

Automotive Maintenance and Light Repair

A Guide to Developing a First Course in the NATEF Model

Tasks + Curriculum + Instruction

Presenter:

Michael Gray, Co-Author of Auto Upkeep

This presentation is available at www.AutoUpkeep.com/presentations.



Download this Presentation



Essential Questions

- What is the NATEF model?
- How do “Gen Z” students learn?
- Why is it necessary to teach maintenance and light repair?
- How does an “Intro to Auto” course fit within a complete Automotive Service Technology Training Program?
- What are the essential units in an entry level course?
- What will each student know and be able to do at the completion an entry level course?

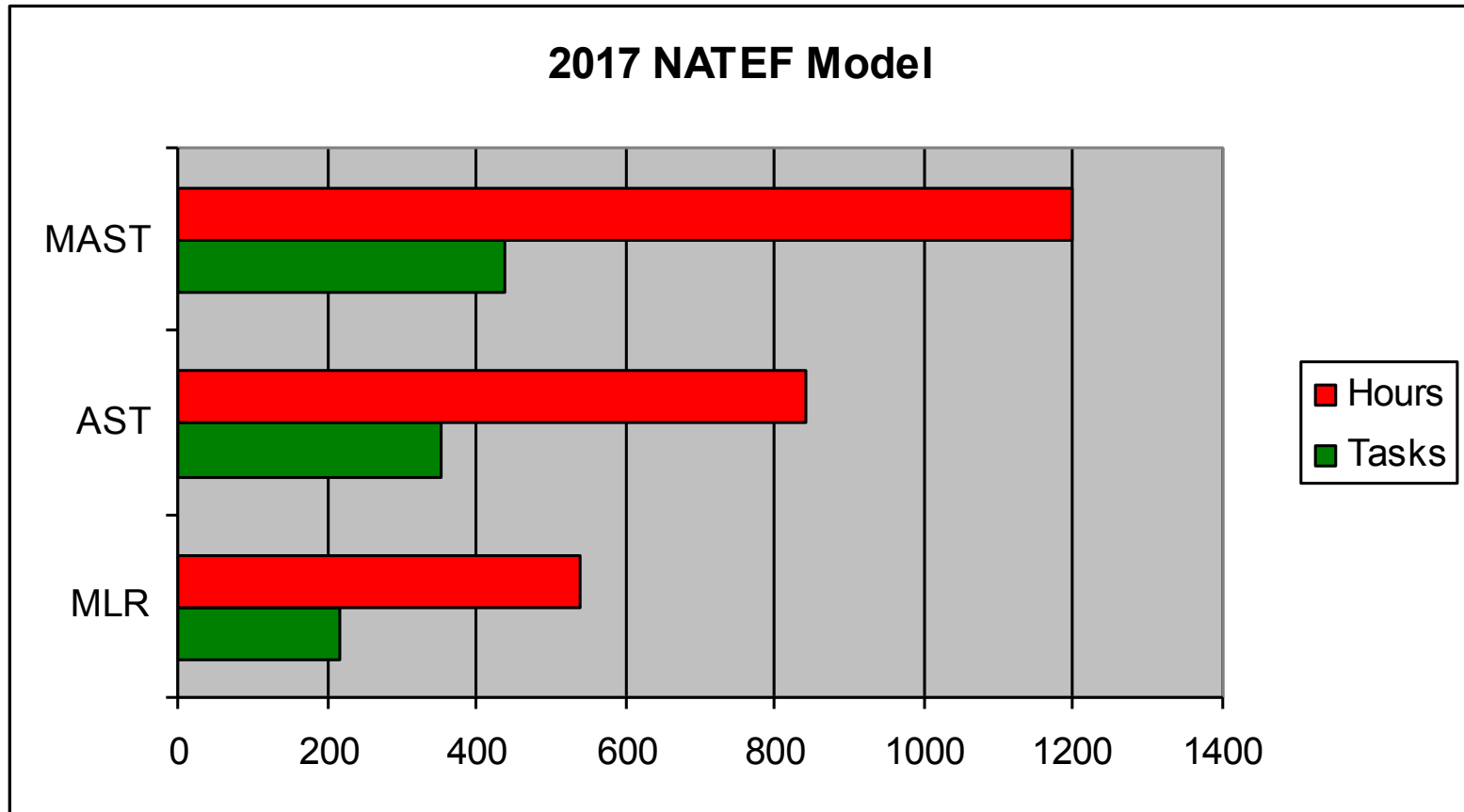


The 2017 NATEF Model

- History on the NATEF Model – Three Level Model since 2012 - **Maintenance & Light Repair (MLR)**, **Automobile Service Technology (AST)**, and **Master Automobile Service Technology (MAST)**. Updated in 2017. Each successive level includes all the tasks of the previous level in addition to newly designated tasks.
 - » Obtained from Page 1 - <https://www.asealliance.org/wp-content/uploads/2015/07/2017-Auto-Program-Standards-Print-Version-1.pdf>
- You can download the standards at:
 - » <https://www.asealliance.org/natef-accreditation/program-standards>.



Tasks/Hours Required



MAST – 439 tasks at 1200 hours (Includes MLR and AST)

AST – 353 tasks at 840 hours (Includes MLR)

MLR – 218 tasks at 540 hours



What is a Task?

- “A task is a psychomotor or cognitive entry-level learning activity consisting of one or more measureable steps accomplished through an instructor presentation, demonstration, visualization or a student application.”

» Obtained from Page 59

<https://www.asealliance.org/wp-content/uploads/2015/07/2017-Auto-Program-Standards-Print-Version-1.pdf>

- It should be noted that each task is not dedicated an hour allotment...some tasks take longer than others.



NATEF Assumptions

- “Individual courses of study will differ across automobile technician training programs”
- “Development of appropriate learning delivery systems and tests which monitor student progress will be the responsibility of the individual training program”

» Obtained from Page 60

<https://www.asealliance.org/wp-content/uploads/2015/07/2017-Auto-Program-Standards-Print-Version-1.pdf>



NATEF Does Not Endorse Curriculum

- “NATEF does not endorse specific curricular materials nor provide instruction. It does, however, set standards for the content of instruction, which includes tasks, tools and equipment, hours, and instructor qualifications.”

» Obtained from <http://www1.natef.org/program.cfm>

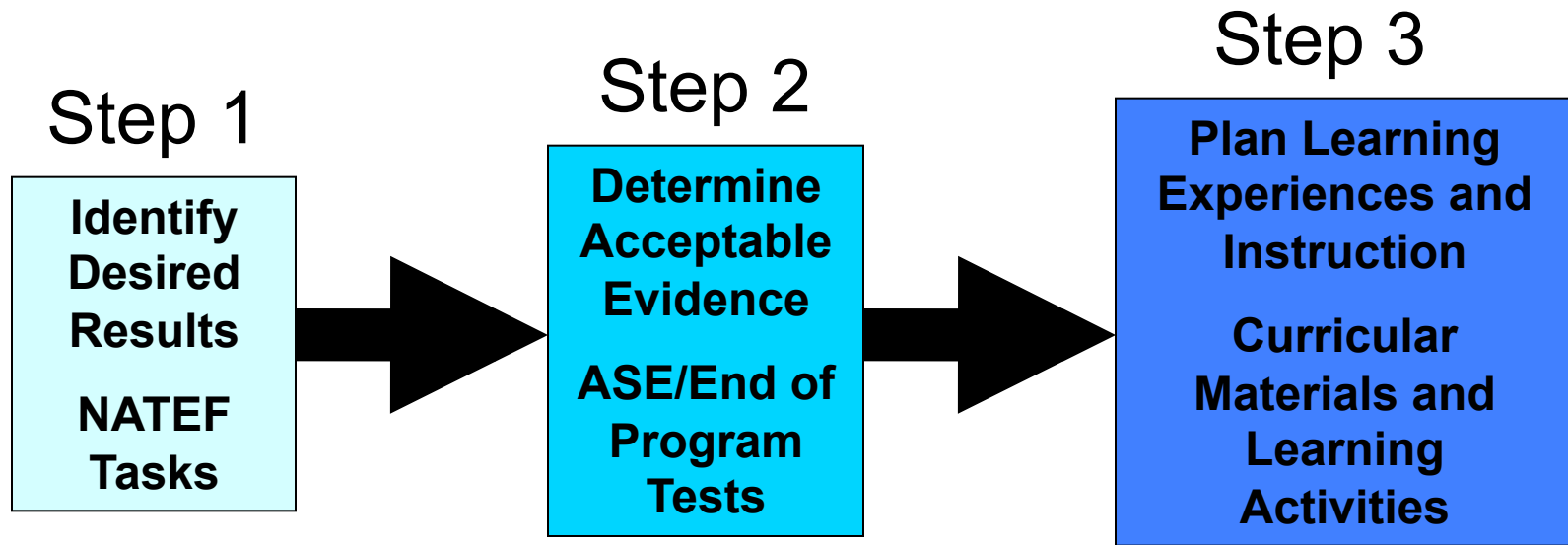


Basically...

- NATEF provides the required tasks and hours, you provide the program course structure, curriculum, and student materials.



