CHAPTER 4
CARE AND MAINTENANCE

CARE AND MAINTENANCE

LESSON TOPIC

CARE AND MAINTENANCE

OBJECTIVES:

- The bus driver will be able to describe basic bus components.
- The bus driver will be able to detect symptoms of possible trouble.
- The bus driver will be able to identify driving actions which prevent undue wear on the bus.
- The bus driver will be able to identify interior and exterior maintenance tasks.
- The bus driver will be able to perform a pre-trip inspection of a bus.

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	**OVERVIEW – SECTION I** Preventative maintenance is the care of a vehicle to ensure safety, dependability and maximum life of the vehicle. It involves organized inspections at regular mileage or time intervals and immediate attention to all reported defects. These inspections involve checking, cleaning, tightening, lubricating and adjusting parts and units. Inspections are the simplest and most economical means of protecting the bus fleet and are the key to a good preventative maintenance program. A trained mechanic will carry out the inspection program, but the school bus driver is in a position to observe a bus's performance under all conditions. Defects should be recognized and immediately reported to the maintenance department. Trouble should not be diagnosed. Brief explanations of the following basic bus components will be provided. 1. braking system 2. engine 3. transmission and drive-shaft 4. clutch 5. steering 6. electrical system 7. suspension 8. tires

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DISCUSS EACH COMPONENT BRIEFLY. AVOID LONG, TECHNICAL EXPLANATIONS. COMPLETE COMPREHENSION OF MECHANICAL OPERATION IS NOT THE PURPOSE HERE. PROVIDE LINE DRAWINGS OF EACH PART AND SHOW THE FLOW OF THE PROCESS FROM IGNITION TO BUS MOTION.	As an instructor you should discuss how each bus component works. **SCHOOL BUS COMPONENTS** A driver should have a basic knowledge of school bus components to understand their effect on the operation of the school bus. There will be times when this knowledge will be useful in adjusting their driving performance and in detecting trouble while on the route. Proper driving habits will increase bus efficiency and economy of operation as well as prolong the life of the bus. **BRAKING SYSTEM** • Hydraulic • Vacuum-Hydraulic • Air Pressing on the brake pedal forces fluid or air into the brake cylinder or air chamber, the s-cam OR the cylinder moves the brake drum shoes outward against the brake drum (inner surface of metal wheel). This creates friction causing the wheel to slow and stop. **DIESEL ENGINE** • Fuel injector • Combustion Chambers • Pistons • Crankshaft Takes fuel in fuel tank, injects it into the cylinder where it mixes with air into combustion chamber where it is ignited by compression. The exploding mixture causes

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	pistons to move, which turns the crankshaft. The rotating crankshaft connects the final power from the engine to the transmission, carrying the power to the drive-shaft; the differential, the rear-end and the rear wheels. **TRANSMISSION AND DRIVESHAFT** Gears allow you to change the ratio of number of engine revolutions to number of wheel revolutions. For example, in low gear, the engine might turn 100 times for one wheel turn. In a higher gear, the engine might turn 10 times for one wheel turn. The drive-shaft connects the transmission to the rear wheels, making them turn. **CLUTCH** When depressed, disconnects engine from transmission, allowing changing of transmission gears. **STEERING** Steering wheel and column connect to gears and linkage mechanism which change direction of front wheels. **ELECTRICAL SYSTEM** Supplies power for primary engine functions and auxiliary functions. • Primary Engine Function Power generation and storage (battery, generator/alternator and voltage regulator). Power distributions (engine wiring).

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- Auxiliary Functions

Inside/outside lighting (headlights, amber/red flashing warning lights, turn signals, instrument panel lights, etc.). Air/heat circulation (heater, defroster, blowers). Horn.

SUSPENSION

Leaf springs and mounted shock absorbers which enable the driver to handle the bus properly on rough terrain and sharp curves, etc.

TIRE CONSERVATION AND SAFETY

Check tires for cuts, bruises, uneven wear and air pressure. The following will improve tire life and vehicle safety:

1. Reduce mileage. Use the bus only on scheduled trips and avoid unnecessary driving.
2. Drive at low speeds.
    a. Tires will wear twice as long at 30 mph compared to 50 mph.
    b. High speed harms tires more in hot weather than in cold. Tires wear six times faster at 100 degrees than at 40 degrees.
    c. Drive slowly, especially on roads with sharp, projecting stones.
    d. Drive slowly on curves and turn slowly. Speeding around curves multiplies tire wear.

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	3. Maintain tire pressure at the level recommended by the tire manufacturer. a. Slight under-inflation increases tire wear. Six pounds under inflation for a tire which should carry 30 pounds of pressure will cut the life of the tire at least 20 percent. b. Learn what the pressure should be and check all tires, including spare, once a week. Keep valve cap screwed on tightly. 4. Avoid rocks, holes, curbs, glass and other objects. a. Anything which produces a sudden sharp bend in the casing is likely to break cords within the tire; other cords break around the weak spot and the tire will fail as a result. b. Cuts or bruises in the side wall will shorten tire life. 5. Make a DAILY inspection. a. Inspect tires daily for cuts, snags, bruises, nails, glass and gravel. b. Water and grit get in at flaws and destroy interior cord structure. 6. Avoid jumping starts and screeching stops. They scuff off tire tread. One ten-foot skid takes many miles off tire life. 7. Keep brakes adjusted so tires evenly brake.

