



Worksheets

We have provided samples of worksheets to get you started in using your electrical training aids. There are dozens and dozens of electrical faults that can be inserted into the trainer circuits depending on the skill level of the class being taught. As a result, most instructors tend to want to customize the work sheets to their own style of teaching.

You can download the student worksheets at

<https://unitedconcepttrainers.com/student-worksheets/>

The worksheets are in a PDF (.pdf) or editable WORD (.docx) format. Feel free to edit them as you wish. They are provided as a service to you!

Brake Stop Lamp System

NAME: _____

TASK TYPE	NATEF TASK NUMBER	ACTION
Primary	NATEF Automotive Repair Task A5-E-5	Check operation of brake stoplight system. Determine necessary action.
Secondary	NATEF Automotive Repair Task A6-A-2	Identify and interpret electrical/electronic system concern. Determine necessary action.
Secondary	NATEF Automotive Repair Task A6-A-13	Inspect and test fusible links, circuit breakers, and fuses. Determine necessary action.
Secondary	NATEF Automotive Repair Task A6-A-14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits. Determine necessary action.
Secondary	NATEF Automotive Repair Task A6-E-1	Diagnose the cause of brighter than normal, intermittent, dim, or no light operation. Determine necessary action.

PURPOSE: To develop through repetition a mastery of diagnosing electrical faults in a typical brake stoplight circuit.

ACTIVITY: Using the 5-Circuit Electrical Training Aid supplied by United Concept Trainers have your instructor install a “fault(s)”. Determine fault(s) location with instructor approved electrical diagnostic tools. Record your diagnosis and conclusions below:

1st fault activity
Circuit symptom _____ fault location _____ diagnosis _____

2nd fault activity
Circuit symptom _____ fault location _____ diagnosis _____

3rd fault activity
Circuit symptom _____ fault location _____ diagnosis _____

4th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

5th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

6th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

Results: Based on the above activity, what can you determine from diagnosing faulty brake stoplight circuits?

Horn System Circuit

NAME: _____

TASK TYPE	TASK NUMBER	ACTION
Primary	Automotive Repair Task A6-G-1	Diagnose incorrect horn operation; perform necessary action.
Secondary	Automotive Repair Task A6-A-2	Identify and interpret electrical/electronic system concern; determine necessary action.
Secondary	Automotive Repair Task A6-A-7	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including source voltage, voltage drop, current flow, and resistance.
Secondary	Automotive Repair Task A6-A-10	Check electrical circuits using fused jumper wires; determine necessary action.
Secondary	Automotive Repair Task A6-A-11	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
Secondary	Automotive Repair Task A6-A-13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
Secondary	Automotive Repair Task A6-A-14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.

PURPOSE: To develop through repetition, a mastery of diagnosing electrical faults in a typical horn circuit.

ACTIVITY: Using the Automotive Electrical Diagnostic Trainer supplied by United Concept Trainers, have your instructor install a “fault(s) in the horn circuit. Determine fault(s) location with instructor approved electrical diagnostic tools. Record your diagnosis and conclusions below:

1st fault activity
Circuit symptom _____ fault location _____ diagnosis _____

2nd fault activity
Circuit symptom _____ fault location _____ diagnosis _____

3rd fault activity
Circuit symptom _____ fault location _____ diagnosis _____

4th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

5th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

6th fault activity
Circuit symptom _____ fault location _____ diagnosis _____

Results: Based on the above activity, what can you determine from diagnosing faulty electric cooling fan circuits?

Heater Blower System Circuit

NAME: _____

TASK TYPE	TASK NUMBER	ACTION
Primary	Automotive Repair Task A7-D-2	Inspect and test A/C heater blower, motors, resistors, switches, relays, wiring, and protection devices; perform necessary action.
Secondary	Automotive Repair Task A6-A-2	Identify and interpret electrical/electronic system concern; determine necessary action.
Secondary	Automotive Repair Task A6-A-7	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including source voltage, voltage drop, current flow, and resistance.
Secondary	Automotive Repair Task A6-A-10	Check electrical circuits using fused jumper wires; determine necessary action.
Secondary	Automotive Repair Task A6-A-11	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
Secondary	Automotive Repair Task A6-A-13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
Secondary	Automotive Repair Task A6-A-14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.

