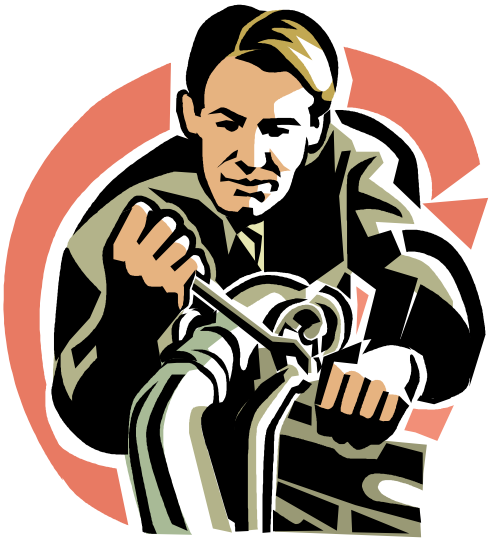
Instructional Systems Design (ISD) Project

Automotive Instruction: Engine Oil Change

Automotive Service Technology (AST)



By:
Mary E. Knight

Course
ASCI 610

Embry-Riddle Aeronautical University

Instructional Systems Design (ISD) Project
Automotive Instruction: Engine Oil Change

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Front-End Analysis

Performance Analysis

In vehicle maintenance, one of the most essential skills that an automotive mechanic student must apply is performing an oil change. The Automotive Service Technology (AST) students taking this course have little or no experience in vehicle maintenance, specifically in performing oil changes. This lesson gives automotive students the opportunity to be self-sufficient in performing an oil change on a vehicle. This lesson of instruction is best taught using a step-by-step, hands-on approach applied by the students and by demonstration provided from the instructor.

Needs Assessment

For students who are pursuing an Automotive Services Excellence (ASE) certification and want to be employable in the automotive services industry, it has been determined that they need to be trained in applying skills and knowledge pertaining to vehicle maintenance. Therefore, training is needed specifically in performing tasks relating to engine oil replacement for routine vehicle maintenance. In addition to engine oil replacement, so other forms of vehicle maintenance subject to routine check-ups include changing the air filter, fuel filter, replacing the transmission fluid, inspection of brakes, flushing of the engine coolant, and power steering inspections.

This lesson of instruction will focus on the engine and teaching the Automotive Service Technology (AST) students step-by-step procedures in performing an oil change, while exercising shop safety practices.

Purpose of Instruction

The purpose of instruction is to provide Automotive Service Technology (AST) students the knowledge and skills necessary to become self-sufficient in performing an engine oil change.

Instructional Goal

The goal of this lesson is to provide preparation and knowledge for the Automotive Service Technology (AST) students to successfully perform an oil change on a vehicle independently. When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.

Intended Learners

The intended learners for this lesson of instruction are in high school or adult Automotive Service Technology (AST) students. These students have little or no experience in

vehicle maintenance and are either pursing a trade in automotive mechanics or taking this course to learn the basics of vehicle maintenance. The students enrolled in this course are considered first year automotive students.

Performance Context

The students will apply their performance skills in vehicle maintenance following instruction by working as an automotive mechanic in a shop. The skills that students will acquire upon completion of this lesson are the ability to replace oil on an automobile independently.

Learning Context

Students will be provided learning in the classroom and automotive shop area. Learning will take place in a vocational setting, which is also known as a technical education setting.

Technical Education is when learning is associated to a specific skill and trade. Students are provided training in a nontraditional-based classroom setting. This type of education focuses on a hands-on approach to learning versus just a lecture-based environment.

Description of tools and equipment needed in order for learner to accomplish goal

In order for the students to perform an engine oil change successfully, the proper tools and equipment are needed. This includes at least two vehicles containing old engine oil, drain pans to place under the vehicles, new replacement filters and oil to put into the engine, jacks to lift the vehicle, and lifts to support the vehicle.

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Lesson Goals

Instructional Goal

This lesson provides preparation and knowledge to the Automotive Service Technology (AST) students to successfully perform an oil change on a vehicle independently. When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.

Goals Analysis and Type of Learning
(Stated on next page)

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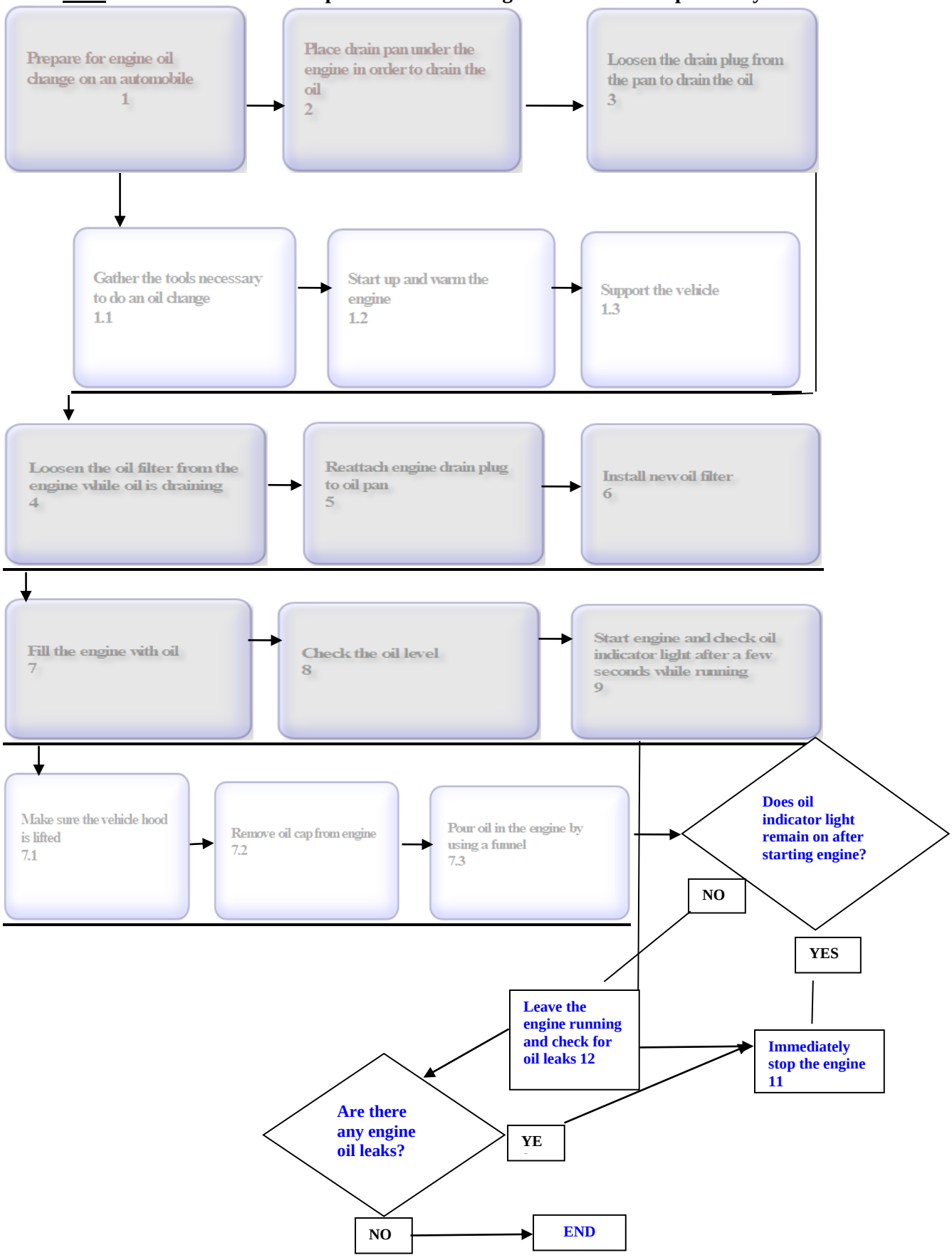
Goals Analysis – *"Perform Oil Change on a Vehicle"*

Goal – Students will learn to perform an oil change on a vehicle independently



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Goal

Using a new filter and new engine oil, perform an oil change on a vehicle

Skill

Perform oil change on a vehicle

Type of learning

Psychomotor

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Lesson Objectives

Terminal Objective

Given the necessary tools, required support equipment, and publications, the Automotive Service Technology (AST) students will perform an oil change on a vehicle using a new filter and engine oil.

Performance Objectives

Given a shop environment and necessary equipment, Automotive Service Technology (AST) students will be able to raise and support a vehicle as demonstrated in the shop area.

Given a shop environment and the necessary tools, AST students will be able to remove the oil filter from the engine as demonstrated in the shop area.

Given a shop environment and the necessary tools, AST students will be able to remove the drain plug from the engine oil pan as demonstrated in the shop area.

Given a shop environment and the necessary tools, AST students will be able to install a new oil filter in the engine as demonstrated in the shop area.

Given a shop environment, necessary tools, and equipment, AST students will be able to inspect for engine oil leaks as demonstrated in the shop area.

At the end of this course, AST students will be able to check the engine oil level as demonstrated in the shop area.

Instructional Materials

Automotive Service Technology (AST)

Automotive Instruction

Engine Oil Change

Instructional Systems Design (ISD) Project
Automotive Instruction: Engine Oil Change

Instructional Materials

The instructional goal of this lesson is to provide preparation and knowledge to the Automotive Service Technology (AST) students to successfully perform an oil change on a vehicle independently. When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.

The instructional materials that will be used for performance of an oil change are a student guide for each student to refer to during their hands-on training in the shop area, instructor guide for the instructor in managing of lesson information, grading sheet, and a textbook (see below information under *Textbook* heading) used during classroom learning. Students will also perform the lesson objectives with the use of training device. The training devices will consist of at least two vehicles containing old engine oil that will be used in the shop area. *Grading Sheets* will also be used to evaluate each student's performance based on the objectives listed. This evaluation tool will be used by the instructor to rate the students based on whether they are capable of performing an engine oil change independently or need additional training in certain areas.

Textbook

To achieve the knowledge areas, the students will refer to a textbook during classroom instruction which gives insight on the steps and background of performing automotive maintenance. The student textbook will cover topic areas for the following chapters: Shop Safety Practices, Preventative Vehicle Maintenance (routine maintenance), and Hand Tools and Shop Equipment. The chapter covering Shop Safety Practices will discuss important topics such as personal safety issues, hazardous materials (HAZMAT), tool/equipment safety, and the Occupational Safety and Health Act (OSHA). The chapter on Preventative Maintenance covers the basics of an engine, preventative maintenance procedures, and historical information about the automobile. And last, the chapter on Hand Tools and Shop Equipment will cover the basic hand tools used in the shop area, jacks and lifts, and measuring tools. The textbook will include a sequence of photo and written-based instructions used specifically for this lesson. These picture illustrations serve as a guidance tool for students when referring to these textbook instructions during instructor-led demonstrations. (See Appendix C for *Textbook Sequence of Instructions:* Changing the Oil and Oil Filter).

Review questions are also included at the end of each chapter. These questions will consist of fill-in-the-blank, multiple choice, and picture illustrations.

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Student Guide

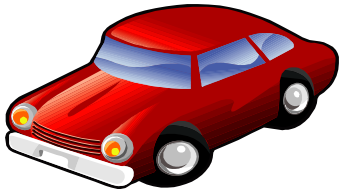
The student guide will serve as an instructional tool that includes the objectives to be covered in the lesson plan, topic areas, and reference materials. Learners will refer to this guide while using the automobile as a training device and also during classroom instruction. The student guide will include written instructions and illustrations on performing engine oil change procedures. Objectives will also be listed for both the classroom (knowledge-based) and shop (skill-based). Underhood maintenance is a topic that is contained in the student guide. Underhood maintenance discusses various maintenance tasks and the importance of vehicle maintenance. In this lesson of instruction, the central topics discussed in underhood maintenance will pertain to engine oil changes. See Appendix A for an example of the Student Guide.

Instructor Guide

During classroom training, the instructors will have an instructor guide that includes the lesson plan, lesson goals, testbank, reading assignments, performance objectives, instructor-led demonstration notes, student workshop practices and procedures, and evaluation tools. The instructor guide includes the chapters to be covered in the lesson plan, which in this case is on underhood maintenance. The instructor guide is also used as a reference tool to gather information on the objectives that each student needs to achieve (in the classroom and shop area) and the course overview. The testbank contains a pre-test and posttest on covering various subjects in auto mechanics which include multiple-choice, essay, and fill-in-the-blank questions. The guide includes classroom demonstration notes and necessary overhead transparencies for the instructor to refer to when explaining the practices and procedures of auto mechanics to students. See Appendix B for an example of the Instructor Guide.

Training Device

Students will perform the lesson objectives on a training device. The training device used is an automobile containing old engine oil. The proper tools will be used along with the training device by the students and as demonstrated by the instructor.



Grading Sheet

This evaluation tool will be used by the instructor to rate the students based on whether they are capable of performing an engine oil change independently or need additional training in certain areas. The grading scale criteria consists of a rating scale of ‘skilled’ (4) being the highest score, ‘limited’ (1) being the lowest, and N/A (0) meaning no information was provided during training and/or classroom discussion. (See assessment tool page for the sample *Grading Sheet*).

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Formative Evaluation

One-to-One Evaluation

Materials

The materials used for this evaluation consisted of paper copied student lesson guides. The student lesson guides given to each participant included instruction, lesson plan information, and assessments. The assessments consisted of multiple choice questions, an illustrated short answer, and fill-in-the-blank questions. The short answer tests consisted of some clip art (picture of an engine and other tools) and illustrations. Another assessment tool used was a checklist to determine how well the participants did on performing each objective and if whether each objective listed was precise and clear to them. A comments section was added on a separate page in the student guide in order to provide participants feedback. Also, a guide was used by the instructor consisting of the same information as the student guides. A comments section was also listed on a separate page for the instructor to take notes based on their own observations and the participant's feedback.