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	8. Keep oil and grease off of the tires since they cause rubber to deteriorate.
HAVE TRAINEES VOLUNTEER ANSWERS. PROVIDE FEEDBACK.	Answer these questions:
1. TRANSMISSION	1. Which bus components is made up of a system of gears.
2. SUSPENSION	2. Which component is responsible for the way the bus handles and rides on rough terrain and in sharp curves?
3. BRAKES	3. Which bus component works on fluid or air pressure?
4. CLUTCH	4. Which component disconnects the engine from the transmission so you can change gears?
ANSWER ANY QUESTIONS THE TRAINEES ASK. LEAD DISCUSSION.	**DETECTING SYMPTOMS OF POSSIBLE TROUBLE**
EMPHASIZE: LISTENING FEELING LOOKING SMELLING	Be alert for symptoms of problems. Use your senses to detect signs of possible trouble.
	LISTENING FOR TROUBLE
	a. Sharp knock when picking up speed or light knock when engine is idling.
	b. Dull regular knock, clicking or tapping noises.
	c. Continuous or intermittent squeal or squeak.
	d. Loud exhaust noise.
	e. Engine backfiring, missing, popping, spitting or overheating.
	f. Steaming or hissing.

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	FEELING FOR TROUBLE a. Excessive vibration in: o engine compartment, o steering wheel, and/or o drive line. b. Low speed or high speed shimmy. c. Hard steering and/or steering wander. **LOOKING FOR TROUBLE** a. Sudden drop in oil pressure. b. Low oil pressure. c. No oil pressure. **NOTE:** IF ANY OF THE ABOVE EXIST, THE VEHICLE SHALL NOT BE DRIVEN UNTIL THE PROBLEM IS CORRECTED. d. Excessive oil consumption. e. Smoke coming from under the dash. f. Smoke coming from under the hood. g. Scuffed tires or spotty wear. h. High temperature reading. i. Drop in air pressure **SMELLING FOR TROUBLE** a. Odor of diesel fuel. b. Odor of burning rubber. d. Odor of burning oil. e. Hot/burning electrical smell. f. Exhaust fumes.

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OPTION: YOU MAY WANT TO HAVE ONE OF YOUR BUS MECHANICS ON HAND TO ANSWER QUESTIONS. THE INTENT HERE IS A BASIC KNOWLEDGE OF THE BUS OPERATIONS SO TRAINEES CAN SPOT TROUBLE EARLY. DO NOT LEAD THEM TO BELIEVE THEY ARE BEING TRAINED TO BE MECHANICS. DESCRIBE IN DETAIL YOUR LOCAL PROCEDURE FOR REPORTING ANY OF THESE SYMPTOMS. PROVIDE YOUR OWN FORMS THAT DRIVERS ARE TO USE. EXPLAIN HOW TO FILL THEM OUT. STRESS THAT ANYTHING THEY NOTICE THAT IS OUT OF THE ORDINARY SHOULD BE REPORTED. THERE IS DANGER IN THINKING THAT AN UNUSUAL NOISE, ETC., IS NOTHING TO WORRY ABOUT, ESPECIALLY IF A DRIVER HAS MECHANICAL EXPERIENCE. STRESS THAT THEY DON'T NEED TO KNOW WHAT IS WRONG BEFORE THEY REPORT SOMETHING "SUSPICIOUS." IT IS BETTER TO REPORT ANY UNUSUAL CONDITION, EVEN IF IT TURNS OUT TO BE MINOR, THAN TO NOT REPORT SOMETHING THAT COULD BE DANGEROUS AND/OR COSTLY.	✓ **NOTE;** ANY OTHER UNUSUAL CONDITIONS SHOULD BE REPORTED IMMEDIATELY TO THE PROPER AUTHORITY. Now that you are familiar with the basic components of a school bus and we have discussed being alert for signs of possible problems, let's look at each component and discuss specific signs of trouble. **PREVENTING PROBLEMS BY DETECTING TROUBLE EARLY** **1. BRAKING SYSTEM – EARLY SIGNS OF TROUBLE** a. Drop in air pressure (air brakes only). b. More than one inch play in slack adjusters. c. Low brake pedal (hydraulic or vacuum-hydraulic brakes). d. Spongy or soft brake (hydraulic or vacuum-hydraulic brakes). e. Smell or see brake fluid (hydraulic or vacuum-hydraulic brakes). f. Brake drum very hot (all types). **2. ENGINE – EARLY SIGNS OF TROUBLE** a. Engine miss at low speed. b. Engine miss at high speed. c. Ping when accelerated. d. Dull "clunk" at idle.

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	e. Sharp, loud knocking; **<u>SHUT OFF ENGINE IMMEDIATELY.</u>** f. Heat gauge indicates temperature rising higher than normal. g. Oil pressure dropping below normal; h. Engine stalls or runs sluggishly. **3. TRANSMISSION AND DRIVESHAFT – EARLY SIGNS OF TROUBLE** a. Hard shifting. b. Slipping out of gear. c. Clunk or jerk when power is applied or released. d. Unusual sounds when power is applied.
	**4. CLUTCH – EARLY SIGNS OF TROUBLE** a. Motor revving with clutch engaged and vehicle in gear and moving. b. Odor of burning clutch lining. c. Gear clash. d. Squealing sound when clutch pedal depressed, with engine running. e. Clutch “chattering.”
	**5. AUTOMATIC TRANSMISSION AND DRIVESHAFT – EARLY SIGNS OF TROUBLE** a. Leaks. b. Slipping or loss of power.

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	c. Jerk or clunk when shifting up or down. d. Fails to shift. **6. STEERING – EARLY SIGNS OF TROUBLE** a. Steering very difficult. b. Wheels shimmy. c. Bus veers one way or the other. d. Bus wanders on roadway. e. More than two inches (2”) free play in steering wheel with engine running.
	**7. ELECTRICAL SYSTEM – EARLY SIGNS OF TROUBLE** a. Voltmeter indicates an under or over charge: **<u>WATCH OUT FOR FIRE.</u>** b. Smoke appearing around wires, switches, etc. c. Voltmeter indicates heavy charging. d. Lights dim. **8. SUSPENSION – EARLY SIGNS OF TROUBLE** a. Bus bounces or rolls from side to side easily. b. Bus out of alignment. c. Bus “bottoms” on bumps.

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EXPLAIN THE REASON FOR GOOD DRIVING HABITS. AVOID LONG, TECHNICAL EXPLANATIONS. FOR EXAMPLE, YOU MIGHT DESCRIBE THE WEARING ACTION ON THE DISC WHEN A DRIVER "SLIPS THE CLUTCH." OPTION: IF YOU HAVE ACCESS TO ACTUAL WORN BRAKE SHOES, CLUTCH PLACE, ETC., PASS THEM AROUND FOR EXAMINATION BY THE CLASS.	**DRIVING ACTION PREVENTING WEAR ON THE BUS.** You can develop good driving habits that will avoid undue wear on each specific bus component. **BRAKES** o Do not jam brakes on hard. Apply them smoothly and steadily. o Do not depress clutch until engine stall speed is reached so engine can assist in stopping the bus. o Do not drive with your foot resting on the brake pedal. o On buses equipped with air brakes, drain water out of air reservoir (if board policy permits). o Pump the brakes (once or twice) on long hard stops. Before starting down hill, shift to lower gear to aid heat dissipation and reduce brake fade. If air brake equipped, check gauges; should be capped off at 120-125 PSI. Before starting downhill, place bus in proper gear. If low air pressure alarm comes on, pull over to side of road, secure vehicle and do not move until air pressure is up to safe level. o **REMEMBER:** The use of brakes on a long and/or steep downgrade is only a supplement to the braking effect of the engine. Once the vehicle is in the proper gear, the following is a proper braking technique:

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	1. Apply the brakes just hard enough to feel a definite slowdown. 2. When your speed has been reduced to approximately five (5) mph below your "safe" speed, release the brakes. This brake application should last for about three (3) seconds. 3. When your speed has increased to your "safe" speed, repeat steps 1 and 2. **FOR EXAMPLE:** If your "safe" speed is 40 mph, you would not apply the brakes until your speed reaches 40 mph. You now apply the brakes hard enough to gradually reduce your speed to 35 mph and then release the brakes. Repeat this as often as necessary until you have reached the end of the downgrade. Escape ramps have been built on many steep mountain downgrades. Escape ramps are made to stop runaway vehicles safely without injuring drivers and passengers. Escape ramps use a long bed of loose soft material to slow a runaway vehicle, sometimes in combination with an upgrade. Know escape ramp locations on your route. Signs show drivers where ramps are located. Escape ramps save lives, equipment and cargo. Use them if you lose your brakes.

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EXPLAIN WHAT IS MEANT BY "LUGGING" – FOR EXAMPLE, TRYING TO GO UP A HILL IN TOO HIGH A GEAR WHICH CAUSES A STRAIN ON THE ENGINE.	**ENGINE** o Do not race engine during warm-up. o Do not speed at any time. o Do not lug engine; this causes engine and driveline damage. o Do not allow engine to operate beyond established oil changes and maintenance intervals. o Do not accelerate too quickly; this causes extreme stress during periods when oil pressure is low and results in excessive wear. o Do not attempt to operate engine when oil pressure is low, temperature is high, or voltmeter indicates a continuous discharge. o Do not add water to overheated engine. o Never remove a radiator cap on a hot engine. o Allow diesel engine to idle according to manufacturer's recommendations before shutting off engine. **TRANSMISSION AND DRIVESHAFT** o Avoid fast acceleration on rough surfaces. o Do not release the clutch quickly. o Transmit power and shift smoothly (coordination). o Avoid jerky movements of any kind.