PURPOSE: To develop through repetition, a mastery of diagnosing electrical faults in a typical three speed A/C heater blower circuit.

ACTIVITY: Using the Automotive Electrical Diagnostic Trainer supplied by United Concept Trainers, have your instructor install a “fault(s)” in the heater fan circuit. Determine fault(s) location with instructor approved electrical diagnostic tools. Record your diagnosis and conclusions below:

<u>1st fault activity</u> Circuit symptom _____ fault location _____ diagnosis _____
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<u>2nd fault activity</u> Circuit symptom _____ fault location _____ diagnosis _____
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<u>3rd fault activity</u> Circuit symptom _____ fault location _____ diagnosis _____
--

<u>4th fault activity</u> Circuit symptom _____ fault location _____ diagnosis _____
--

<u>5th fault activity</u> Circuit symptom _____ fault location _____ diagnosis _____
--

6th fault activity

Circuit symptom _____ fault location _____ diagnosis _____

Results: Based on the above activity, what can you determine from diagnosing faulty electric cooling fan circuits?

Electric Cooling Fan Circuit

NAME: _____

TASK TYPE	TASK NUMBER	ACTION
Primary	Automotive Repair Task A7-C-8	Inspect and test electric cooling fan, fan control system and circuits; determine necessary action.
Secondary	Automotive Repair Task A6-A-2	Identify and interpret electrical/electronic system concern; determine necessary action.
Secondary	Automotive Repair Task A6-A-7	Demonstrate the proper use of a digital multimeter (DMM) during diagnosis of electrical circuit problems, including source voltage, voltage drop, current flow, and resistance.
Secondary	Automotive Repair Task A6-A-8	Check electrical circuits with a test light; determine necessary action.
Secondary	Automotive Repair Task A6-A-10	Check electrical circuits using fused jumper wires; determine necessary action.
Secondary	Automotive Repair Task A6-A-11	Locate shorts, grounds, opens, and resistance problems in electrical/electronic circuits; determine necessary action.
Secondary	Automotive Repair Task A6-A-13	Inspect and test fusible links, circuit breakers, and fuses; determine necessary action.
Secondary	Automotive Repair Task A6-A-14	Inspect and test switches, connectors, relays, solenoid solid state devices, and wires of electrical/electronic circuits; perform necessary action.

PURPOSE: To develop through repetition, a mastery of diagnosing electrical faults in a typical cooling fan circuit.

ACTIVITY: Using the Automotive Electrical Diagnostic Trainer supplied by United Concept Trainers, have your instructor install a “fault(s)” in the cooling fan circuit. Determine fault(s) location with instructor approved electrical diagnostic tools. Record your diagnosis and conclusions below:

1st fault activity

Circuit symptom _____ fault location _____ diagnosis _____

2nd fault activity

Circuit symptom _____ fault location _____ diagnosis _____

3rd fault activity

Circuit symptom _____ fault location _____ diagnosis _____

4th fault activity

Circuit symptom _____ fault location _____ diagnosis _____

5th fault activity

Circuit symptom _____ fault location _____ diagnosis _____

6th fault activity

Circuit symptom _____ fault location _____ diagnosis _____

Results: Based on the above activity, what can you determine from diagnosing faulty electric cooling fan circuits?

Voltage Check with a DMM (Digital Multimeter)

NAME: _____

TITLE: Check voltages in electrical wiring circuits with a DMM (digital multimeter)

TASK #: Repair Task B-1 of Mechanical & Electrical Components

PURPOSE: To develop through repetition, a mastery of using a DMM to measure voltage in electrical circuits that are working as designed (with no faults inserted by instructor).

ACTIVITY: Using a DMM approved by your instructor, demonstrate the ability to measure and record circuit voltage at various test points on the Automotive Electrical Diagnostic Trainer supplied by United Concept Trainers.

