8. Fume hoods should be installed in all laboratories where flammable or toxic vapors or airborne particles are released or generated (NFPA-45, 1998). A face velocity of 100 fpm is recommended (hood can overcome a maximum external static pressure of 0.259 H2O at 100 fpm face velocity 720 cfm).

Since hoods are routinely used for potentially explosive mixtures of flammable vapors and air, all electrical connections such as switches, lights, and motors should be explosion proof. All hood controls should be located outside the vented area. Sufficient "make-up air" must be provided for hood operation.

9. The laboratory should be designed and constructed in accordance with Americans with Disabilities Act and ANSI standard 117.1, 1998 in such a manner as to permit use by handicapped persons. Decide if you want a permanent handicap lab station built in or would you rather invest in a portable handicap lab station that can be moved from room to room? There should be a large sink with easy access.

10. The layout should be such that a 54-inch (137 cm) aisle exists between workstations where students must work back-to-back. All other corridors between stations should be a minimum of 40 inches (102 cm).

11. The design should provide a minimum of 60 square feet of space per student in a laboratory/classroom.

**Storage Space**

Storage space should be provided to insure that all equipment, chemicals, and other teaching supplies can be secured against unauthorized use. In-room storage should be installed in such a manner as not to hamper student movement to workstations or exits.

Chemical storage in a school building should serve four functions: 1 Provide security against unauthorized use. 2. Restrict or vent emissions from stored chemicals. 3. Protect the chemicals from fire. 4. Prevent unintended chemical reactions.

**Special Storage Requirements**

1. All storage areas that contain poisonous, corrosive, caustic, or explosive materials must be provided with a secure lock system. This would include all chemicals rated NFPA 2, 3, or 4 on health, reactivity, or flammability.

2. Flammable storage cabinets should be constructed in accordance with the requirements of NFPA 30, 1998 edition. Such cabinets should be vented to the outside of the school building.
3. High school laboratory suites should have a storage room constructed and ventilated in accordance with NFPA 30, 1998 edition. The floors in such storage rooms should be constructed of chemical resistant material and form a liquid-tight catch basin. The storeroom should be equipped with an exhaust system capable of six changes of room air per hour. All electrical connections such as lights, switches, and motors should be explosion proof. All receptacles should include Ground Fault Interrupters.

4. Each laboratory area should have an adjacent preparation area with a minimum of 10 square feet per student based on the design capacity of the adjoining laboratory areas.

5. The storage area must be ventilated to create a minimum of four air changes per hour. Elementary school rooms devoted to science instruction will also need adequate and appropriate storage areas for their supplies. If chemicals are stored, ventilation, flammability, and storage compatibility must be taken into their planning as above.

**Safety Equipment Requirements**

Safety equipment should be provided to reduce the potential for accidental injury. The provision of such equipment should depend on the probability of an accident occurring. The risk of having a person splashed with a concentrated acid is very high in a chemistry lab and low in a physics lab under normal operating conditions.

1. Portable fire extinguishers (ABC rated) should be located, installed, and maintained in accordance with the Standards for the Installation of Portable Fire Extinguishers, NFPA 10, 1998.

2. Eyewash fountains are required for all laboratories. These should be capable of providing a steady low-pressure (25 psi) flow of water for a minimum of 15 minutes.

3. Secure master controls should be provided for gas, water, and electricity. In the event of fire, electrical shock, flooding, or explosion, the teacher should be able to shut down the services and initiate emergency procedures.

4. Safety shower(s) should be provided where strong caustics, corrosives, or skin-absorbable poisons are utilized in the program. Most chemistry programs would be in this category. ANSI standard 117.1 recommends the following specifications for safety showers:

   a) Showers should be located no further than 50 feet (15 m) from work-stations where corrosives and caustics are being used and preferably no more than 25 feet (7.6 m) from point of egress
   b) Showers should be located away from electrical apparatus, power outlets, or panels
   c) Shower locations should be indicated by a painted circle or square on the floor
   d) Shower heads should be located 7 to 8 feet (2 to 2.5 m) above the floor and a minimum of 25 inches from the nearest wall
   e) A floor drain is a must for safety showers including a means to block the drain in the event of a chemical spill.
   f) The shower valve should be operated by a ring and chain, triangle, and rod or chain arrangement
   g) The shower should be capable of delivering a flow-rate of 60 gallons per minute (200 l) at a pressure of 20 to 50 psi
   h) Showers should be tested semi-annually

5. Protective aprons, protective gloves, splash resistant goggles, and fire blankets must be in the chemistry laboratory

6. Safety charts, first-aid kits, safety goggles and protective gloves must be furnished in all science laboratories.
7. All students must wear protective aprons and splash resistant goggles (Meets ANSI Z87.1 Standards) when using chemicals. Protective gloves are required when working with strong acids, bases or heated materials that could damage unprotected skin.

8. All students must wear latex or other protective gloves (if latex sensitive) when touching preserved biological specimens. While fixatives kill most diseases, there are viruses that affect humans that are not necessarily killed by the preservative. Some old specimens may be preserved in formaldehyde (gloves and protective mask must be worn if these are touched). Schools should make every effort to switch to non-formaldehyde preservatives. It is also prudent to wear gloves during dissection to reduce the chances of spreading blood-borne diseases if a student is accidentally cut.

9. All chemicals must be labeled with the name purchase date, and expiration date of the chemical on the container and segregated to separate incompatible types. Each school building must maintain an annual inventory of their laboratory chemicals along with Materials Safety Data Sheets.

10. Chemicals must be kept under lock and key. They must be stored on a non-corrodible surface in a cabinet or storage shelf. Flammable or corrosive chemicals should be placed in cabinets designed for this purpose.

11. Chemical storage rooms in the chemistry laboratory should be locked and must have a ventilation purge fan (four air changes per hour) to the outside air. Isolate the chemical storage exhaust from the building ventilation system.

12. Have access to an outgoing phone in each lab room.

Classroom and Laboratory Furniture
The classroom and laboratory will need student desks, teacher desk, student lab workstations with gas (except at elementary and middle levels) and water connections, student tables, teacher demonstration table, sinks, black/white or erasable boards, TV monitor, computer stations, safety goggle cabinet, display/storage cabinets. These sinks should include at least one deep, large sink with a high swivel spout faucet. This sink should be capable of holding a bucket,

Table Tops
Plastic Laminate - Wears exceptionally well under normal use. It has superior resistance to scratching with limited resistance to high temperatures, organics, and concentrated acids and bases.
Chemsurf - Alternative to the more expensive epoxy resin tops. Has excellent resistance to scratching and heat. It should not be subjected to open flames or temperatures exceeding 275 °F.
Epoxy Resin - Have excellent resistance to chemicals, heat and scratching and should last longer that the other types listed.

Scheduling of Classes and Lab Usage
Science teachers need a laboratory in their classroom or nearby. If a lab must be shared, the science teachers involved should devise a fair schedule. Even a well-equipped science lab is of little value to a science teacher if other non-science classes are scheduled into the lab. Science teachers need time to set up laboratory experiments during their preparation period and must be able to leave those experiments in the room during the day. They also need the opportunity to clean up after labs.

Non-science classes should never be scheduled in a science lab classroom. Neither should non-science classes be scheduled in any regular science classroom where science lab activities are conducted. It is dangerous to schedule other classes in laboratories. This practice may result in student injury or loss of equipment.
A past survey by the Arkansas Department of Education indicated that nearly 80% of our schools have under-funded science budgets and lack the appropriate equipment to carry out science programs that meet the Arkansas Science Frameworks.

All science courses in Arkansas public schools should be laboratory courses that require a minimum of 20% of the science instructional time to be spent in hands-on laboratory experiences.

Schools could use these estimates to compare their science inventories against these costs. It is also recommended that each school should budget for replacement and repair cost of science materials and equipment per course or teacher:

- **Primary school** $1,000  ($12 per student for lab consumables + equipment repair and replacement)  (NSTA recommends minimum of 60% of science instruction be hands-on. Current Arkansas Frameworks require a 20% minimum.)
- **Middle school** $2,000 - 3,000 ($15 per student for lab consumables + equipment repair and replacement)  (NSTA recommends minimum of 80% of science instruction be laboratory-related activities. Current Arkansas Frameworks require a 20% minimum.)
- **High School** $2,500 – 4,000 ($18 per student for lab consumables + equipment repair and replacement)  (NSTA recommends minimum of 40% of science instruction be laboratory-related activities. Current Arkansas Frameworks require a 20% minimum.)