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EXPLAIN WHAT "RIDING THE CLUTCH" MEANS, FOR EXAMPLE, KEEPING FOOT ON CLUTCH PEDAL AND LEAVING PEDAL PART WAY DEPRESSED WHEN NOT SHIFTING GEARS. EXPLAIN WHAT IS MEANT BY "SLIPPING THE CLUTCH," FOR EXAMPLE, KEEPING THE CLUTCH PARTIALLY ENGAGED WITH THE ACCELERATOR ALSO PARTIALLY DEPRESSED TO THE POINT WHERE THE BUS CAN HOLD ON THE HILL WITHOUT THE USE OF THE BRAKE PEDAL.	**CLUTCH** o Don't "ride" the clutch. It partially disengages the clutch causing excess heat or wear. o Don't upshift at low engine speed. o Permit engine to speed up enough in one gear so that when the shift is made to the next gear, the engine won't lug. o Do not skip gears when upshifting or downshifting. This causes undue engine lugging and shock-loading of clutch and driveline. o Do not coast with the clutch disengaged. The clutch disc will spin at a very high speed and may disintegrate. o Do not hold the bus on a hill by slipping the clutch. This wears out a clutch. Use the park brake to hold the bus on a hill. Adjust shifting speeds to accommodate load and terrain. **STEERING** o Avoid potholes; drive around if possible. Slow down if you must drive through. o Have mechanic inspect steering if you hit a bad bump or pothole.

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ELECTRICAL SYSTEM

- Do not drive when voltmeter indicates discharge.
- Do not start engine with lights or heaters on.
- Check belt tension and battery water level.
- Do not operate heaters and lights for an extended period when bus or engine is stopped.
- Do not run lights and/or heaters for a prolonged period of time with engine at idle.

SUSPENSION

- Do not travel fast on rough roads.
- Do not cross rough areas at high speeds.
- Check wheel alignment if the bus is on a rough road frequently.

Bus cleanliness is part of proper maintenance. A clean bus will:

1. safeguard student health;
2. prevent incidents caused by students falling, tripping or slipping on the floor;
3. serve as a role model for students (enlist student cooperation in keeping the bus neat and clean; do not allow eating or drinking on the bus);
4. give the public a favorable impression; and
5. help prolong the life of the bus.

Regardless of the engineering involved, a school bus cannot continue to deliver maximum safety, economy and dependability unless it is properly maintained. Although skilled mechanics repair the school buses, a driver can do

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	much to aid the mechanic and prolong the life of the vehicle by following the guidelines in this manual.
ANSWER THE QUESTIONS TRAINEES MAY HAVE ABOUT MAINTENANCE TASKS. DEMONSTRATE ANY OF THE UNFAMILIAR MAINTENANCE TASKS.	**OVERVIEW – SECTION II** Daily and weekly inspections will help the driver identify problems for repair and maintain a clean and safe bus. Regular inspections will help decrease maintenance costs. The pre-trip inspection shall be part of a driver's daily routine. The few minutes invested in the pre-trip inspection could result in the saving of lives or avoid an on-the-road breakdown or collision. **DAILY GENERAL INSPECTION** 1. Check the bus for forgotten books, clothing **and students**. Return items to owners on the next trip or turn them into the office. 2. Sweep the floor and, in the winter, sweep water out of the bus to prevent freezing. Sweep bus steps also. 3. Check bus seats for pencil/pen marks or other damage. 4. Check adjustment of mirrors, driver's seat and vents. 5. Check fuel tank gauge. 6. Follow procedure for frequency of filling fuel tank. 7. Clean the windshield and side windows.

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8. Wash exterior of bus at regular intervals. Keep all exterior lights, mirrors and the license plate clean.
9. Check outside of the bus for dents and scratches.

DAILY PRE-TRIP AND WALK AROUND INSPECTION

All bus drivers are to perform a complete pre-trip inspection that meets federal and state regulations before the first trip on each and every bus they drive that day. After the initial pre-trip inspection, all subsequent bus runs that day (on the same bus) are to be preceded by a walk-around inspection that will consist of checking:

1. steering
2. tires
3. console
4. dash panel
5. mirrors
6. service brake
7. park brake
8. emergency equipment

SECTION 1

1. As you approach the vehicle, check the posture of the bus. Make sure it is not leaning to either side and there are no obstacles, such as wires or tree limbs in the path of the bus. Look under the front of the bus to check for oil, transmission fluid, water or anti-freeze leaks, check crossing gate, if equipped.
2. Check front lights, lens covers and reflectors. Make sure they are mounted and secure. Check west coast, fender and crossover mirrors.

