Math-in-CTE Lesson Plan for Automotive Technology Lesson AT01 - "Repair Orders"

Lesson Title: AT01/Repair Orders Les		Lesson #		
Author(s):	Phone Number(s):	E-mail Address(es):		
Larry Pelletier	207-924-7670	lpelletier@sad46.org		
Victor LaPrade	207-368-4354	vlaprade@rsu19.org		
Occupational Area: Automotive Technology				
CTE Concept(s): Repair Orders				
Math Concepts: Using arithmetic and number sense, whole numbers/ decimals, percentages				
Lesson Objective:	emonstrate a working knowledge of a repair orders			
Supplies Needed:	pplies Needed: Repair Order, Online parts catalog, Labor Time Guide, Price Sheet			

The "7 Elements"	Teacher Notes
	(and answer key)

Introduce the CTE lesson.	
Objective: Learn the process of a repair order/customer invoice When work is performed on a customer's vehicle we need to track the parts and labor time, so the customer can be assured they are paying the correct amount on their invoice. Today we're going to cover areas such as labor time, labor rates, net costs and customer costs. We will cover the technician's responsibility of the 3 Cs (Complaint, Cause, Correction) at a later time.	In this lesson, students will continue to develop their skills using prior knowledge of the Parts Order checklist and the online parts catalogue.

2. Assess students' math awareness as it relates to the CTE lesson.	
A. Customer Information	A. Customer Information
What type of information do you need to fill the repair order out correctly?	(Students will use their own information for this exercise)
Type of repair to be done (customer complaint)?	Name
	Address
B. Labor	Contact Phone #
How do we know how much labor time is needed to complete a repair?	Vehicle Information (Year, Make, Model, VIN, Miles)
Where do we find Labor Time?	Tune-up, oil change, alignment, Recall, broken part, etc.
What are the two types of Labor charges?	
What is the labor rate at your shop?	B. Labor
	Labor time guide
	Warranty time (factory time)
	Motor time (customer labor time)
	Hourly labor rate (\$65 /hr)
	Discuss that this rate is the Shop Rate, not the technician's hourly rate
	Discuss flat rate time: Predetermined time for a repair to be completed.
	Warranty Time- the time set for the repair by the manufacture
	Motor (customer time) - The time set for a repair to be performed on a vehicle no longer under warranty.
	Show/ use labor time guide (use handout or online guide), practice several examples (the online guide, Mitchell and All Data are subscribed websites, so a handout or time book will be necessary)

C. Parts	C. Parts
What parts are needed?	
What is the net cost (shop cost) of the part?	Discuss net and retail cost of parts
What is the retail cost (customer cost) of the part?	Net cost is the cost the shop pays for the parts(your cost maybe
What are multiple parts? Example?	listed as cost, wholesale, net price)
What is a core charge?	Retail cost is the cost to the customer Multiple parts- more then one identical part needed to complet the repair.
Net cost plus 30% mark-up for retail price	
What is Sales Tax? Is sales tax charged on labor?	i.e. eight spark plugs, two ball joints, valve stems
	Core charge is refunded cost on certain parts to be returned for remanufacture, such as alternators, batteries, starters, or brake shoes.
	Explain parts mark up to get customer cost (30%)
	Parts worksheet- provided by instructor
	Sales tax on the parts only 5%
	Total- total cost to customer

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3. Work through the math example <i>embedded</i> in the CTE lesson.	
Show a student how to fill out a work order. Have students fill out a repair order- see repair order handout Introduce formula and hand out worksheet # 1 / key Discuss that we can use a formula to find the total cost of a job.	Project repair order on whiteboard for example and have students complete their own copy. Formula I=Labor rate t=Total Time in Flat Rate Hours Image: Material Cost per part Image: Quantity of part s= Sales tax rate in decimal Labor = Image: Image

Review changing percents to decimals
Examples: 25%= 0.25 4%= 0.04
125%=1.25 0.23%= 0.0023
Go to <u>www.kutasoftware.com</u> in the Pre-Algebra section for Free Worksheets to print a practice Percents worksheet. Example #1:
Substitute Hourly Rate for I and Labor Time for t x <t< td=""></t<>
Substitute 19 for C. Convert percent to decimal. The answer is \$24.70.
Example #3:
We can also use a formula to solve for discounts: Example #4: Take the price of the rotor and <u>subtract</u> the <u>product</u> of the percent and the rotor to get the discount price





6. Students demonstrate their understanding.	
	Demonstrate the use of actual work orders to students.
Handout worksheet #2 / key	
If time, students can also create their own problems.	Students are to prepare estimates for all jobs.
	Students are to complete work orders and invoices for each job.
7. Formal assessment.	
Repair Order (R.O.) Assessment	Students will be given a mock situation and will need to complete a R.O. from start to finish, including Customer Information, Parts Order worksheet, and the Repair Order (R.O.).

NOTES: