NAPE

STEM Careers for Counselors

National Alliance for Partnerships in Equity

http://www.napequity.org/

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Goal

Integrate knowledge and positive examples about STEM careers, benefits, and workplace skills into the curriculum.

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Who Is NAPE?

NAPE

National Alliance for Partnerships in Equity

Professional Development	Research and Evaluation	Technical Support	Public Policy and Advocacy
Provide tools and curricula for educators through conferences, presentations, webinars, and formal training	Develop reports. Identify research-based promising practices. Provide input to others' research.	Develop tools and resources for LEAs. Provide consulting services. Offer expertise on access, equity, and diversity issues.	Work with federal agencies. Educate legislators on equity and diversity issues. Develop policy briefs. Alert membership policy issues.

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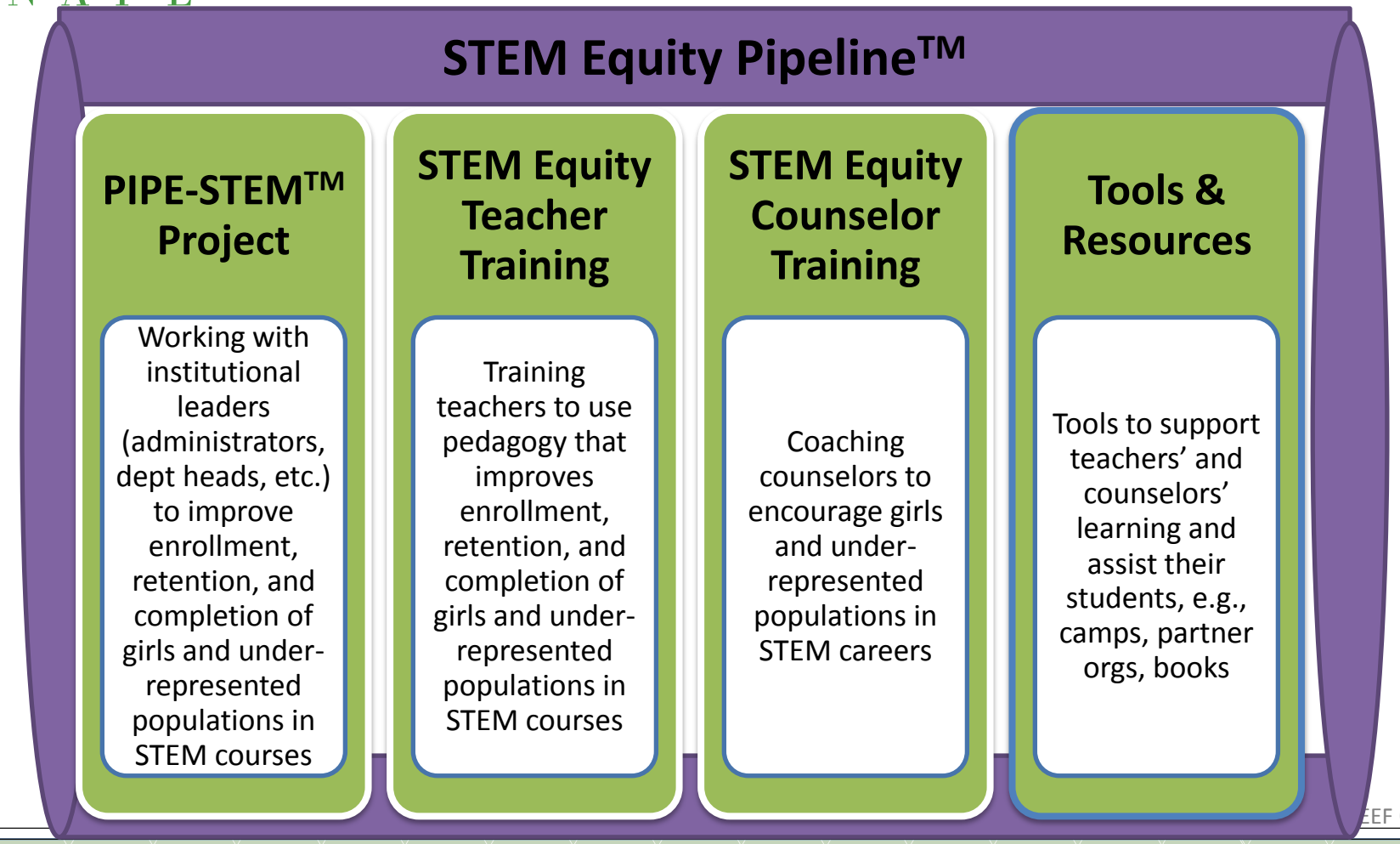
NAPE's Professional Development Suite of STEM Equity Programs



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Activity: Name 1 Thing

Create a list of all
the items you have
used today that have been

engineered.

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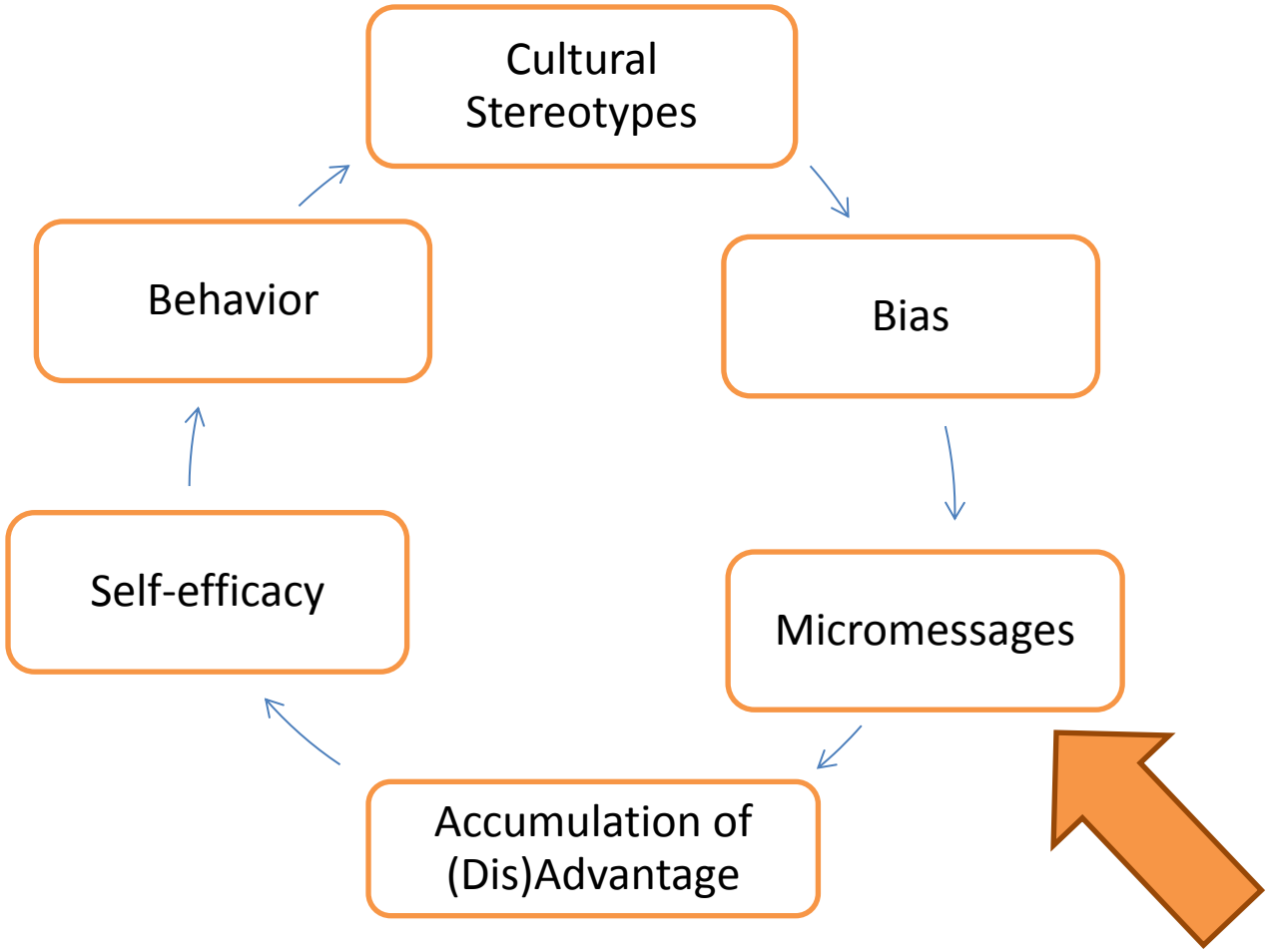
Micromessages: The Missing Link in Culture Delivery



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Micromessaging

Micromessages

- Small, subtle, semi-conscious messages we send and receive when we interact with others

Micro-inequities

- Negative micro-messages we send other people that cause them to feel devalued, slighted, discouraged, or excluded

Micro-affirmations

- Positive micro-messages that cause people to feel valued, included, or encouraged

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STEM Careers:
Changing the Conversation

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Activity: One Example of Grand Challenges for the 21st Century

- **Make solar energy economical**
- **Provide energy from fusion**
- **Develop carbon sequestration methods**
- **Manage the nitrogen cycle**
- **Provide access to clean water**
- **Restore and improve urban infrastructure**
- **Advance health informatics**
- **Engineer better medicines**
- **Reverse-engineer the brain**
- **Prevent nuclear terror**
- **Secure cyberspace**
- **Enhance virtual reality**
- **Advance personalized learning**
- **Engineer the tools of scientific discovery**

Pick 1 Challenge – Reflection Questions

- From this or another Grand Challenges list, what does the grand challenge mean?
- What are some applications?
- Why is it important?
- How are we going to solve this challenge?
- Who benefits from solving this challenge?
- How can you talk about this with your students?

GRAND CHALLENGES

Changing the Conversation

STEM Professionals

make a world of difference and help shape the future.

STEM Careers

are essential to our health, happiness, and safety.

STEM Professionals

are creative & collaborative problem-solvers.

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Activity: Health, Happiness, and Safety

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ACTIVITY

STEM Careers are essential to our **Health, Happiness, and Safety**

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Below are 20 STEM occupations, and examples of what someone in these careers might do. Read through each, and consider if and how the example listed contributes to our health, happiness, and/or safety.

Science	Technology	Engineering	Math
Audiologist *Screen newborns for hearing loss and refer affected patients to appropriate services.*	**Remote Sensing Technologist** *Evaluate climate changes by creating annual maps of thawing land using satellite data.*	**Geographic Information Systems Technician** *Aid law enforcement by creating a mapping database to track criminals on probation wearing GPS anklets.*	**Math Teacher** *Use examples from nature, like shells, to show students that math is all around them. Inspire the next generation of STEM professionals.*
Cytotechnologist *Save a child's life by detecting a serious infection in his blood samples and informing the doctors.*	**Database Administrator** *Protect bank accounts from hackers by adding security features to a bank's financial database.*	**Microsystems Engineer** *Help a child with cerebral palsy walk by creating an internal medication pump for anti-muscle-spasm drugs.*	**Economist** *Evaluate if micro-loans (start-up investments for small international businesses) help combat poverty.*
Electrician *Test the grounding on swimming pool equipment to prevent electrocution.*	**Computer Programmer** *Program and test the autopilot for an airplane's flight control system.*	**Weatherization Installer** *Help a family save money by installing insulation in the home's attic and crawlspace.*	**Statistician** *Develop metrics to help a baseball team manager evaluate a player.*
Physical Therapist *Train and encourage an amputee to return to her everyday activities using a prosthetic limb.*	**Computer Software Engineer** *Write software that allows people to communicate over great distances.*	**Wind Energy Engineer** *Analyze annual wind speed and direction data to determine the best location for a wind farm, a form of clean energy.*	**Actuary** *Advise movie studio owners about how much liability insurance they should purchase to cover dangerous sets.*
Climate Change Analyst *Help avoid famines by projecting how climate change will affect worldwide farming and food distribution.*	**Multimedia Artist/ Animator** *Help develop a full-length 3D, animated motion picture, or create the characters for a new Saturday morning cartoon.*	**Nanosystems Engineer** *Design a new lightweight, but superstrong, fabric out of nano-materials to make into bulletproof suits that protect our soldiers, civil servants, and governmental leaders.*	**Mathematician** *Design and decipher codes to help our military and intelligence agencies securely transmit and retrieve sensitive information.*

Funded by a grant from the National Science Foundation, GSE/EXT: STEM Equity Pipeline Project, Grant No. HRD-1203121

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ACTIVITY

STEM Careers are essential to our **Health, Happiness, and Safety**

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Go to sciencebuddies.org, select the green tab labeled Science Careers. Below the colored tabs you will see some greytabs for careers in STEM. Explore the lists of occupations and examples of what one might do in these careers. Identify 9 different careers that are interesting to you, 3 each for health, happiness & safety. Write the occupation and example.

Health	Happiness	Safety

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Alternate Activity: Health, Happiness, and Safety

- Read over the next 6 slides to see how STEM jobs support Health, Happiness, and Safety.
- How could you use this information to help your students understand the role of STEM professionals?

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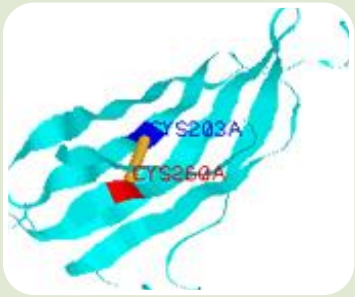
A Biologist Could...

Analyze different types of taste bud receptors to understand how the tongue detects different flavors.



Uncover the relationship between a protein's genetic mutations and a patient's symptoms to better understand a disease.

Protect gorillas from extinction by studying their habitats and interactions in the wild.

Investigate all the physiological side effects that a flight into space has on a human being's body.

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A Chemist Could...

Develop a synthetic fiber that can stop a speeding bullet.

Help discover new medicines that alleviate pain or cure diseases.

Figure out how to make hair-styling gel work better.

Discover new processes that could solve the world's energy crisis.

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An Environmental Scientist Could...

Help avoid famines by projecting how climate change will affect worldwide farming and food distribution.

Find an underground water reserve that can be used to produce geothermal energy.

Gather and evaluate meteorological data to predict a drought.

Help refineries reduce their toxic gas emissions, which contribute to acid rain and global warming.

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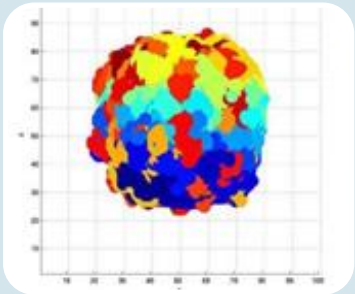
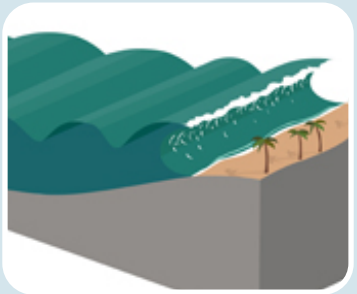
A Mathematician Could...

Design and decipher codes to help our military and intelligence agencies securely transmit and retrieve sensitive information.



Predict how fast tumors will grow and how well chemotherapy can shrink them, using a mathematical model.

Mathematically model interactions between different animals to understand how the extinction of one species will impact the food chain.



Develop a mathematical model to predict tsunamis that develop after underwater sediment avalanches.

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An Actuary Could...

Determine the monetary value of unusual items, such as a concert pianist's hands.

Price property insurance for homes, given their location and the likelihood of a natural disaster.

Analyze statistical information about people over age 55 to estimate deaths, disabilities, and retirement rates.

Advise movie studio owners about how much liability insurance they should purchase to cover dangerous sets.

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A Statistician Could...

Develop metrics to help a baseball team manager evaluate a player.

Work with public health officials to estimate the number of people afflicted with flu in a region.

Analyze the failure rates of engine parts exposed to extreme weather conditions.

Develop and interpret a sampling survey so that governments can predict population growth.

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Reflection

1. Name 1 Thing
2. STEM Grand Challenges
3. Health, Happiness, and Safety

In your Reflection Journal, create a plan for how you will engage students by incorporating one or more of these activities.

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Super Strategies

- Connect STEM to the students' world by helping them see the application in everything around them.
- Use key messaging to improve student awareness of the value of STEM in our world.
- Conduct these three activities with your students to help them understand the value of STEM careers!