Participants and Instructions

Three participants were selected for this evaluation. The samples consisted of 2nd year automotive students based on their ability levels (above average, average, or below average). The students have either completed high school or still in high school and are taking automotive courses at the same trade school and are in their second year (advanced level).

In order to put the students at ease, the instructor explained the purpose of this evaluation and stated that there is no right or wrong answers. The participants were told to check for certain areas contained in the materials such as vocabulary, spelling, and how clear test questions and instruction are communicated to the students.

Preinstructional Materials

A comments block was provided on a separate page after each participant completed a section of the materials. The instructor had the participants comment on these main areas: 1) how clear is the message being conveyed to the learner? Is the spelling and vocabulary clear?, 2) how well does the student understand the illustrations, demonstrations, and drawings contained in the lesson plan, and 3) whether they possessed any of the skills associated with the performance objectives. An additional feedback area was provided at the bottom of the comments page.

Content Presentation

The students identified misspelled words by placing a circle around them. They also highlighted in yellow of any instructions that were unclear to them. Each student participant was asked by the instructor to provide any additional information/direction they may have received during their 1st year as an automotive student when taught how to perform an engine oil change.

Learner Participation

The feedback section was provided for each participant to jot down what was missed, whether content in certain areas in the instructional material were unclear, and what improvements in instruction could be made.

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Assessments
In the pretests and posttests, the student participants were asked to provide feedback on clarity of the test instructions, illustrations listed, spelling errors, consistency of assessment tools with the lesson plan, and vocabulary use. The students identified these by highlighting areas they felt were unclear and circling misspelled/unfamiliar words. A feedback block was also included under each question or set of questions for the student. Participants were interviewed separately by the instructor to recall any unclear directions contained in the assessments and what revisions may be needed in order to complete the testing tool successfully.

Small-Group Formative Evaluation

The small-group formative evaluation is applied 4 weeks after the one-to-one formative evaluation.

Materials
The materials used in the one-on-one formative evaluation were revised based on instructor comments and feedback of the student participants. The guides used were in a much "fancier" format consisting of the same lesson plan information as before.

The purpose in conducting this evaluation was to determine whether the students can apply the material independently (without interaction by the instructor).

Participants and Instructions
Twelve participants were selected for this evaluation. The samples consisted of twelve 2nd year Automotive Services Technology (AST) students based on their ability levels (4 considered above average, 4 considered average, and the remaining 4 were considered below average). These students are currently in their 2nd year of the program and take courses from two different trade schools. Six students have completed high school and the other six are still in high school.

Preinstructional Materials
A pretest consisting of multiple-choice, illustrated short-answer, and fill-in-the blank tests were administered to each student. The purpose was for the target learners to identify any unclear instructions contained in these tests by making highlights. Also, a feedback block was provided after each question or set of questions.

Content Presentation
As in the one-on-one formative evaluation, students were given the opportunity to mark any areas of question. This included illustrations, drawings, vocabulary usage, lesson plan instruction, and skill demonstrations. However, no interviews were conducted during evaluation.

Assessments
In the pretests and posttests, the student participants were asked to provide feedback on clarity of the test instructions, illustrations listed, spelling errors, consistency of assessment tools with the lesson plan, and vocabulary use. The students identified these by highlighting areas they felt were unclear and circling misspelled/unfamiliar words. A feedback block was also included under each question or set of questions for the student.

Instructors also recorded the amount of time it took for each participant to complete the pretest, lesson plan of instruction, and posttest.

Field Trial

The field trial is applied 2 weeks after the small-group formative evaluation.

Location of Evaluation

The evaluation would take place in a classroom setting and the workshop area of a trade school. This evaluation would take place in the intended setting.

Criteria and Data

The purpose of conducting this evaluation is to eliminate any problem areas that remain in the instructional materials.

Participants

The sample consists of thirty-five automotive students from different trade schools. These participants have either completed the 2-year automotive program or currently in their second year. They have or had taken automotive courses from three different trade schools within the surrounding county area.

Data Summary

Same forms of data are used in this evaluation except any errors or other problem areas encountered by the participants. Those encounters are then used to make any final revisions to the material.

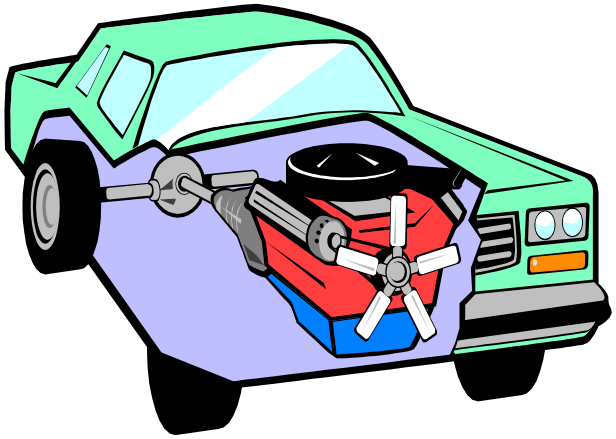
Appendix A – Student Guide

Automotive Service Technology (AST)

Automotive Instruction

AST STUDENT GUIDE

Engine Oil Change



Prepared:
June 2008

Student Guide

Lesson Goal: Using a new filter and new engine oil, perform an oil change on a vehicle.