Series Lamp Circuit

With circuit operating normally and ON, measure and record circuit voltage at the following test point locations:

a _____ b _____ c _____ d _____ g _____ h _____ k _____ m _____ n

o _____ r _____

Parallel Stoplamp Circuit

With the circuit operating normally and ON, measure and record circuit voltage at the following test point locations:

a _____ b _____ c _____ d _____ g _____ h _____ n _____ o _____ r _____ s

t _____ w _____ x _____ y _____ bb _____

Cooling Fan Circuit

With the circuit operating normally and ON, measure and record circuit voltage at the following test point locations:

a _____ b _____ c _____ d _____ e _____ 30 _____ 86 _____ 87 _____ 85 _____

h _____ k _____ m _____ n _____ q _____ t _____

Horn Circuit

With the circuit operating normally and ON, measure and record circuit voltage at the following test point locations:

a _____ b _____ c _____ d _____ e _____ 30 _____ 86 _____ 87 _____ 85 _____

h _____ k _____ m _____ n _____ q _____ t _____

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Heater Circuit

With the circuit operating normally and ON, measure and record circuit voltage at the following test point locations on LOW, MED, and HIGH location:

LOW - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

MED - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

HI - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

Results: Based on the above activity, what can you determine from the voltage readings of each circuit tested?

Voltage Drop and Current Flow with a DMM (Digital Multimeter)

NAME: _____

TITLE: Check for voltage drop and/or current flow in electrical wiring circuits and components with a DMM (digital multimeter)

TASK #: Repair Task B-2 of Mechanical & Electrical Components

PURPOSE: To develop through repetition, a mastery of measuring voltage drops and current flow at various test points on the Automotive Electrical Diagnostic Trainer supplied by United Concept Trainers.

AMPS ACTIVITY:

Using a DMM approved by your instructor, demonstrate the ability to measure and record circuit amperage flow at the following test point loop connections on each of the trainer circuits.

NOTE: to prevent damage to the DMM internal fuse, ask your instructor if unsure of proper procedures for measuring circuit amperage.

Series Lamp Circuit

With circuit operating normally and ON, open circuit loop at the following test points and install meter in-line:
e to f _____ p to q _____

Parallel Stoplamp Circuit

With the circuit operating normally and ON, open circuit loop at the following test points and install meter in-line:
e to f _____ u to v _____ p to q _____ k to m _____ z to aa _____

Cooling Fan Circuit

With the circuit operating normally and ON, open circuit loop at the following test points and install meter in-line:
f to g _____ o to p _____ r to s _____

Horn Circuit

With the circuit operating normally and ON, open circuit loop at the following test points and install meter in-line:
f to g _____ o to p _____ r to s _____

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Heater Circuit

With the circuit operating normally and ON, open circuit loop at the following test points and install meter in-line in the in the *LO*, *MED*, and *HIGH* positions:

LOW – k to m _____ q to r _____ s to t _____

MED – k to m _____ q to r _____ s to t _____

HI – k to m _____ q to r _____ s to t _____

Results: Based on the above activity, what can you determine from the amperage readings of each circuit tested?

NAME _____

VOLTAGE ACTIVITY:

Using a DMM approved by your instructor, demonstrate the ability to measure and record circuit voltage drops in a circuit that has "fault(s) inserted that will affect normal circuit operation.

Series Lamp Circuit

With circuit operating with instructor installed fault(s), measure and record voltage at the following test points:

a _____ b _____ c _____ d _____ g _____ h _____ k _____ m _____ n _____
o _____ r _____

Parallel Stoplamp Circuit

With circuit operating with instructor installed fault(s), measure and record voltage at the following test points:

a _____ b _____ c _____ d _____ g _____ h _____ n _____ o _____ r _____ s _____
t _____ w _____ x _____ y _____ bb _____

Cooling Fan Circuit

With circuit operating with instructor installed fault(s), measure and record voltage at the following test points:

a _____ b _____ c _____ d _____ e _____ 30 _____ 86 _____ 87 _____ 85 _____
h _____ k _____ m _____ n _____ q _____ t _____

Horn Circuit

With circuit operating with instructor installed fault(s), measure and record voltage at the following test points:

a _____ b _____ c _____ d _____ e _____ 30 _____ 86 _____ 87 _____ 85 _____
h _____ k _____ m _____ n _____ q _____ t _____

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Heater Circuit

With circuit operating with instructor installed fault(s), measure and record voltage at the following test points in the in the *LO*, *MED*, and *HIGH* positions:

LOW - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

MED - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

HI - a _____ b _____ c _____ d _____ e _____ f _____ g _____ 30 _____ 86 _____ 85
_____ 87 _____ h _____ n _____ o _____ p _____ u _____

Results: Based on the above activity, what can you determine from the voltage drop readings of each circuit when diagnosing faults in electrical circuits?
