



Scoutmaster Bucky

AUTOMOTIVE MAINTNENANCE

Merit Badge Workbook

This Workbook has been developed to help aid in organizing notes and references while working on the Automotive Maintenance Merit Badge Requirements.

Visit www.ScoutmasterBucky.com for more information

SCOUT'S INFORMATION	MERIT BADGE COUNSELOR INFORMATION
Name _____	Name _____
Phone _____	Address _____
Organization _____	City State Zip _____
WORKBOOK INFORMATION	
Scoutmaster Bucky Workbook based off of <i>Boy Scout Requirements – 2011 Edition</i>	
Visit www.ScoutmasterBucky.com for more information.	
	Phone _____
	Mobile _____
	Email _____

YOU WILL NEED ACCESS TO A CAR OR TRUCK AND ITS OWNER'S MANUAL TO MEET SOME OF THE REQUIREMENTS FOR THIS MERIT BADGE

REQUIREMENT 1: DISCUSS WITH YOUR COUNSELOR THE SAFETY EQUIPMENT, TOOLS, AND CLOTHING USED WHILE CHECKING OR REPAIRING A MOTOR VEHICLE. USE THIS EQUIPMENT, TOOLS, AND/OR CLOTHING (WHEN NEEDED OR CALLED FOR) IN MEETING THE REQUIREMENTS FOR THIS MERIT BADGE.



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REQUIREMENT 2:	GENERAL MAINTENANCE, SAFETY, AND REGISTRATION
REQUIREMENT 2A:	REVIEW THE MAINTENANCE CHART IN THE OWNER'S MANUAL. EXPLAIN THE REQUIREMENTS AND TIME LIMITS.
<p>This requirement does not require any workbook entry.</p> <p>You should have your car's or your family's car's owner's manual with you to review with your counselor, unless instructions provided to you prior to the meeting with your counselor state that another car's owner's manual will be provided and used (i.e. the counselor's car)</p>	
REQUIREMENT 2B:	DEMONSTRATE HOW TO CHECK THE FOLLOWING: <ol style="list-style-type: none">1. BRAKE FLUID2. COOLANT3. POWER STEERING FLUID4. WINDSHIELD WASHER FLUID5. TRANSMISSION FLUID6. BATTERY FLUID (IF POSSIBLE) AND CONDITION OF THE BATTERY TERMINALS.
<p>This is a skill based requirement and does not require any workbook entry.</p> <p>Be sure to review the merit badge pamphlet for further information on this requirement</p> <p>You will need to be able to demonstrate this requirement to your counselor.</p>	
REQUIREMENT 2C:	LOCATE THE FUSE BOXES; DETERMINE THE SIZE OF FUSES. DEMONSTRATE THE PROPER REPLACEMENT OF BURNED-OUT FUSES.
<p>This is a skill based requirement and does not require any workbook entry.</p> <p>Be sure to review the merit badge pamphlet for further information on this requirement</p> <p>You will need to be able to demonstrate this requirement to your counselor.</p>	
REQUIREMENT 2D:	DEMONSTRATE HOW TO CHECK THE CONDITION AND TENSION OF BELTS AND HOSES.
<p>This is a skill based requirement and does not require any workbook entry.</p> <p>Be sure to review the merit badge pamphlet for further information on this requirement</p> <p>You will need to be able to demonstrate this requirement to your counselor.</p>	
REQUIREMENT 2E:	CHECK THE LIGHTING IN THE VEHICLE, INCLUDING INSTRUMENT, WARNING, AND EXTERIOR BULBS.
<p>This is a skill based requirement and does not require any workbook entry.</p> <p>Be sure to review the merit badge pamphlet for further information on this requirement</p> <p>You will need to be able to demonstrate this requirement to your counselor.</p>	
REQUIREMENT 2F:	LOCATE AND CHECK THE AIR FILTER.
<p>This is a skill based requirement and does not require any workbook entry.</p> <p>Be sure to review the merit badge pamphlet for further information on this requirement</p> <p>You will need to be able to demonstrate this requirement to your counselor.</p>	



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REQUIREMENT 2G: EXPLAIN THE PURPOSE, IMPORTANCE, AND LIMITATIONS OF SAFETY BELTS AND PASSIVE RESTRAINTS.

Purpose:

Importance:

Limitations:

REQUIREMENT 2H: FIND OUT THE REQUIREMENTS FOR THE STATE INSPECTION IN YOUR STATE, INCLUDING HOW OFTEN A VEHICLE NEEDS TO BE INSPECTED.