Instructional Goal: This lesson provides preparation and knowledge to the Automotive Service Technology (AST) students to successfully perform an oil change on a vehicle independently. When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.

Lesson Media: Equipment Training Devices, Electronic-Mediated Lecture (EML)

Prerequisite(s): N/A

Reference Materials:

1. Textbook - Automotive Technology: *A Systems Approach*

Student Preparations (classroom area):

1. Discuss historical information about the automobile.
2. Discuss the importance of underhood maintenance.
3. Discss the basics of preventative maintenance procedures.
4. Identify general shop safety rules and procedures.
5. Identify personal safety issues.
6. Explain the purpose of the engine oil inside an engine.
7. Explain the purpose and operation of the oil filter.
8. Identify the basic hand tools used in the shop.
9. Identify the proper tools/equipment used in the shop (jacks and lifts and measuring tools to change engine oil).

Student Preparations (shop area/hands-on training as demonstrated by the instructor):

1. Practice general shop safety rules and procedures.
2. Use a jack and lift to support the vehicle
3. Change engine oil and filter.
4. Remove the drain plug from the engine oil pan.
5. Check engine oil level and condition.
6. Inspect for engine oil leaks.
7. Practice the steps on what to do in the event of an oil leak.

Grading Scale Criteria:

Performance Rating	
0	**Not Applicable/No exposure to material –** no information provided during training or classroom instruction
1	**Skilled -** can perform each task at a satisfactory level without instructor intervention.
2	**Moderately Skilled –** ability to perform tasks independently during training. Additional training may be required

Performance Rating	
3	**Limited –** can do some tasks with limited intervention. Additional training and supervision is required
4	**Exposure Only –** general information provided with minimal training and practice time. Additional training is required.

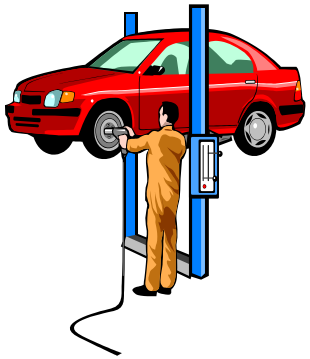
Performance Objectives:

1. Raise and support an automobile
2. Remove the oil filter
3. Remove drain plug from the engine oil pan
4. Install a new oil filter
5. Check the engine oil level

The following is a sequence of photo and written instructions that are included in this student guide specifically for this lesson of instruction. These photo illustrations serve as a guidance tool for students when a hands-on approach to performing an engine oil change is applied in the shop area. (See next page).

Sequence of Instructions: *Changing the Oil and Oil Filter*

Pictured Instruction 1
Start the engine and allow it to run until it is warm. Always do this prior to lifting the vehicle.



Pictured Instruction 2
Make sure vehicle is positioned safely on a lift or supported by jackstands prior to working on it. *(This illustration shows the vehicle being supported with a lift but students will also be trained on using a jack for vehicle support with instructor-led demonstration)*

(Pan used for draining oil)

(Safety Goggles)

(Wrench)

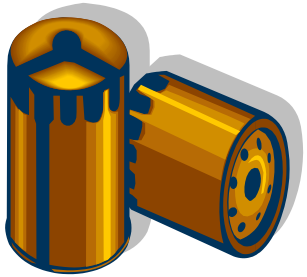
(Funnel)

(Oil)

Pictured Instruction 3
The above illustrations list the items and tools needed for performing an oil change. These include safety goggles, funnel, rags (not pictured), drain pan, and wrench used for drain plug. Drain pan needs to be placed under the drain plug

Drain Pan

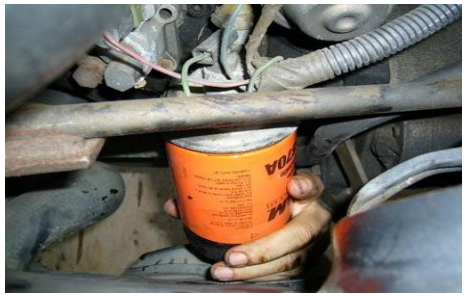
Pictured Instruction 4
Drain pan is to be placed under the drain plug before draining the oil.
(NOTE: make sure drain pan is positioned to catch all the draining oil)



