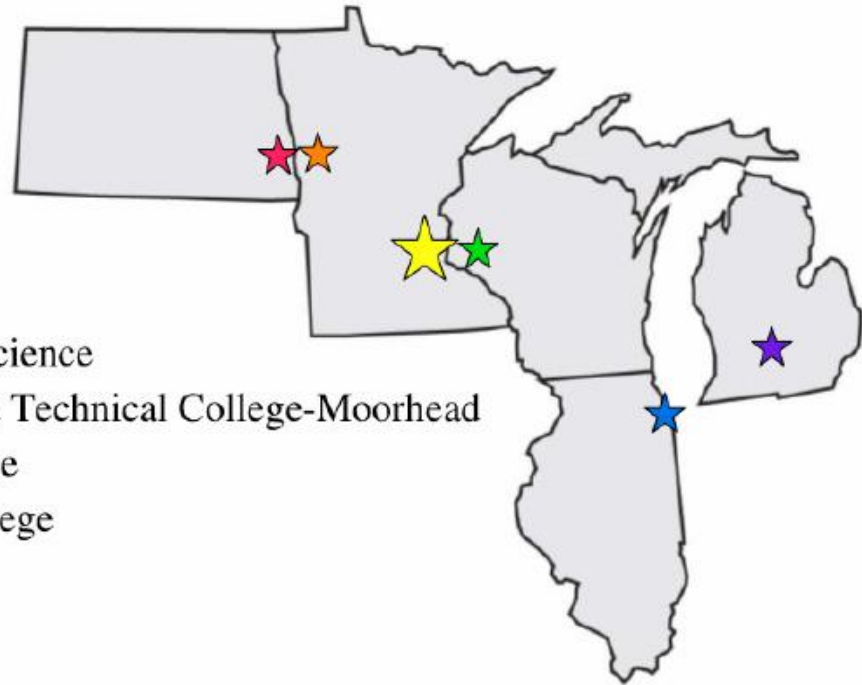




Midwest Regional Center for
Nanotechnology Education

- ★ North Dakota State College of Science
- ★ Minnesota State Community and Technical College-Moorhead
- ★ Dakota County Technical College
- ★ Chippewa Valley Technical College
- ★ William Rainey Harper College
- ★ Lansing Community College



Lead Institution: Dakota County Technical College

University Partner: University of Minnesota

PI: Deb Newberry deb.newberry@dctc.edu



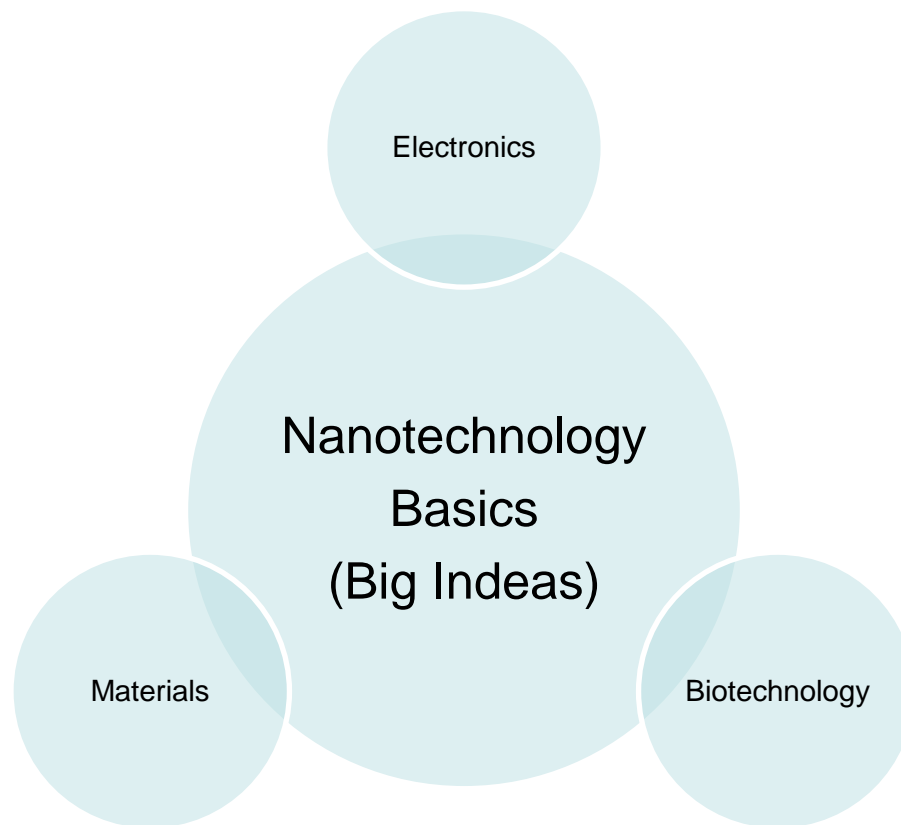
Midwest Regional Center for
Nanotechnology Education





Nanolink will enable community colleges and high schools to infuse nanotechnology into the curriculum in easy stages.





Observations

- Scientifically complex subjects can be explained and understood in an applied and conceptual way
- Research skills should be taught that enable students to find detailed information as needed
- Students need to know terminology and language that allow them to work as a team member with scientists and engineers
- Students need to become lifelong learners
 - How to stay up to date in nanoscience (via professional organizations, articles – which supplement texts)

Core AAS NanoScience Program

Critical Thinking

Conceptual Understanding

Hands-On

Soft Skills

Traditional Science Applicable Concepts (lecture and lab experiences)

Physics

Chemistry

Biology

Materials Science

Math

Engineering

Nanoscience Concepts (lecture and lab experiences)

Sense of Scale
Surface area to volume ratio

Atomic and Molecular Structure
Material Properties

Forces and Interactions
Quantum Effects

Application Extension of basic Concepts
"Self assembly"

Computer Simulation

Nanomaterials

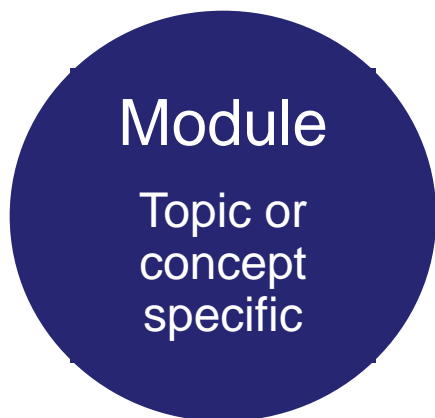
Nanoelectronics

Nanobiotechnology

Topical, Specific, Complete Modularized Content

FOR				
Technical and Community Colleges	High Schools	Industry	Informal	Others

A Module is.....



- Topic specific
- 3 to 5 hours of class time
- Background information on the topic
- Prerequisites
- List of companion traditional concepts
- Lecture Power Points – Nano Concepts
- As Appropriate:
 - Demonstrations
 - Activities
 - Experiments
- Student Assessment
- Topics for Discussion
- Models, Simulations, animations
- Related journal articles and worksheets

Morphing a course into modules

Nanomaterials
4 Units, 16 weeks

Structure

Materials

Examples &
Applications

Properties

Atomic Structure

Forces & Interactions

Self-Assembly

Crystals

Metals

Polymers

Ceramics

Carbon Nanotubes

Nanoparticles

Nanowires

Aerogels

Colloids

Electrical

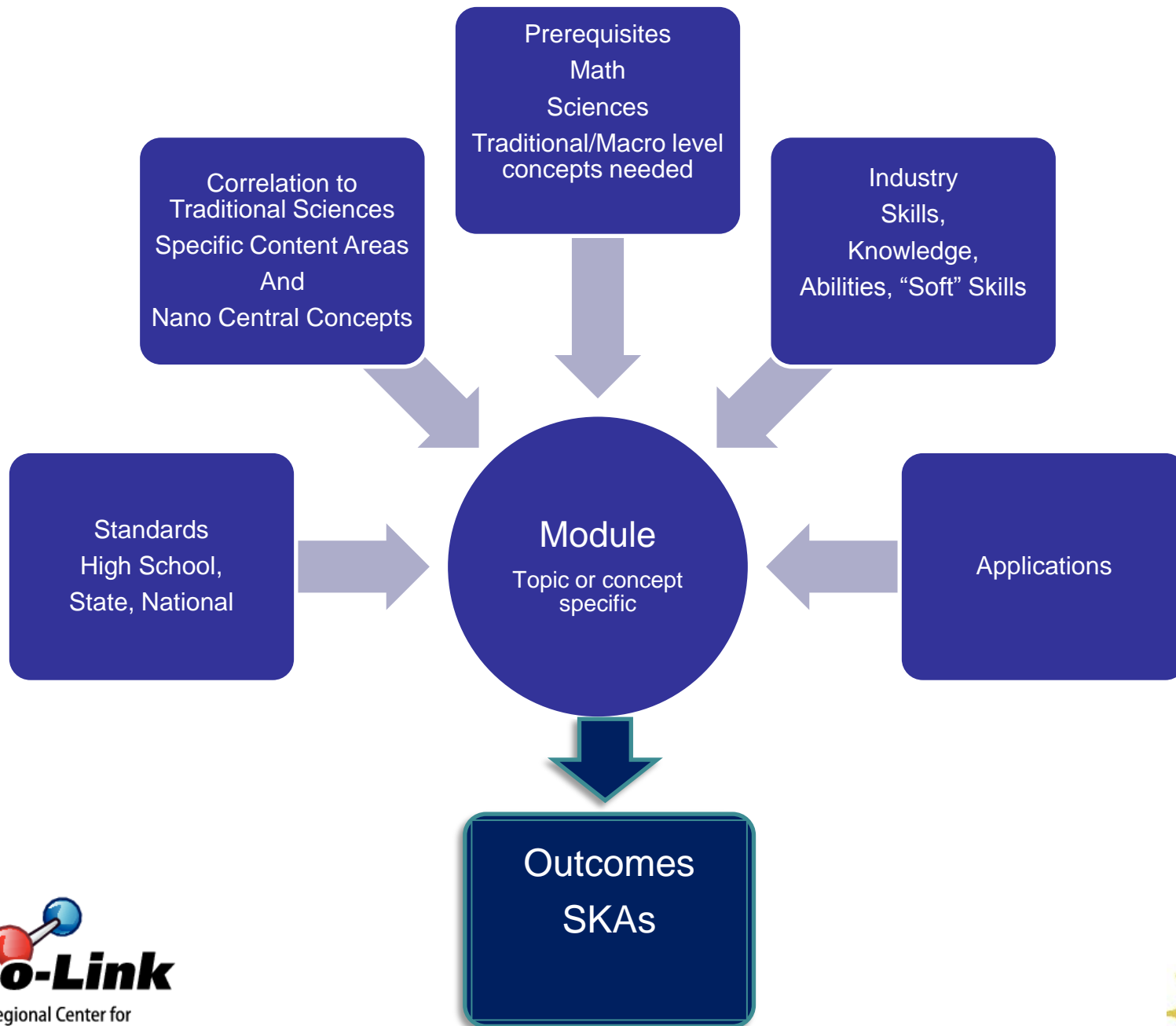
Optical

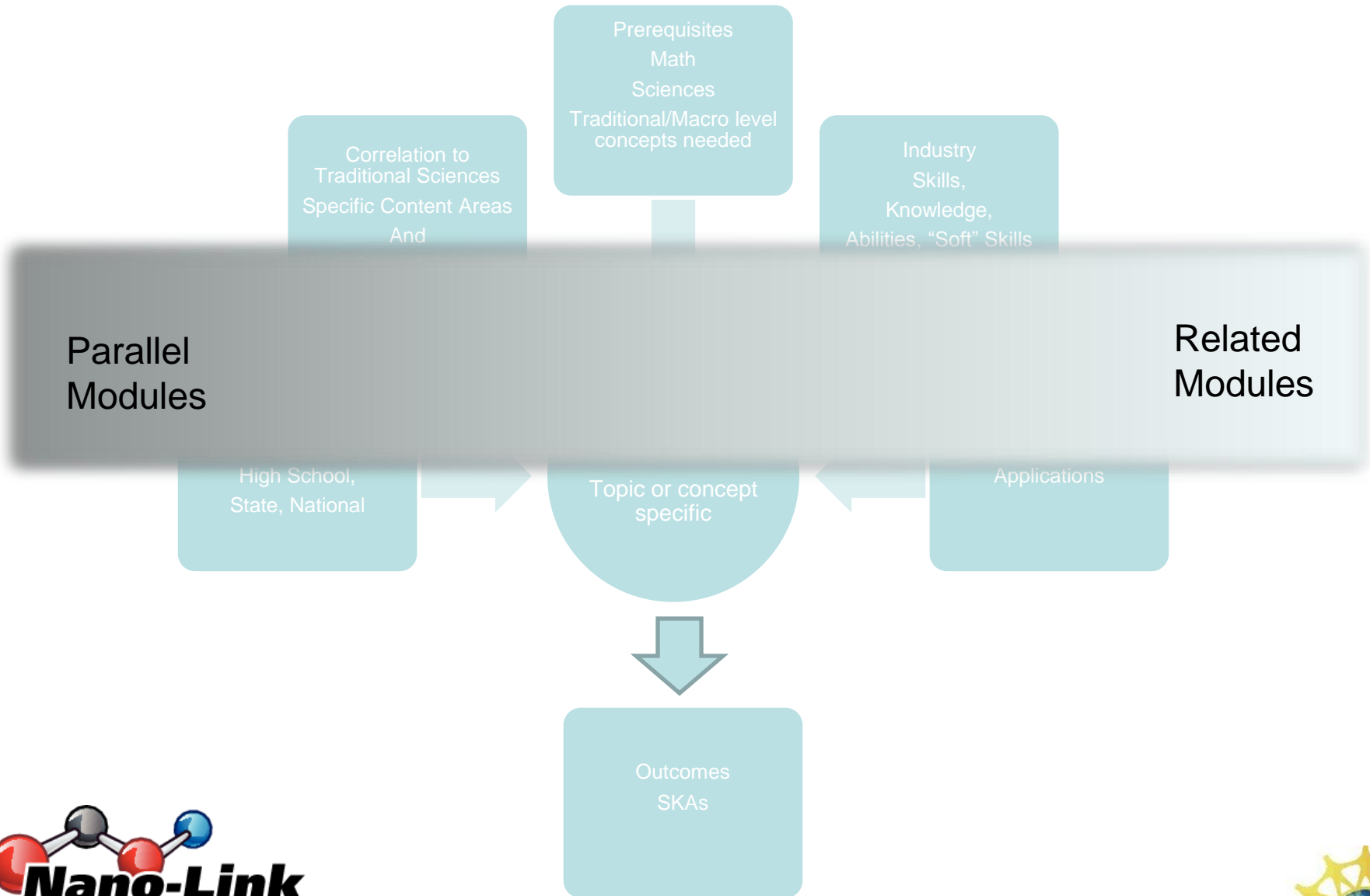
Mechanical

Thermal

Magnetic







Previous
Modules

Prerequisites
Math
Sciences
Traditional/Macro level
concepts needed

Industry
Skills,
Knowledge,
Abilities, "Soft" Skills

Standards
High School,
State, National

Topics
specifications

Applications

Outcomes
SKAs

Following
Modules

In the Nano-Link Workshops.....

- You will be exposed to several of our modules ...
- with particular emphasis on hands-on, experiments
- These workshops will give you sense of what we are doing.....
- And give you a chance to give us input and direction