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	3. Check the windshield for anything that may obstruct your view. Check wipers to make sure the rubber is mounted and secure. Check spring tension on wipers. 4. Open hood latches; each latch must be mounted and secure. Visually inspect the hood for damage. 5. Check engine oil, automatic transmission fluid, if so equipped and windshield washer fluid. 6. Inspect the engine, one side at a time. Check power steering fluid, hoses and belts. Make sure everything is mounted and secure, no leaks and no more than ¾" play in the belts. Check steering shaft, steering box and steering linkage for securement. 7. Check radiator reservoirs for leaks and sufficient fluid level. Check radiator and heater hoses. Check water pump (which is located on the front of the engine, behind the fan) for leaks. Check that belts have no more than ¾" of play. 8. Check air compressor for leaks and securement. Check belts (if equipped) to compressor for frays or cracks and that there is no more than ¾" play. 9. Check alternator and wires. Make sure it is securely mounted with no more than ¾" play in belts.

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	SECTION 2 10. Check leaf springs for broken or missing parts. Check hanger brackets and mounts for securement. Check shocks for leaks. **SECTION 3** 11. Check front air line and front air chambers for damage, leaks and securement. Pull on the slack adjuster; no more than 1" play. Check that cotter pin is mounted and secure. Check front drums for oil soaking, cracks, welds or rust. You may not be able to check brake linings if drums have dust covers. **SECTION 4** 12. Inspect front tires for cuts and bruises. Make sure tread depth in major grooves is at least 4/32". Check for mismatched, recapped or regrooved tires on front. Look down the front of the tire, checking for cuts and bruises. Check rims for cracks, rust or welds. Check air pressure. Make sure lug nuts are tight and there is no heavy rust, missing lug nuts or leaks in hub oil seals. Check air valves and valve stems for leaks.

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	SECTION 5 13. Move to the front door. As you enter the bus, open and close the door. Check the glass and rubber seal on the door. Check for broken steps or torn coverings. Make sure hand rails are securely mounted and that pinch points have been eliminated. **SECTION 6** 14. Check fire extinguisher. Make sure it is charged. Check the first-aid kit. Check for spare fuses. Check for three (3) reflective triangles and body fluid clean-up kit. **SECTION 7** 15. Make sure parking brake is on and gearshift is in neutral. Start engine. Allow air pressure to build to 120 PSI. Check all gauges; oil pressure, air, voltage, water temperature, fuel gauge. Test window washer and wipers (high and low). Check mirrors for proper adjustment. Test all heaters (high and low), defrosters and fans. Check dome lights, stop arm and override switch. Check front big yellow lights, and amber indicator light, headlights, flashing red stop lights and red indicator light, stop arm, crossing gate, turn signals and four-way hazards. Check for no more than 2” play in 20” steering wheel. Check park brake. With park brake on, place vehicle in low

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gear. Raise engine RPM to 1500 (if bus moves, brakes are out of adjustment). Check service brake for air usage per application. On a straight shift air brake equipped bus, place in low gear, release clutch and lightly accelerate with park brake applied. If bus moves, brakes are out of adjustment.

Allow hydraulic brake equipped park brake vehicle to slowly roll forward, apply park brake, vehicle should stop. Check horn, driver seat and seat belt.

SECTION 8

16. Chock rear wheels. Turn **OFF** engine. Turn key on. Push in parking brake. Start your brake LAB check.
    - LEAKS - No brakes applied, should not leak more than 2 PSI per minute. Press on brake pedal for one minute. It should not leak more than 3 PSI per minute.
    - ALARM – Pump brakes. Alarm should come on at 65 to 60 PSI.
    - BUTTON – Continue pumping brake. Button should pop out between 40 and 10 PSI.

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	SECTION 9
	17. Start engine and build air to 120 PSI; shut engine off but leave key on. Walk through bus checking floors and seat backs. Open and check ALL alarms on emergency windows, roof hatches, left side emergency door, if equipped, and rear door. Big yellow lights should be checked from the back door. Go outside and check all of your lights. Turn signals, hazards, head lights, parking lights, clearance lights, brake lights, marker lights, warning lights and big reds should all be tested. You cannot check back-up lights unless it is dark, because gear needs to be in reverse and the engine on.
	SECTION 10
	18. Check down right side. No leaks in fuel lines or tank. Check fuel cap, fuel tank and cage for securement. Visually inspect exhaust system, drive shaft and shaft guards, frame, slack adjusters, air chambers, air lines, drums, shocks, leaf springs, mounts and air ride, if equipped. Check windows, reflectors and clearance lights. Visually check rims for cracks, rust or welds; axle seals, inside and outside and spacers. Inspect lug nuts and valve stems. You may not be able to check the drums or brake linings because of dust

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	cover. Visually look for leaks, metal shavings or damage. Check rear shocks and air ride, if equipped. Check rear tires (tread depth in rear 2/32") and check tires for proper inflation.
	SECTION 11
	19. Go to the rear of bus. Check lights, reflectors and rear glass. Open and check rubber seal around door. Check that license plate is securely mounted. Check all lens covers. Make sure everything is mounted and secure.
	SECTION 12
	20. On lift bus check wheelchair lift, door, tie downs and floor tracks. Check for "Knife for Life" and fire blanket.
	SECTION 13
	21. Check service brakes.