The following science equipment lists are based on the current Arkansas Science Framework. They are materials needed to meet an adequate science classroom and lab at the various grades.
K12 Arkansas Science Equipment

K-1 Science Classrooms

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety Equipment:
- eyewash system
- fire extinguisher
- first aid kit
- goggles (1 per student + teacher)
- MSDS binder
- safety posters

Non-consumable Materials and Equipment:

Tables or desks with flat tops (not slanted)
- anatomy apron - teacher
- aquarium/animal keepers (2)
- balances (elementary) (1 per 4 students)
- cart (equipment)
- cleaning brush & dust pan (1 per 4 students)
- eyedroppers (25)
- file cabinet (4 drawer)
- flashlights (1 per 2 students)
- funnels (assorted sizes - 10)
- graduated beaker sets - (plastic - 5)
- graduated cylinders (assorted - 6)
- hot plate
- laboratory cart
- magnets (classroom demo set)
- magnifying glasses (1 per student)
- magnifier (bug) boxes (1 per student)
- calculators (1 per student)
- meter sticks (1 per 2 students)
- microscope (hand held e.g. Tasco, Magiscope – 1 per 2 students)
- microscope slides (prepared of insect, hair etc.)
- microwave
- mineral sample set
- mirrors (1 per 2 students)
- prisms (glass - 1 per 4 students)
- refrigerator (dorm size)
- rock sample set
- rubber balls (assorted 12)
- sink (large, with high faucet)
- slinky (1 per 2 students)
- stethoscopes (1 per 4 students)
- stopwatch (digital) (2)
- thermometers (1 per 2 students)
- thermometer for classroom
- thermometer model
- timer (digital)

Kits:
- Kits, grade level - correlated to district curriculum/state frameworks/national standards. (ex.: FOSS, GEMS, SEPUP, etc.)

Miscellaneous:
- buckets (2)
- colored pencils (class set)
- dish drainer
- extension cord / power strip (number as needed)
- paint brushes (1 per student)
plastic containers bowls
plastic pitchers /containers for pouring
plastic tubing
pot holders
safety posters
scissors (class set)
spoons (metal – 1 per student)
tool box (hammer, screw drivers, box opener, etc.)
transparencies or posters (human body, plants, senses, trees, weather, animal, etc.)
weights (metric and English)

**Examples of Consumable Materials (but not limited to):**

Alkaseltzer tablets
aluminum foil
aquarium filters
animal food
baking soda
batteries (sizes as needed)
balloons
construction paper
colored pencils (class set)
food coloring
glue/glue sticks
gravel /small rocks
masking tape
modeling clay
paper (computer printer)
paper clips
plaster of Paris
plastic cups
plastic gloves
pipe cleaners
potting soil
straws
tempera paint
tissue paper
various seeds
wax paper
ziplock bags
printer ink
**other consumables as needed to support frameworks and benchmarks**

**Technology:**

TV (minimum 32 inch with S video)
VCR/DVD
Overhead projector and large wall screen
Flex video microscope (Flexcam) with Discovery Scope Kit
Laptop Computer
Interactive White Board, 72 inch with stand or Wall-mounted (Smart Board or Hitachi Star Board)
Color printer access
Internet access
Projector (computer)
Access to digital camera and video camera (Connectors as necessary for all equipment)
All equipment installed, on carts, and/or mounted to walls as needed.


d “Every teacher of science needs an easily accessible budget for materials and equipment as well as for unanticipated expenses that arise as students and teachers pursue their work.”

National Science Standards
2nd-3rd Grade Science Classrooms

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety Equipment:
- eyewash system
- fire extinguisher
- first aid kit
- goggles (1 per student + teacher)
- MSDS binder
- safety posters

Non-consumable Materials and Equipment:

Tables or desks with flat tops (not slanted)
- anatomy apron (teacher)
- aquarium/ animal keepers (2)
- balances (elementary) (1 per 4 students)
- brush and dustpan (1 per 4 students)
- eyedroppers (1 per student)
- file cabinet (4 drawer)
- flashlights (1 per student + teacher)
- funnels (assorted sizes- 10)
- graduated beakers sets- (plastic – 1 per 4 students)
- graduated cylinders (assorted - 6)
- hot plate
- magnets (classroom demo set)
- magnets (assorted types - 1 set per 2 students)
- magnifying glasses (1 per student)
- magnifier (bug) boxes (1 per student)
- calculators (1 per student + teacher)
- laboratory cart
- meter sticks (1 per 2 students)
- microscope (hand held e.g. Tasco, Magiscope – 1 per 2 students)
- microscope slides (prepared of insect, hair etc.)
- microwave
- mineral sample set
- mirrors (1 per 2 students)
- prisms (glass- 1 per 4 students)
- refrigerator (dorm size)
- rock sample set
- rubber balls ( assorted 12)
- sink (large, with high faucet)
- slinky (1 per 2 students)
- stethoscopes (1 per 4 students)
- stopwatch (digital) (1 per 4 students)
- thermometers (metal-backed) (1 per 2 students)
- thermometer for classroom
- thermometer model
- timer (digital)

Kits:
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: FOSS, GEMS, SEPUP, etc.)

Miscellaneous:
- buckets
- colored pencils
- dish drainer
- extension cord / power strip
- plastic containers/bowls
- plastic pitchers /containers for pouring
- plastic tubing
- pot holders
Examples of Consumable Materials (but not limited to):

- Alkaseltzer tablets
- aluminum foil
- aquarium filters
- animal food
- baking soda
- batteries (as needed)
- balloons
- colored pencils (class set)
- construction paper
- food coloring
- glue/glue sticks
- gravel /small rocks
- masking tape
- modeling clay
- paper clips
- plaster of Paris
- plastic cups
- plastic gloves
- pipe cleaners
- potting soil
- printer ink
- straws
- tissue paper
- various seeds
- wax paper
- ziplock bags
- **other consumables as needed to support frameworks and benchmarks**

Technology:

- TV (minimum 32 inch with S video)
- VCR/DVD
- Overhead projector and large wall screen
- Flex video microscope (Flexcam) with Discovery Scope Kit
- Laptop computer
- Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)
- Color printer access
- Internet access
- Projector (computer)
- Access to digital camera and video camera (Connectors as necessary for all equipment)
- All equipment installed, on carts, and/or mounted on walls as needed.

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National Science Standards
4th Grade Science Classrooms

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety Equipment:

- eyewash system
- fire extinguisher
- first aid kit
- goggles (1 per student + teacher)
- MSDS binder
- safety posters

Non-consumable Materials and Equipment:

- Tables or desks with flat tops (not slanted)
  - anemometer
  - apron (1 student)
  - aquarium/animal keepers with supplies (2)
  - balances (elementary pan) (1 per 2 students)
  - barometer
  - binoculars (1 per 2 students)
  - broom
  - brush and dustpan sets (4)
  - calculators (1 per student + teacher)
  - compasses for direction (1 per 2 students)
  - electric circuits (intro. set – 1 per 2 students)
  - eyedroppers (50)
  - file cabinet (4 drawer)
  - flashlights (1 per student + teacher)
  - funnels (assorted sizes-20)
  - graduated beakers sets - (plastic -1 per 2 students)
  - graduated cylinders (1 set per 4 students)
  - graph marker board (large demonstration)
  - graph marker boards (individual size-1 per student)
  - hot plates (2)
  - iron filings
  - laboratory cart
  - magnets (classroom demo set)
  - magnets (assorted – 1 set per 2 students)
  - magnifying glasses (1 per student + teacher)
  - magnifier boxes (1 per student)
  - meter sticks (1 per student)
  - metric measuring tapes (1 per 2 students)
  - microscope (hand held e.g. Tasco, Magiscope – 1 per student)
  - microscope slides (100)
  - microscope slides (prepared of insects, hair, etc)
  - marbles (various sizes)
  - microwave
  - mineral sample set (1 per 4 students)
  - mirrors (1 per student)
  - plastic trays (1 per 2 students)
  - prisms (glass- 1 per 2 students)
  - refrigerator (dorm size)
  - rock sample sets (1 per 4 students)
  - rubber balls (assorted 1 per student)
  - triple beam balance scales (1)
  - sink, deep (large with high faucet)
  - slinky (1 per 2 students)
  - stethoscopes (1 per 2 students)
  - stopwatch (digital- 1 per 2 students)
  - test tubes (various sizes)
  - test tube racks – 1 per 2 students
  - bottle/test tube brushes (assorted)
  - thermometers ( F&C 1 per student)
  - thermometer for classroom
  - thermometer model
  - timer (digital)
  - tuning forks (128, 256, 512, cps - 1 each per 3 students)
  - trundle wheels (1 per 3 students)
  - weather vane
  - ziplock bags
**Kits:**

Kits correlated to district curriculum/state frameworks and national standards. (ex.: FOSS, GEMS, SEPUP, etc.)