Notes:



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REQUIREMENT 2I: EXPLAIN THE IMPORTANCE OF REGISTERING A VEHICLE...

Notes:

REQUIREMENT 2I: ...AND FIND OUT THE ANNUAL REGISTRATION FEE FOR RENEWING YOUR FAMILY CAR'S REGISTRATION.

Notes:

REQUIREMENT 3: DASHBOARD

REQUIREMENT 3A: EXPLAIN THE FUNCTION OF THE FUEL GAUGE, SPEEDOMETER, TACHOMETER, OIL PRESSURE, AND ENGINE TEMPERATURE GAUGE. POINT EACH ONE OUT ON THE INSTRUMENT CLUSTER.

Fuel Gauge:



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Speedometer:

Tachometer:

Oil Pressure:

Engine Temperature Gauge:



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REQUIREMENT 3B: EXPLAIN THE SYMBOLS THAT LIGHT UP ON THE DASHBOARD AND THE DIFFERENCE BETWEEN YELLOW AND RED SYMBOLS. EXPLAIN EACH OF THE INDICATORS ON THE DASHBOARD, USING THE OWNER'S MANUAL, IF NECESSARY.

Notes:

REQUIREMENT 4: TIRES

REQUIREMENT 4A: EXPLAIN THE DIFFERENCE BETWEEN TIRE MANUFACTURER'S AND VEHICLE MANUFACTURER'S SPECIFICATIONS AND SHOW WHERE TO FIND THEM.

Notes:



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REQUIREMENT 4B: DEMONSTRATE HOW TO CHECK TIRE PRESSURE AND PROPERLY INFLATE A TIRE. CHECK THE SPARE TIRE AND MAKE SURE IT IS READY FOR USE.

This is a skill based requirement and does not require any workbook entry.
Be sure to review the merit badge pamphlet for further information on this requirement
You will need to be able to demonstrate this requirement to your counselor.

REQUIREMENT 4C: EXPLAIN WHY WHEEL ALIGNMENT IS IMPORTANT TO THE LIFE OF A TIRE.

Notes:

REQUIREMENT 4C: EXPLAIN CASTER, CAMBER, AND TOE-IN ADJUSTMENTS ON WHEEL ALIGNMENT.

Caster:



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Camber:

Toe-In:

REQUIREMENT 4D: EXPLAIN THE PURPOSE OF THE LATERAL-WEAR BAR INDICATOR.

Notes:



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REQUIREMENT 4E: EXPLAIN HOW TO DISPOSE OF OLD TIRES IN ACCORDANCE WITH LOCAL LAWS AND REGULATIONS.

Notes:

REQUIREMENT 5: ENGINE

REQUIREMENT 5A: EXPLAIN HOW AN INTERNAL COMBUSTION ENGINE OPERATES.

Notes:



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REQUIREMENT 5A: TELL THE DIFFERENCES BETWEEN GASOLINE AND DIESEL ENGINES.

Notes:

REQUIREMENT 5A: EXPLAIN HOW A GASOLINE-ELECTRIC HYBRID VEHICLE IS POWERED.

Notes:



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REQUIREMENT 5B: EXPLAIN THE PURPOSE OF ENGINE OIL.

Notes:

REQUIREMENT 5B: EXPLAIN THE API SERVICE CODE, THE SAE NUMBER, AND THE VISCOSITY RATING.

API Service Code:

SAE Number:

Viscosity Rating:

REQUIREMENT 5C: EXPLAIN WHERE TO FIND THE RECOMMENDED OIL TYPE AND THE AMOUNT OF OIL TO BE USED IN THE VEHICLE'S ENGINE.

Notes:



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REQUIREMENT 6: COOLING SYSTEM

REQUIREMENT 6A: EXPLAIN THE NEED FOR COOLANT IN THE COOLING SYSTEM.

Notes:

REQUIREMENT 6B: EXPLAIN HOW TO FLUSH AND CHANGE THE ENGINE COOLANT IN THE VEHICLE AND HOW TO PROPERLY DISPOSE OF THE USED COOLANT.

How to flush and change the engine coolant:

How to properly dispose of used coolant:



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REQUIREMENT 7: FUEL SYSTEM

REQUIREMENT 7A: EXPLAIN HOW THE AIR AND FUEL SYSTEMS WORK TOGETHER...

Notes:

REQUIREMENT 7A: ...AND WHY IT IS NECESSARY TO HAVE AN AIR FILTER AND FUEL FILTER.

Notes:

REQUIREMENT 7B: EXPLAIN HOW A FUEL INJECTION SYSTEM WORKS...

Notes:

REQUIREMENT 7B: ...AND HOW AN ON-BOARD COMPUTER WORKS WITH THE FUEL INJECTION SYSTEM.

Notes:



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REQUIREMENT 8: IGNITION AND ELECTRICAL SYSTEMS

REQUIREMENT 8A: DIAGRAM AND EXPLAIN THE PARTS OF THE ELECTRICAL SYSTEM

Draw and label your diagram here:

Notes:



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REQUIREMENT 8B: EXPLAIN THE CYLINDER ENGINE SEQUENCE.

Notes:

REQUIREMENT 8C: EXPLAIN THE PURPOSE OF THE SPARK GAP.

Notes:

REQUIREMENT 8D: DEMONSTRATE HOW TO CHANGE THE SPARK PLUGS IN ANY INTERNAL COMBUSTION ENGINE (LAWN MOWER, DIRT BIKE, MOTORCYCLE)

This is a skill based requirement and does not require any workbook entry.
Be sure to review the merit badge pamphlet for further information on this requirement
You will need to be able to demonstrate this requirement to your counselor.

REQUIREMENT 8E: DEMONSTRATE HOW TO SAFELY CONNECT JUMPER CABLE TO YOUR CAR BATTERY.

This is a skill based requirement and does not require any workbook entry.
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REQUIREMENT 9: DRIVE TRAIN

REQUIREMENT 9A: DIAGRAM THE DRIVE TRAIN AND EXPLAIN THE DIFFERENT PARTS

Draw and label your diagram here:

Notes:



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REQUIREMENT 9B: EXPLAIN THE DIFFERENCE BETWEEN AUTOMATIC AND STANDARD TRANSMISSIONS.

Notes:

REQUIREMENT 9C: EXPLAIN THE TYPES OF AUTOMATIC TRANSMISSION FLUID.

Notes:



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REQUIREMENT 9D: EXPLAIN THE TYPES OF LUBRICANTS USED IN A STANDARD TRANSMISSION AND IN THE DIFFERENTIAL.

Notes:

REQUIREMENT 9E: EXPLAIN THE DIFFERENCE BETWEEN FRONT-WHEEL, REAR-WHEEL, AND FOUR-WHEEL DRIVE.

Front-Wheel:

Rear-Wheel:

Four-Wheel:



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REQUIREMENT 10: BRAKE SYSTEM

REQUIREMENT 10A: EXPLAIN THE BRAKE SYSTEM (INCLUDING ANT-LOCK SYSTEMS) AND HOW IT OPERATES

Notes:

REQUIREMENT 10B: EXPLAIN THE DIFFERENCE BETWEEN DISC AND DRUM SYSTEMS.

Disc:

Drums:

REQUIREMENT 10C: DEMONSTRATE HOW TO CHECK THE CONDITION OF A VEHICLES BRAKE SYSTEM. AFTER CHECKING MAKE RECOMMENDATIONS FOR REPAIRS (IF NECESSARY).

This is a skill based requirement and does not require any workbook entry.
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DO TWO OF THE FOLLOWING (11A, 11B, 11C, OR 11D) IN REQUIREMENT 11

REQUIREMENT 11A: DETERMINE THE VALUE OF THREE DIFFERENT VEHICLES YOU ARE INTERESTED IN PURCHASING. ONE MUST BE NEW AND ONE MUST BE USED; THE THIRD VEHICLE CAN BE NEW OR USED. FOR EACH VEHICLE, FIND OUT THE REQUIREMENTS AND COST OF AUTOMOBILE INSURANCE TO INCLUDE BASIC LIABILITY AND OPTIONS FOR COLLISION, COMPREHENSIVE, TOWING, AND RENTAL CAR. USING THE THREE VEHICLES YOU CHOSE AND WITH YOUR MERIT BADGE COUNSELOR'S ASSISTANCE, COMPLETE THE OPERATION/MAINTENANCE CHART PROVIDED IN THE MERIT BADGE PAMPHLET. USE THIS INFORMATION TO DETERMINE THE OPERATING COST PER MILE FOR EACH VEHICLE, AND DISCUSS WHAT YOU LEARN WITH YOUR COUNSELOR.

