Programs of Study: Secondary and Postsecondary Outcomes From the NRCCTE’s Longitudinal Research

James R. Stone III
Director
Since the mid-1980s we have

Added the equivalent of *one full year* of core academics (math, science, language arts) to high school graduation requirements.

- (NAEP) *Reading scores have significantly declined*
- (NAEP) *Science scores have significantly declined*
- (NAEP) *math scores have remained relatively unchanged*
12th Grade Math Scores 2005

<table>
<thead>
<tr>
<th>Scale score</th>
<th>Average score</th>
<th>10th Percentile</th>
<th>25th Percentile</th>
<th>50th Percentile</th>
<th>75th Percentile</th>
<th>90th Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>300</td>
<td>150</td>
<td>105</td>
<td>127</td>
<td>151</td>
<td>174</td>
<td>194</td>
</tr>
</tbody>
</table>

Proficient

Basic
One solution?

Be born to smarter parents!
US Trails 22 Nations in HS Completion
The United States, once the world leader in high-school completion, now trails 22 other leading industrialized countries that have graduation rates higher than the American rate of 72 per cent, according to a report released last week by the Organization for Economic Cooperation and Development. (December 4, 2008)

Best States fail to graduate 12-14%

Worst state fail to graduate 37-41%

2010-2011

Source: One-Third of a Nation (ETS, 2005)
Special Concern: We have a boy problem

... but many of the people who don’t fit in are boys. A decade or so ago, people started writing books and articles on the boy crisis. At the time, the evidence was disputable and some experts pushed back. Since then, the evidence that boys are falling behind has mounted. The case is closed. The numbers for boys get worse and worse.

By 12th grade, male reading scores are below females’

11th grade boys write at an 8th grade girl level

Boys used to have an advantage in math and science, but that gap is nearly gone.

Boys are more likely to have discipline problems

Boys account for ¾ all D’s and F’s

Men are a minority in college (40%)

2 million fewer men graduate from college over the past decade than women

Grad school gap is even higher

David Brooks, NYT July 5, 2012
One Solution:

A Survival Analysis

CTE Participation helps boys “survive” high school

There is no CTE “survival” effect for girls; but it “does no harm”
Two Key Questions:

1. What is the appropriate mix of academic, occupational and technical skills required for the emerging labor market?
2. How can schools help students develop these skills?
PROGRAMS OF STUDY – WHAT FOCUS?
College for all? Only 40% of 27-year olds have earned an A.A. degree or higher

40%

What about the 60%?
What about career development for the 40%?

Educational Attainment, by Age 26-27

- Master’s Degree or above
- Bachelor’s Degree
- Associate’s Degree
- Some College, No Degree
- High School Diploma or Equivalent
- Less than High School

S&E occupations make up only about one-twentieth (5%) of all workers (5.3%) in 2018 Urban Institute, 2007; (6%) in 2018, Carnevale, 2010.

435,000 U.S. citizens and permanent residents a year graduated with bachelor's, master's, and doctoral degrees in science and engineering. Over the same period, there were about 150,000 jobs added annually to the science and engineering workforce.

http://www.businessweek.com/print/smallbiz/content/oct2007/sb20071025_827398.htm
Murray said that none of the companies she has talked with has suggested that there is a shortage of qualified chemists or life scientists. She said that **employers’ greatest concern “is not numbers, it is training.”** She cited the example of managers who told her they could interview hundreds of candidates for an organic chemistry position but wish they knew how to identify those candidates who **“can behave collaboratively”** and have the other broad competencies discussed at the workshop. She argued that the degree to which scientists have these other capabilities “really seems to be the problem.”

IS THERE A SHORTAGE OF SCIENTISTS?

**High Demand Occupations 2010-2020**

*The BLS Perspective*

**Education**
- High School or Less
- Certificate
- 2 Year College
- 4 Year College or More

- Registered nurses
- Retail salespersons
- Home health aides
- Personal care aides
- Office clerks, general
- Food prep/service & Fast Food
- Customer Service Reps
- Heavy & Tractor Trailer Drivers
- Laborers - freight, stock, material
- Postsecondary Instructors
- Nursing aides, orderlies
- Child Care Workers
- Booking, Accounting, Auditing Clerks
- Cashiers
- Elementary teachers
- Receptionists and information clerks
- Janitors & Cleaners
- Landscaping & Groundskeeping
- Sales Representatives, except technical
- Construction laborers
- Medical Secretaries
- Office Supervisors
- Carpenters
- Waiters & Waitresses
- Security Guards
- Teacher Assistants
- Accountants and Auditors
- Licensed Practical Nurses
- Physicians and surgeons
- Medical Assistants
High Growth Occupations 2010-2020