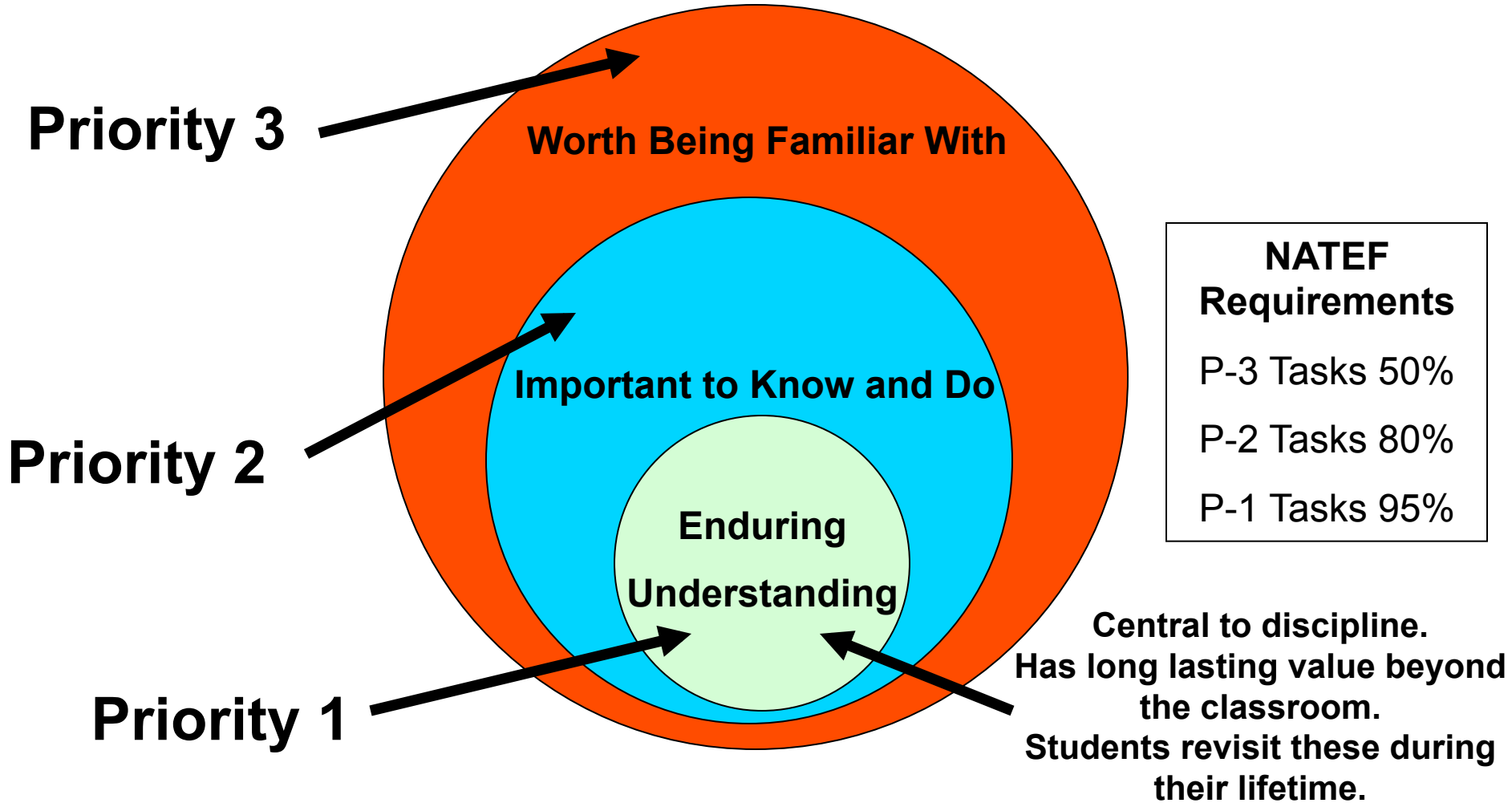
Curriculum Design



Adapted from Wiggins and McTighe - *Understanding by Design* framework.



Enduring Understandings



A Question to Think About...



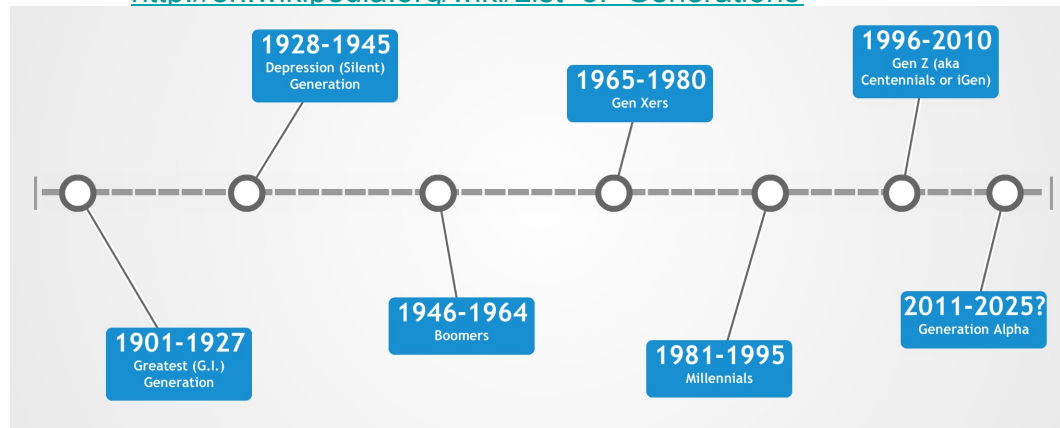
So how do you teach this new generation of students the fundamentals of Automotive Technology?



Generations are Defined by Life Experiences

- Life experiences develop attitudes, beliefs, and sensitivities...
 - Greatest (G.I.) Generation – Great Depression, FDR's New Deal
 - Depression (aka Silent) Generation – WWII and Cold War
 - Boomers – space race, civil rights movement, Vietnam, Watergate
 - Gen Xers – fall of Berlin Wall, AIDS, Chernobyl, Challenger, World Wide Web
 - Millennials (aka Gen Y) – Facebook, Cell Phones, Instant/Text Messaging – but also remember a slow Internet.
 - Gen Z (aka Gen Now, iGen, Centennials, Gen C) – Post 9/11, they don't know a time before computers. They are digital natives.

» Sources <http://net.educause.edu/ir/library/pdf/erm0342.pdf> and http://en.wikipedia.org/wiki/List_of_Generations



Information Age Mindset

- Computers aren't technology – they are an assumed part of life
- Internet is a place for socialization
- Doing is more important than knowing
- Learning is more trial and error
- Multitasking is a way of life
- Staying connected is essential
- Expect services/responses to be quick and available 24x7

» Source <http://net.educause.edu/ir/library/pdf/erm0342.pdf>



Today's Students

- Experiential/hands-on learning
- Working in teams
- Social networking
- They expect immediate responses
- Face-to-face learning (but have a low tolerance for boring)
- Achievement-oriented
- Value authenticity and stories

» Source
<http://www.brandonhallnews.com/28oct8.htm>



What do most “Gen Z” students know about automobiles?

- Discussion...



Uninformed Consumers



<https://www.youtube.com/watch?v=MWdmD1jF8aw>



<https://www.youtube.com/watch?v=IOooYBJWBa4>

What happens when you don't change the oil as required?



Automotive Statistics

- 80% of vehicles need service, fluids, or replacement parts
(Car Care Council, 2017)
- 11.6 years old is the average age of cars and trucks in the USA
(IHS Markit, 2016)

Common Vehicle on the Road Today

Is Over 11 Years Old

Has 139,000+ Miles

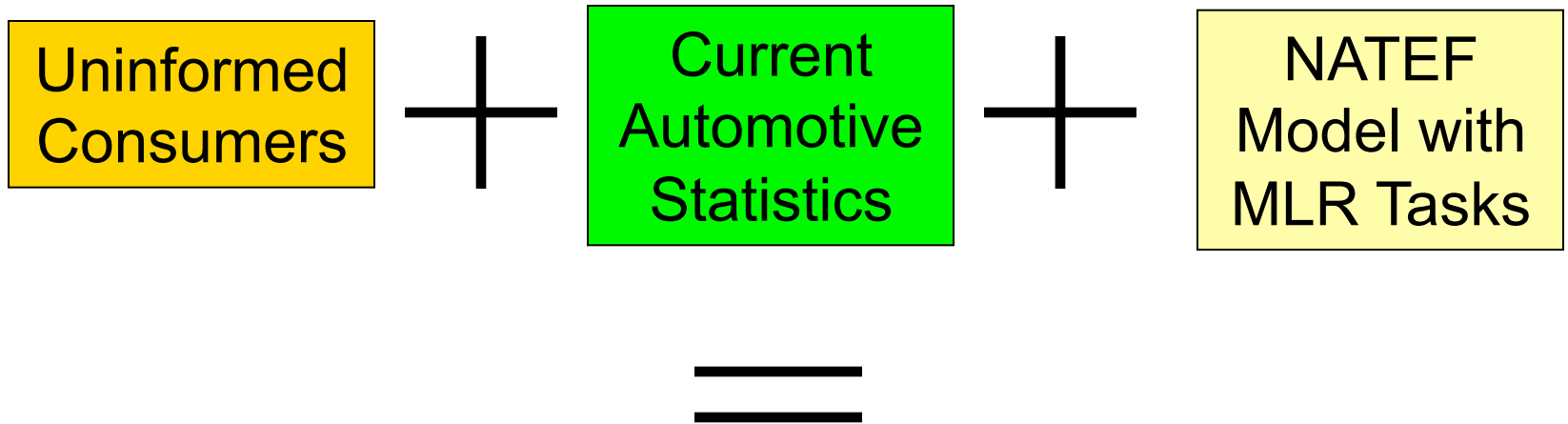
Needs Service

References:

IHS Markit. (2016). Vehicles Getting Older: Average Age of Light Cars and Trucks in U.S. Rises Again in 2016 to 11.6 Years, IHS Markit Says. [Press Release]. Retrieved from <http://news.ihsmarkit.com/press-release/automotive/vehicles-getting-older-average-age-light-cars-and-trucks-us-rises-again-2016>
Car Care Council. (2017). Community Car Care Events Show Most Vehicles Need Service. [Press release]. Retrieved from <http://media.carcare.org/2017-07-11-Community-Car-Care-Events-Show-Most-Vehicles-Need-Service>



The NEED



Students NEED a Starting Point

An Essential Foundation with “Enduring Understandings”



So You Need a First Course...

- What will your first course look like?
- How will it feed your advanced programs?
- How could it serve a community need?
- How can you generate more informed consumers AND increase the number of highly-qualified technicians?
- How can you serve both populations at the same time?



What does your first course look like now?

- Discussion...



Attracting Non-Traditional Students

- Defined:
 - What is a Non Traditional Student?
 - “A non-traditional student would be any male or female that is enrolled in a program of study where the opposite gender accounts for more than 75%, such as a male student enrolled in Health and Human Services or a female in Automotive Technology.”

» Obtained from http://www.gptc.edu/content.cfm?PageCode=other_non_traditional



The Case for Non-Traditional Students...

- Careers should be based on abilities and interests, not gender stereotypes.
- Men and women spend more than 30 years in the workplace and why not enjoy it?
- Women can earn up to 30% more working in nontraditional jobs.
- Nontraditional students can learn new ways of thinking and dealing with others.
- Less than one-third of new occupations require a four-year degree.

» Obtained from <http://www.hawaii.edu/cte/publications/nontrad1.pdf>



How do you attract non-traditional students into your program?

- Discussion...



How can an *Intro* course be rigorous?

- Well, it's already relevant – all drivers should know how cars work.
- MLR/Entry Level Programs are Rigorous – They Require Students to:
 - Learn in the **Cognitive** (knowledge), **Affective** (attitudes), and **Psychomotor** (skills) domains.
 - **Think and work.**
 - Apply knowledge **across disciplines.**
 - Apply knowledge to **real-world predictable situations** (e.g., change oil, rotate tires, check tire pressure, periodic inspections, check fluid levels).
 - Apply knowledge they learned to **real-world unpredictable situations** (e.g., burned out headlight, dead battery, flat tire, burst radiator hose, car stuck) – remember that uniformed consumer!

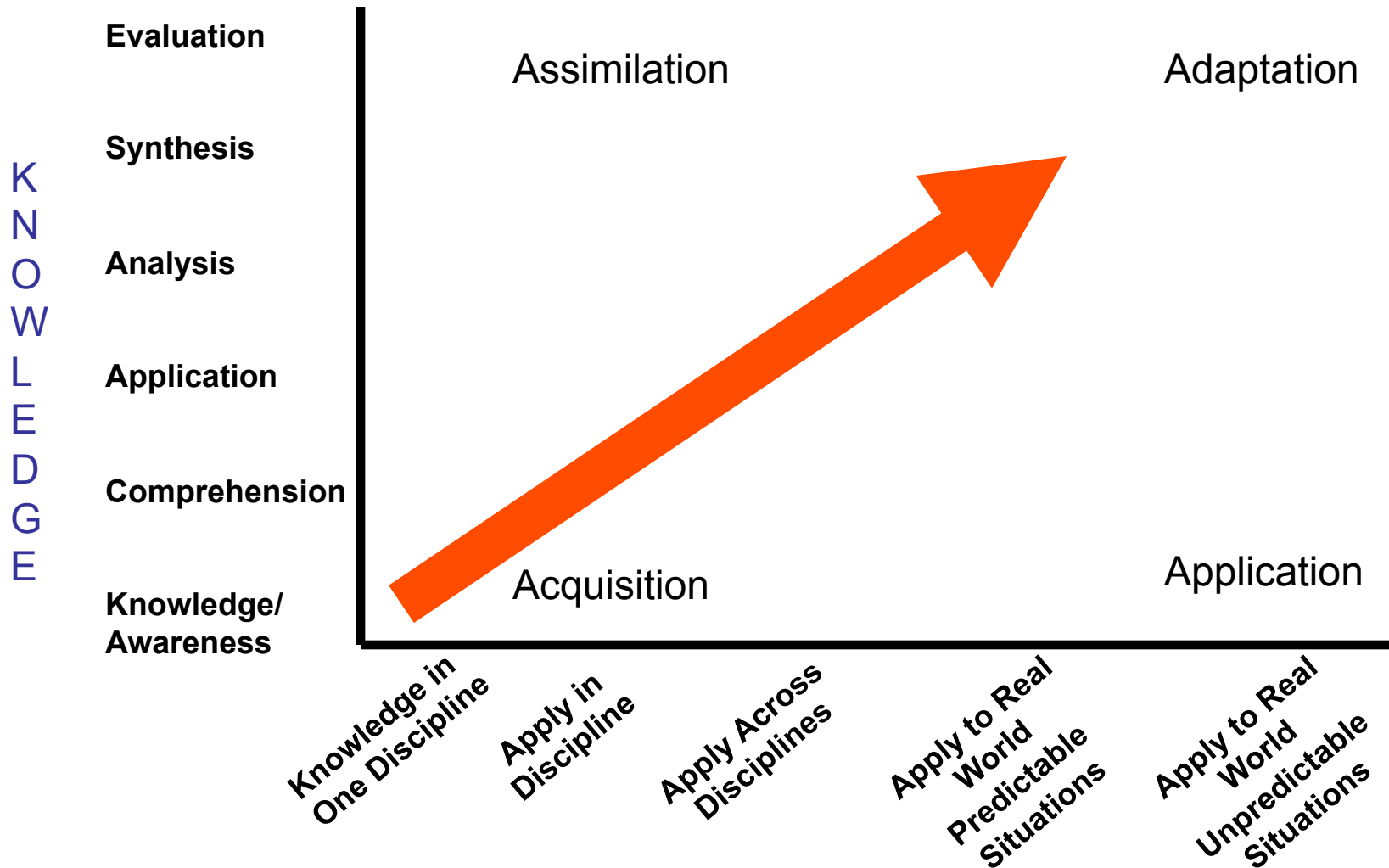


Being Relevant Matters

- A NATEF publication on English, Math and Science integration with automotive technology at the MLR, AST, and/or MAST program accreditation level.
 - Can be downloaded at <http://www.natef.org/Achieving-Accreditation/Integrated-Academic-Skills/Automobile.aspx>



Rigor/Relevance Framework



MLR Example

- It is difficult to generalize, since every secondary and post-secondary school approaches this uniquely.
 - But if MLR requires 540 hours, then...
 - It takes a minimum of 4 credits in a traditional secondary school system to complete ($540 \text{ hours} / 135 \text{ hours} = 4$).
 - 90 minute block x 90 days = 8100 minutes or 135 hours
 - Or
 - 45 minute periods x 180 days = 8100 minutes or 135 hours
 - It takes a minimum of 20 credits/units in a traditional post-secondary system to complete depending how units are allocated (e.g., if a unit = 27 hours of instruction/lab, then $540 \text{ hours} / 27 \text{ hours} = 20 \text{ units}$).

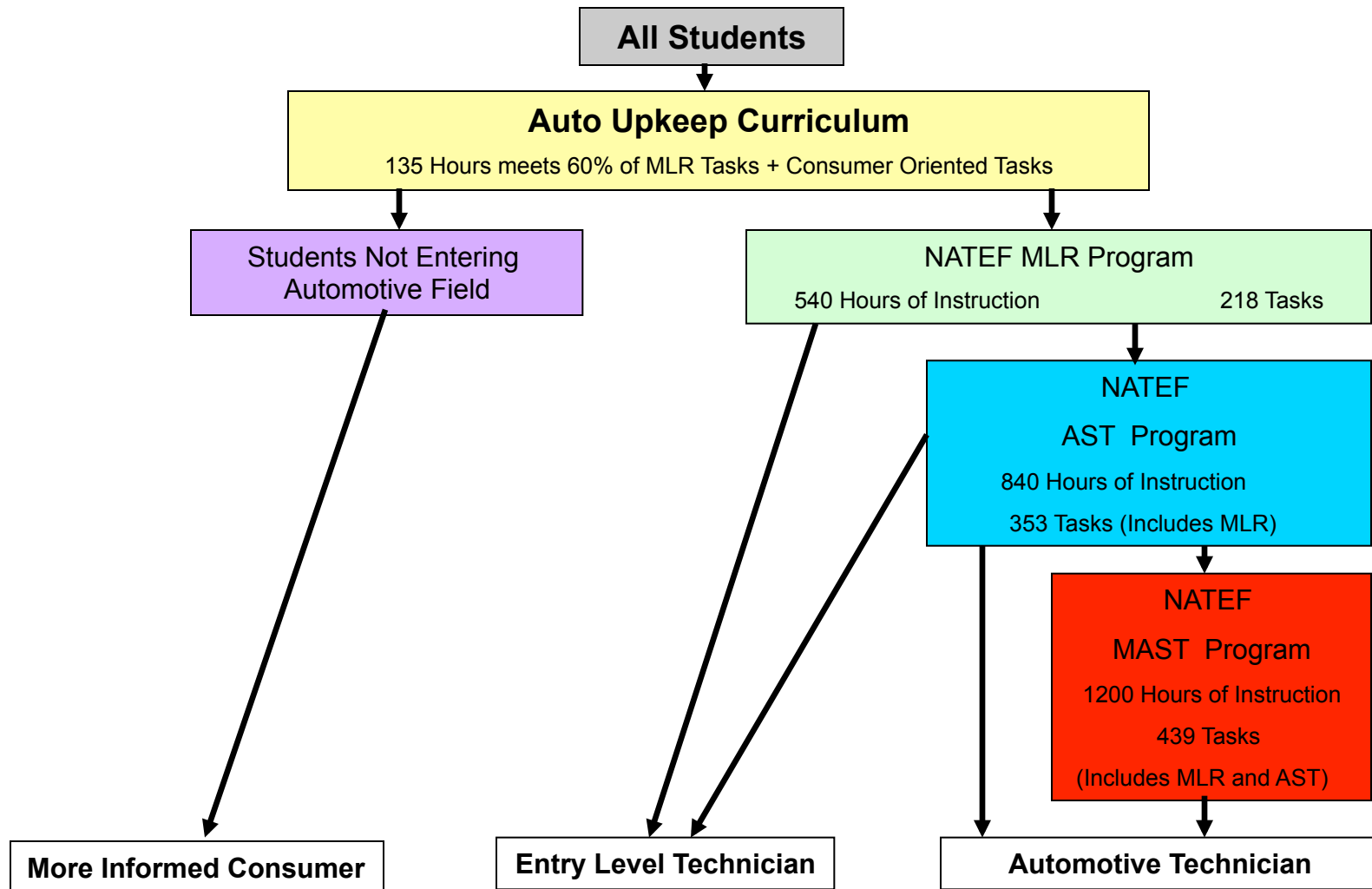


How do you organize courses in your program?

- Discussion...

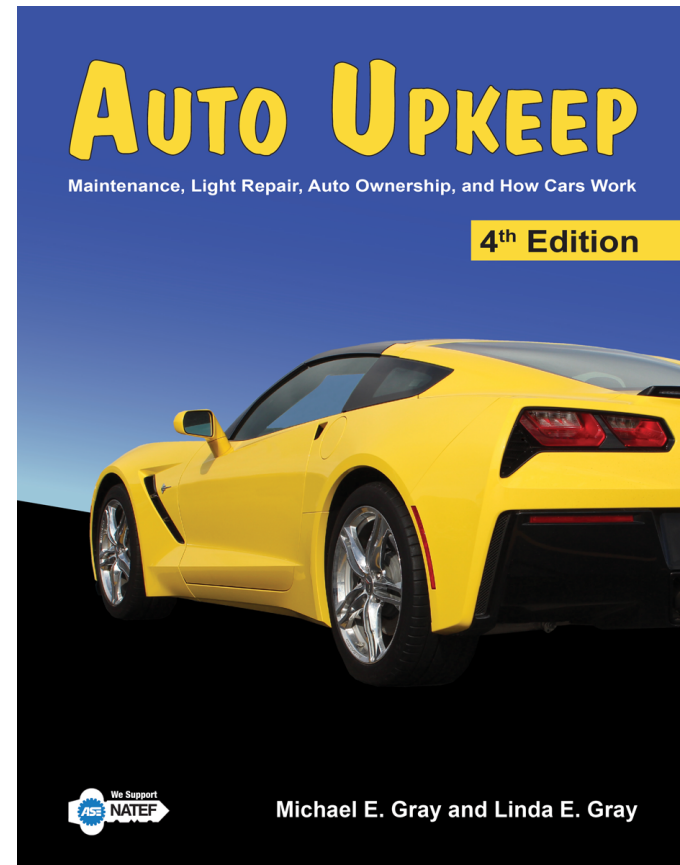


How Auto Upkeep fits



What is Auto Upkeep?

- Was developed because most texts are either too complex 1500+ pages or too simple to teach an Introduction to Automotive course.



Think of it this way...

**1500+ Pages = Comprehensive Automotive Technology Textbook
Includes a lot of “Worth Being Familiar With” Information**

Best Suited for MAST Programs

Auto Upkeep = 288 Pages = Best Suited for MLR/Intro Programs

Information Central to Discipline, Long Lasting Value Beyond the Classroom



What's special about Auto Upkeep?

- Short, concise chapters
- 12 point font – Easy-to-Read
- 3 Levels of Headings When Necessary
- A figure, picture, or graph accompanies almost every block of text
- Helpful emphasis blocks – Tech Tips, Price Guides, Web Links, Servicing, Trouble Guides, Activities, Q & A's, Career Paths, Calculations
- Videos, Apps, and QR Codes to Extend Learn Online
- Reviewed by young adults and technical reviewers
- Extensive effort was put on book layout
- Hands-on and Internet-based activities (40 activities in all)



What are the Auto Upkeep units?

- | | |
|-----------------------------------|--|
| 1. Introduction and How Cars Work | 11. Fuel System |
| 2. Buying an Automobile | 12. Cooling System and Climate Control |
| 3. Automotive Expenses | 13. Ignition System |
| 4. Repair Facilities | 14. Suspension, Steering, and Tires |
| 5. Safety Around the Automobile | 15. Braking System |
| 6. Tools and Equipment | 16. Drivetrain |
| 7. Auto Care and Cleaning | 17. Exhaust and Emission System |
| 8. Fluid Level Check | 18. Alternative Fuels and Designs |
| 9. Electrical System | 19. Automotive Accessories |
| 10. Lubrication System | 20. Common Problems and Roadside Emergencies |

* 40 hands-on and internet-based activities engage the students



How is the Auto Upkeep commonly delivered?

- Most often offered as a 1 credit course, but also used by some school districts as a ½ credit course.
- Some community colleges and universities use it as a first auto course or as an evening adult education course.
- Auto Upkeep was designed to have a balance between in-class and hands-on instruction.
 - Commonly two days a week are in-class and three days a week are in the automotive lab.



What will each student know and be able to do at the completion of Auto Upkeep?

- 200 competencies are assessed.
- Over 60% of MLR Tasks are addressed.
- In general, students become confident, empowered consumers and users of the automobile. Plus, Auto Upkeep builds a solid foundation for future courses.
- Let's look at the complete competency profile and the NATEF MLR Matrix.

» <http://www.autoupkeep.com/standards/>



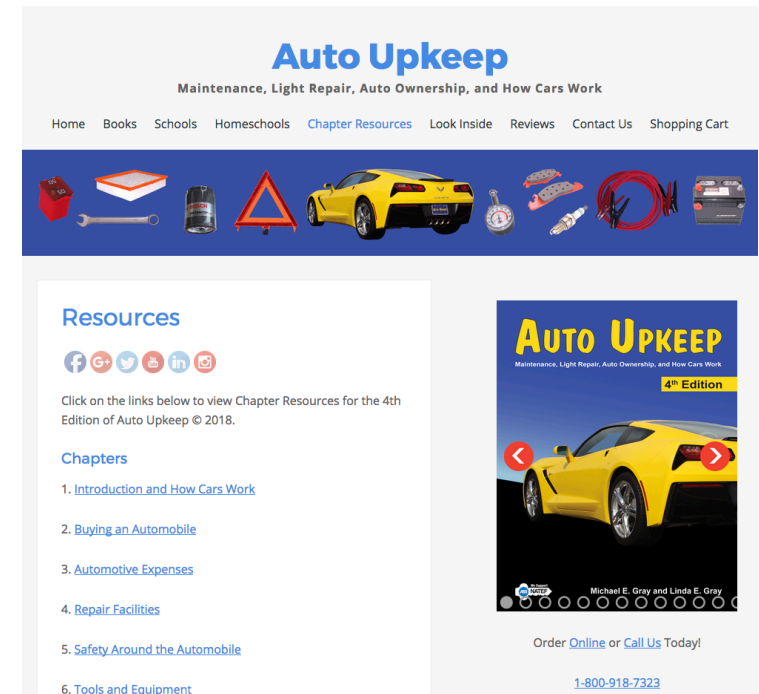
Instructor USB – Turn Key Curriculum or Modify it as YOU Want

- Sample Course Syllabus Outline
- PowerPoints
- Competency Profile
- MLR Correlation Matrix
- Tests and Exams
- Lab Activities
- Study Questions
- Answer Keys



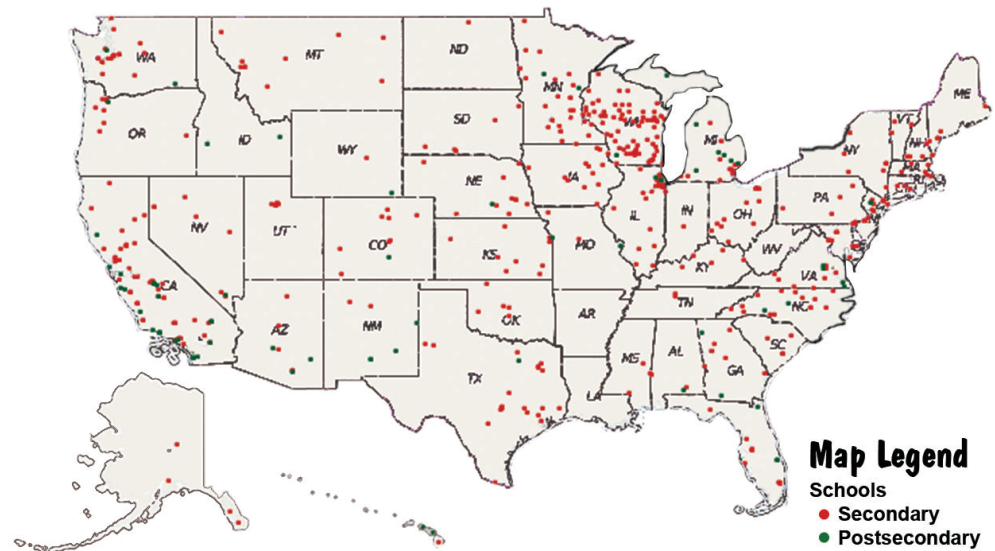
Integrates Online Material Throughout

- QR Codes
- App Links
- Video Links
- Check out the “Chapter Resources” tab at www.AutoUpkeep.com



Who's using Auto Upkeep?

- Over 500 secondary and post-secondary schools throughout the United States and Canada
- Large schools in Texas to small schools in Wisconsin
- NATEF and Non-NATEF Schools
- Over 100,000 copies sold since inception
- Now in the 4th Edition



To Get Free eBook Access

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Questions?



Contact Information

Michael Gray
Rolling Hills Publishing
800-918-READ

www.RollingHillsPublishing.com

www.AutoUpkeep.com

Email: info@autoupkeep.com

LinkedIn – www.Linkedin.com/in/MichaelEGray

Twitter – www.Twitter.com/AutoUpkeep

Videos – www.Video.AutoUpkeep.com

YouTube – www.YouTube.com/AutoUpkeep

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