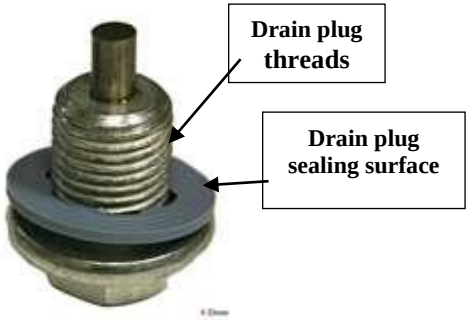
Pictured Instruction 5
Use the appropriate wrench to *loosen* the oil filter while oil is draining. (NOTE: it is recommended that the oil filter is not *completely* removed – just loosened – while oil is draining during this step).

Pictured Instruction 6
After oil has drained, completely remove the oil filter. Make sure the oil filter seal came off with the filter. Discard the old filter once removed.

Pictured Instruction 7
Be sure to wipe off the oil filter sealing area on the engine block. Apply a coat of clean engine oil onto the new oil filter's seal. This step is to ensure that the new oil filter is sealed on better once it is installed.



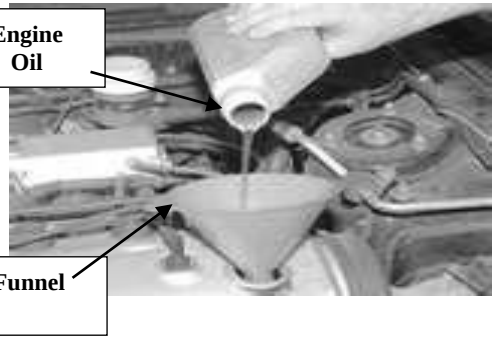
Pictured Instruction 8
Install the new filter and be sure to hand- tighten it.



Pictured Instruction 9
Before installing the drain plug, wipe off these parts of the drain plug with a clean rag:
1) Drain plug threads
2) Drain plug sealing surface

Pictured Instruction 10
Tighten the drain plug when installing it, but do not *over* or *undertighten* it. Overtightening the drain plug can cause damage to the thread area and undertightening can cause an oil leak. Once the new oil filter and drain plug is installed, lower the vehicle.

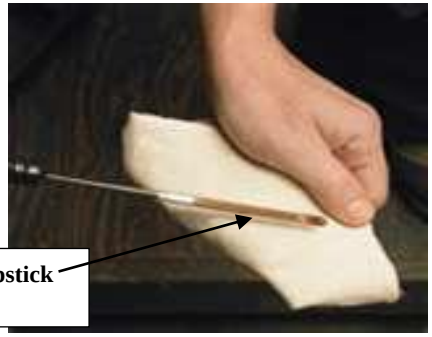
Pictured Instruction 11
Once the vehicle is lowered, remove the oil filler cap.



Pictured Instruction 12
Once the filler cap is removed, pour oil into the engine using a funnel.

Instruction 13
Start the engine and allow it to reach normal temperature. Check for engine oil leaks while the engine is running.

If there is an oil leak, shut the engine and check for any problems.



Pictured Instruction 14
Once oil is poured in the engine, check the oil level using the dipstick (shown here). Wipe off any excess oil from the dipstick prior to placing it back.

Instruction 15
After engine has been turned off, recheck the oil level and correct it as necessary.

Appendix B – Instructor Guide

Instructor Guide: Automotive Instruction
Engine Oil Changes

Instructor Guide

Lesson Goal: Using a new filter and new engine oil, perform an oil change on a vehicle.

Instructional Goal: This lesson provides preparation and knowledge to the Automotive Service Technology (AST) students to successfully perform an oil change on a vehicle independently. When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.

Overview: This lesson discusses the importance of performing an engine oil change in a proper manner and the various tasks.

Lesson Media: Training Device, Electronic-Mediated Lecture (EML)

List of information provided in the Instructor's Guide:
*Chapter discussions
*Testbank
*Discussion and demonstration notes
*Worksheets and lab practices
*Proper transparencies to use for lectures

Prerequisite(s): N/A

Reference Materials:
1. Automotive Technology: *A Systems Approach* (Textbook)
2. Today's Technician: *Classroom Manager to Accompany Basic Automotive Service and Systems.* (Student Guide)

Student Preparations (classroom area):
1. Discuss historical information about the automobile.
2. Discuss the importance of underhood maintenance.
3. Discuss the basics of preventative maintenance procedures.
4. Identify general shop safety rules and procedures.
5. Identify personal safety issues.
6. Explain the purpose of the engine oil inside an engine.
7. Explain the purpose and operation of the oil filter.
8. Identify the basic hand tools used in the shop.
9. Identify the proper tools/equipment used in the shop (jacks and lifts and measuring tools to change engine oil).