Veterinarians
Pile-Drive Operators
Mental Health Counselors
Medical Scientists
Cost Estimators
Stonemasons
Health Educators
Audiologists
Bicycle Repairers
Dental Hygienists
Physical Therapists
Brick Masons
Marriage & Family Therapists
Market Research/Analysts
Medical Secretaries
Interpreters
Glaziers
Physical Therapy Aide
Occ Therapy Asst
Medical Diagnostic Tech
Event Planners
Plumber’s Helpers
Physical Therapy Asst
Rebar Workers
Vet Tech
Carpenter’s Helpers
Construction Helpers
Biomedical Engineer
Home Health Aides
Personal Care Aides

Required Education
High School
Community College
4-Year College or More
The Other Perspective
63% of all jobs will require some college or better by 2018.

Source: Analysis of March CPS data, various years, Center on Education and the Workforce forecasts of education demand to 2018.
Sub-Baccalaureate Credentials Pay Off

<table>
<thead>
<tr>
<th>Licenses and Certificates Earn More Than:</th>
<th>Associates Earn More Than:</th>
</tr>
</thead>
<tbody>
<tr>
<td>43%</td>
<td>31%</td>
</tr>
<tr>
<td>27%</td>
<td></td>
</tr>
</tbody>
</table>

Percentages compare the earnings of those with licenses and certificates to those with Associates and Bachelors degrees.
Education and Future Work:
BLS & CEW

<table>
<thead>
<tr>
<th>Education Level</th>
<th>USDOL-BLS</th>
<th>CEW</th>
</tr>
</thead>
<tbody>
<tr>
<td>BS/BA or more</td>
<td>23</td>
<td>33</td>
</tr>
<tr>
<td>Some College</td>
<td>30</td>
<td>30</td>
</tr>
<tr>
<td>Associate</td>
<td>5</td>
<td>6</td>
</tr>
<tr>
<td>PS Award</td>
<td>6</td>
<td>8</td>
</tr>
<tr>
<td>Work Experience</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>OJT-Short to Long</td>
<td>58.5</td>
<td></td>
</tr>
<tr>
<td>HS or less</td>
<td>36</td>
<td></td>
</tr>
</tbody>
</table>

USDOL-BLS and CEW data comparison.
A 3rd Perspective

Computers now exhibit human-like capabilities not just in games such as chess, but also in complex communication such as linguistic translation and speech. These new abilities stem from “pattern recognition” technologies – the same techniques that underpin, for example, the Siri voice recognition tool in Apple’s iPhone 4S.
A 3rd Perspective: The Race Against the Machine (The Machines are Winning?)

- The Google car (truck?)
- IBM Watson
- Deep Blue
- The “Square”
- Text readers/
  Pattern recognition (goodbye legions of lawyers-only 60% accurate)
- Automated ‘call centers’ (goodbye India)
- GeoFluent (goodbye translators)
- Vending machines for … everything
Can People Win?

Instructional methods

Softer skills

Instructional focus

The Human Advantage (for now)

- Khan Academy
- CTSOs/WBL
- Hyperspecialists, entrepreneurship
- Physicality of work
- Advanced pattern recognition
- General problem solving
- Creativity
The Solution

PROGRAMES OF STUDY
Why We do Experimental Research: A Cautionary Tale

- The Japanese eat very little fat and suffer fewer heart attacks than the British or Americans.
- The Mexicans eat a lot of fat and also suffer fewer heart attacks than the British or Americans.
- The Japanese drink very little red wine and suffer fewer heart attacks than the British or Americans.
- The Italians drink excessive amounts of red wine and also suffer fewer heart attacks than the British or Americans.
- The Germans drink a lot of beer and eat lots of sausages and fats and suffer fewer heart attacks than the British or Americans.

CONCLUSION: Eat and drink what you like.

Speaking English is apparently what kills you.
FOR POS TO BE SUCCESSFUL

Increase Student Engagement
Completing HS
Completing PS/industry credential

Facilitate Transition
To continuing education;
To the workplace;
To a successful adulthood

Improve Achievement
Academic
Occupational
Technical
Rigorous, Longitudinal POS Studies: Mixed Method Studies*

- A longitudinal study of three cohorts in SC (6th, 9th, 11th graders) in three diverse WIAs
- A backward mapping (from CC) study of three sites with 15 years of history of POS-like programs
- A random assignment or propensity match study in five sites (3 states)

* Systems Data (transcript) & Interview, Survey Data
Caveats

- These are longitudinal studies
- Data collection lags actual events
  - Students have to complete the “thing”
  - A true POS includes HS&PS – 4+ 2-3 years minimum
  - Release of system lags by 4 months to 4 years.
- Early findings will point toward proximal variables
  - Progress toward graduation
  - Behaviors
  - Self-efficacy
  - Academic & Technical Achievement
- Evidence on distal variables 5+ years(?)
ENGAGEMENT
At the comprehensive HS one student’s brother attends, “they don’t think about their future as much as they do here.”

Regarding her POS HS, another student said: “I feel really prepared because of the workload and the different ways that we are learning why we’re doing something. Not just learning the actual topic…[but] the reasons behind it.”
POS Student Opinion #2

One student said she’d been disengaged from school freshman year but by senior year, she loved school and looked forward to her nursing career:

“This school has really changed – could really change someone. It gets you to the career path that you want and if you’re around people that want to do it and succeed you’ll want to succeed.”
Do POS make a difference for students?

Over 70% of high school students reported being in a POS made them more engaged in school and better prepared for college and careers.

35% of sample enrolled in the local (POS affiliated) college. Of these:

- 45 - 57% continued to study in their POS area (next slide)
- 29% of our sample (compared with 17% of students from non-POS affiliated HS), reported feeling “very” prepared for college level studies
Student Behavior-Engagement
Percentage of POS1 2011 Cohort Switching IGP Career Clusters, by School Poverty Index (POV)

Poverty Index (Higher Score -> Higher Poverty)
Hot off the press:
Graduation Rates
(10:30 this morning)

POS Completers: 97.5%
All Comparison: 95.5%
Comparison Pathway Completers: 95.3%
ACHIEVEMENT
Weighted Cumulative Overall GPA HOT OFF THE PRESS

- POS Completers: 2.74
- All Comparison: 2.72
- Comparison Pathway Completers: 2.53
Weighted Cumulative Overall GPA (Hot off the press)

POS Completers: 2.74
All Comparison: 2.72
Comparison Pathway Completers: 2.53
Higher Math Credits Earned (Hot of the Press!)

<table>
<thead>
<tr>
<th></th>
<th>POS Completers</th>
<th>All Comparison</th>
<th>Comparison Pathway Completers</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5</td>
<td></td>
<td>1.4</td>
<td>1.2</td>
</tr>
</tbody>
</table>
Science Credits Earned

POS Completers: 3.7
All Comparison: 3.8
Comparison Pathway Completers: 3.6
Taking more CTE courses is related to taking more math and science credits, and to a higher GPA in science.

CTE course taking has a positive relationship (i.e., not detrimental) with academic motivation and skills.

[Further transcript analyses, including HS to college longitudinal analyses, are forthcoming.]
Numbers of CTE Program Completers
Comparison Group & Test Group

Laurel
Poplar
Apple
Elm
Redwood
Azalea
Orchid
Iris
TRANSITION
Transition to Affiliated College (35% of sample)

Of those who entered affiliated college, 45% stayed in the same POS (e.g., culinary) as in HS

57% stayed in the same career cluster (e.g., hospitality) as their HS POS
Did they do what they planned?

<table>
<thead>
<tr>
<th></th>
<th>2009 plans</th>
<th>2012 actual status*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Technical/trade school</td>
<td>8%</td>
<td>12%</td>
</tr>
<tr>
<td>2 year college</td>
<td>28%</td>
<td>41%</td>
</tr>
<tr>
<td>4 year college</td>
<td>45%</td>
<td>29%</td>
</tr>
<tr>
<td>Work</td>
<td>5%</td>
<td>13%</td>
</tr>
<tr>
<td>Military</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Not sure</td>
<td>7%</td>
<td>N/A</td>
</tr>
<tr>
<td>Unemployed &amp; Not in school</td>
<td>N/A</td>
<td>4%</td>
</tr>
</tbody>
</table>

* Based on final survey responses and other means of tracking students
Factors Most Strongly Associated with Student Retention and Completion at Three Community Colleges

