

# DEALERSHIP TOUR: EDUCATOR'S HANDOUT

## Scientific Principles/Concepts in Automotive Systems

AUTOMOTIVE SYSTEMS	SCIENTIFIC PRINCIPLES/CONCEPTS																											
	Bernoulli's Principle	Atomic/Molecular Theory	States of Matter	Boyle's Law	Heat of Fusion	Capillary Action	Hydrodynamics	Charles's Law	Incandescence	Galvanic Action	Inclined Plane	Condensation	Cohesion of Liquids	Adhesion of Liquids	Inductive Reactance	Electrical Resistance	Volumetric Efficiency	Elasticity	Inertia/Momentum	Electromagnetic Induction	Electromotive Force /Voltage	Evaporation/Heat of Evaporation	Frequency/Hertz	Conservation of Energy	Friction	Left/Right Hand Rules	Lenz's Law	Mass/Velocity Laws
Hand & Power Tools											◆																	
Shop Safety																												
Engine Design & Const.				●													●	●	●						●			●
Engine Powertrain																	●	●	●					●	●			●
Engine Valve Train																	●	●	●						●			●
2 Stroke, Gas Turb., Jet Rocket, Diesel																	●							●	●			●
Performance & Measurement		●															●		●						●			
Cooling Systems			●	●	●					●													●		●			
Lubrication Systems						●	●						●	●											●			
Fuel Systems		▲	▲			▲						▲			▲								▲					
Carburetors	▲	▲	▲			▲						▲					▲						▲					
Fuel Injection		▲	▲									▲											▲					
Basic Electricity								▲							▲	▲				▲	▲		▲	▲		▲		▲
Batteries		▲								▲						▲	▲				▲	▲		▲		▲		▲
Starting Systems																▲	▲				▲	▲		▲		▲		▲
Charging Systems																▲	▲			▲	▲		▲	▲		▲		▲
Ignition Systems																▲	▲			▲	▲		▲	▲		▲		▲
Basic Electronics															▲	▲				▲	▲		▲	▲		▲		▲
Electronics Ignition																▲	▲			▲	▲		▲	▲		▲		▲
On-board Computers										▲						▲				▲	▲		▲	▲		▲		▲
Emission Control		■										■																
Brakes																				■				■	■			■
Clutches																				■				■	■			■
Manual Trans														■						■								
Automatic Trans																												
Drivelines & Univ. joints																												
Differentials															■				■						■			
Suspension																								■				■
Steering																									■			
Air Conditioning			■					■				■										■		■				



Shop Practices



Chassis/Powertrain

Created by Dennis Mattoon, Instructor, Reynolds High School, Portland, Oregon. Used with permission.

# DEALERSHIP TOUR: EDUCATOR'S HANDOUT

## Scientific Principles/Concepts in Automotive Systems

AUTOMOTIVE SYSTEMS	SCIENTIFIC PRINCIPLES/CONCEPTS																										
	Newton's Law of Motion	Ohm's Law	Parallax	Pascal's Principle	Photo-Voltaic Action	Piezoelectric Action	Thermodynamics	Series/Parallel Circuits	Simple Machines	Surface Tension	Thermal Expansion/Contraction	Transformer Action	Viscosity	Volatility	Electronics/Semiconductors	Refrigeration	Metallurgy	Power Transmission	Lubrication Theory	Chemistry	Catalytic Action	Oxidation/Reduction Reactions	Types of Energy	Centrifugal Force	Global Warming	Torque/Leverage	Gravity
Hand & Power Tools		◆						◆								◆		◆				◆	◆		◆	◆	
Shop Safety										◆							◆		◆				◆	◆		◆	◆
Engine Design & Const.	●				●		●				●						●						●	●		●	●
Engine Powertrain	●						●										●	●					●	●		●	●
Engine Valve Train				●													●	●						●		●	●
2 Stroke, Gas Turb., Jet Rocket, Diesel	●						●				●						●			●						●	●
Performance & Measurement						●	●										●						●			●	●
Cooling Systems							●				●						●			●			●	●		●	●
Lubrication Systems				●									●						●	●			●	●		●	●
Fuel Systems							▲							▲	▲				▲				▲		▲		▲
Carburetors														▲	▲												
Fuel Injection							▲							▲	▲												
Basic Electricity		▲		▲			▲				▲				▲									▲	▲		
Batteries		▲		▲			▲		▲											▲			▲	▲			
Starting Systems		▲					▲	▲										▲					▲	▲			
Charging Systems		▲					▲	▲										▲					▲	▲			
Ignition Systems		▲	▲	▲		▲	▲	▲			▲												▲	▲			
Basic Electronics		▲					▲	▲							▲												
Electronics Ignition		▲					▲	▲			▲				▲												
On-board Computers		▲			▲		▲	▲							▲												
Emission Control							■													■	■	■					
Brakes	■			■							■				■		■						■	■		■	■
Clutches	■																■	■					■	■		■	■
Manual Trans								■										■								■	■
Automatic Trans				■														■							■	■	■
Drivelines & Univ. Joints																	■	■								■	■
Differentials																	■	■								■	■
Suspension								■									■							■		■	■
Steering	■			■													■									■	■
Air Conditioning																■	■						■		■		■

- ◆ Shop Practices
- Heavy Engine Systems
- ▲ Engine Performance
- Chassis/Powertrain