STEM Learning Exchange Presentations

January 30, 2013

Agriculture, Food and Natural Resources: Jay Runner

Energy: William Hunter

Health Science: Bruce Neimeyer

Information Technology: Colleen White

Manufacturing: Jim Nelson

Research and Development: Jane Fischer

Transportation, Distribution, and Logistics: Ben Brockschmidt

Agriculture, Food and Natural Resources STEM Learning Exchange

Jay Runner

Agriculture, Food & Natural Resources (AFNR) STEM Learning Exchange

Jay Runner
AFNR STEM Learning Exchange Coordinator

RTT Coordinator's Meeting
January 30, 2013

AFNR Career Pathways

- Agricultural Science (Plant, Animal, Food)
- Agricultural Business Management
- Agricultural Mechanic & Technology
- Natural Resources Conservation Management
- Horticulture Science

Highlights

- Agribusiness industry comprises 75% Illinois' land area
- Employs over 163,000 workers
- Contributes $13.5 billion to state's economy
- Core of human survival providing food and shelter
- Over 300 career opportunities
- Illinois Agricultural Education students are 90% non-farm, 37% female, 10% minorities

Career Profile Poster

Career Profile Narrative

career profile

Name: Alex Williams
Job Title: Horticulturist

Employer: Indianapolis Park District

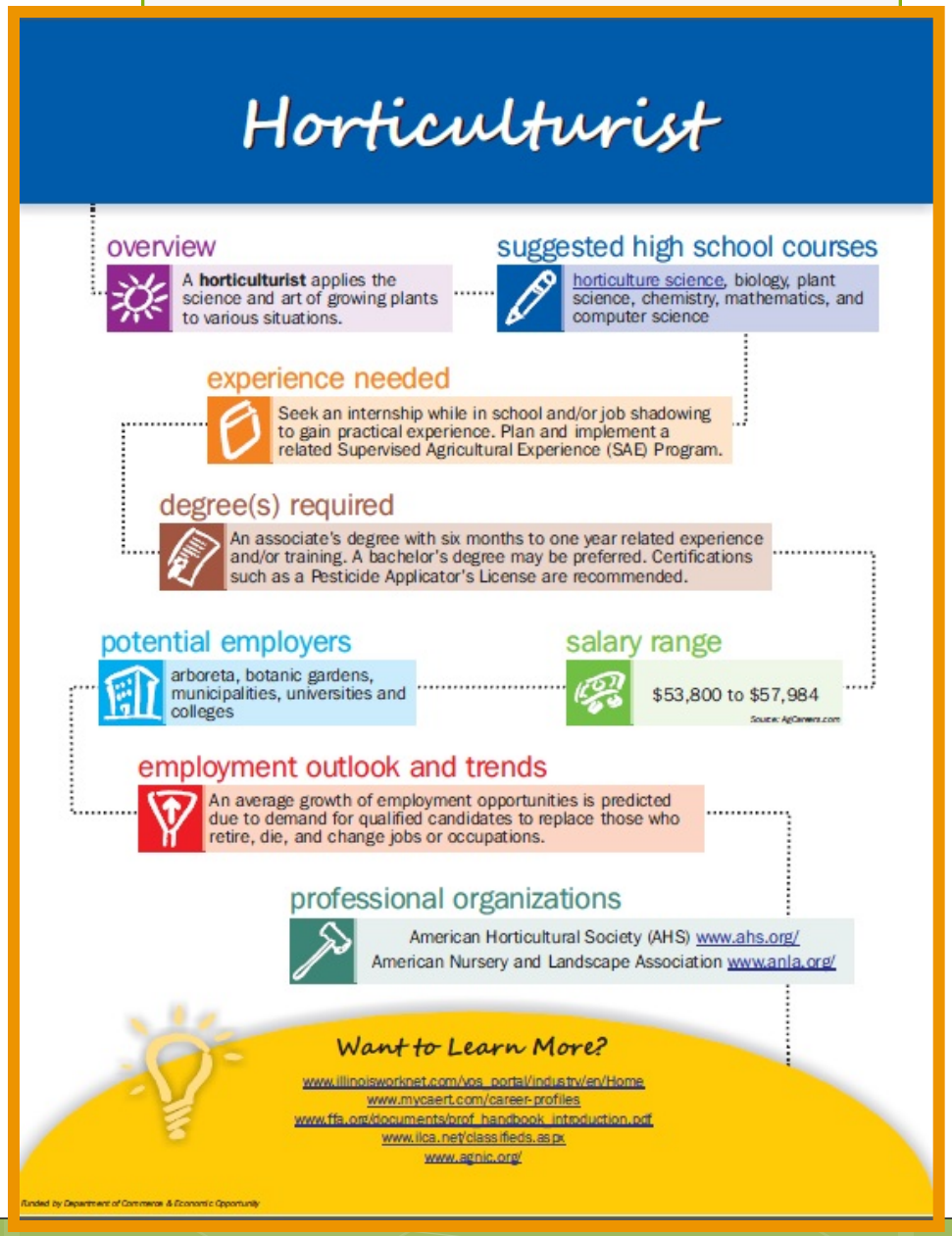
Education: BS, Purdue University: West Lafayette, IN

I am a horticulturist for the Indianapolis Park District. I have had an interest in plants since I was a child. However, it wasn't until a school counselor told me that I could study horticulture that I decided to pursue a career related to plants.