DAILY PRE-TRIP INSPECTION AND FOLLOW-UP WALK

AROUND INSPECTION

FOR USE AS A SEQUENTIAL GUIDE WHEN TEACHING NEW

DRIVERS

All bus drivers shall perform a complete pre-trip inspection that meets Federal and state regulations before the first trip each day and every bus they drive that day. After the initial pre-trip inspection, all subsequent bus runs on that day shall be preceded by a walk-around inspection that will consist of: (1) tires; (2) brakes; (3) console panel; (4) dashboard gauges and controls.

1. As you approach the vehicle, check the posture of the bus. It is not leaning to either side and there are no wires or tree limbs in the path of the bus. Look under the front of the bus; check for oil, transmission fluid, water and/or anti-freeze leaks.

   Check front lights, lens covers and reflectors. Make sure they are mounted and secure. Check crossing gate, if equipped. Check west coast (Double Nickel), fender and crossover mirrors.

   Check the windshield for anything that may obstruct your view. Check wipers and make sure the rubber is mounted and secure. Also check spring tension on wipers.

   Check hood latch; each latch must be mounted and secure. Visually inspect the hood for damage.

   Check engine oil, (auto) transmission fluid (if so equipped) and windshield washer fluid.

   Inspect the engine one side at a time. Check power steering fluid, hoses and belts. Make sure everything is mounted and secure. No leaks. No more than ¾" play in the belts. Check steering shaft, steering box and steering linkage for securement.

   Check radiator reservoir for leaks and sufficient fluid level. Also check radiator and heater hoses. Check water pump which is located on the front of the engine behind the fan for leaks. Belts have no more than ¾" of play.

   Check air compressor for leaks and securement. Check belts to compressor for frays or cracks and that there is no more than ¾" play.

   Check alternator and wires. Make sure it is mounted and secure and no more than ¾" play in belts.

2. Check leaf springs for broken or missing parts. Check hanger, brackets and mounts for securement. Check shocks for oil leaks and that they are fully extended.

3. Check front brake air hoses and front brake air chambers for damage, leak and securement. Pull on slack adjuster; no more than 1" play. Check cotter pin is mounted and secure. Check front brake drums for leaks, cracks, welds, or rust. You may not be able to check brake linings if brake drums have dust covers.

4. Inspect back of front tire for cuts and bruises. Make sure tread depth in major grooves is a least 4/32". Also check for mismatched, recapped or regrooved tires on front. Come down front of tire checking for cuts or bruises. Check rims for cracks, rust or welds. Check air pressure. Make sure lug nuts are tight and there is no heavy rust, missing lug nuts or leaks in hub oil seals. Check air valves and stems for leaks.

5. Move to the front door. As you enter the bus, open and close the door. Check the glass and rubber seal on the door. Check for broken steps or torn covering. Make sure hand rails are mounted and secure.

6. Check the fire extinguisher. Make sure it is charged. Check the first-aid kit. Also check for fuses. Check for three reflective triangles. Check for clean-up kit.

7. Make sure parking brake is on and gear shift is in neutral. Start engine. Allow air pressure to build to 120 PSI. Check all gauges; oil pressure, air, voltage, water temperature, fuel gauge. Test window washer and wipers (high and low). Check mirrors for proper adjustment. Test all heaters (high and low), defrosters and fans. Check indicator lights, dash lights. Check dome lights, stop arm and override switch. Check park brake; park brake on – place vehicle in low gear. Raise engine RPM to 1500 (on automatic transmission only). Straight-shift transmission with air brakes, with park brake on – start engine, place bus in first gear, depress clutch, lightly accelerate. If bus moves, brakes are out of adjustment. Hydraulic brakes – start engine, release park brake, let bus roll forward about three (3) MPH, apply park brake – bus should stop. If the vehicle moves, brakes are out of adjustment. Check no more than 2" play in 20" steering wheel. Check horn. Check seat for securement and seat belt for operational condition.

8. Chock rear wheels. Turn off engine. Turn key on. Push in parking brake. Start your LAB check.
    - LEAKS – NO BRAKES APPLIED SHOULD NOT LEAK MORE THAN 2 PSI PER MINUTE. PRESS BRAKE PEDAL

FOR ONE MINUTE. IT SHOULD NOT LEAK MORE THAN 3 PSI.

- ALARM – PUMP BRAKES. ALARM SHOULD COME ON AT 65 TO 60 PSI.