- Math placement test scores
- Age (older students do better)
- Receipt of financial aid
- **Status as occupational major**
- Use of tutoring services in first term in college

From Bremer, C. D., Center, B. A., Medhanie, A., Opsal, C. L., Geise, A., & Jang, Y. J. (in review). Outcome Trajectories of Developmental Reading and Writing Students in Community Colleges
Weighted Cumulative Overall GPA (academic, CTE, elective)

- POS Completers: 2.74
- All Comparison: 2.72
- Comparison Pathway Completers: 2.53
FINDINGS: THE 10 OVAE ELEMENTS
10 Supporting Elements of POS*

- Legislation and Policies
- Partnerships
- Professional Development
- Accountability and Evaluation Systems
- College and Career Readiness Standards
- Course Sequences
- Credit Transfer Agreements
- Guidance Counseling & Academic Advisement
- Teaching and Learning Strategies
- Technical Skill Assessments

# Guidance & Counseling: A Critical Component

<table>
<thead>
<tr>
<th>Percentage of Respondents</th>
<th>Class of 2009</th>
<th>Class of 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>No One</td>
<td>12%</td>
<td>4%</td>
</tr>
<tr>
<td>Parent</td>
<td>34%</td>
<td>29%</td>
</tr>
<tr>
<td>Teacher</td>
<td>9%</td>
<td>5%</td>
</tr>
<tr>
<td>Guidance</td>
<td>36%</td>
<td>58%</td>
</tr>
<tr>
<td>Friends</td>
<td>6%</td>
<td>2%</td>
</tr>
<tr>
<td>Multiple Responses</td>
<td>4%</td>
<td>2%</td>
</tr>
</tbody>
</table>
## Typical “Progression of courses” template

<table>
<thead>
<tr>
<th>9th Grade</th>
<th>10th Grade</th>
<th>11th Grade</th>
<th>12th Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>English I or English I-Honors</td>
<td>English II, World Lit. Honors, or Business Communications</td>
<td>American Lit., AP English, or Applied Communication</td>
<td>English IV or Technical Report Writing</td>
</tr>
<tr>
<td>or Geometry Honors</td>
<td>II, Geometry, or Geometry Honors</td>
<td>II, Pre-Calculus Honors, or Trigonometry and Prob/Stats.</td>
<td></td>
</tr>
<tr>
<td>Principles of Science or Biology I-Honors</td>
<td>Biology I, Biology I-Honors, Chemistry I, or Chemistry I-Honors</td>
<td>Chemistry I, Chemistry I-Honors, AP Chemistry, Physics I, or Physics I-Honors</td>
<td>Physics or AP Physics</td>
</tr>
<tr>
<td>World History or AP World History</td>
<td>US History or AP US History</td>
<td>US Government</td>
<td>Foreign Language</td>
</tr>
<tr>
<td>Physical Education I</td>
<td>Physical Education II</td>
<td>Accounting I (1 credit)</td>
<td>*Office Technology II (2 credits)</td>
</tr>
<tr>
<td>Freshman Academy</td>
<td>Intro to Business Technology (semester)</td>
<td>Office Technology I (2 credits)</td>
<td>or *Computerized Accounting (2 credits)</td>
</tr>
<tr>
<td>Health/Drivers’ Ed (semester)</td>
<td>Introductory Computer Concepts (semester)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Introductory Computer Concepts (semester)</td>
<td>Multimedia &amp; Desktop Publishing (semester)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

### Certifications
- MCAS (Microsoft Certified Applications Specialist)

### Possible Articulated Courses
- ACC135B – Bookkeeping I IS 101

### Post Secondary Options
- CC – Division of Business
- State College – Business Administration
- University – College of Business Administration
Opportunity to Acquire PS Credits
(No Consistent Models)

DUAL CREDIT

- At West, college credit is immediately granted if students pass the HS course with an A or a B; the credits are portable.
- At East and South, students must pass an extra exam and/or show an IRC, and they must attend that CC to get the credits.

