



EXPANDING STEM SKILLS

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2018 Minnesota Independent School Forum (MISF) Conference

August 7, 2018

EXPANDING STEM SKILLS- **OPENING ACTIVITY**

Fear in a Hat

- **Write down a fear you have about this topic or about this presentation**
- **Place in the “hat” when you are finished.**
- **You do not need to share/identify your fear**



EXPANDING STEM SKILLS- **OPENING ACTIVITY**

I Have, Who Has

- **Examine the card you were given**
- **Find the other 3 cards which matches with your card.**
- **Be prepared to share with the group**



E

Is a universal solvent

Tasteless and odorless
liquid

Becomes a solid at
 0°C



E



Y



EXPANDING STEM SKILLS- **INTRODUCTIONS**

Who are we?

- **Cheryl Moeller**

- High Tech Kids
- The Bakken Museum
- University of St. Thomas
- Medtronic
- VTC, Inc.
- Honeywell

- **Tim Barrett**

- Minnesota Department of Education
- Minnesota High Tech Association (MHTA)
- The Bakken Museum
- Minnesota Institute for Talented Youth (MITY)
- University of St. Thomas/St. Catherine University
- Climb Theater

- **Brenda Barrett**

- Frassati STREAM Academy
- STEPS Camp – St. Thomas
- Minnesota Institute for Talented Youth (MITY)
- Kindercare/Children's World
- Climb Theater



EXPANDING STEM SKILLS- **INTRODUCTIONS**

Using the activities to teach STEM

- Engages different learning styles
- Makes the abstract idea more concrete
- Assists students in understanding processes they already use in other settings



WHY THIS APPROACH?

Differences from a traditional approach:

- Active vs. Passive Participation
- Lower the “filter”
- Keep students on their toes
- Model a Growth Mindset



Minnesota Career Fields, Clusters & Pathways

■ Marketing

- > Merchandising
- > Marketing Management
- > Marketing Communications
- > Marketing Research
- > Professional Sales

■ Business, Management, and Administration

- > Administrative Support
- > Operations Management
- > Business Information Management
- > Human Resources Management
- > General Management

■ Hospitality and Tourism

- > Lodging
- > Recreation, Amusements and Attractions
- > Restaurants and Food/Beverage Services
- > Travel and Tourism

■ Finance

- > Banking Services
- > Business Finance
- > Securities and Investment
- > Accounting
- > Insurance

■ Agriculture, Food, and Natural Resources

- > Animal Systems
- > Agribusiness Systems
- > Environmental Service Systems
- > Food Products and Processing Systems
- > Natural Resources Systems
- > Plant Systems
- > Power, Structural, and Technical Systems

■ Arts, Audio/Video Technology, and Communications

- > Audio/Video Technology and Film
- > Journalism and Broadcasting
- > Performing Arts
- > Printing Technology
- > Communications Technology
- > Visual Arts

■ Information Technology

- > Information Support and Services
- > Network Systems
- > Programming and Software Development
- > Web and Digital Communications

■ Law, Public Safety, Corrections, and Security

- > Correction Services
- > Emergency and Fire Management Services
- > Law Enforcement Services
- > Legal Services
- > Security and Protective Services

■ Government and Public Administration

- > Revenue and Taxation
- > Foreign Service
- > Governance
- > National Security
- > Planning
- > Public Management and Administration
- > Regulation

■ Human Services

- > Consumer Services
- > Counseling and Mental Health Services
- > Early Childhood Development and Services
- > Family and Community Services
- > Personal Care Services

■ Education and Training

- > Administration and Administrative Support
- > Professional Support Services
- > Teaching/Training

CAREER FIELD

Agriculture, Food, & Natural Resources

CAREER FIELD

Business, Management, & Administration

CAREER FIELD

Human Services

Health Science Technology

CAREER FIELD

■ Health Science

- > Biotechnology Research and Development
- > Diagnostic Services
- > Support Services
- > Health Informatics
- > Therapeutic Services

CAREER FIELD

Engineering, Technology, & Manufacturing

■ Transportation, Distribution, and Logistics

- > Facility and Mobile Equipment Maintenance
- > Health, Safety, and Environmental Management
- > Logistics Planning and Management Services
- > Sales and Services
- > Transportation Operations
- > Transportation Systems/Infrastructure Planning, Management, and Regulation
- > Warehousing and Distribution Center Operations

■ Architecture and Construction

- > Construction
- > Design/Pre-construction
- > Maintenance/Operations

■ Manufacturing

- > Production
- > Manufacturing Production Process Development
- > Maintenance, Installation, and Repair
- > Quality Assurance
- > Logistics and Inventory Control
- > Health, Safety, and Environmental Assurance

■ Science, Technology, Engineering, and Mathematics

- > Engineering and Technology
- > Science and Mathematics

Foundation Knowledge & Skills

- Problem Solving • Critical Thinking
- Employability • Citizenship • Ethics
- Career Development • Integrity • Teamwork
- Legal Responsibilities • Academic Foundations
- Technology Application • Communications
- Safety, Health & Environment • Leadership
- Technical Literacy • Cultural Competence
- Lifelong Learning • Financial Well-Being
- Organizational & Global Systems
- Creativity • Innovation

Learn about Programs of Study

www.mnprogramsofstudy.org

iSPEAK CTE Blog

www.mnlearningthatworks.org

Legend:

■ = Career Cluster

> = Career Pathway

Explanation provided on reverse side.



Minnesota Department of Education

BACKGROUND RESEARCH

Research about how interdisciplinary activities affects student engagement:

1. Breaks the ice to enable learning
2. Increases engagement through variation
3. Playing with ideas increases learning



EXPANDING STEM SKILLS-

BACKGROUND RESEARCH

By using **interdisciplinary activities** in the
STEM classroom, we can -

1. Lower anxiety due to STEM's rigorous nature
2. Engage those who do not identify with STEM
3. Reinforce STEM skills and understanding



EXPANDING STEM SKILLS-

WHAT ARE STEM SKILLS?

10 Important STEM Skills:

- Maintain accuracy in record-keeping and communicate findings.
- Research topics and determine good, reliable sources of information.
- **Analyze small parts of systems and see relationships; notice details in content and process.**
- **Recognize cause and effect relationships and distinguish fact and opinion.**
- Use mathematical skills for calculations and measurements.
- **Predict and draw conclusions using data.**
- Read and understand technical materials.
- Repair equipment and use software.
- **Communicate with others and listen.**
- **Think creatively and solve problems and experiment.**



EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES



EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

- **Detail Change**

- **Which One?**
 - **Select an object**

 - **Compare it to your companions**

 - **Be prepared to find it again**



EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

- **Detail Change**
- **Which One?**
- **How Many Standing**
- **Eyewitness Story**



EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

When Time Stands Still

As a burglar reaches for something on the mantle, he accidentally knocks over a clock. It falls to the floor, breaks, and stops. The next morning, however, police aren't able to determine what time the robbery took place.

Why not?



EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

When Time Stands Still - TIME TO THINK

- The police could see the clock.
- The burglar did not alter the clock in any way after it fell.
- The police didn't expect to be able to read the clock.
- What kind of clock is it?



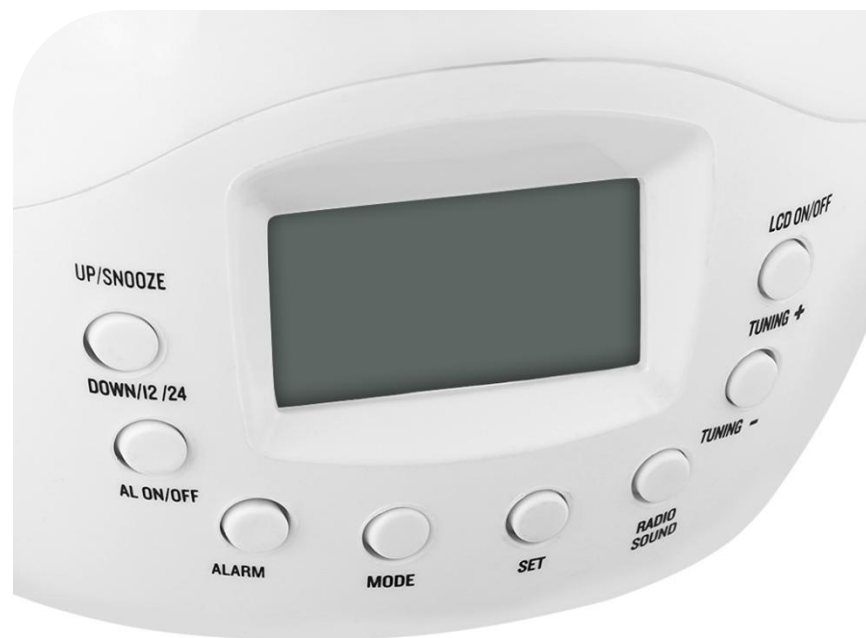
EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

When Time Stands Still - THE SOLUTION

- The burglar knocked over a digital clock.

When it broke and stopped, it no longer displayed the time.



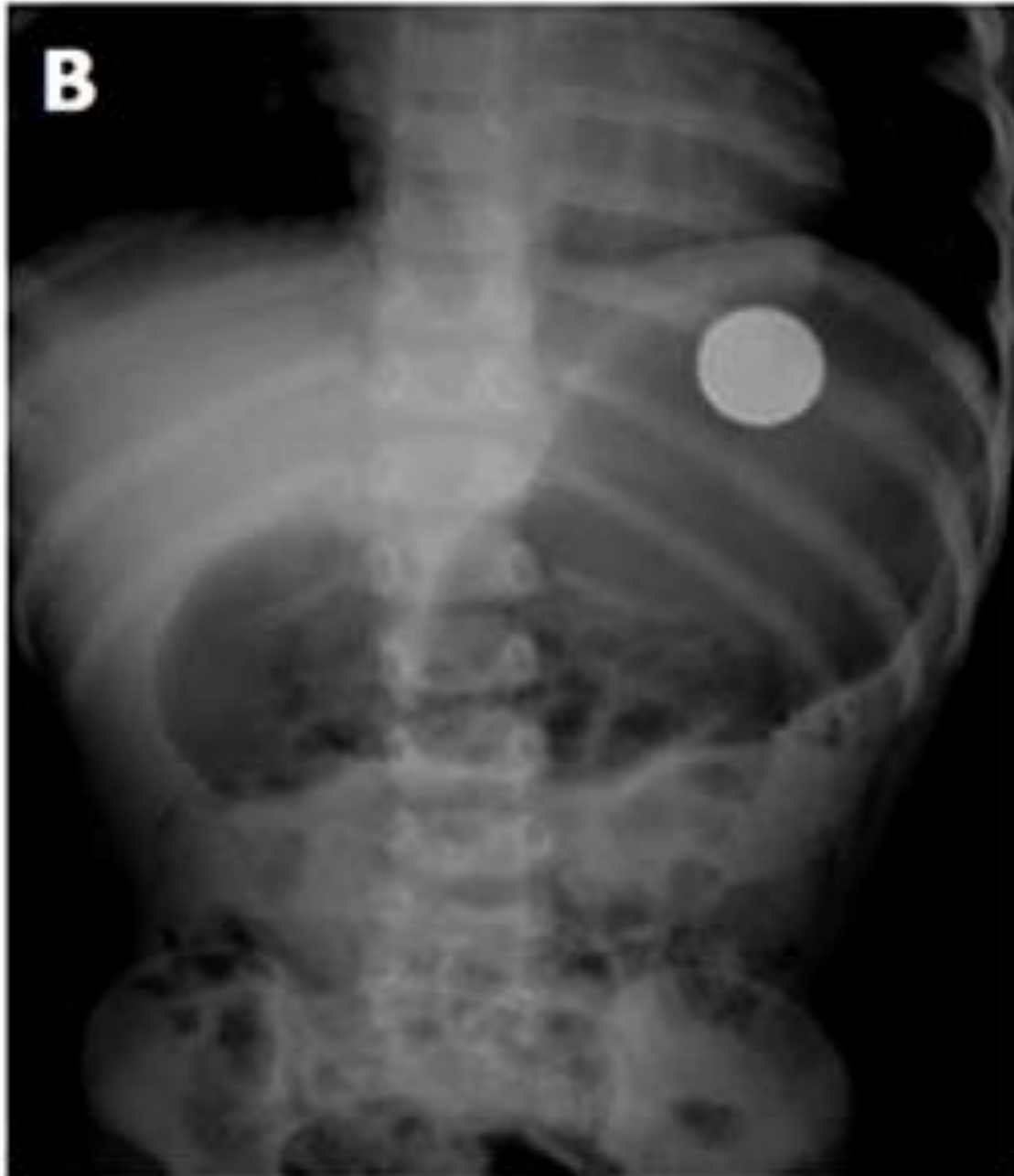
EXPANDING STEM SKILLS-

INTRODUCTORY ACTIVITIES

- **Detail Change**
- **Which One?**
- **How Many Standing**
- **Eyewitness Story**
- **The Rules of the Game**



EXPANDING
Pt



EXPANDING STEM SKILLS- **PHOTO STORY**

The battery was
carefully removed
using magnetic and
balloon catheters
under fluoroscopic
guidance.



EXPANDING STEM SKILLS-

REVIEW AND QUESTIONS

By using **interdisciplinary activities** in the
STEM classroom, we can -

- Lower anxiety due to STEM's rigorous nature
- Engage those who do not identify with STEM
- Reinforce STEM skills and understanding

Any Questions?



Thanks!

- www.HighTechKids.org
- www.frassati-wbl.org
- www.SparkEdMN.org