Student Preparations (shop area/hands-on training as demonstrated by the instructor):
1. Practice general shop safety rules and procedures.
2. Use a jack and lift to support the vehicle
3. Change engine oil and filter.
4. Remove the drain plug from the engine oil pan.
5. Check engine oil level and condition.

Instructor Guide: Automotive Instruction
Engine Oil Changes

Student Preparations (shop area/hands-on training as demonstrated by the instructor):

6. Inspect for engine oil leaks.
7. Practice the steps on what to do in the event of an oil leak.

Grading Scale Criteria:

Performance Rating	
0	**Not Applicable/No exposure to material –** no information provided during training or classroom instruction
1	**Skilled -** can perform each task at a satisfactory level without instructor intervention
2	**Moderately Skilled –** ability to perform tasks independently during training. Additional training may be required
3	**Limited –** can do some tasks with limited intervention. Additional training and supervision is required
4	**Exposure Only –** general information provided with minimal training and practice time. Additional training is required

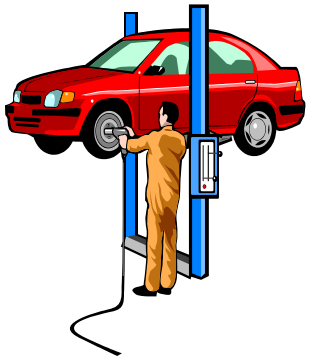
Performance Objectives:

1. Raise and support an automobile
2. Remove the oil filter
3. Remove drain plug from the engine oil pan
4. Install a new oil filter
5. Check the engine oil level

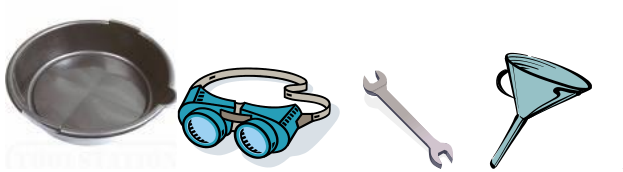
Appendix C – Textbook Sequence of Instructions (Written and Pictured)

Textbook Sequence of Instructions: *Changing the Oil and Oil Filter*

Picture-1
Start the engine and allow it to run until it is warm. Always do this prior to lifting the vehicle.

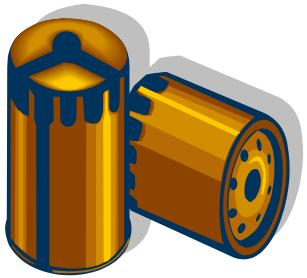


Picture-2
Make sure vehicle is positioned safely on a lift or supported by jackstands prior to working on it. *(This illustration shows the vehicle being supported with a lift but students will also be trained on using a jack for vehicle support with instructor-led demonstration)*



Picture-3
The above illustrations list the items and tools needed for performing an oil change. These include safety goggles, funnel, rags (not pictured), drain pan, and wrench used for drain plug. Drain pan needs to be placed under the drain plug

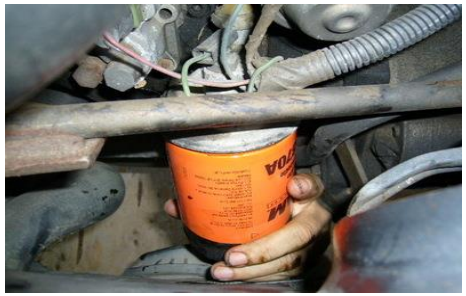
Picture-4
Drain pan is to be placed under the drain plug before draining the oil.
(NOTE: make sure drain pan is positioned to catch all the draining oil)



Picture-5
Use the appropriate wrench to *loosen* the oil filter while oil is draining. (NOTE: it is recommended that the oil filter is not *completely* removed – just loosened – while oil is draining during this step).

Picture-6
After oil has drained, completely remove the oil filter. Make sure the oil filter seal came off with the filter. Discard the old filter once removed.

Picture-7
Be sure to wipe off the oil filter sealing area on the engine block. Apply a coat of clean engine oil onto the new oil filter's seal. This step is to ensure that the new oil filter is sealed on better once it is installed.



Picture-8
Install the new filter and be sure to hand- tighten it.

Picture-9
Before installing the drain plug, wipe off these parts of the drain plug with a clean rag:
1) Drain plug threads
2) Drain plug sealing surface

Picture-10
Tighten the drain plug when installing it, but do <u>not</u> *over* or *undertighten* it. Overtightening the drain plug can cause damage to the thread area and undertightening can cause an oil leak. Once the new oil filter and drain plug is installed, lower the vehicle.

Picture-11
Once the vehicle is lowered, remove the oil filler cap.

Picture-12
Once the filler cap is removed, pour oil into the engine using a funnel.