**Miscellaneous:**

- buckets
- colored pencils
- dish drainer
- extension cord / power strip
- plastic containers/bowls
- plastic pitchers /containers for pouring
- plastic tubing
- pot holders
- safety posters
- scissors (class set)
- spoons (metal – assorted)
- tool box (hammer, screw driver, pliers, )
- tongs
- transparencies or posters (human body, plants, senses, trees, weather, animal)
- weights (metric and English)
- wire screen

**Examples of Consumable Materials (but not limited to):**

- Alkaseltzer tablets
- aluminum foil
- animal food
- baking soda
- batteries (as needed)
- balloons
- colored pencils (class set)
- construction paper
- dry erase markers and erasers (class set)
- food coloring
- glue/glue sticks
- litmus paper
- masking tape
- modeling clay
- paper plates
- plaster of Paris
- *other consumables as needed to support frameworks and benchmarks*
**Technology:**

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</thead>
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National Science Standards
5th-6th Grade Science Classrooms

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Equipment:

ABC dry chemical fire extinguisher
ANSI approved chemical splash goggles
(2 class sets - if multiple classes)
broom/brushes/dust pans for clean-ups
demonstration table with water and electricity
demonstration shield
eye wash station - continuous flow faucet type
fire blanket
first aid kit
goggle sterilization cabinet (if there are multiple classes)
laboratory grade aprons (1 per student + teacher)
laboratory safety posters/charts
MSDS list folder
plastic hot hands or hot gloves
solid waste disposal containers
chemical/biological waste disposal containers
waste disposal containers for glass
sinks (4 - deep, large with high faucets)

Non-consumable Materials and Equipment:

Tables or desks with flat tops (not slanted)
acetate sheets
alcohol, isopropyl (8 bottles per teacher)
altimeter,
animal cages/habitats with needed accessories
animals and needed food and accessories
anemometers (1 per 6 students),
antibacterial hand soap dispensers (1 per sink)
aquarium & accessories (55 gal., 1 per teacher)
aquarium fish net
aquarium thermometer
gravel
live water plants
filter kit
aquarium heater
fish/food/chemicals
balances, triple-beam (1 per 2 students)
balls, hard rubber (1 inch), steel (1 inch), tennis, golf (1 each per 2 students)
barometers (2),
battery jars
beakers sets, Pyrex (1000mL, 600 ml, 400 ml, 250 ml, 100 ml, 50mL) (1 set per 4 students)
beaker sets (plastic – 1 per 2 students)
beaker tongs (1 per 2 students)
blocks, wooden square and rectangular in assorted sizes
brushes, assorted test tube sizes
calculators (1 per student + teacher), capillary tubes
charts (weather, rocks, minerals, astronomy, periodic table, metric, SI measuring system),
clamps (1 per 2 students),
clear glass plates and streak plates (28 of each),
cloud chamber
compasses, drawing (1 per 2 students),
compasses, magnetic (1 per 2 students)
conductivity apparatus
convection box
corks (50 in assorted sizes),
cotton towels
cover slips (2 pkg. per teacher each year)
crystal kits
culture tubes & caps (20 X 200 mm) (2 per student)
density kit; cube, cylinder, rectangular blocks
(solids of different shapes but same material)
diffraction gratings, framed (1 per student)
diffraction gratings, framed (1 per student)
dipnets for field studies (1 per 4 students)
dissection kits (1 per 2 students),
dissecting trays (1 per 2 students)
dissecting pins 2 boxes
droppers, plastic (100)
dropping bottles (100+)
evaporating dishes (1 per 4 students)
extension cords, heavy duty (as needed)
electric circuit materials - class set
(alligator clips, light bulbs with bases, insulated wire, switches, batteries, bells, rheostats, bulbs, motors, and resistors, etc.)
electrostatic generator
electrostatics cloths (silk, wool, fur)
file cabinets (4-drawer, 2 for multiple classes)
filters for light (1 set of colors per 4 students), fire extinguisher, fire blanket,
first aid kit, flashlights, narrow beam (1 per 2 students)
flasks with stoppers 250 ml (1 per 2 students), foam balls
forceps, biological, chemical (1 per 2 students)
fossils (plastic or natural) Arkansas specific friction rods of various types (1 per 2 students)
fraction plates (1 per 2 students)
funnels, short stem plastic (15 assorted sizes) genecons (1 per 2 students),
glass squares (1 per 2 students)
glass and plastic stirring rods (30 each), graduated cylinders (30 each - 10ml, 25ml, 50ml, 100ml),
gyroscopes, student type (1 per 2 students)
heater, immersion
hot plates (1 per 3 students)
hydrometer
hygrometer
inclined planes (1 per 2 students)
insect nets (1 per 2 students)
insect pins (2 boxes per teacher)
insect magnifying boxes (1 per student)
iron filing
laboratory carts (2)
laser pointer
lenses (plain, curved – concave, convex) (1 each per 2 students)
lens holders for meter sticks (1 per 2 students)
lamps, flexneck (1 per 4 students)
light box + power supply (1 per 3 students)
magnets (1 set of assorted sizes per 2 students)
magnifiers (1 per student)
maps (biomes, topographical, retractable wall maps of North America and world, 1 world globe per 4 students)
meter sticks (1 per student)
meter stick sliding screw clamps (1 per 2 students)
meter stick support stands (1 per 2 students)
meter sticks (1 per 4 students)
microscope slides (1 large box per teacher per year)
microscope slides, concave (1 per student)
microscope slides (prepared of insect, hair, blood, cells, etc.) (1 set per 4 students)
microscopes, compound with light source (1 per 2 students)
microscopes, stereo with light source (1 per 4 students)
microwave
mineral identification sets (1 per 2 students)
mirrors (1 assorted set per 2 students), models (cell, celestial globe, crystal shapes, ear, eye, flower, heart, human torso, land form, lung demonstration, mitosis/meiosis, planetarium, skeleton, etc.)
mortar and pestles (1 per 4 students)
overflow can sets (1 per 4 students)
paper towel dispensers (one at each sink)
petri dishes, Pyrex and plastic disposable pins, straight (2 pkg.)
pith balls (1 per 2 students)
plant presses (1 per 2 students)
plastic wash bottles (1 per 2 students)
plastic lab trays (1 per student) (lunchroom style)
preserved classification specimens (assorted)
prisms (1 per 2 students), equilateral glass protractors (1 per student)
pulleys, single sheave (1 set of single, double, & triple per 2 students)
radiometer
rain gauge
refracting telescope (clear plastic) (1 per 2 students)
refrigerator (dorm size)
ring stands each with large and small rings, rods, and universal clamps (1 per 2 students)
rock identification sets (1 per 2 students)
rocks & minerals of AR (1 set per student - free, AR Geological Commission)
rocket launchers for plastic bottle rockets (1 per 6 students)
rubber stoppers (25 each of assorted sizes)
rubber tubing (assorted diameters and lengths)
rulers - metric, standard (1 per student)
safety chart
scissors (class set)
sieve (screen boxes) (1 per 2 students)
simple machines (1 of each), sinks (at least four and one large with high faucet – one to accommodate filling and emptying of buckets)
slinky (1 per 2 students)
soil test kits with sampling tubes,
solar system model,
solar cell kit (1 per 2 students)
spatula, scoop type (1 per 2 students)
spectroscopes (1 per 2 students)
spectrum tube power supply and holder
spectrum tubes: hydrogen, mercury, neon, nitrogen, sodium
spring scales, calibrated in Newtons, bath (clear plastic) (1 per 2 students)
star finders (1 per student)
stopper, rubber and cork (assorted sizes)
storage containers, clear plastic to sort and store supplies
streak plates (1 per student)
stethoscope (1 per 4 students)
stopwatches (1 per 2 students), strainers (plastic, various sizes)
stream table with accessories (1 per 4 students)
terraria
test tube racks , (1 per student), test tube holders, clamps (1 per student)
test tube/bottle brushes (assorted)(4 sets)
test tubes (assorted sizes)
thermometers (15 °F & 15 °C), thermometers; Celsius, oral with disposable covers (1 per 4 students)
tongs, beaker (1 per 2 students)
tuning forks (1 set per 4 students)
wash bottles (plastic)
washers, metal - assorted sizes
wave springs (1 per 4 students)
weather thermometer (min/max)
weight/mass (1 set per 2 students) (English and Metric)
wind vane
wire gauze, ceramic center
wire, copper insulated (16 gauge, 18 gauge)

Kits:
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: FOSS, GEMS, Lego-Dacto, SEPUP, etc.)

Examples of Consumables (but not limited to):
Consumables as needed possibly including but not limited to: glycerin, baking soda, flour, sand, straws, plastic spoons, styrofoam cups, paper plates, bleach, ammonia, vinegar, flour, sugar, sugar cubes, pipe cleaners, rubber bands, salt, laundry detergent, borax, steel wool, string, twine, fishing line, yarn, toothpicks, colored pencils (class set), cotton balls, cotton swabs, syrup, yeast, bar soap, cooking oil, hydrogen peroxide, iodine, plastic storage containers, sandpaper, litmus paper, pH paper, PTC paper, potting soil, printer ink, seeds, graph paper, wax glass marking pencils, dowel rods, wooden splints, dissection specimen, balloons, buckets, batteries, food coloring, glue, ….
Other Electronic Equipment and Technology:

Computer/printer access/internet access in each classroom (1 per 4 students)
Access as needed to a computer lab with internet access for all students
Flex video microscope (Flexcam) with Discovery Scope Kit
Overhead projector and large wall screen (1 per teacher)
Laptop computer
Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)
Color printer access
Projector (computer)

TV (minimum 32 inch with S video)
VCR/DVD
Camera – digital and video
Laser pointer
Data collecting devices – ex.: CBL, CBR, graphing calculators (1 per 4 students)
Probes and computer graphing software such as Vernier or Pasco (temperature, pH, motion, voltage, light, sound, force, heart rate, pressure, etc. – 1 set per 4 students)
Connectors as necessary for technology equipment
All equipment installed, on carts, and/or mounted on walls as needed.

“Every teacher of science needs an easily accessible budget for materials and equipment as well as for unanticipated expenses that arise as students and teachers pursue their work.”

National Science Standards

**All equipment and supplies not stored in the immediate classroom should be easily accessible to all science teachers. (Each teacher should have the necessary keys to access supplies.)
Life Science Equipment

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Equipment:

ABC dry chemical fire extinguisher
ANSI approved chemical splash goggles (2 class sets)
broom/brushes/dust pans for clean-ups
demonstration table with water, electricity
demonstration shield
eye wash station - continuous flow faucet type
fire blanket
first aid kit
goggle sterilization cabinet
laboratory grade aprons (1 per student + teacher)
laboratory safety posters/charts
MSDS list folder
plastic hot hands or hot gloves
solid waste disposal containers
chemical/biological waste disposal containers
waste disposal containers for glass
sinks (4 - deep, large with high faucets)

Non-consumable Materials and Equipment:

Lab tables with fire and chemical resistant tops
acid cabinet
aquarium and accessories (55 gallon)
beakers sets, Pyrex (2000mL, 1000mL, 600 ml, 400 ml, 250 ml, 100 ml, 50mL)(1 set per 4 students)
beaker sets (plastic – 1 per 2 students)
binoculars (1 per 2 students)
bowls, plastic (6 large, 48 cereal size)
broom + 4 cleaning brush/dustpan sets
buckets (2)
calculators (1 per student + teacher)
charts –classification, life systems - plant and animal, periodic table, cells, etc.
compound microscopes with light source (1 per 2 students)
corks (assorted sizes)
dissecting microscopes, stereo with light source (1 per 2 students)
dissection kits (1 per 2 students)
electronic balances, recommended sensitivity to 0.1 gram (1 per 6 students)
extension cords, grounded, 3 prong
eye droppers (100)
file cabinets (4-drawer, 2 per teacher)
flasks with stoppers (1 per 2 students)
forceps (1 per 2 students)
funnels (assorted sizes)
glassware drain rack for test tubes, beakers and graduated cylinders
gooseneck lamps (8) (UV, infrared, incandescent, fluorescent interchangeable bulbs)
graduated cylinders (10, 25, 50, 100, 1000 ml) (1 set per 2 students)
hose clamps
hot plates (1 per 4 students)
incubators (2)
laboratory carts (2)
magnifying glasses (1 per student)
meter sticks (1 per student)
microwave
models: plant cell, animal cell, human torso, heart, brain, eye, ear, leaf, flower, mitosis, meiosis, skeleton, skin
mortar and pestle (1 per 2 students)
MSDS list folder
paper towel dispensers, 1 at each sink
pitchers, plastic 1/2 gallon (1 per 2 students)
plants, assortment
plankton nets (1 per 3 students)
prepared slide assortment (1 set per 2 students)
preserved specimens (Animal Survey Set)
refrigerator (dorm size)
ring stand and gas burner (each with large and small rings, clamps, and wire gauze - both plain and with ceramic center (1 per 2 students)
rubber tubing (assorted sizes)
rubber stoppers (assorted sizes)
safety chart
scissors (class set)
sinks, minimum of one large, deep sink that will accommodate a bucket and large pans + 4 smaller sinks
stopwatches (1 per 2 students)
strainers (1 per 2 students)
tape measures (1.5 meter – 1 per 2 students)
tape measure (50 ft.- 1 per 3 students)
terrarium and animal habitats, food and supplies needed for care
test tubes (assorted sizes)
test tube racks (1 per student)
test tube holders (clamps), wire (1 per student)
thermometers, lab grade, °F and °C combination (1 per student)
thermometers - Celsius, oral with plastic covers (1 per 2 students)
timer, digital
tool box, (hammer, Phillips and standard screwdrivers, file, pliers, box cutter, etc.)
trays, large plastic, round or rectangular (1 per student)
tree cross-sections (1 per 2 students) or dendrochronology tree ring dating kit
triple beam balances (1 per 2 students)
stirring rods (30)

**Kits:**
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: FOSS, GEMS, SEPUP, etc.)

**Examples of Consumables (but not limited to):**
Order annually or as needed from Science Catalogs or purchase locally:

- acid - base indicators (bromthymol blue, Benedict’s solution, phenolphthalein, pH paper - hydron, red and blue litmus paper, pH pencil, universal solution)
- agar, nutrient
- animal and fish food /other maintenance supplies as needed
- bromthymol blue
- cover slips (2 pkg. per teacher per year)
- colored pencils (class set)
- disposable gloves for dissections
- dissection and observation specimens (owl pellets, preserved animals, planaria, hydra, daphnia, chlorella, euglena, elodea, others
- filter paper
- gram stain
- iodine/iodine stain
- isopropyl alcohol (70% and 90%)
- lens paper
- petri dishes, Pyrex - plastic disposable (150)
- plant food and other plant supplies as needed
- protozoan slowing solution
- printer ink
- PTC paper (4 boxes)
- seeds
- slides (2 boxes)
- wax pencils (2)

- masking tape, wax paper, aluminum foil, plastic wrap, ziplock bags in assorted sizes, paper plates, paper/plastic cups, styrofoam cups, straws, balloons, toothpicks, plastic spoons, (grocery items as needed), fishing line, string, twine, yarn, cotton balls, cotton swabs, potting soil…
Electronic Equipment and Technology:

Computer/printer access/internet access
   (1 set-up per 4 students)
Access as needed to a computer lab with internet
   access for all students
Flex video microscope (Flexcam) with Discovery
   Scope Kit
Overhead projector and large wall screen
   (1 per teacher)
Laptop computer
Interactive White Board, 72 inch with stand or
   wall mounted (Smart Board or Hitachi Star
   Board)
Projector (computer)
TV (minimum 32 inch with S video)

VCR/DVD
Camera – digital and video
Laser pointer
Data collecting devices – ex.: CBL, CBR,
   graphing calculators (1 per 4 students)
Probes and computer graphing software such as
   Vernier or Pasco (temperature, pH,
   motion, light, sound, heart rate, pressure,
   etc. – 1 set per 4 students)
Connectors as necessary for technology
   equipment
All equipment installed, on carts, and/or mounted
   on walls as needed.

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for unanticipated expenses that arise as students and teachers pursue their work.”

National Science Standards

**All equipment and supplies not in the classroom should be easily accessible to all science
teachers. (Each teacher should have the necessary keys to access supplies)
EARTH SCIENCE EQUIPMENT

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Equipment:
- ABC dry chemical fire extinguisher
- ANSI approved chemical splash goggles (2 class sets)
- demonstration table with water, electricity and gas demonstration shield
- eye wash station - continuous flow faucet type
- fire blanket
- first aid kit
- fume hood with front sash with exhaust hood properly vented
- goggle sterilization cabinet
- laboratory grade aprons (1 per student + teacher)
- laboratory safety posters/charts
- MSDS list folder
- plastic hot hands or hot gloves
- solid waste disposal containers
- waste disposal containers for glass sinks (4 - deep, large with high faucets)

Non-consumable Materials and Equipment:
- Lab tables with fire and chemical resistant tops
- altimeter
- anemometer
- balance – electronic (1 per 6 students)
- barometers (2)
- beakers sets, Pyrex (2000mL, 1000mL, 600 mL, 400 mL, 250 mL, 100 mL, 50mL)(1 set per 4 students)
- beaker sets (plastic – 1 per 2 students)
- broom
- brush and dust pan sets (4)
- charts (weather, rocks, minerals, astronomy, periodic table, plate tectonics, clouds, geologic time, Earth’s forces, safety, etc)
- clamps (1 per 2 students)
- clinometer, compass (1 per 2 students), crucibles and covers (1 per 2 students)
- dropper bottles (100)
- evaporating dishes (1 per 2 students)
- eye droppers (100)
- file cabinets (4-drawer, 2 per teacher)
- flask (Erlenmeyer and Florence – 125, 250, 500 mL) (1 set per 2 students)
- forceps (1 per 2 students)
- fossil kit (2)
- funnels (1 per 2 students)
- gas burners (1 per 4 students)
- glass plates (1 per student)
- Geiger counter
- glass tubing 5 or 6mm (25 ft.)
- glass squares (1 per student)
- glass stirring rods (1 per student)
- goggle sanitizer cabinet
- graduated cylinders (10, 25, 50, 100 mL) (1 set per 2 students)
- hygrometer
- laboratory carts (2)
- magnets (1 set per student)
- magnifier (1 per student)
- maps – retractable wall map set, globes, topographic, county sectional, raised relief, etc.
- meter sticks (1 per student)
- microwave
- mineral identification kits (1 per 2 students)
- mineral samples (various for testing)
- models – solar system, Earth’s forces, topography, sun, etc.)
- mortar and pestles (1 per 2 students)
- psychrometers – student grade sling type (1 per 2 students), professional grade (1)
reflecting telescope
refracting telescope
ringstand and rings (1 per 2 students)
rock hammers (1 per 4 students)
rock identification kit (1 per 2 students)
rock samples (various for testing)
rubber tubing - assorted diameters
spatulas (1 per 2 students)
spectrometer and assorted gas tubes (1 set)
spectroscope, student grade (1 per student)
star projector
stoppers – rubber/cork (assorted sizes)
stream tables (1 per 4 students)
streak plates – black and white (1 each per student)
test tubes (assorted sizes)
test tube racks (1 per 2 students)
test tube and bottle brushes, assorted
triple beam balances & mass sets (1 per 2 students)
U V light
wave generator
weather station
soil test kits (1 per 4 students)
wire gauze

**Kits:**
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: FOSS, GEMS, SEPUP, etc.)

**Examples of Consumables (but not limited to):**
printer ink, colored pencils (class set), filter paper, styrofoam cups, sand, salt, diatomaceous earth, glue, charcoal, various wire, bluing, Epsom salts, copper sulfate, paper plates, dish soap, borax, wax marking pencils, hydrochloric acid, graph paper, food coloring, baking soda, vinegar, chalk, lime, cornstarch, ziplock bags, wax paper, aluminum foil, sea shells, modeling clay, etc.

**Electronic Equipment and Technology:**

Computer/printer access/internet access (1 set-up per 4 students)
Access as needed to a computer lab with internet access for all students
Flex video microscope (Flexcam) with Discovery Scope Kit
Overhead projector and large wall screen (1 per teacher)
Laptop computer
Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)
Projector (computer)
TV (minimum 32 inch with S video)

VCR/DVD
Camera – digital and video
Laser pointer
Data collecting devices such as CBL, CBR, graphing calculators (1 per 4 students)
Probes and computer graphing software such as Vernier or Pasco (temperature, pH, motion, light, sound, pressure, etc. – 1 set per 4 students)
Connectors as necessary for technology equipment
All equipment installed, on carts, and/or mounted on walls as needed.

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National Science Standards

**All equipment and supplies not in the classroom should be easily accessible to all science teachers. (Each teacher should have the necessary keys to access supplies)**

**PHYSICAL SCIENCE EQUIPMENT**
(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

**Safety and Permanent Chemistry Equipment:**

- ABC dry chemical fire extinguisher
- ANSI approved chemical splash goggles (2 class sets)
- broom/dust pan for clean-ups
- demonstration table with water, electricity and gas
- demonstration shield
- eye wash station - continuous flow faucet type
- Fire Blanket
- First Aid kit
- Fume Hood with front sash and properly vented exhaust
- acid/base carrying containers
- acid storage cabinet (approved material)
- flammable material storage cabinet (approved material)
- hazardous materials containment unit (temporary storage until removal by haz/mat unit)
- Goggle sterilization cabinet
- laboratory grade aprons (1 per student)
- laboratory safety posters/charts
- MSDS list folder
- plastic "hot hands" or hot gloves
- safety shower
- chemical absorbing/disposal containers
- solid waste disposal containers
- telephone with outside phone line – emergency use

**Laboratory Storage Rooms:**

- ventilation system in storage rooms (standards approved)
- wooden shelving with a lip on the front of each shelf
- sinks (4 - deep, large with high faucets)

**Lab Equipment:**

**Lab tables with fire and chemical resistant tops**

- AC/DC power supply (1 per 4 students)
- alligator clips (20)
- Archimedes' apparatus
- aspirator (1 per 4 students)
- barometer – aneroid, mercury, digital
- beakers – heatable type --Pyrex or other lab grade (50, 100, 150, 250, 500, 600, 1000ml) (1 set per 2 students)
- beakers, plastic (1 set per 2 students)
- beral pipettes (100)
- boom apparatus
- bottles (gas collecting, reagent) (1 each per student)
- burettes (25 ml and 50 ml) (1 per 2 students)
- Bunsen burners with safety hose (1 per 2 students)
- calorimeter
- capacitor (1 per 4 students),
- ceramic pads (1 per 2 students)
- charts; safety, common procedures, periodic table, Newtons’ forces, etc.
- circuit board (1 per 2 students)
- cloud chamber (1 per 4 students)
- compasses, directional (1 per 2 students)
- cork borer, variety of diameters (2 sets)
- corks (20 each assorted sizes to match flasks/test tubes)
- crucibles and covers (1 per 2 students)
- deflagrating spoons (1 per 2 students)
- demineralizer unit
- diffraction grating (1 per 2 students)
- distilling unit
- electric circuit kits - simple (class size appropriate)
electrolysis apparatus (1 per 4 students)
electronic balances (1 per 6 students)
electroplating apparatus
electrosopes (1 per 4 students)
electrostatic generator
electrostatic clothes (silk, wool, fur – 1 each per 2 students)
evaporating dishes (1 per student)
eye droppers (50)
filter paper (12 boxes assorted grades/sizes)
filters, colors (1 set per 4 students)
flasks, lab grade/heatable (Erlenmeyer and Florence - 125, 250, 500, 1000 ml) (1 set per 2 students)
force boards (1 per 4 students)
force apparatus
forceps (1 per 2 students)
friction rods (6 of various types)
friction box
funnels (1 per 2 students)
galvanometer (1 per 2 students)
Genecon (1 per 2 students)
glass stirring rods (24)
glass tubing 5 or 6mm (25ft.)
glass plates squares (1 per student)
glass tubing (assorted sizes -15 ft.)
gravity cylinders (glass with collar/base 10, 50, 100 ml) (1 set per 2 students)
hot plates (1 per 4 students)
hot mitts (1 per 2 students)
incline plane (1 per 4 students)
induction coil
inertia apparatus
gyroscope (1 per 2 students)
kaleidoscopes (1 per 4 students)
laboratory carts (2)
lamps (UV, infrared, high-powered lens-illuminating, mercury -1 each)
laser kit with pointer (1 per 6 students)
law of motion apparatus
lenses (plain, curved, biconvex, biconcave, polarized, & colored (1 set per 4 students)
lenses holders (1 per 2 students)
level holders (1 per 4 students)
light box with power supply (1 per 2 students)
light sockets (1 per 4 students)
linear expansion apparatus (1 per 2 students)
magnets, assorted sizes (1 set per 2 students)
magnifiers (1 per student)
manometers (1 per 2 students)
meter sticks (1 per student)
metric tape (1 - 50 m)
micropipet (1 per student)
microwave
mirrors, assorted (1 set per 2 students)
models: atomic/molecular structure, orbital (1 set)
molecular motion detector (1 per 4 students)
mortar and pestles (1 per student)
multimeters (1 per 2 students)
optical bench (1 per 2 students)
oscilloscope (1)
osmosis apparatus
pendulum apparatus (1 per 2 students)
pH meters (1 per 2 students)
pipette stem triangles (1 per 2 students)
pipettes and bulbs (1 per 2 students)
pith balls (1 per 2 students)
plastic trays (1 per student)
plastic wash bottles (1 per student)
pneumatic troughs (1 per 2 students)
prisms (1 per 2 students)
pulleys (single, double, & triple) (1 set per 2 students)
radioactive material set
radiometer
refrigerator (dorm size)
resistance board (1 per 4 students)
resonance tubes (1 per 4 students)
rheostat (1 per 4 students)
ring stands with iron rings, rods, clamps (1 per 2 students)
ripple tank
rockets (Estes) & glider planes (1 each per 4 students)
rubber stoppers (50 in assorted sizes)
rubber tubing (40 ft.),
rubber corks (30 assorted 1-hole, 2-hole, 3-hole -- matching flasks
rubber balls (assorted 12)
scissors (class set)
semiconductors (1 per 2 students)
shot, metal (Cu, Pb, etc.)
simple machines (3 of each)
slinky (1 per 2 students)
solar cell kit (1 per 4 students)
solenoids (1 per 2 students)
spark generator
spatulas (1 per 2 students)
spectroscope (1 per 4 students)
spectrum tubes (1 per 4 students)
spectrum tube power supply
spill buckets (4)
spring scales (N, g, high and low capacity)
   (1 set per 2 students)
standing wave apparatus
stop watches (1 per 2 students)
strobe light
switches (1 per 2 students)
test tubes, glass/heatable (120 assorted sizes)
test tube racks, 10 capacity (1 per 2 students)
test tube and bottle brushes (12 assorted sizes)
thermometers (°F and °C) (1 per student)

thermostat

**Kits:**
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: SEPUP, Neo Science, Lab Aids, Boreal Science Kit, etc.)

**Chemical supply and examples of consumables (but not limited to):**

Standard chemicals to include but not limited to: common acids, common bases, copper sulfate, lead nitrate, sugar, salt, Alkaseltzer, lime, calcium chloride, charcoal, manganese dioxide, paraffin candles, distilled water, hydrogen peroxide, isopropyl alcohol, ethanol, sodium bicarbonate, vinegar, indicators – (pH, bromothymol blue, phenolphthalein, litmus, and iodine), wooden splints, aluminum metal (foil/sheeting), copper metal, lead metal, zinc metal, magnesium ribbon, electrical tape, clear tape, wax marking pencils, paper labels, glue/glue sticks, supply of batteries as needed, battery recharger, etc.

**Electronic Equipment and Technology:**

Computer/printer access/internet access (1 per 4 students)
Access as needed to a computer lab with internet access for all students
Flex video microscope (Flexcam) with Discovery Scope Kit
Overhead projector & wall screen (1 per teacher)
Laptop computer
Projector (computer)
Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)

TV (minimum 32 inch with S video)
VCR/DVD
Camera – digital and video
Laser pointer
Data collecting devices – ex.: CBL, CBR, graphing calculators (1 per 4 students)
Probes and computer graphing software such as Vernier or Pasco (temperature, pH, motion, light, sound, pressure, etc – 1 set per 4 students)
Connectors as necessary for technology equipment
“Every teacher of science needs an easily accessible budget for materials and equipment as well as for unanticipated expenses that arise as students and teachers pursue their work.”

National Science Standards

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Biology Equipment

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Biology Equipment:

ABC dry chemical fire extinguisher
ANSI approved chemical splash goggles (2 class sets)
broom/dust pan for clean-ups
demonstration table with water, electricity and gas
demonstration shield
eye wash station - continuous flow faucet type
fire blanket
first aid kit
fume hood with front sash with exhaust hood, properly vented
goggle sterilization cabinet
laboratory grade aprons (1 per student)
laboratory safety posters/charts
MSDS list folder
plastic hot hands or hot gloves
safety shower
sinks (1 at each lab station)
sink (at least 1 large, deep with high faucet)
solid waste disposal containers
chemical/biological waste disposal containers
waste disposal containers for glass

Laboratory Storage Rooms

acid/base carrying containers
acid storage cabinet
flammable storage cabinet

ventilation system for storage rooms
wooden shelving with a lip on front of each shelf

Biology laboratory equipment:

Lab tables with fire and chemical resistant tops
agar, nutrient
antibiotic discs – 3 each of the following:
aureomycin, chloromycetin, penicillin,
streptomycin, tetracycline, terramycin
animal cages, plastic (1 per 2 students)
aprons, laboratory (1 per student)
aquarium with accessories (2)
aquarium nets (1 per 4 students)
animal habitat units (small) (2)
autoclave
beakers sets, Pyrex (2000mL, 1000mL, 600 ml, 400 ml, 250 ml, 100 ml, 50mL)(1 set per 4 students)
beaker sets (plastic – 1 per 2 students)
balances – electronic, (1 per 6 students)
balances – triple beam (1 per 2 students)
beakers, glass/heatable (50, 100, 250, 500, 1000 ml) (1 set per 2 students)
binoculars (1 per 2 students)
blood chemistry kit
Bunsen burner (1 per 2 students)
candles, (1 per 4 students)
clamps (1 per 4 students)
cellophane: blue, clear, green, red
centrifuge
charts –anatomical, cells, lab safety, Periodic table, mitosis/meiosis, etc.
cheesecloth
conductivity apparatus
cork borer set
corks assorted sizes
cover slips (2 pkg.)
crucible and cover (1 per 4 students)
culture dishes- disposable and glass (1 each per student)
culture tubes (20 X 200 mm), screw top with caps
dessicators (2)
dialysis tubing (25 ft)
dip nets (1 per 2 students)
dissection specimens, (4 types of animals) (1 set per 2 students)
dissection kits – ruler, scalpel, scissors, forceps, probes/needles (1 per 2 students)
dissecting trays (1 per 2 students)
dissecting pins
droppers, medicine (30)
dropping bottles (30)
drying oven
electrophoresis apparatus
file cabinets (4-drawer, 2 per teacher)
filter paper
flasks (125, 250, 500, 1000 ml) (1 set per 4 students)
forceps (1 per 2 students)
funnels (6 - assorted sizes)
glass tubing – assorted diameters
glass marking pencils (1 per 2 students)
graduated cylinders (10, 25, 50, 100ml) (1 set per 2 students)
hands lens (1 per student)
hot plates (1 per 4 students)
human skeleton (1 adult size)
incubators (2)
indicators - bromthymol blue, pH, litmus, phenolphthalein, methylene blue, phenol red, etc.
insect box magnifiers (1 per student)
insect pins (2 boxes)
jars, large with lid (1 per 2 students)
kymograph kit
laboratory carts (2)
lamps, gooseneck with shade and 25 watt bulb (1 per 4 students)

microtome
microwave
oil emersion microscope (3)
osmometer
pans (large)

petri dishes (plastic) (1 per student)
pipe cleaners
pipette bulbs, rubber (12)
pipettes (5 and 10 ml) (24)
plastic tubing (25 ft)

preserving fluid

protractors
plankton nets (1 per 4 students)
prepared slides, (assortment of plants, animals, cell
mitosis, etc.)
preserved specimens, (assorted of plants & animals)
PTC control paper
PTC paper
razor blades, single-edged
refrigerator (dorm size)
ring stands, rings, clamps, rods (1 per 2 students)
rubber tubing (assorted diameters)
rubber stoppers (assorted types –solid, 1, 2 holes assorted sizes matching test tubes/flasks)
rulers (1 per student)

scalpels (1 per 2 students)

scissors, blunt tip, dissecting, fine-point, heavy (1 per 2 students)
sieves (1 per student)

spatula (1 per 4 students)
sphygmomanometer (1)
spirometer (1)
stains- carmine red, congo red, crystal violet, gram,
iodine

staining trays (1 per student)
stirring rods (1 per student)
sudan III
stethoscope (1 per 4 students)
terrarium and accessories (2)
test tubes, large and small (assorted)
test tube racks, 8 capacity (1 per 2 students)
test tube holders (clamps) (1 per 2 students)
test tape for glucose

thermometers (12 °F & 12 °C), (1 per student)
timers (1 per 2 students)  
tool box – pliers, screw drivers, wrench,  
hammer, metal file, etc.  
water test kits (2 per teacher of pH, DO,  
dissolve solids, turbidity, etc.)  
wash bottles (1 per student)  
waterbath, (1 per 4 students)  
white sorting trays (1 per 2 students)  
wire gauze (12 sq. ft.).