Vehicle #1 (New Vehicle): Make, Model, Year _____

Value of vehicle: _____

Automobile Insurance costs: (itemize the costs to include basic liability, collision, comprehensive, towing, and rental car)

<i>Expenses</i>	<i>Cost</i>
Operating Costs	
Cost of gas per 10,000 miles driven	
(cost per gallon of gas ÷ miles per gallon X 10,000)	
Maintenance	
Oil changes	
Air, fuel filters	
Tune-ups	
Other	
Tires	
Rotation and balance	
Wheel alignment	
Ownership Costs	
Insurance (Basic liability, collision, comprehensive, towing, rental car)	
License, registration, taxes	
Miscellaneous Costs	
Car washes, cleaning supplies	
Accessories	
Total Driving Costs (Add all rows)	
Divide total driving costs by total miles driven	
Yearly Cost per Mile	



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Vehicle #2 (Used Vehicle): Make, Model, Year _____

Value of vehicle:

Automobile Insurance costs: (itemize the costs to include basic liability, collision, comprehensive, towing, and rental car)

<i>Expenses</i>	<i>Cost</i>
Operating Costs	
Cost of gas per 10,000 miles driven	
(cost per gallon of gas ÷ miles per gallon X 10,000)	
Maintenance	
Oil changes	
Air, fuel filters	
Tune-ups	
Other	
Tires	
Rotation and balance	
Wheel alignment	
Ownership Costs	
Insurance (Basic liability, collision, comprehensive, towing, rental car)	
License, registration, taxes	
Miscellaneous Costs	
Car washes, cleaning supplies	
Accessories	
Total Driving Costs (Add all rows)	
Divide total driving costs by total miles driven	
Yearly Cost per Mile	

Vehicle #3 (New or Used Vehicle): Make, Model, Year _____

Value of vehicle:

Automobile Insurance costs: (itemize the costs to include basic liability, collision, comprehensive, towing, and rental car)



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<i>Expenses</i>	<i>Cost</i>
Operating Costs	
Cost of gas per 10,000 miles driven	
(cost per gallon of gas ÷ miles per gallon X 10,000)	
Maintenance	
Oil changes	
Air, fuel filters	
Tune-ups	
Other	
Tires	
Rotation and balance	
Wheel alignment	
Ownership Costs	
Insurance (Basic liability, collision, comprehensive, towing, rental car)	
License, registration, taxes	
Miscellaneous Costs	
Car washes, cleaning supplies	
Accessories	
Total Driving Costs (Add all rows)	
Divide total driving costs by total miles driven	
Yearly Cost per Mile	

REQUIREMENT 11B: CHOOSE A CAR CLEANER AND WAX PRODUCT FOR A VEHICLE YOU WANT TO CLEAN. EXPLAIN CLEAR-COAT PAINT AND THE PRECAUTIONS NECESSARY FOR CARE.

Notes:



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REQUIREMENT 11B: CLEAN THE VEHICLE, BOTH INSIDE AND OUT, AND WAX THE EXTERIOR. USE A VINYL AND RUBBER PROTECTANT (ON VINYL TOPS, RUBBER DOOR SEALS, SIDEWALLS, ETC)...

This is a skill based requirement and does not require any workbook entry.
Be sure to review the merit badge pamphlet for further information on this requirement
You will need to be able to demonstrate this requirement to your counselor or show that you have done this.

REQUIREMENT 11B: ... AND EXPLAIN THE IMPORTANCE OF THIS PROTECTANT.

Notes:

REQUIREMENT 11C: LOCATE THE MANUFACTURER'S JACK. USE THE JACK TO DEMONSTRATE HOW TO ENGAGE THE JACK CORRECTLY ON THE VEHICLE, THEN CHANGE A TIRE CORRECTLY.

This is a skill based requirement and does not require any workbook entry.
Be sure to review the merit badge pamphlet for further information on this requirement
You will need to be able to demonstrate this requirement to your counselor.

REQUIREMENT 11D: PERFORM AND OIL FILTER AND OIL CHANGE ON A VEHICLE.

This is a skill based requirement and does not require any workbook entry.
Be sure to review the merit badge pamphlet for further information on this requirement
You will need to be able to demonstrate this requirement to your counselor.

REQUIREMENT 11D: EXPLAIN HOW TO PROPERLY DISPOSE OF THE USED OIL AND FILTER.

Notes:



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REQUIREMENT 12: FIND OUT ABOUT THREE CAREER OPPORTUNITIES IN THE AUTOMOTIVE INDUSTRY. PICK ONE AND FIND OUT THE EDUCATION, TRAINING, AND EXPERIENCE REQUIRED FOR THIS PROFESSION. DISCUSS THIS WITH YOUR COUNSELOR, AND EXPLAIN WHY THIS PROFESSION MIGHT INTEREST YOU.

Career Opportunity #1: _____

Career Opportunity #2: _____

Career Opportunity #3: _____

Selected Career Opportunity: _____

Education:

Training:

Experience:

Notes: