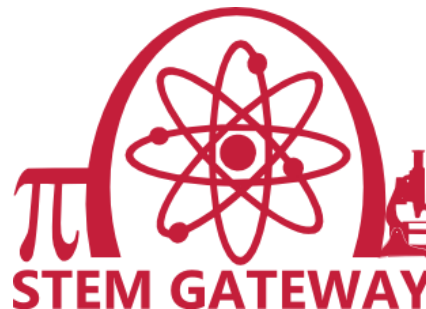


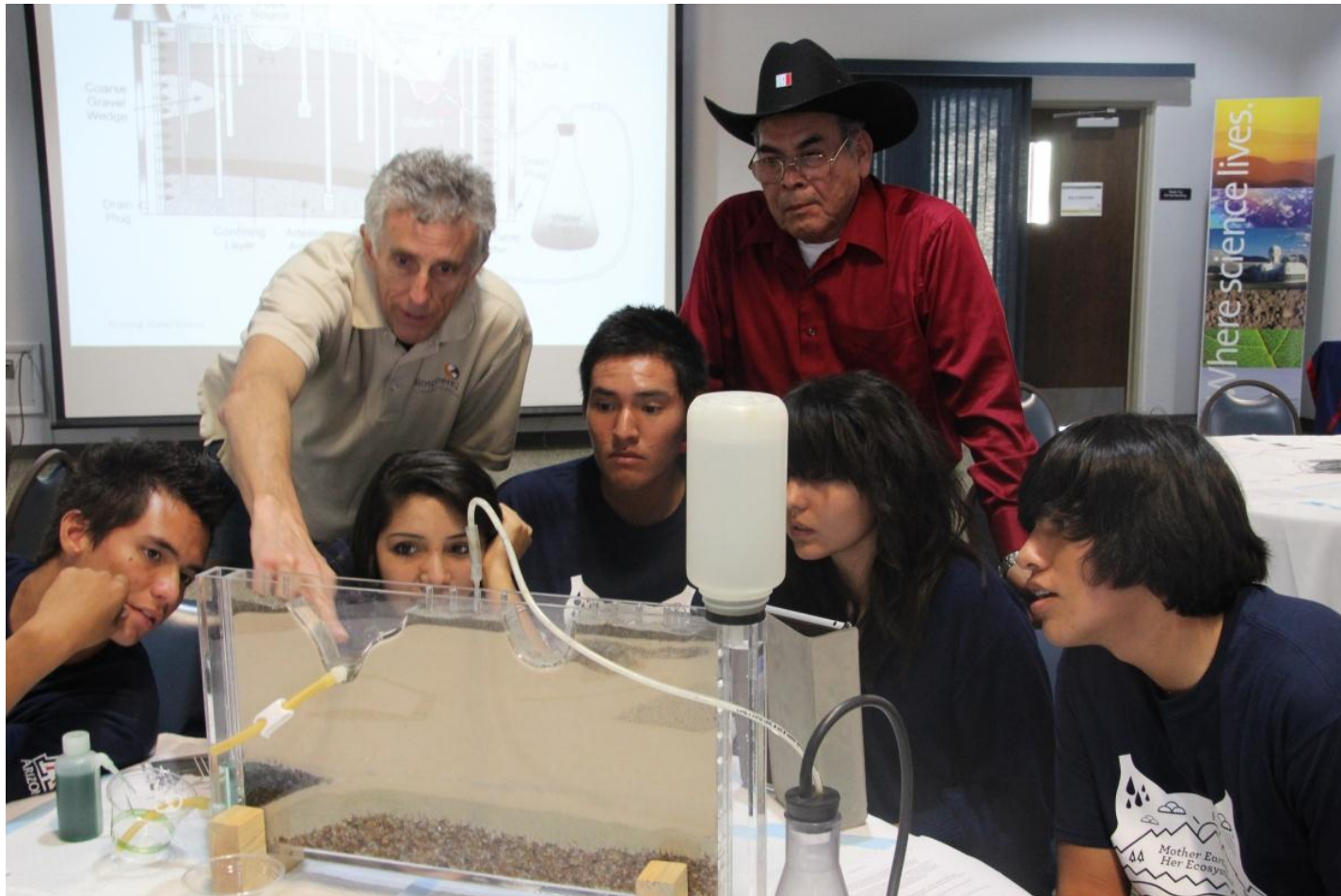
Beginning-Student Socialization with STEM Experiences

Science, Technology, Engineering, and Math
(STEM) Student Interest Groups (SSIGs)

Audriana Stark, STEM Gateway Project Assistant
Office of Support for Effective Teaching



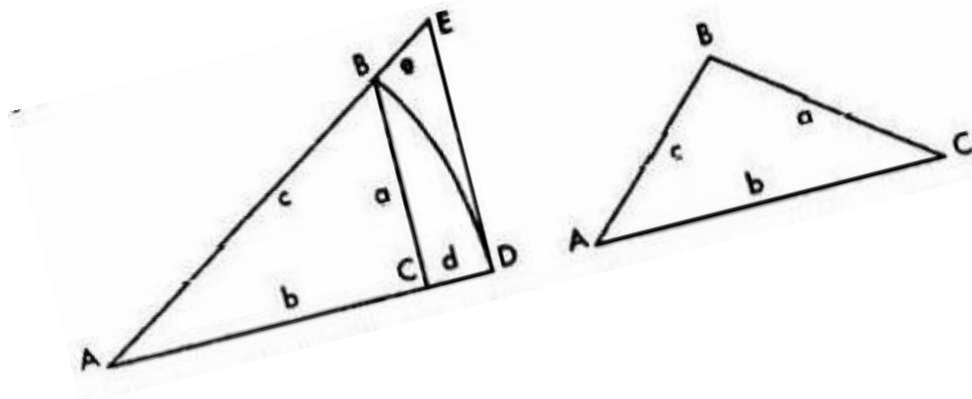
I want to be an engineer



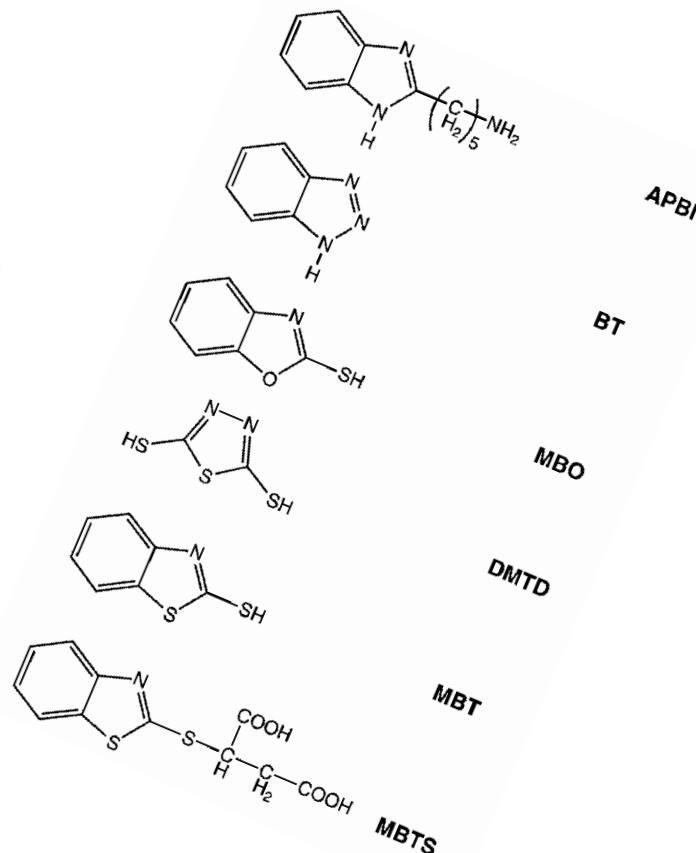
What am I doing here?



What does this have to do with being an engineer?



$$i\hbar \frac{\partial}{\partial t} \Psi = \hat{H} \Psi$$



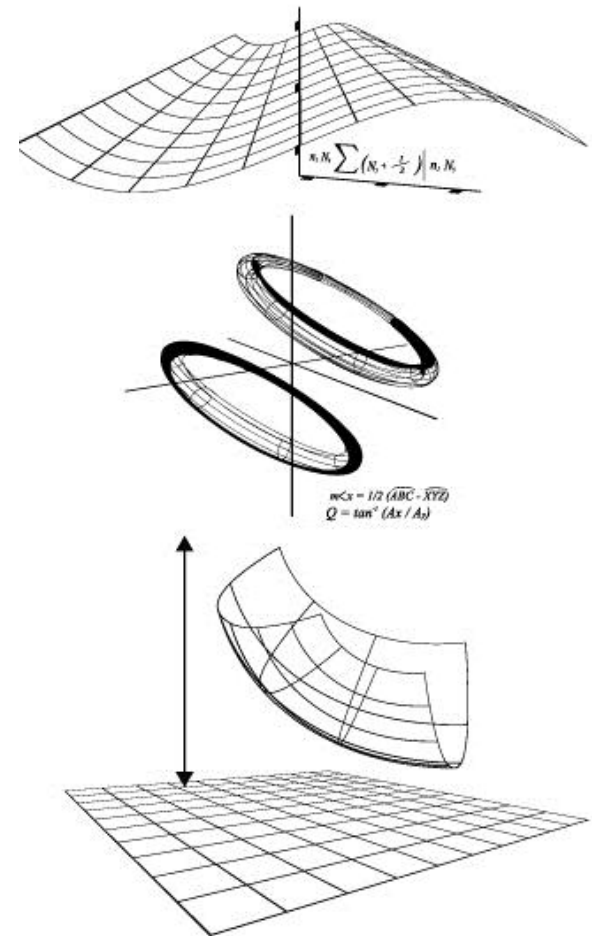
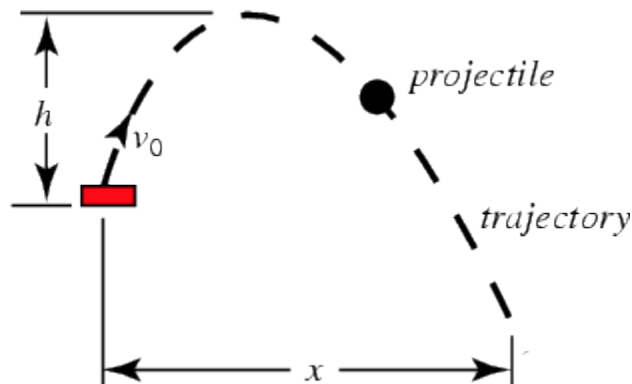
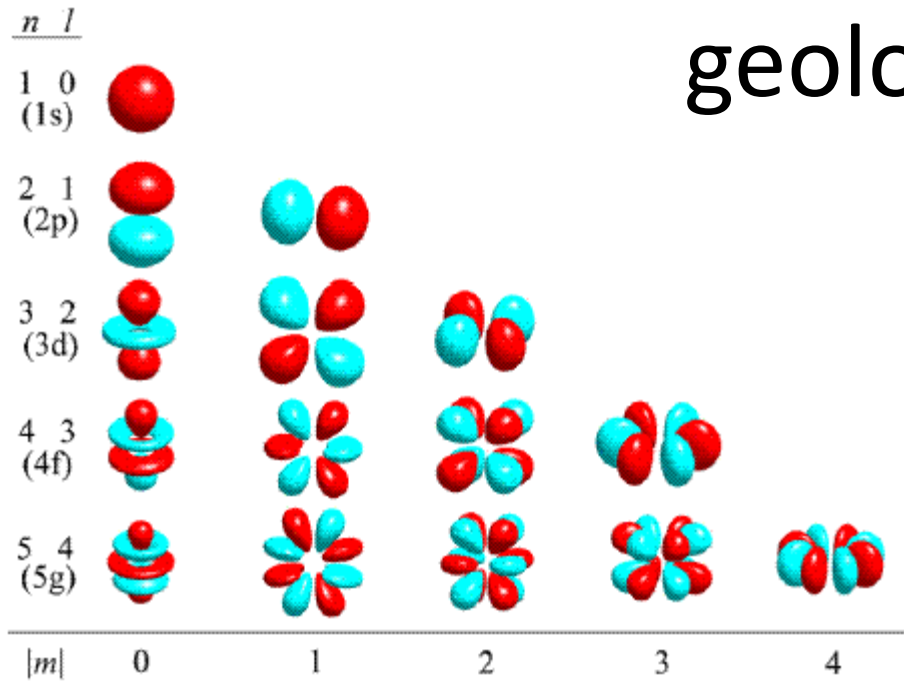
I want to be a geologist



What am I doing here?



What does this have to do with being a geologist?



I want to be a doctor



What am I doing here?



What does this have to do with being a doctor?

$$\frac{d}{dx} \int_a^x f(t) dt = f(x)$$

The First Law of Thermodynamics

$$\begin{aligned}\Delta U &= Q - W \\ &= Q - P^* \Delta V\end{aligned}$$

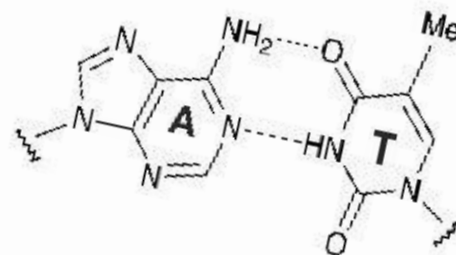
ΔU = internal energy change

Q = heat flow

W = macroscopic work

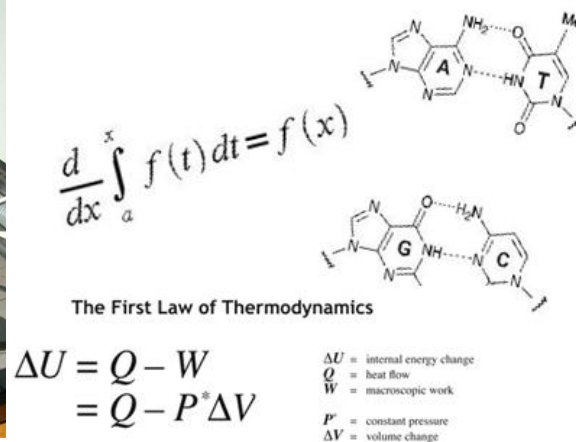
P^* = constant pressure

ΔV = volume change



Issue 1

- Lacking explicit connections, not all students are motivated to succeed in gateway courses outside of their major field



I like science...but I can't understand
this stuff



What does it mean to...

...think like a scientist

...solve problems scientifically

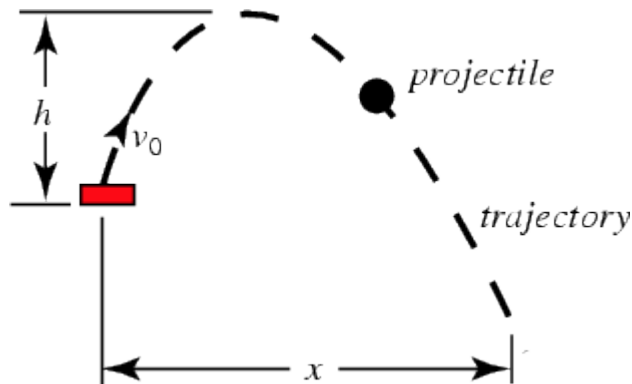
...think about thinking

Am I learning?

How can I learn better?

Issue 2

- Even capable students struggle with complex thinking and problem solving



$$i\hbar \frac{\partial}{\partial t} \Psi = \hat{H} \Psi$$

What is going on in there?

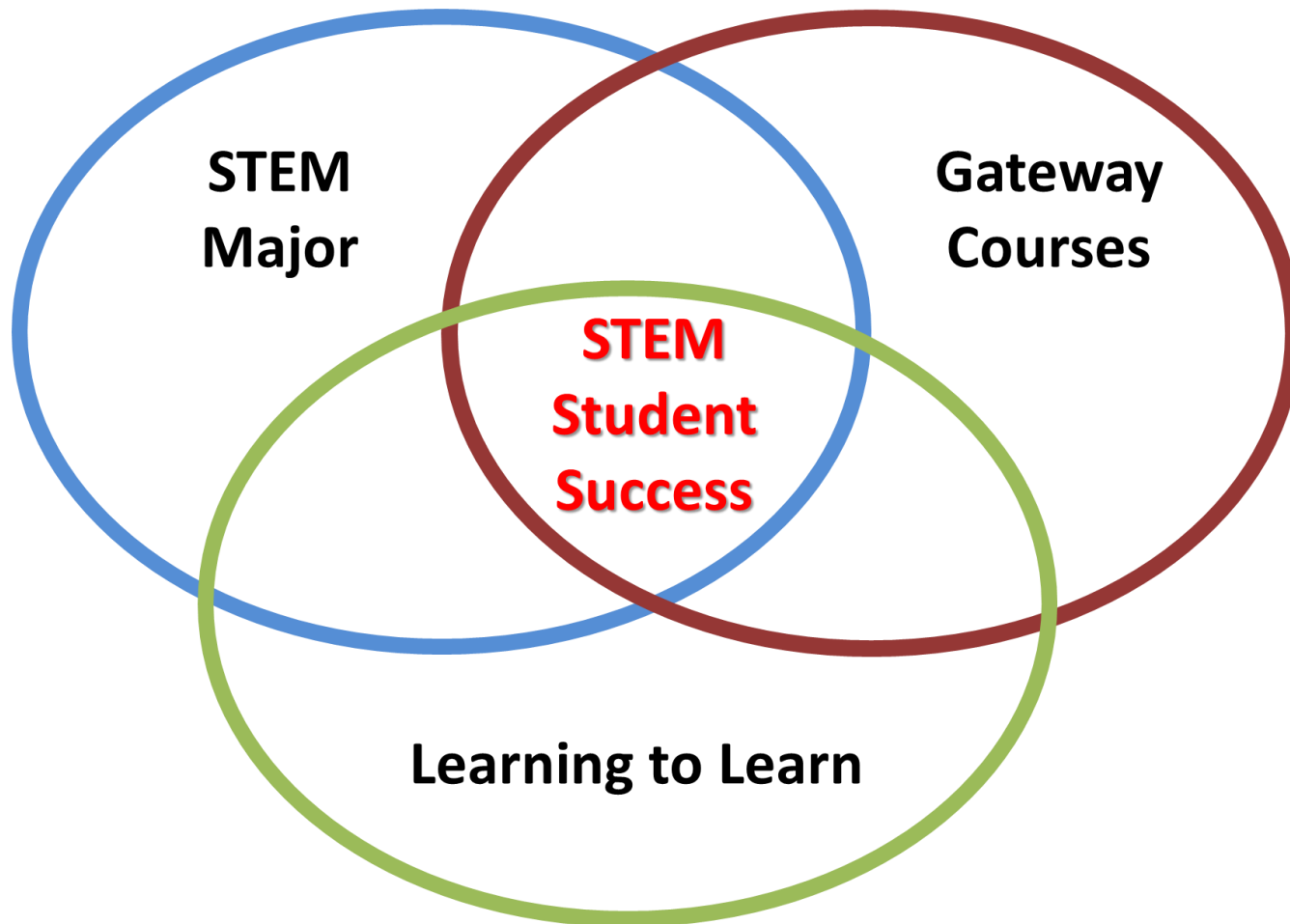


Issue 3

- Students don't get involved with their major departments as early as they should

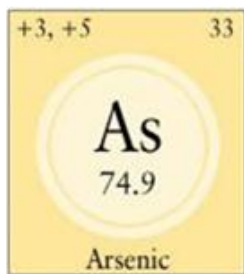


SSIGs as a Solution



Making Connections Between STEM Gateway Courses and Majors

Gateway course:
Chemistry



Engineering:
Designing safe mines to
reduce arsenic exposure



Biology:
Toxic effects of arsenic

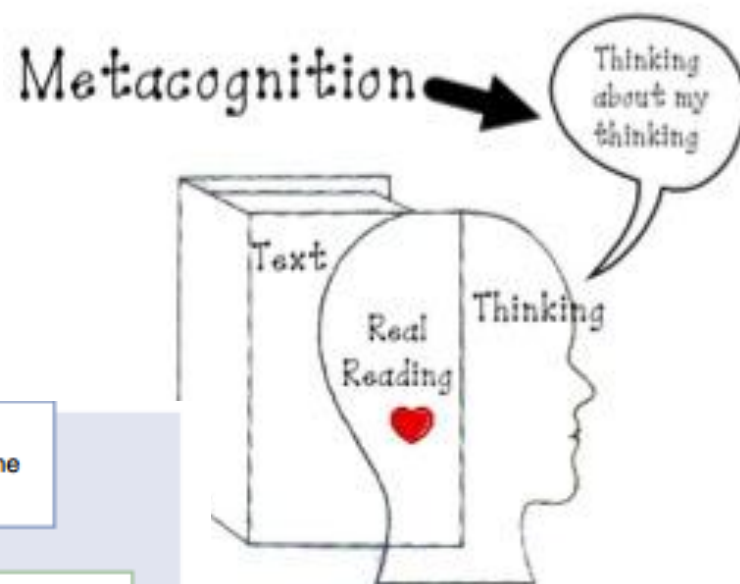
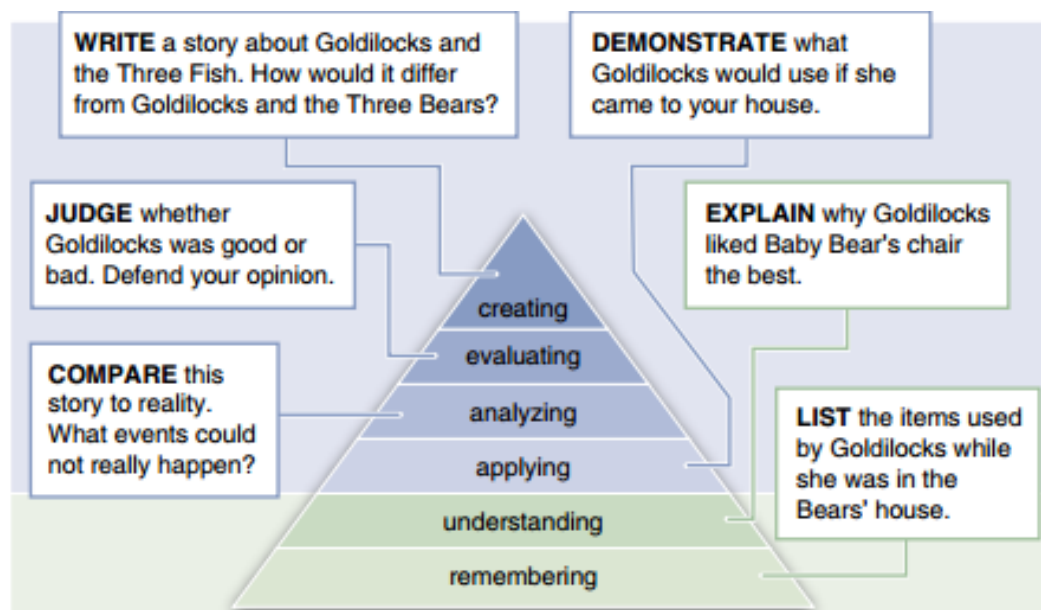


Earth and planetary sciences:
Natural sources of arsenic.

Developing Learning-to-Learn Habits of Mind

Soloman/Felder's Inventory of Learning Styles

- Active Learners vs. Reflective Learners
- Global Learners vs. Sequential Learners
- Visual Learners vs. Verbal Learners
- Sensing Learners vs. Intuitive Learners



Engaging in the Major Department



Exploring Research Opportunities



Degree Planning

Engaging in the Major Department

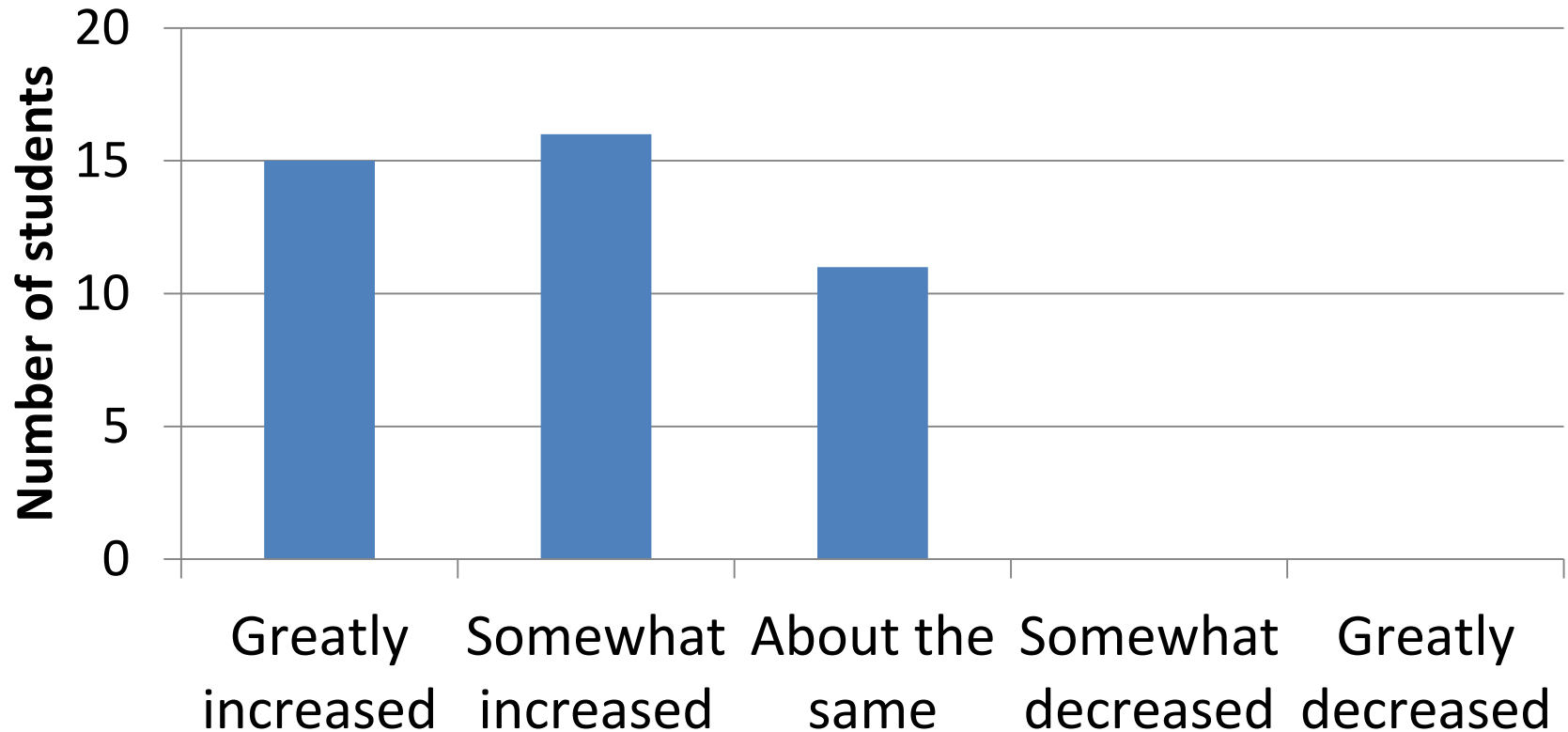


Building relationships with
other students
and faculty in the major



Lab Tours

Appreciation for Gateway Courses

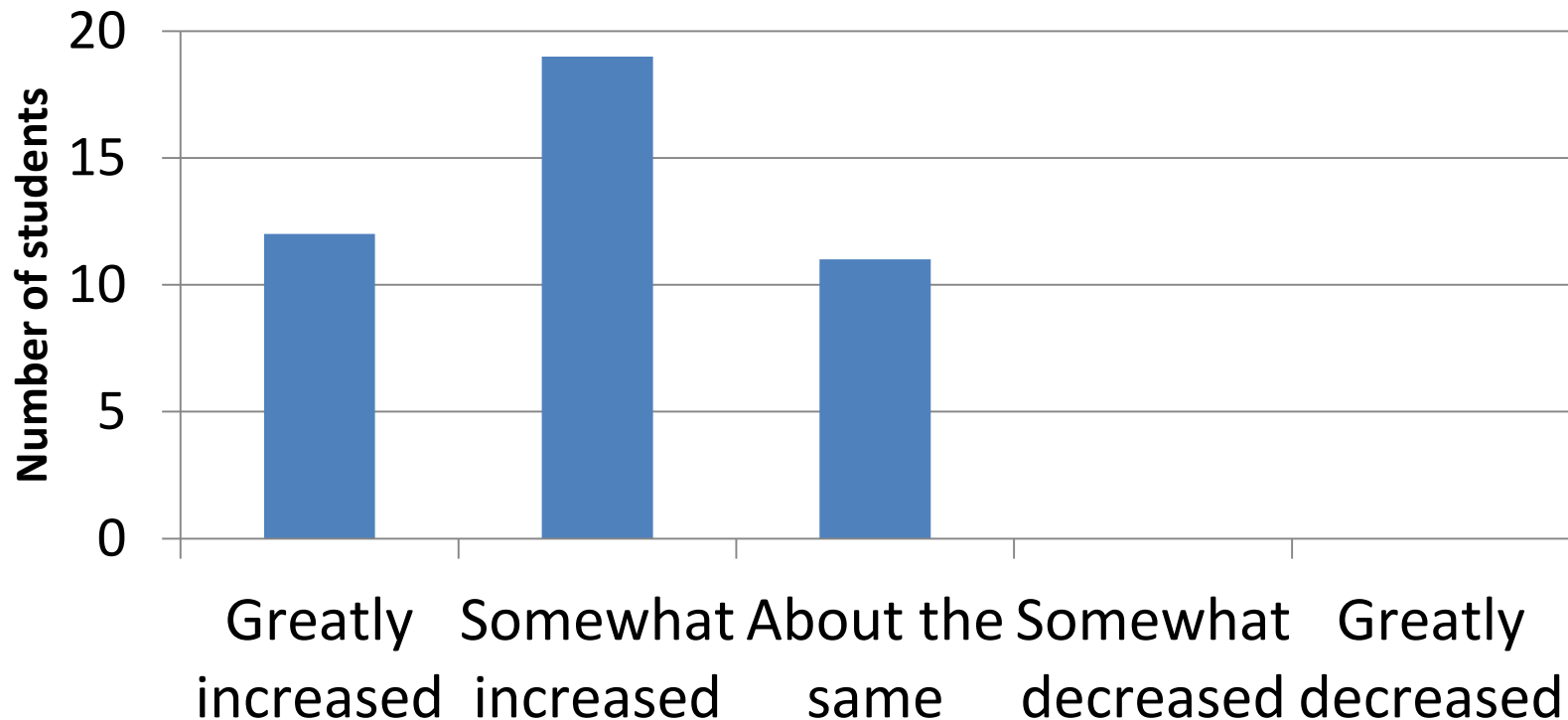


Student responses to: As a result of taking this course, my appreciation of science and math courses required outside my major department can best be described as...

Student Quote About Connections Between Gateway Courses and Major

“The instructor had a holistic approach and was very versatile- by this I mean we could focus on chemistry in biology in interesting applications, but we also discussed increasing learning proficiency, graduate school, and research opportunities.”

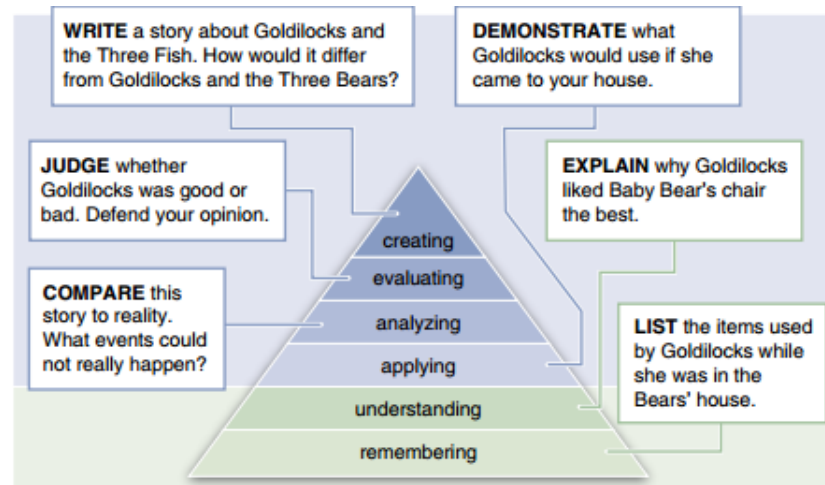
Problem Solving Ability



Students responses to: As a result of taking this course, my ability to analyze and solve a problem can best be described as...

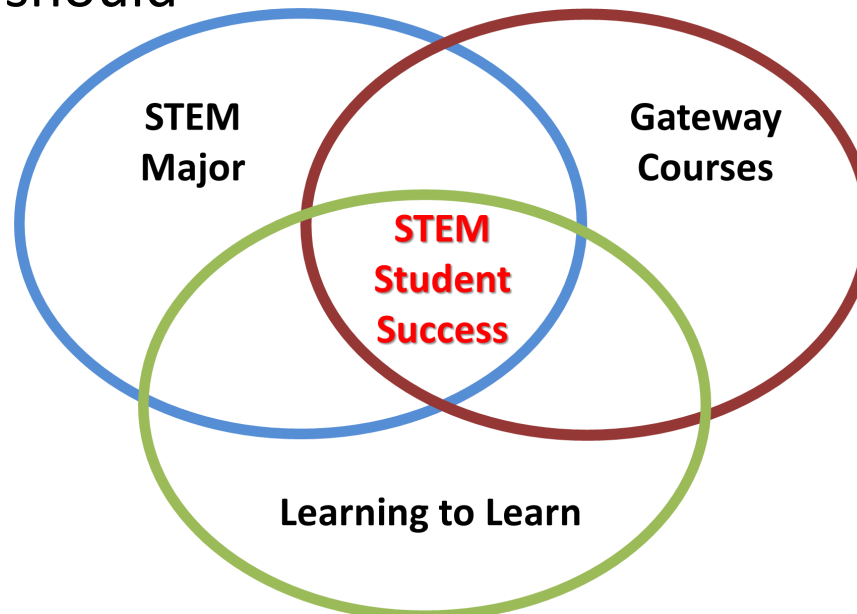
Student Quote about Developing a Learning-to-Learn Habit of Mind

“We went over the blooms taxonomy pyramid and while doing the reading I was immediately reminded of my college career. The apply section is like going from lecture to lab. I would love to get myself to the create section. I hope that I can get there and perhaps publish my research.”



Three Key Issues

1. Lacking explicit connections, not all students are motivated to succeed in gateway courses outside of their major field
2. Even capable students struggle with complex thinking and problem solving
3. Students don't get involved with their major departments as early as they should



Beginning-Student Socialization with STEM Experiences

SSIGs are having a positive impact but are not attracting sufficient student participation

Therefore, STEM Gateway project leadership is exploring expanded formats beyond the current SSIGs in order to meet the three objectives.

Including potential partnerships with:

- University College learning communities and other general education initiatives
- Student Services organizations
- Academic departments

What Else Can We Do That Connects to The Three Issues?

1. Lacking explicit connections, not all students are motivated to succeed in gateway courses outside of their major field
2. Even capable students struggle with complex thinking and problem solving
3. Students don't get involved with their major departments as early as they should