**Kits:**
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: SEPUP, Neo Science, Lab Aids, Boreal Science Kit, etc.)

**Examples of Consumables (but not limited to):**
cotton swabs, cotton balls, cloth (absorbent), cheesecloth, wax paper, cellophane wrap, aluminum foil, distilled water, straws, yeast (dry), surgical gloves, sugar, salt, modeling clay, ethanol, isopropyl alcohol, hydrogen peroxide, matches, candles, seeds, charcoal, gravel, food coloring, potting soil, clay pots, sulfuric acid, hydrochloric acid, nitric acid, antacid tablets, vinegar, petroleum jelly, etc.

**Electronic Equipment and Technology:**
Computer/printer access/internet access(1 per 4 students)  
Access as needed to a computer lab with internet access for all students  
Flex video microscope (Flexcam) with Discovery Scope Kit  
Overhead projector and large wall screen (1 per teacher)  
Laptop computer  
Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)  
Projector (computer)  
TV (32 inch with S video)  
VCR/DVD  
Camera – digital and video  
Laser pointer  
Data collecting devices such as CBL, CBR, graphing calculators (1 per 4 students)  
Probes and computer graphing software such as Vernier or Pasco (temperature, pH, motion, light, sound, CO₂, heart rate, pressure, etc. – 1 set per 4 students)  
Connectors as necessary for technology equipment  
All equipment installed, on carts, and/or mounted on walls as needed.

**Reference material:**
Field guides - flowering plants, trees/shrubs, aquatic plants, spiders, insects, butterflies, mammals, fish, tracks/skulls, birds, aquatic plants, reptiles/amphibians, aquatic invertebrates, research paper guides, scientific abstracts, scientific periodicals, dichotomous (identification) keys, biological reference reports, etc…

“Every teacher of science needs an easily accessible budget for materials and equipment as well as for unanticipated expenses that arise as students and teachers pursue their work.”
National Science Standards

**All equipment and supplies not in the classroom should be easily accessible to all science teachers. (Each teacher should have the necessary keys to access supplies).**
Chemistry Equipment

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Chemistry Equipment:

- ABC dry chemical fire extinguisher
- ANSI approved chemical splash goggles (2 class sets)
- broom/dust pan
- brushes/dust pan sets (1 per 4 students)
- chemistry safety video
- chemistry videos from ACS
- demonstration table with water, electricity, air and gas
- demonstration shield
- eye wash station - continuous flow faucet type
- Fire Blanket
- First Aid kit
- Fume Hood with front sash and properly vented

Laboratory Storage Rooms

- acid/base carrying containers
- acid storage cabinet (approved material)
- flammable material storage cabinet (approved material)
- hazardous materials containment unit (temporary storage until removal by haz/mat unit)
- ventilation system in storage rooms (standards approved)
- wooden shelving with a lip on the front of each shelf

Equipment for labs:

Lab tables with fire and chemical resistant tops

- alligator clips (24)
- 10 ml graduated pipettes with pipette bulbs (1 per student)
- 20 L Nalgene Container for distilled water
- AC/DC power source (1 per 4 students)
- aneroid (or digital) barometer (3)
- balances – electronic, triple beam, dial-o-gram (0.01 g sensitivity recommended) (1 per 4 students)
- beakers sets, Pyrex (2000mL, 1000mL, 600 mL, 400 mL, 250 mL, 100 mL, 50mL)(1 set per 2 students)
- beaker sets (plastic – 1 per 2 students)
- bottles – gas collecting, reagent, etc. (1 each per student)
- Boyle's law apparatus
- burettes (50 mL)(1 per 2 students)
- burner with safety hose – Bunsen or laboratory (1 per 2 students)
- candles (1 per 2 students)
- centrifuge
- ceramic centered wire gauze (1 per student)
- Charles' Law apparatus
- chromatography paper
- chromatography apparatus
cloths pins (1 per student)
conductivity meter (1 per 4 students)
cork borer (2 sets)
corks and rubber stoppers (solid, 1-hole, 2-hole, 3-hole, assorted sizes to fit Erlenmeyer flasks and test tubes)
crucibles and covers (1 per student)
de-ionized water still with appropriate storage container for water
deflagrating spoons (1 per 2 students)
Dewar Flask—for demonstrations with liquid nitrogen
diffraction gratings or spectroscope (1 per 2 students)
dropper pipettes or micropipet (500 plastic)
electrolysis apparatus (Hoffman Apparatus)
evaporation dishes (1 per student)
file cabinets (4-drawer, 2 per teacher)
filter paper (assorted grades)
flame testers, nichrome or platinum wire loops
flash lights (1 per 2 students)
funnels, assortment (1 per student)
Geiger Counter with appropriate radiation sample kit
Geissler tube apparatus and hydrogen, neon, oxygen, chlorine, etc. tubes
glass stirring rods (1 per student)
glass slides (1 per student)

glassware: beakers - 50ml, 250ml, 400ml, 600ml, 1000ml (1 set per 2 students)
graduated cylinders - 10ml, 50ml, 100ml, 1000ml, 2000ml (1 set per 2 students)
Erlenmeyer flasks and Florence flasks - 50mL, 250mL, 400mL, 600mL, 1000mL (1 set per 2 students)
distillation flasks - 250 ml, 500ml (1 set per 2 students)
test tubes- heatable: class set -10 or 12 mm x 25 mm. others: 13x100, 18x150, 25x200, etc
gas measuring tubes (50 mL)
glass squares (1 per student)
glass tubing/glass rod supply
gloves, plastic (1 pair per student)
hand held spectroscopes (1 per student)
hand lens (1 per student)
hot plates (1 per 4 students)

hydrometer (1 per 4 students)
iron rings (1 per student)
indicators: BTB, BCG, BPB, MCP, TB, Sudan III, bromthymol blue, phenolphthalein, methyl red, methyl orange, universal, pH, litmus, etc.
Laboratory carts (2)
Leibig condenser tubes for distillations
Magneburg spheres
magnetic stirrers/hot plates (1 per 4 students)
metals – brass, lead, copper, iron, zinc, aluminum, etc. (density and specific heat determinations)
meter sticks (1 per student)
microwave
micro-scale: micro-well 9-12 well plates, 96 well plates, 1 x 12 well strip (1 per student)
thin stem plastic pipet
pipet rack
Millikan apparatus
models – atomic structure, orbitals, etc.)
mortar and pestle (1 per 2 students)
multimeters (1 per 2 students)
needle nose forceps (1 per 2 students)

pH meters (1 per 2 students)
pinch clamps (1 per student)
pipet rack
pipestem triangles (1 per student)
pipe cleaners
plastic dropper bottles (60)
plastic or rubber tubing – assorted diameters
plastic petri dishes (1 per student)
plastic wash bottles (1 per 2 students)
plastic trays (1 per student)
pneumatic troughs (1 per 2 students)
polyethylpentene storage bottles (reagents) assorted sizes
polystyrene cups
reagent bottles (1 per student)
refrigerator (dorm size)
ring stands, rings, clamps, rods (1 per 2 students)
scissors (small pointed Fiskars) (class set)
scoops or spoons (1 per student)

single and double burette clamps (1 per student)
small scale reaction surfaces
spectrophotometers with cuvettes-computer compatible
tube clamps (1 per 2 students)
test tube brushes - assorted sizes
test tubes - heatable: classroom set - 10 or 12 mm x 25mm. Others: 13x100, 18x150, 25x200, etc.
thermometers (class set) non-mercury or digital thermometers only
thistle tubes (1 per 2 students)
timers (1 per 2 students)
tongs - beaker, test tube (1 each per 2 students)
triangular files/glass tubing cutters (1 per 2 students)
test tube racks (8 capacity) (1 per 2 students)

**Vacuum Pump**

**Volumetric Cups** – plastic (1 per student)

**Watch glasses** (1 per 2 students)

**Water testing kits** (dissolved oxygen, dissolved solids, pH, ammonia, carbon dioxide, etc.)

**Wing tops for burners** (1 per 2 students)

**Wire** - copper, galvanized, steel wire

**Wire Gauze** – ceramic center (1 per student)

**Thermometers (class set)** non-mercury or digital

**Thermometers only**

**Thistle Tubes** (1 per 2 students)

**Timers** (1 per 2 students)

**Tongs** – beaker, test tube (1 each per 2 students)

**Triangular Files/Glass Tubing Cutters** (1 per 2 students)

**Test Tube Racks** (8 capacity) (1 per 2 students)

**Kits:**
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: SEPUP, Neo Science, Lab Aids, Boreal Science Kit, etc.)

**Examples of Consumables (but not limited to):**

- Batteries, assortment (AAA, AA, B, C & 6 and 12 volt as needed), battery charger, labels, wax marking pencil, pennies, paper towels, India ink, cooking oil, food coloring, balsa wood, cellophane tape, colored strips of tape, wooden splints, cotton swabs, plastic cups, sand, sugar, salt, ziploc bags, matches, color pencils, graph paper, coffee filter, chemicals (appropriate chemicals for labs that meet the science framework), chromatography paper, etc.

**Electronic Equipment and Technology:**

- Computer/printer access/internet access (1 per 4 students)
- Access as needed to a computer lab with internet access for all students
- Flex video microscope (Flexcam) with Discovery Scope Kit
- Overhead projector and large wall screen (1 per teacher)
- Laptop computer
- Interactive White Board, 72 inch with stand or wall mounted (Smart Board or Hitachi Star Board)
- Projector (computer)
- TV (32 inch with S video)

**Reference Material:**
Physicians desk reference, abstracts in chemistry, chemical periodicals (JChem), solutions manual, bright line spectrum chart, etc.
“Every teacher of science needs an easily accessible budget for materials and equipment as well as for unanticipated expenses that arise as students and teachers pursue their work.”

National Science Standards

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Physics Equipment

(Please refer to cover pages for more specific equipment and classroom storage details. All grades and classes should be equipped with the additional safety equipment necessary to meet all city, state, and federal requirements.)

Safety and Permanent Equipment:

- ABC dry chemical fire extinguisher
- ANSI approved chemical splash goggles (2 class sets)
- broom/dust pan for clean-ups
- demonstration table with water, electricity, air and gas
- demonstration shield
- eye wash station - continuous flow faucet type
- Fire Blanket
- First Aid kit
- Fume Hood with front sash and properly vented exhaust
- goggle sterilization cabinet

Laboratory Storage Rooms

- acid/base carrying containers
- acid storage cabinet (approved material)
- flammable material storage cabinet (approved material)
- hazardous materials containment unit (temporary storage until removal by haz/mat unit)

Laboratory equipment:

- barometer (3)
- beakers sets, Pyrex (2000mL, 1000mL, 600 mL, 400 mL, 250 mL, 100 mL, 50mL) (1 set per 2 students)
- beaker sets (plastic – 1 per 2 students)
- binoculars (1 per 4 students)
- blocks of wood
- blocks of metal
- boom apparatus
- bottles (12)
- Boyle's law apparatus
- bead assemblies (1 per 4 students)
- calorimeter (1 per 4 students)
- capacitors (1 per 4 students)

Lab tables with fire and chemical resistant tops

- AC/DC power source, (1 per 2 students)
- acceleration timer (1 per 6 students)
- acceleration apparatus
- air track
- air table
- alligator clips (24)
- angular motion apparatus
- Archimedes' apparatus
- aspirator
- balances- 0.01g sensitivity (1 per 6 students)
- inertia platform/set masses 1 to 1000, balances, spring (1 per 2 students)
- balances, triple beam (1 per 2 students)
- balances, electronic (1 per 4 students)
Cartesian diver
cathode ray tubes, assorted
centripetal force apparatus
Charles' law apparatus
clamps (20 assorted)
cloud chamber (1 per 6 students)
collision balls and apparatus (1 per 4 students)
compasses directional (1 per 2 students)
Coulomb's law apparatus
circuit board (1 per 2 students)
deflection tube (1 per 6 students)
dew point apparatus (1 per 6 students)
diffraction grating (1 per student)
dynamic energy apparatus
dynamic carts and track (1 per 4 students)
etric circuit kits - simple (1 per 4 students)
etroplating apparatus
electroscopes (1 per 4 students)
etrostatic generator
electrostatics cloths (silk, wool, cat, fur)
eye droppers (30)
file cabinets (4-drawer, 2 per teacher)
filters (color sets) (1 set per 2 students)
fish line, nylon
flasks (Erlenmeyer and Florence 125, 250, 500 ml) (1 set per 2 students)
force boards (1 per 4 student)
force apparatus
forceps (1 per 2 students)
friction rods (6 of various types)
friction box
function generators
galvanometer (1 per 2 students)
gas burners (1 per 2 students)
Genecon (1 per 2 students)
glass tubing (assorted diameters)
graduate cylinders (10, 50, 150, 250, 500, 1000 ml) (1 set per 2 students)
gyroscopes (1 per 2 students)
gyroscopes, large (bicycle wheel shaft) (1)
Hall's carriage
Helmholtz coil
holography kit
Hooke's law apparatus (1 per 2 students)
hot plate (1 per 4 students)
Huffman's electrolysis apparatus
incline plane (1 per 4 students)
induction coil
inertia apparatus
kaleidoscopes (1 per 4 students)
kinesic stool (1)
laboratory carts (2)
lamps (UV, infrared, high-powered lens-illuminating, mercury (1 of each)
laser kit (2)
law of motion apparatus
lenses (plain, curved, polarized, & colored) (1 set per 4 students)
level holders (1 per 4 students)
light box with power supply (1 per 2 students)
light sockets (1 per 4 students)
linear expansion apparatus (1 per 2 students)
Magdeburg hemispheres
magnets (sets of assorted sizes) (1 set per 2 students)
magnifiers (1 per student)
manometers (1 per 2 students)
meter sticks (1 per 2 students)
microscope (1 per 50 m)
Michelson interferometer
microwave
Millikan oil drop apparatus
mirrors (1 set per 4 students)
molecular motion detector
multimeters (1 per 2 students)
optical bench (1 per 2 students)
oscilloscope (3)
osmosis apparatus
pendulum apparatus (1 per 4 students)
photoelectric effect apparatus
photogate
pith balls (1 per 2 students)
Planck's constant apparatus
potentiometers (1 per 4 students)
prisms (1 per 2 students)
pulleys (sets of single, double, & triple) (1 set per 4 students)
radiation material set
radiometer
resistance boards (1 per 4 students)
rheostats (1 per 4 students)
ringstands – rings, clamps, rods (1 per 2 students)
ripple tank
rockets (Estes) and glider planes (1 each per 4 students)
rotation disk platform
rubber balls (assorted 12)
rubber tubing (20 ft.)
rubber corks (30 assorted)
scaler laboratory
scissors (class set)
semiconductors (1 per 2 students)
shot (Cu, Pb, etc.)
simple machines (3 of each)
slinky (1 per 2 students)
solar cell kit (1 per 4 students)
sonic ranger
sonometer
spark generator
spectroscope (1 per 4 students),
spectrum tube power supply
spectrum tubes (6)
spinthariscopes (1 per 4 students)
spring scales (N, g, high and low capacity)
(1 set per 2 students)
standing wave apparatus
stop watches (1 per 2 students)

strobe light
superconductivity apparatus
switches (1 per 2 students)
Tesla coil
Thermometers, °C and °F (1 per student),
thermostat
tool box - hammer, screwdrivers, pliers, metal
files, c-clamps, etc
trajectory apparatus
transformers (1 per 4 students)
triple beam balances (1 per 2 students)
tuning forks (1 set per 4 students)
twine, nylon
vacuum pump (1 per 2 students)
Vernier calipers (1 per 2 students)
wave spring (1 per 2 students)
whetstone bridge
circuit board (1 per 2 students)
wire in various sizes (30 ft.)
xylophone/tone producer

Kits:
Kits correlated to district curriculum/state frameworks/and national standards. (ex.: SEPUP, Neo
Science, Lab Aids, Boreal Science Kit, etc.)

Examples of Consumables (but not limited to):
Batteries – assorted sizes as needed, battery charger, glass jars, chalk, dowel rods, string, plywood, wire,
cups, graph paper, buckets, marbles, oil, alcohol, peroxide, etc.

Reference material:
Scientific periodicals, physics abstracts, laws/formulas chart, conversion charts, bright line spectrum
charts, etc.

Electronic Equipment and Technology:

Computer/printer access/internet access (1 per 4
students)
Access as needed to a computer lab with internet
access for all students
Flex video microscope (Flexcam) with Discovery
Scope Kit
Overhead projector and large wall screen
(1 per teacher)
Laptop computer
Interactive White Board, 72 inch with stand or
wall mounted (Smart Board or Hitachi Star
Board)
Projector (computer)
TV (minimum 32 inch with S video)
VCR/DVD
Camera – digital and video
Laser pointer
Data collecting devices – ex.: CBL, CBR,
graphing calculators (1 per 4 students)
Probes and computer graphing software such as
Vernier or Pasco (temperature, pH, motion, voltage, light, sound, force, pressure, etc. – 1 set per 4 students)
Connectors as necessary for technology

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