DUAL ENROLLMENT

- At West, students are free to enroll in college courses and earn credits.
- At East and South, only gen ed courses are available to HS students.
### Options for College Credit: SC Pathways

#### Table 11. Change in Course-Taking Over Time

<table>
<thead>
<tr>
<th></th>
<th>2009</th>
<th>2011</th>
<th>Diff</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Non-POS Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Students AP/IB</td>
<td>26%</td>
<td>28%</td>
<td>2%</td>
</tr>
<tr>
<td>Average Number of AP/IB Credits</td>
<td>3.4</td>
<td>3.6</td>
<td>0.2</td>
</tr>
<tr>
<td>Percent Dual Credit</td>
<td>10%</td>
<td>9%</td>
<td>-1%</td>
</tr>
<tr>
<td>Average Number of Dual Credits</td>
<td>2.3</td>
<td>2.6</td>
<td>0.3</td>
</tr>
<tr>
<td>Number of 10/11th Credits</td>
<td>7.0</td>
<td>7.2</td>
<td>0.27***</td>
</tr>
<tr>
<td><strong>POS Students</strong></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Percent Students AP/IB</td>
<td>11%</td>
<td>9%</td>
<td>-2%</td>
</tr>
<tr>
<td>Average Number of AP/IB Credits</td>
<td>2.0</td>
<td>1.5</td>
<td>-0.5</td>
</tr>
<tr>
<td>Percent Dual Credit</td>
<td>9%</td>
<td>16%</td>
<td>7%**</td>
</tr>
<tr>
<td>Average Number of Dual Credits</td>
<td>2.1</td>
<td>2.5</td>
<td>0.4</td>
</tr>
<tr>
<td>Number of 10/11th Credits</td>
<td>8.0</td>
<td>8.1</td>
<td>0.1</td>
</tr>
</tbody>
</table>
Lead to Industry-Recognized Credential, Certificate, AA, or BA

- All POS in the study lead to IRC in HS or CC, or AA/AAS or BA/BS programs
- Many IRCs can be earned in HS – South District’s goal is to have students graduate with HS diploma “and something else”
- Time, personnel, and funding cited as problematic: *East District can no longer cover exam costs* and have downplayed this aspect of POS
What We Found

POS Framework in Action
- Shared vision
- Flexibility
- Relationships
- Industry involvement
- Credit transcription
- Need Career Guidance
- Dedicated staff
- Grant funding
- Students on campus

OVAE POS Framework
- Legislation and Policies
- Course Sequences
- Partnerships
- Credit Transfer Agreements
- Guidance Counseling
- Professional Development
- Technical Skills Assessments
- Teaching/Learning Strategies
- Accountability/Evaluation
- College/Career Ready Standards
Emergent trends

- Some evidence of academic achievement effect, but the evidence is mixed
- Mandate did not appear to have much effect on POS implementation (e.g., % of students engaged in POS, use of dual credit)
- 10 elements are not equally important or too costly to employ (e.g., TSA)
- Other elements may be more important (e.g., external funding)
Emergent Trends II

- Even when the policy is required by law, implementation is uneven and may be skewed towards lower performing districts.
- Career guidance/career development is emerging as a necessary condition for RPOS
- Cost is a barrier (counseling, TSAs, professional development)
Things We Don’t Know . . . Yet

Transition to postsecondary education
- Limited evidence from the Mature POS study
- No follow up with HS cohorts in SC Pathways or U of L Rigorous Test sites

Transition to work
- Acquisition of credentials and,
- The signaling power of the earned credentials
Implicit Assumptions: With Policy Implications

- Education reforms operate independently of economic context
- Adolescents are rational, logical decision makers
- The 10 “elements” are the right elements to ensure POS success

Accountability challenges for POS
- What will POS success mean?
- Enrolled in any college?
- Pursuing same POS pathway?
- Student sense of contribution of POS?
POS MUST EMBRACE COLLEGE & CAREER READINESS

Occupational
SCANS
21st Century Skills
“Soft” Skills
Employability Skills

Academic
Mathematics
Science
Communications

Technical
Job specific skills valued by employers

College & Career Ready
An Industry Driven POS-Toyota

THE SKILL PIPELINE PROBLEM

The U.S. community college system produces less capable graduates than parallel systems in competitor nations.

Intentional preparation consists mostly of academic education only, i.e. pass technical courses and get a degree.

Schools do not produce graduates with vital preparation for workplace success, such as a highly developed safety culture, skills in workplace organization, lean work skills, and problem solving.
The Toyota Solution
Seamlessly Connect Paths for Career Long Growth and to Strengthen the Whole Company

TOYOTA
Advanced Manufacturing Career Paths

TOYOTA Maintenance Career
MGR
AM
TM
TL

TOYOTA Seibi Career
Org Mgt. Seibi Mgt. Seibi Tech

Automotive Manufacturing
M.B.A.

Lean Manufacturing Certificate

Manufacturing Management Program
B.B.A.
A.B.

Toyota Maintenance Internship

Toyota Advanced Program

AMT Advanced Manufacturing Technician Program

Special Toyota Degree Program

100% Toyota Relevant

K-12

Project Lead the Way

Robotics
Programmable Controls
Line Controllers
Vision System
Troubleshooting

TOYOTA Engineering Career
Production Engineer TEMA

NED New Engineer Development

AME Advanced Manufacturing Engineering Program
Electrical / Industrial Mechanical
B.S.

TOYOTA Maintenance Career MGR GL TL

* 6 mo. – 2 years
* Full-time floor experience

TOYOTA Advanced Manufacturing Career

* 100% Toyota Relevant

TOYOTA Maintenance MGR AM TL

TOYOTA Advanced Manufacturing
Robotics
Programmable Controls
Line Controllers
Vision System
Troubleshooting

TOYOTA Maintenance Career

TOYOTA Seibi Career
Org Mgt. Seibi Mgt. Seibi Tech

Automotive Manufacturing
M.B.A.

Lean Manufacturing Certificate

Manufacturing Management Program
B.B.A.
A.B.

Toyota Maintenance Internship

Toyota Advanced Program

AMT Advanced Manufacturing Technician Program

Special Toyota Degree Program

100% Toyota Relevant

K-12

Project Lead the Way

Robotics
Programmable Controls
Line Controllers
Vision System
Troubleshooting
The Solution
Totally Redesign the Learning Environment

The New Model School
For Manufacturing

MORE REALISTIC
Looks Like a Factory
Feels Like a Factory

MANUFACTURING SIMULATOR
Central Focus
Reason for Learning
Toyota Troubleshooting

TOYOTA LEARNING
Safety, TPS, 5S
Learning Lab

Make the Place of Learning look and feel like the Place of Work

ORGANIZED BY
FUNDAMENTAL SKILL
Electricity / Fluid Power
Mechanics & Fabrication

PROCESS LEARNING
Students learn in a structure sequence

Students Learn the Right Way the First Time
Tech Ed and vocational programs, as they exist now, are not part of the solution. On they whole they do not produce graduates with the capabilities that give U.S. companies advantage over off-shore based competitors and they create too much cost to up-skill when hired.
The Solution
Totally Redesign The Community College Program

NEXT GENERATION Technical Degree
Advanced Manufacturing Technician Program
Associate Degree in Applied Science
TOYOTA MAINTENANCE FUNDAMENTAL SKILLS

1st Semester
- General Education: Math
- Technical Core Areas: Intro to Electricity
- Manufacturing Experience Program: Production Experience

2nd Semester
- General Education: History
- Technical Core Areas: Fluid Power
- Manufacturing Experience Program: Maintenance Introduction

3rd Semester
- General Education: Social Science
- Technical Core Areas: Motors Mechanics
- Manufacturing Experience Program: Preventive Maintenance Support

4th Semester
- General Education: Science
- Technical Core Areas: Controls PLC
- Manufacturing Experience Program: Priority 1 Mastery Start

5th Semester
- General Education: Public Speaking
- Technical Core Areas: Welding & Machining Drawings
- Manufacturing Experience Program: System Troubleshooting Robots

Selection Process
PLTW High School Graduates (Math ACT ≥ 19)

Characteristics When Hired
- Communication and critical thinking skills
- Multiskilled Technical Foundation
- Floor experience and hands-on skill
- Good safety practice on hire
- 5S understanding and practice on hire
- Lean mfg thinking and practice on hire
- Problem solving thinking and use on hire
- Understanding of maintenance practice on hire
- Excellent worker behavior on hire

Manufacturing Core Exercises
- 5S
- Toyota Production System for Maint.
- Total Productive Maintenance

Work Behavior
- Attendance – Diligence – Teamwork – Interpersonal Relations - Initiative

Manufacturing Core Exercises
- Safety
- Coach
- Continue Practicing Activity
- Coach
- Continue Practicing Activity
- Coach
- Continue Practicing Activity
- Coach
- Continue Practicing Activity
- Coach
- Continue Practicing Activity

Problem Solving
- Coach
- Continue Practice
- Coach
- Continue Practice
- Coach
- Continue Practice
- Coach
- Continue Practice
Three Reports on Career & College Ready
VISIT OUR WEBSITE OR SEND ME A NOTE

www.nrccte.org

JAMES.STONE@NRCCTE.ORG