- BUTTON – CONTINUE PUMPING BRAKE. BUTTON SHOULD POP OUT BETWEEN 40 AND 10 PSI.

9. Start engine and build air to 120 PSI; shut engine off but leave key on. Walk through bus, checking floor and seat backs. Open and check ALL alarms on emergency windows, roof hatches, left side emergency door (if equipped). Check big yellow as you check emergency rear door. Go outside and check all of your lights. Turn signals, markers, hazards, headlights, parking lights, clearance lights, brake lights and big reds should all be tested. You cannot check back-up lights because gear needs to be in reverse and the engine on. Have someone check back-up lights for you as you must be in the driver's seat for this test. Look for any damage to the bus.

10. Start checking down right side. No leaks in fuel lines or tank. Check fuel cap and fuel tank and cage for securement. Visually inspect exhaust system, drive shaft an shaft guards; frame, slack adjusters, air chambers, air lines, drums, shocks, leaf springs, mounts and air ride, if equipped. Check windows, reflectors, clearance lights. Visually check rims for cracks, rust or welds; axle seals, inside and outside and spacers. Inspect lug nuts and valve stems. You may not be able to check the drums of brake linings because of dust cover. Visually look for leaks, metal shavings or damage. Check rear shocks and air ride, if equipped. Check rear tires (tread depth in rear 2/32") and check tires for proper inflation.

11. Go around to rear. Check lights, reflectors and rear glass. Open rear emergency door. Check rubber seal around door. Check to make sure you have a license play. Check all lens covers. Make sure everything is mounted and secure.

12. Check left side the same as the right. Also check the left emergency door, stop arm and battery box.

13. Check service brakes. Move bus slowly forward. Apply brakes. Check for proper brake operation.

BEFORE PERFORMING PRE-TRIP INSPECTION CHOCK WHEELS AND SET PARKING BRAKE

TURN IN DAILY IF DEFICIENCY IS NOTED, WEEKLY IF NO DEFICIENCIES ARE FOUND

DRIVERS SIGNATURE				Bus Safe to Drive Today
	Sun _____	Date ___	Miles____	Yes No
	M _____	Date ___	Miles____	Yes No
	T _____	Date ___	Miles____	Yes No
	W _____	Date ___	Miles____	Yes No
	Th _____	Date ___	Miles____	Yes No
	F _____	Date ___	Miles____	Yes No
	Sat _____	Date ___	Miles____	Yes No

	Su	M	T	W	Th	F	Sa
AM							
Midday							
PM							
Others							

County:							
Location:							
Bus #:							
Mechanic Signature:							
Date:							
Su	M	T	W	Th	F	Sa	
Check Here for No Deficiencies							

COLUMN 1

ENGINE COMPARTMENT 1

CHECK ONLY IF DEFICIENT

- ☐ Leaks Under Bus
- ☐ Front Lights, Lenses, Mirrors
- ☐ Windshield Condition
- ☐ Washer Fluid & Wiper Condition
- ☐ Hood Latch or Hold Downs
- ☐ Oil Level
- ☐ Transmission Fluid
- ☐ Power Steering Fluid
- ☐ Belts, Hoses, Wiring
- ☐ Steering Box & Linkage
- ☐ Radiator Reservoir
- ☐ Water Pump
- ☐ Air Compressor
- ☐ Alternator
- ☐ Battery & Hold Downs

FRONT SUSPENSION 2

- ☐ Leaf Springs
- ☐ Spring Mounts
- ☐ Shocks

FRONT BRAKES 3

- ☐ Brake Hoses
- ☐ Brake Chambers
- ☐ Slack Adjusters
- ☐ Drums

FRONT WHEELS 4

- ☐ Rims
- ☐ Lug Nuts, Drum Bolts
- ☐ Hub Oil Seals
- ☐ Tires
- ☐
- ☐
- ☐

COLUMN 2

PASSENGER ENTRY 5

CHECK ONLY IF DEFICIENT

- ☐ Service Door and Handrails
- ☐ Steps ☐ Step Light

EMERGENCY EQUIPMENT 6

- ☐ Fire Extinguisher ☐ Reflective Triangles (3)
- ☐ First Aid Kit ☐ Clean Up Kit
- ☐ Spare Fuses ☐

START ENGINE 7

- ☐ Gear Shift & Clutch
- ☐ Oil Pressure
- ☐ Air Gauges
- ☐ Voltage & Amps
- ☐ Coolant Temperature
- ☐ Fuel Gauge
- ☐ Washers & Wipers
- ☐ Mirrors
- ☐ Heater Blowers
- ☐ Defrosters & Defroster Fans
- ☐ Dash Lights, Light Indicators
- ☐ Dome Lights & Rear View Mirrors
- ☐ Big Red Lights & Stop Arm (Override)
- ☐ Big Yellow Loading Lights (Front)
- ☐ Head Lights – Hi-Low Beam
- ☐ Clearance Lights
- ☐ Big Red Lights & Stop Arm
- ☐ Strobe Light
- ☐ Crossing Gate if Equipped (override)
- ☐ 4-Way Hazard Lights (Front)
- ☐ Steering Play (Max 2" on 20" Wheel)
- ☐ Driver's Seat & Seat Belt
- ☐ Park Brake
- ☐ Horn
- ☐ Service Brake, Air Use Per Application
- ☐ Hydraulic Service Brakes (If Applicable)