Instruction 13

Start the engine and allow it to reach normal temperature. Check for engine oil leaks while the engine is running.

If there is an oil leak, shut the engine and check for any problems.

Picture-14
Once oil is poured in the engine, check the oil level using the dipstick (shown here). Wipe off any excess oil from the dipstick prior to placing it back.

Instruction 15

After engine has been turned off, recheck the oil level and correct it as necessary.

Appendix D – Grading Sheet

Assessment Tool - Grading Sheet

Task: Replacing Engine Oil	**DATE:**					
Student Name:	**OVERALL SCORE:**					
Area of Evaluation: Shop Area						
Lesson Plan Goal: **When performing the necessary steps of an oil change, students will exercise shop safety practices and proper tool usage. Students will apply the assigned skills to the defined objective standard.**						
EVALUATED AREA	**0**	**1**	**2**	**3**	**4**	**COMMENTS FIELD BELOW *(TO REPORT ANY PROGRESS):***
Task (Shop) Objectives:						
Raise and support the vehicle	☐	☐	☐	☐	☐	
Remove the oil filter from the engine	☐	☐	☐	☐	☐	
Remove drain plug from the oil pan	☐	☐	☐	☐	☐	
Install a new oil filter in the engine	☐	☐	☐	☐	☐	
Check engine oil indicator light and follow proper procedures	☐	☐	☐	☐	☐	
Inspect for oil leaks	☐	☐	☐	☐	☐	
Check engine oil level and condition	☐	☐	☐	☐	☐	
Shop Safety Practices						
. Cleans up necessary equipment and tools after completing task	☐	☐	☐	☐	☐	
Proper Tool Usage						
. Handles the proper tools with care	☐	☐	☐	☐	☐	

Grading Scale Criteria

0 Not Applicable/No exposure to material – no information provided during training or classroom instruction.

1 Skilled - can perform at high levels without instructor intervention.

2 Moderately Skilled – ability to perform tasks independently during training. Additional training may be required.

3 Limited – can do some tasks with limited intervention. Additional training and supervision is required

4 Exposure Only – general information provided with minimal training and practice time. Additional training is required.

ADDITIONAL COMMENTS (be sure any unsatisfactory progress is stated below):

Citations:

Instructor guide cite:

Webster, J., Erjavec, J., Raadsheer, F., & Kidd, R. (1995). *Today's technician: Classroom manager to accompany basic automotive service and systems.* New York: Delmar Publishers.

Student guide cite:

Webster, J., Erjavec, J., Raadsheer, F., & Kidd, R. (1995). *Today's technician: Classroom manager to accompany basic automotive service and systems.* New York: Delmar Publishers.

Photo Illustration Cites:

www.toolstation.com/.../stock/webbig/69629.jpg
500 x 500 - 24k
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Below is the image in its **original context** on the page: www.toolstation.com/.../MechanicsTools/d10/sd180

www.2carpros.com/how_to/images/how_to_change_...
476 x 303 - 101k
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www.mbzponton.org/.../oil/mb_190_oil_bucket.jpg
360 x 270 - 41k
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Below is the image in its **original context** on the page: www.mbzponton.org/.../oil/oilchange.htm

www.2carpros.com/images/oil_filter_343.jpg
479 x 382 - 51k
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z.about.com/.../1/5/i/1/-/-/oilchgfltrinst.jpg
400 x 300 - 61k
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Below is the image in its **original context** on the page: autorepair.about.com/.../ss/oil_change_6.htm

(Picture of drain plug)
http://search.msn.com/images/results.aspx?FORM=OFFWEB&q=Drain+plug+for+automobile# (Windows Live Search for Clip art)

OR
Image url:http://www.heatperformanceparts.com/heatshop/images/magnetic_drain_plugs_550.jpg
Go to page:http://www.heatperformanceparts.com/heatshop

Image url:http://images.hondatuningmagazine.com/tech/0506_ht_13_z+LS_vtec+magnetic_oil_drain_plug.jpg
Go to page:http://www.hondatuningmagazine.com/tech/0506_ht_ls_vtec_head_swap/photo_09.html

Image url:http://www.aa1car.com/library/oil_filler_cap.jpg
Go to page:http://www.aa1car.com/library/synthetic_motor_oil.htm

Image url:http://xor.cz/Prirucka/chiltonimages/9315/93151P26.jpg
Go to page:http://xor.cz/Prirucka/9315CH01_OIL___FILTER_CHANGE.htm

www.difflock.com/.../Oil-Filter-Fitting.jpg
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Below is the image in its **original context** on the page: www.difflock.com/.../tdi-6k-service/index.shtml

Textbook cite:
Erjavec, J. (2005). *Automotive technology: A systems approach* (4th ed.). New York: Thomson Delmar Learning.