The position I hold allows me to work with plants and many great people. I participate in the planning, planting, and care of ornamental and vegetative crops. In doing so, I must stay within a budget. I see that the park district conservatory is managed for seasonal shows. I schedule crops for indoor and outdoor displays in the production greenhouse. Among my responsibilities are the selection of plant varieties and calculation of the number of plants to be grown. I supervise technicians who propagate, water, and fertilize crops. I assist landscape architects with park planning by sharing my knowledge of woody landscape plants. I give instruction to crews that conduct maintenance work such as pruning, mowing, and pest management.

One of the most rewarding parts of my job is the interaction with the public. I have been involved in a community vegetable gardening program. This program has gotten people involved in growing their own vegetables. I have also conducted a variety of classes for homeowners on such topics as how to prune trees and shrubs and lawn care.

Career Profile "Map"



AFNR STEM LE Partnerships

- Illinois Committee for Agricultural Education(ICAE)
- Illinois Leadership Council For Agricultural Education(ILCAE)
- Illinois TEAM AG ED
- Illinois Association Vocational Agricultural Teachers(IAVAT)
- Illinois Association Community College Agricultural Instructors(IACCAI)
- Illinois Ag In The Classroom(IAITC)
- Facilitating Coordination in Agricultural Education(FCAE)
- Illinois FFA Association
- Illinois Foundation FFA
- Illinois FFA Alumni
- Illinois American Water
- Midwest Engines
- Lincoln Welders

AFNR STEM LE Initiatives - Work-Based Learning and Professional Development

- Supervised Agricultural Experience(SAE) Mini-Grant
- SAE AgriScience Research Start-up Mini-Grant
- Illinois FFA AgriScience Fair Participation
- CTE Water, Food, Energy Challenge Project
- Mentor Program with “Career Cruising”
- Teacher Professional Development Workshops
- Internships for Secondary and Postsecondary Students

AFNR STEM LE Initiatives – Curriculum Resources and Assessments

- Common Core Math and Science Integration Activities
- End of Year Course Assessments
- Alignment of Existing Curriculum and Resources to Common Core Standards
- Agricultural Industry Certification Development

AFNR STEM LE Initiatives – Technology

- Illinois Agricultural Education Website Revision – Educational Resources, Professional Development, Career Development and Outreach, Data Collection Enhancement
- Align Various Agricultural Education Data Sources

FCAE Staff

FCAE — Facilitating Coordination in Agricultural Education

www.agriculturaleducation.org

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Sept. 2012

Energy STEM Learning Exchange

William Hunter

Illinois Energy Learning Exchange

Dr. William J.F. Hunter
Director, Center for Mathematics, Science and Technology
Illinois State University

ELE Vision

V1. Promote STEM learning using Energy as the medium.
V2. To provide an introduction to energy-related careers (including Energy literacy expectations that everyone should achieve).
V3. To provide advanced education on energy related careers (so that those with talent and interest are able to make moves into careers).
V4. To compile a list of opportunities that exist, barriers to achieving the goals, and to identify low-hanging fruit in energy education that could be achieved in the next 12-18 months.

ENERGY

Energy Cluser: Developing, planning and managing the production of energy including renewable energy and clean coal technology and its distribution through smart grid technologies.

Cluster: Change Cluster Go

= Courses = Work-Based Learning = Credentials / Assessments = Shared Pathways

Select any Pathway to see related programs then click on any course, work-based learning, credentials/assessments, or shared pathway icon to see related lists.

Energy Pathways
- Energy Management
- Energy Engineering
- Building Energy Efficiency
- Transportation Energy Efficiency
- Energy Research and Development
- Energy-Related Manufacturing

Orientation (e.g. Middle & High School)	Pathways (e.g. High School)	Postsecondary Education and Training (Bridge / Certificates and Associates / Bachelors / Graduate)	Careers
Technology Orientation	Energy Management	Energy Management	Careers
	Energy Engineering	Energy Engineering	Careers
	Building Energy Efficiency	Building Energy Efficiency	Careers
	Transportation Energy Efficiency	Transportation Energy Efficiency	Careers
	Energy Research and Development	Energy Research and Development	Careers
	Energy-Related Manufacturing	Energy-Related Manufacturing	Careers

Supply and Demand Reports
Collection of reports highlighting cluster occupation profiles and Illinois school programs and completers

ELE Plans

1.1 Create a repository/clearinghouse, a master energy curriculum database/catalog
2.1 Develop a rating system
3.1 Adopt or modify the U.S. Department of Energy Literacy Standards
3.2 Specify at a minimum that all students be able to demonstrate the 6 energy literacy outcomes in various ways at various grade levels.
4.1 Address career readiness,
4.2 Formally adopt career orientated outcomes

U.S. Dept. of Energy Literacy Standards

3.1 What is Energy Literacy?

An understanding of the nature and role of energy in the universe and in our lives.

The ability to apply this understanding to answer questions and solve problems.

An energy-literate person:

1. can trace energy flows and think in terms of energy systems
2. knows how much energy he or she uses, for what, and where the energy comes from
3. can assess the credibility of information about energy
4. can communicate about energy and energy use in meaningful ways
5. is able to make informed energy and energy use decisions based on an understanding of impacts and consequences, and
6. continues to learn about energy throughout his or her life.

4.1 & 4.2 What is an energy-career ready person?

1. Has an increasingly sophisticated immersion in energy-career knowledge –progressing from courses, to site visits, to internships, to on the job training.
2. Can calculate, discuss, and work with energy on the sub-visible scale (Ohms, watts, resistance, hertz, joules, AC/DC, etc.).
3. Can calculate energy usage, energy efficiency for small and large applications –appliances, machinery, buildings, factories, municipalities, etc.
4. Has the people/soft skills to interact with consumers, industry representatives, government officials in energy related issues.
5. Has the technical skills to work safely, productively, and efficiently at an entry level for various energy-related industries.

Who is Part of the Energy Learning Exchange?

Energy Learning Exchange Members

Colleges and Universities:

Illinois State University
Illinois' first public university

NIU

Richland Community College
40 Years of Excellence

Western Illinois University

IIRA
Illinois Institute for Rural Affairs

College of Lake County

Northwestern University
ISEN
Initiative for Sustainability and Energy at Northwestern

Eastern Illinois University

Illinois Institute of Technology

Advancing Biofuels Research
NCERC at SIUE

UIC
University of Illinois at Chicago

KCC Kankakee Community College

Energy Learning Exchange Members

Schools :

ADLAI E. STEVENSON HIGH SCHOOL
STEVENSON
DISTRICT 125 LINCOLNSHIRE, ILLINOIS

CHICAGO PUBLIC SCHOOLS
CPS

PONTIAC TOWNSHIP HIGH SCHOOL

Homewood-Flossmoor
HIGH SCHOOL | DISTRICT 233

Energy Learning Exchange Members

Companies :

Ameren Illinois

edp renewables

integrys

Primera

CATERPILLAR

EMB Consultants Chartered Quantity Surveyors

Mainstream Renewable Power

nicor gas An AGL Resources Company

ComEd An Exelon Company

Iberdrola Renewables

PALM

TRICON

Kestrel Development Company

Robert M. Fletcher Company

PROactive Strategies, Inc.

Sustainable Strategies

Energy Learning Exchange Members

Workforce Boards:

Cook County Illinois

McHenry County
mchenrycountyil.gov

DuPage Workforce Board
Making Connections

LakeCounty

River Valley WIB
Workforce Investment Board

The Workforce Boards
of Metropolitan Chicago

Workforce Investment Board of Will County

Energy Learning Exchange Members

Workforce Related:

Operation Green Jobs

IBEW LOCAL 34

SEIU Local 73
Representing 25,000 Public Service Employees in Illinois & NW Indiana

TEAMSTERS LOCAL 786

Utility Workers Union of America AFL-CIO Local 18007

Energy Learning Exchange Members

More:

The Illinois Business RoundTable

ILLINOIS CHAMBER OF COMMERCE

IGEN
Illinois Green Economy Network
A Community College Partnership

ILLINOIS ENERGY ASSOCIATION

National and State Resources

Illinois Energy Workforce Consortium

Health Science STEM Learning Exchange

Dr. Bruce C. Neimeyer

Health Science Learning Exchange

Lead Entity – University of Illinois at Chicago
Dr. Bruce C. Neimeyer
Associate Vice Chancellor for Special Programs

Health Science Learning Exchange

Examples of Associated Coursework

Informatics/Health Information Technology	•Computer Information Technology •Medical Office Procedures – CTE Course •Office and Administrative Technologies
Biomedical Research and Development	•Bio-Medical Capstone •Bio-Medical Science •Medical Interventions
Support Services	•Central Supply Services •Health Support Service –Workplace Experience or Independent Study •Vocational Rehabilitation and Community Living Skills
Therapeutic and Diagnostics	•Clinical Lab Assistant Course •Dental Assistant •EKG Technician •Home Health Aid or Nursing LPN

Health Science Learning Exchange

Examples of Careers

Informatics/Health Information Technology	•Medical and Health Services Managers / Med Records and Health Info Technicians / Medical Assistants / Medical Transcriptionists / Administrative Services Managers / Healthcare Support Workers / Bill and Account Collectors/ Receptionists and Information Clerks
Biomedical Research and Development	•Medical Scientists and Epidemiologists / Biological Scientists / Microbiologists/ Biochemists and Biophysicists
Support Services	•Mental Health Counselors / Medical Health Social Workers / Rehab Counselors / Substance Abuse and Behavioral Disorder Counselors / Dietetic Technicians / Food Service Managers / 1st line Server and Managers Food Prep / Cooks in Institutions and Cafeteria
Therapeutic and Diagnostics	•Med and Clinical Lab Technologists and Technicians / Diagnostic Medical Sonographers / Nuclear Medicine Technologists / Radiologic Techs /Cardiovascular Techs

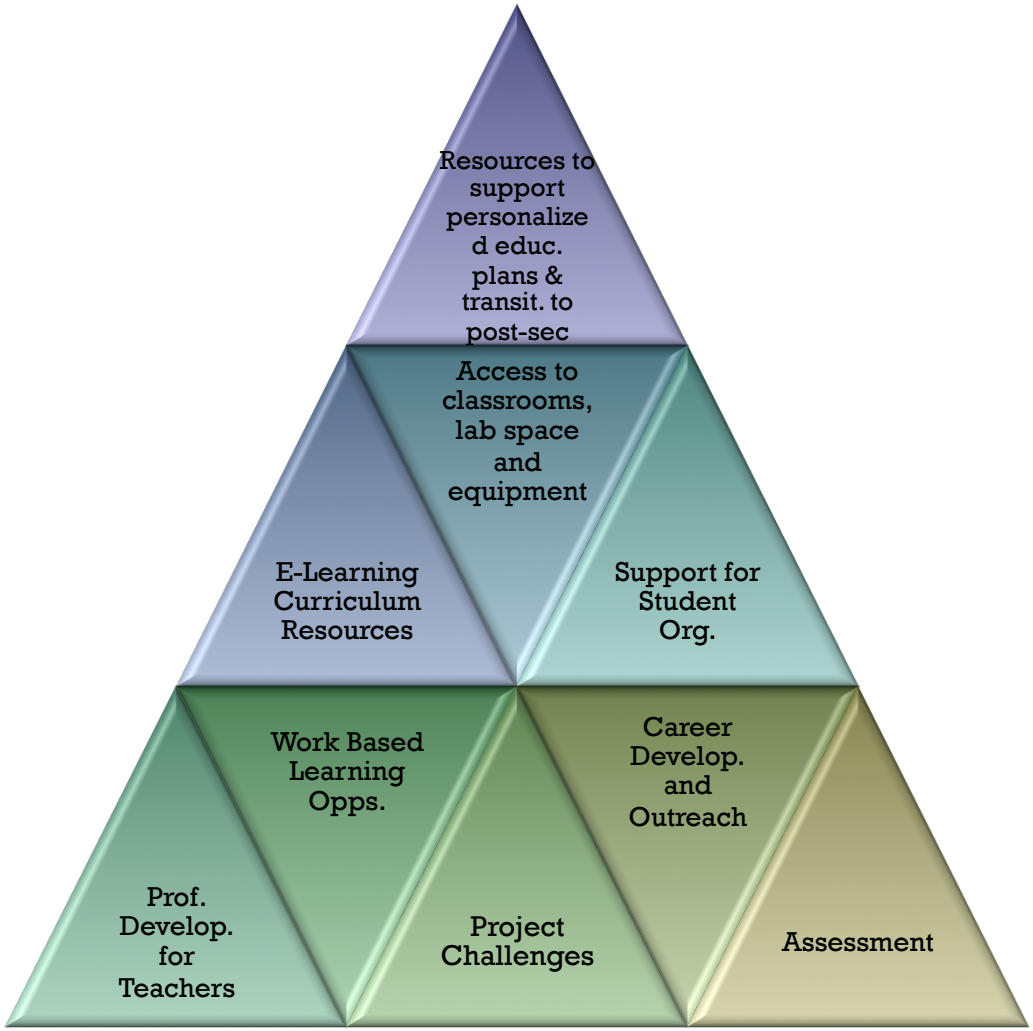
Health Science Learning Exchange

Current Partners

- Employers
- Industry Associations
- Labor Unions
- Professional Associations
- Secondary Educational Institutions
- Community Colleges
- Private and Public Universities
- State Education and Econ Development Agencies
- STEM Education Experts
- Local Workforce Investment Boards
- Museums
- Community Based Non-Profits

Health Science Learning Exchange

Resources Offered



Health Science Learning Exchange

What happens next ?

Contact Bruce Neimeyer at neimeyer@uic.edu or 312-996-8820 to add your name to the working membership of the HSLE.

Provide your current projects that support the nine core functions of the HSLE so that we can demonstrate to potential financial supports the current level of work that can be expanded.

Be active in the HSLE so that you can help to inform the direction we take next.

Information Technology STEM Learning Exchange

Colleen White

CompTIA®

Advancing the Global IT Industry

IT Learning Exchange Presentation
January 30, 2013

Colleen White
CompTIA

www.comptia.org

A Career in Information Technology

- **Knowledge and Skills Required**
  - Foundational, entry-level skills for IT technicians
- **Types of Credentials/Careers**
  - CompTIA A+:
    - Technical support specialist
    - Field service technician
    - IT support technician
    - IT support administrator
    - IT support specialist
  - CompTIA Network+:
    - Network administrator
    - Network technician
    - Network installer
    - Help desk technician
    - IT cable installer

Current Partnerships

Working to Get Other Partners Like…

BlueCross BlueShield of Illinois

3 Year Strategic Plan

- **2013 Focus**
  - Provide E-Learning Curriculum Resources
  - Provide Professional Development Resources for Teachers, Administrators, Guidance Counselors/Programmers
  - Provide Career Development and Outreach Resources for Students, Teachers, Administrator, Guidance Counselors/Programmers and Parents
- **2014 Focus**
  - Expand Access to Space, Equipment and Resources
  - Support Student Organizations and the Major Activities
  - Sponsor Challenges and Project Management Resources for Students
  - Provide Student Data and Assessment Tools and Resources on Students' Performance on the IT POS
- **2015 Focus**
  - Connect Students with Adult Mentors
  - Provide Tools & Resources to Assist Implementation of Personalized Education Plans

Examples of Resources Support

- **Work-Based Experiences/Internships/Apprenticeships**
  - **Rico Enterprises, Inc**: Internships, work-based learning experiences, speakers and mentors for career development
- **Curriculum Resources**
  - **Microsoft:** e-Learning courses
  - **IL Institute of Technology:** on-line courses
  - **Pearson Education**: e-Learning content
  - **TEC Services Consulting**: e-Learning curriculum
- **Technology, Equipment, Training**
  - **IL Institute of Technology**: lab time, instructors teaching hours, course seats

Final Comments

- **Major IT skills gap in U.S. today**
  - Currently more than *350,000 open IT jobs* with not enough qualified candidates to fill open positions
- **IT companies highly value industry certifications**
  - Validates knowledge and skills
- **A+ prepares students for entry level jobs**
  - IT Technicians are needed in every industry

Manufacturing STEM Learning Exchange

Jim Nelson

Manufacturers Education Initiative

A comprehensive approach to preparing students and adults for careers in Advanced Manufacturing

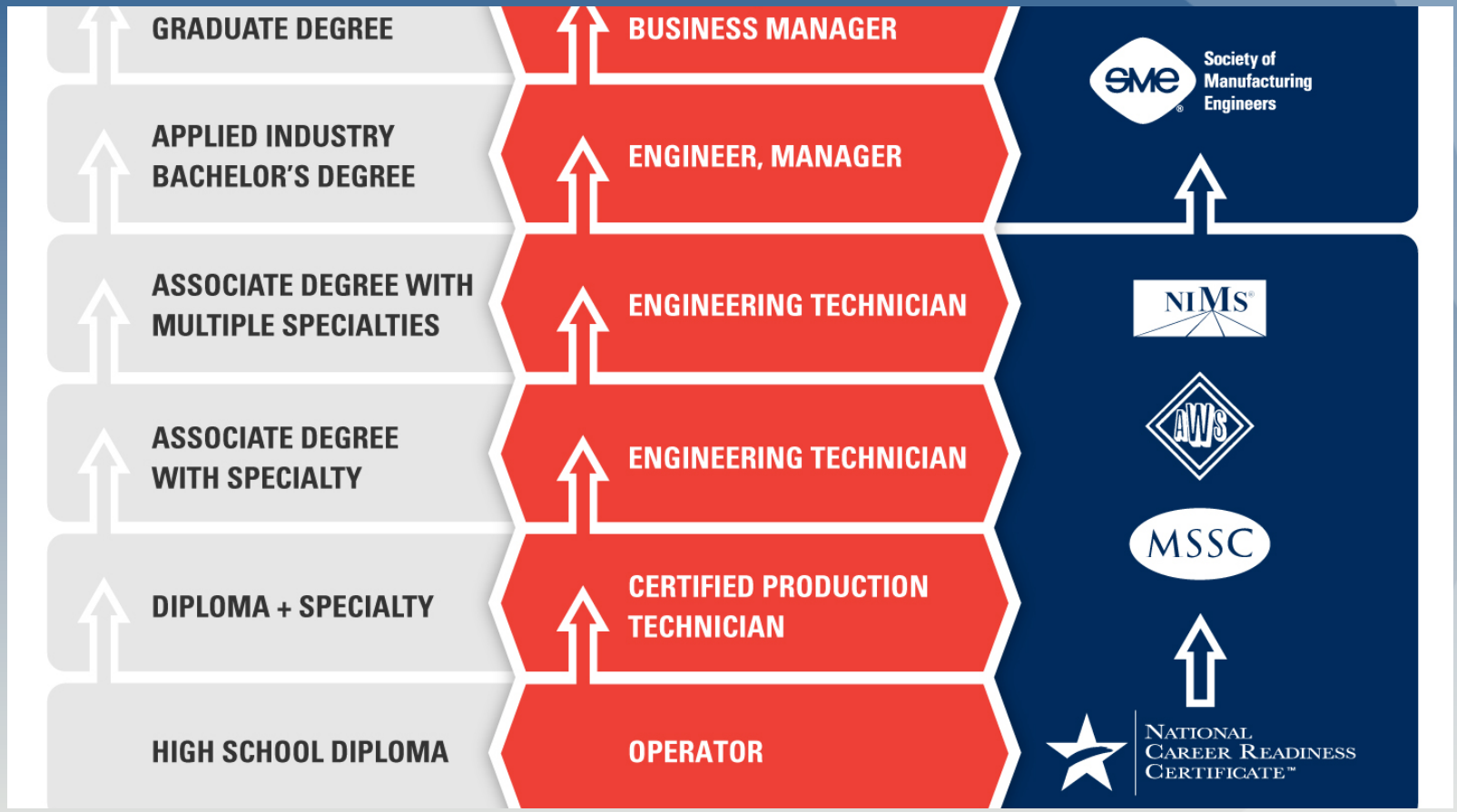
The Challenge

- At the height of the global recession, **four in five (82%) manufacturing companies reported moderate to serious skills shortages in the hiring pool.**
- Contributing to our workforce challenges are:
  - Demographics: We face a graying workforce coupled with a shrinking pipeline. In Illinois, **30,000 retiring production workers need replacements every year for the next 10 years.**
  - Technological advances in modern **manufacturing require more advanced skill** sets. We are inventing the jobs of the future.
  - Major **deficits in our education system hamper competitiveness** on the world stage: our global competitors continue to surpass our educational system in producing a high-volume, high-quality technical workforce.

Illinois' P-20 Council recognizes the issues

- The goal of Illinois' P-20 Council is "60% by 2025". Currently 43% have post-secondary degrees/meaningful certificates, goal is 60% by 2025.
- Businesses have boomer generation retirement problem, and we can't wait until 2025 for it to be solved.
- Our initiative introduces students to jobs in manufacturing and TD&L so they know the options before them. Training can begin in High School and can engage a "learn while you earn" model (particularly helpful to kids of limited means).
- High school diplomas don't have as much currency as they once did, and virtually all jobs in manufacturing today requires some post-secondary education.

How it works…


GRADUATE DEGREE
BUSINESS MANAGER
APPLIED INDUSTRY BACHELOR'S DEGREE
ENGINEER, MANAGER
ASSOCIATE DEGREE WITH MULTIPLE SPECIALTIES
ENGINEERING TECHNICIAN
ASSOCIATE DEGREE WITH SPECIALTY
ENGINEERING TECHNICIAN
DIPLOMA + SPECIALTY
CERTIFIED PRODUCTION TECHNICIAN
HIGH SCHOOL DIPLOMA
OPERATOR
SME
Society of Manufacturing Engineers
NIMS
AWS
MSSC
NATIONAL CAREER READINESS CERTIFICATE™

The Manufacturers Education Initiative

- Industry-driven
- Aligned to the Manufacturing Competency Model
- Nationally Portable
- Third-Party Validated (ISO/ANSI)
- Data-based and Supported

Nationally recognized organizations see the challenge…and offer certifications

Founding Partners

ACT

MSSC

AWS

NIMS

SME Society of Manufacturing Engineers

Partners

APICS The Association for Operations Management

AST&L American Society of Transportation and Logistics

ASQ

nccer

FMA

PMMI

ISA

NADCA North American Die Casting Association

Fluid Power International Society

What Manufacturers Want

(Requirements for *every* job)

- Workers who have obtained the skills necessary to fulfill the requirements of the job
- Acceptable soft skills – Attendance, proper attire, ability to communicate, ability to work as part of a team, etc.
- The successful passing of drug screening
- Disclosure of any criminal background
- Reliable Transportation/Child Care

What educators want from employers

- Worthwhile Internships for students that put into practice what is taught in the classroom
- Between-term Externships for faculty to make sure students are being taught the latest techniques and processes and…
- …help with obtaining up-to-date equipment
- A guarantee for interviewing students successfully completing certificates
- An ongoing dialogue to assure continuous improvement

How can we get started?

Thank you for your time

Research and Development STEM Learning Exchange

Jane Fischer

Overview

Research & Development (R&D)

Science, Technology, Engineering and Math (STEM)

Learning Exchange

About Us

- The Illinois Science & Technology Institute (ISTI) leads the R&D STEM Learning Exchange as part of Illinois Pathways Race to the Top program.

RESEARCH & DEVELOPMENT

ILLINOIS Pathways

- The mission of the ISTI is to advance scientific understanding and technological innovation in Illinois through discovery, education, invention and partnership.

- The ISTI is an affiliate of the Illinois Science & Technology Coalition (ISTC), a statewide leader that cultivates and attracts research and technology-based economic development in Illinois.

ILLINOIS SCIENCE & TECHNOLOGY COALITION

About Our Partners
The R&D STEM Coalition

Secondary Education	Post-Secondary	Industry	Non-Profit
Illinois Math & Science Academy	City Colleges of Chicago	Northrop Grumman Corporation	Argonne National Laboratory
Chicago Public Schools	Illinois Institute of Technology	Baxter International	Brookfield Zoo
Hinsdale Central High School	Illinois State University	Astellas Pharma US	Chicago Council on Science & Technology
Niles Township High School	Northern Illinois University	Eaton Corporation	Fermi National Laboratory
NSERVE Consortium	Northwestern University	Gas Technology Institute	iBIO/Institute
Oak Park River Forest High	Oakton Community College	GTL Resources	Illinois Business Roundtable
District U-60	University of Chicago	Comcast	Illinois Junior Academy of Science
STEM Summit	University of Illinois Urbana-Champaign	Monsanto	Illinois Science & Technology Coalition
Waukegan High School	Aurora University	NanoInk	Project Exploration
Wheeling High School	DePaul University	Takeda Pharmaceuticals	ScienceFIST Foundation
Lane Tech High School		Motorola Solutions	Shedd Aquarium
Palatine High School		Kraft Foods Inc.	
Northwest Educational Council for Student Success		Wm. Wrigley Jr. Company	
Walter Payton College Prep			

ILLINOIS SCIENCE & TECHNOLOGY COALITION

R&D STEM Learning Exchange Strategic Plan

- Completed January 2013
- Steering committee of diverse partners led strategic planning process
- Gathered feedback from Coalition members and many teachers
- Focus on improving secondary school student access to authentic research and development experiences in and out of school

ILLINOIS SCIENCE & TECHNOLOGY COALITION

Strategic Plan Key Initiatives

Online STEM Learning Tools

- R&D-focused resources and services
- Aligned to Next Generation Science and Common Core Math Standards

Electronic Mentor Matching

- Links students with industry/ university mentors
- Supports meaningful research collaboration within mentoring relationship

STEM Events and Challenges

- Supports industry-led challenges using real world problems
- Enhances industry and career awareness through statewide events

ILLINOIS SCIENCE & TECHNOLOGY COALITION

Examples

Integrate standard-aligned, quality R&D STEM experiences	• Teachers use hands-on learning tools and professional development from the Shedd Aquarium, FermiLab and Argonne that are reviewed and aligned to standards
Engage students and teachers in real-world problems	• Eaton Corporation and Baxter provide electronic mentoring to students across the state around real-world challenges
Encourage innovation through partnership	• Together NanoInk, Oakton Community College and Wheeling High School are changing the field of nanotechnology

Opportunities to Engage

- Consider Research & Development as program of study
- Contact us to discuss how to make the most of current programs and relationships
- Provide feedback: Participate in our upcoming asset map/ program inventory of existing resources

Contact Us

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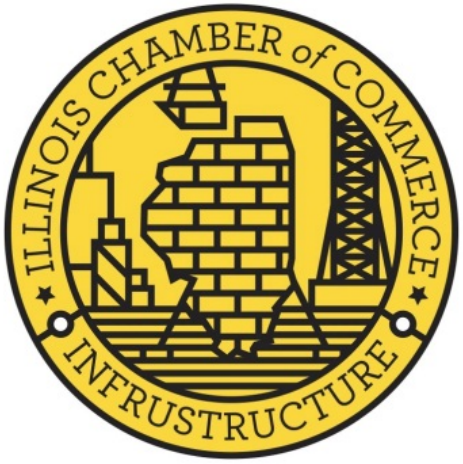
ILLINOIS SCIENCE & TECHNOLOGY COALITION



Transportation, Distribution, and Logistics STEM Learning Exchange

Ben Brockschmidt

Rail

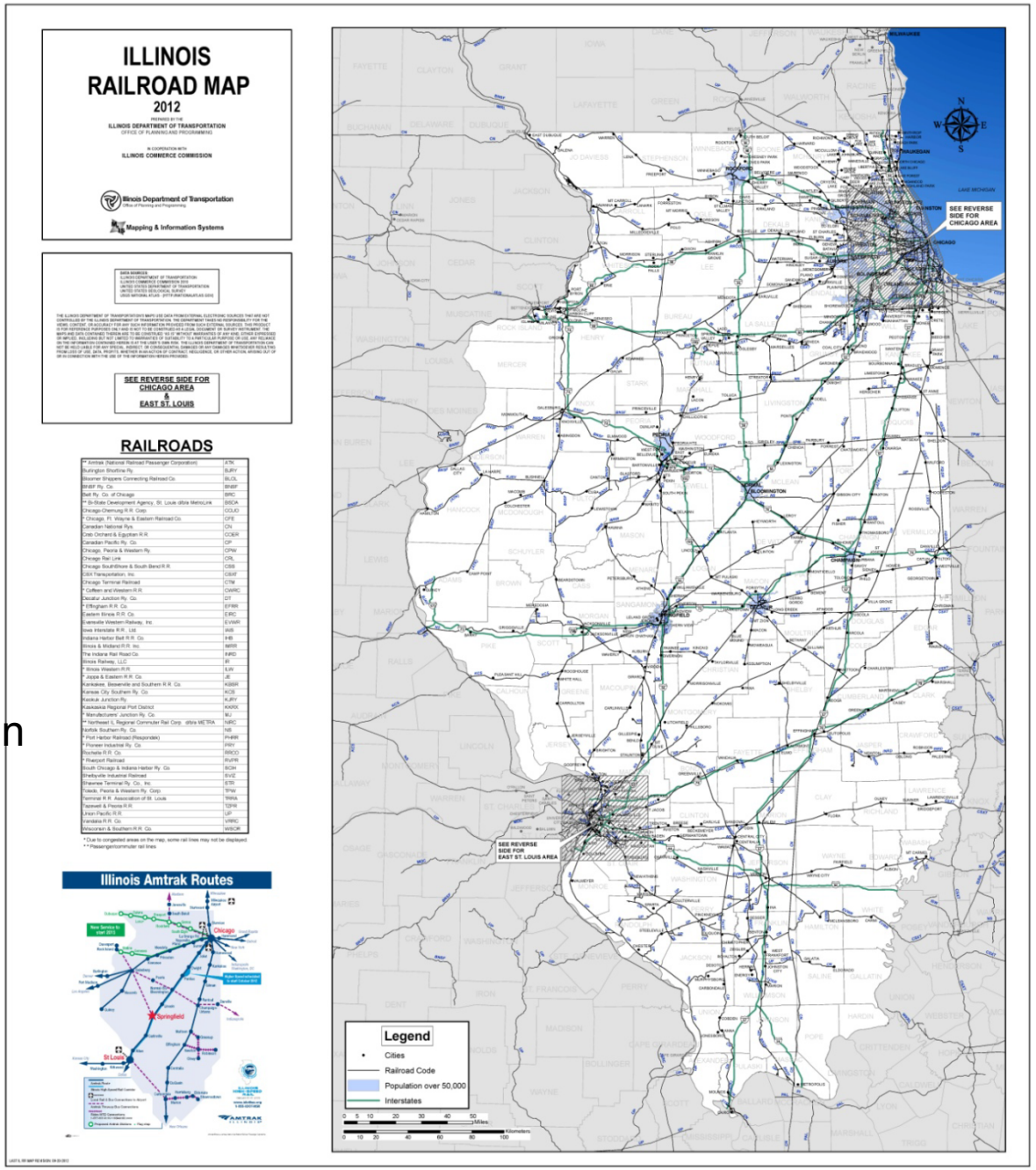
46 Railroads
7,000+ miles of track

North American ports

High-Speed
Rail
CREATE Program

Illinois is top **THREE** for rail in

- Carloads carried
- Carloads terminated
- Carloads originated
- Tons originated
- Tons terminated
- Tons carried



Intermodal Facilities

Original Source: U.S. Bureau of Transportation Services
Secondary Source: Illinois State Rail Plan Final Draft 11/2012

So What?

2010

- 1.26 billion tons of goods
  - Trucks carried 63
  - Rail carried 26 percent
- Waterways transported 11 percent
  - Air, a tenth of one

2040

- 1.7 billion tons of goods
- Trucks will carry 67%
- Rail will carry 24%
- Water will carry 9%
- Air will carry 0.2%

Increase of

Trucks - 334.2 million tons
Air freight - 3 million tons
Rail - 79.5 million tons
Water - 13.9 million tons

Thank You!