COLUMN 3

AIR BRAKE TEST 8

CHECK ONLY IF DEFICIENT

Chock Wheels, Engine Off,Key,On,Button In

- ☐ Leaks (Max. 2 P.S.I. Per Minute, No Brake Applied)
- ☐ Leaks (Max. 3 P.S.I. Per Minute, With Service Brake Applied)
- ☐ Alarm Activates (Approx. 60 P.S.I.)
- ☐ Button (Self Activates 40 – 10 P.S.I.

PASSENGER COMPARTMENT 9

INTERIOR

- ☐ Seats & Bus Floor Damage
- ☐ Emergency Windows
- ☐ Roof Hatches
- ☐ Emergency Doors
- ☐ Big Yellow Loading Lights (Rear)

EXTERIOR

Left Side	Right Side
☐ Stop Arm	☐ Windows
☐ Battery Box (Don't Open)	☐ Clearance Lights
☐ Windows	☐ Running Lights
☐ Clearance Lights	☐ Reflectors
☐ Running Lights	☐ Right Mirrors
☐ Reflectors	☐ Damage
☐ Left Mirrors	☐
☐ Damage	☐

FUEL AREA 10

- ☐ Fuel Tank – Secure Leaks, Cap, Cage

(VISUAL) UNDER VEHICLE	(VISUAL) REAR BRAKES
☐ Drive Shaft & Guards	☐ Brakes Hoses
☐ Exhaust System	☐ BrakeChambers
☐ Frame	☐ Slack Adjusters
☐	☐ Drums

COLUMN 4

REAR SUSPENSION (VISUAL) 10

CHECK ONLY IF DEFICIENT

- ☐ Leaf Springs
- ☐ Spring Mounts
- ☐ Torsion Shocks
- ☐ Air Ride (If Equipped)

REAR WHEELS

- ☐ Tires
- ☐ Rims
- ☐ Lug Nuts, Drum Bolts
- ☐ Axle Seals – Inside & Outside
- ☐ Spacers

REAR OF BUS 11

- ☐ Emergency Door -Outside Seals
- ☐ Clearance Lights
- ☐ 4-Way Hazard Lights
- ☐ Big Red Lights
- ☐ Brake Lights
- ☐ Turn Signals
- ☐ Reflectors
- ☐ License Plate & Lights

SPECIAL EQUIPMENT 12

- ☐ Wheel Chair Lift & door
- ☐ Wheel Chair Tie – Downs
- ☐ Wheel Chair Floor Tracks
- ☐ Knife for Life
- ☐ Fire Blanket

OTHER 13

- ☐ Check Service Brake

WALK AROUND INSPECTION

☐	Steering	☐	Mirrors
☐	Tires	☐	Service Brakes
☐	Console	☐	Park Brake
☐	Dash Panel	☐	Emergency Panel

	Su	M	T	W	Th	F	Sa
AM							
Midday							
PM							
Others							

Notes/Comments _____

A pre-trip inspection of a forward control bus should be performed in the same manner as above. However, the driver should be advised that many components have to inspected visually since it is impossible to manually check various engine parts. WHITE-MAINTENANCE COPY YELLOW-DRIVER COPY PINK-TRANSPORTATION COPY

7/02

NAME: _____DATE:_____

CARE AND MAINTENANCE
TEST
**** PLEASE ANSWER TRUE (T) OR FALSE (F) OR FILL IN THE BLANK****

KEY

1. _____ Crossing gates shall be inspected during a pre-trip inspection and, if inoperable, the bus shall be deadlined immediately.

2. _____ Cuts or bruises in a tire side wall should not affect the tires overall life.

3. _____ When depressed, the clutch's function is to disengage the transmission from the drive-shaft.

4. _____ High speed is more detrimental to tires in cold weather than hot.

5. _____ The voltmeter indicates the amount of charge in the battery.

6. _____ The parking brake should be used only when parking. It is not permissible to engage the parking brake to hold the bus on a hill.

7. _____ Which bus component works on fluid or air pressure?

8. _____ All front tires require a minimum of two thirty-seconds of an inch (2/32") of tread in all major grooves.

9. _____ Four (4) emergency items to check on a Kentucky school bus are 1) fire extinguisher, 2) first-aid kit, 3) reflective triangles and 4) a body fluid clean-up kit.

10. _____ The alternator belt should have no more than three quarters of an inch (3/4") play.

INSTRUCTOR'S SIGNATURE: _____

CHAPTER 4
CARE AND MAINTENANCE
ANSWER SHEET

The answer key is only released to KDE endorsed trainers.