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Linking STEM Careers to Student Work Values

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Activity: Choosing a Career Path

With **ONE** idea per Post-it note, list all the reasons why people may choose a **career path**.

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Activity: Choosing a Career Path

Working in small groups, organize all of your post-it notes and simplify into ***four*** categories.

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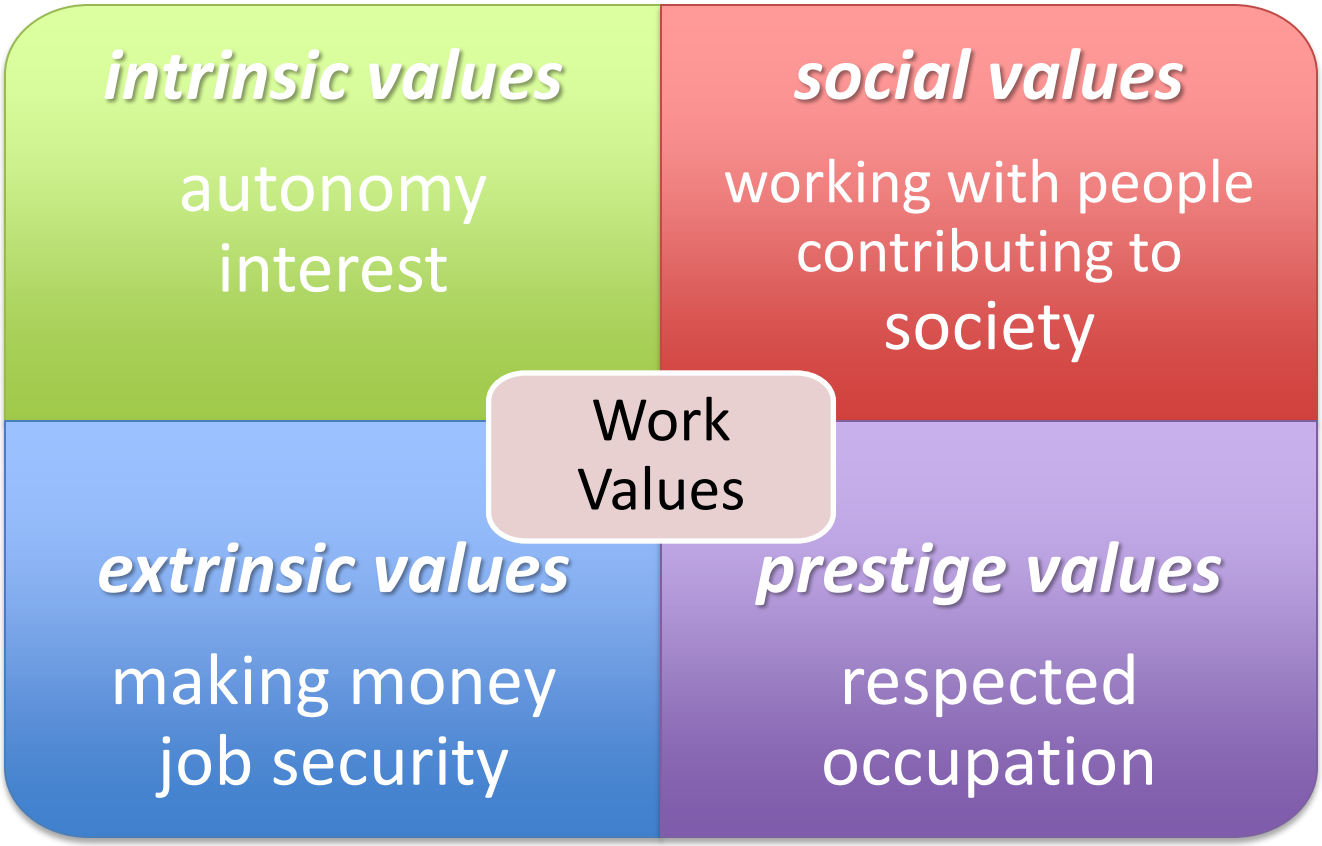
Activity: Choosing a Career Path



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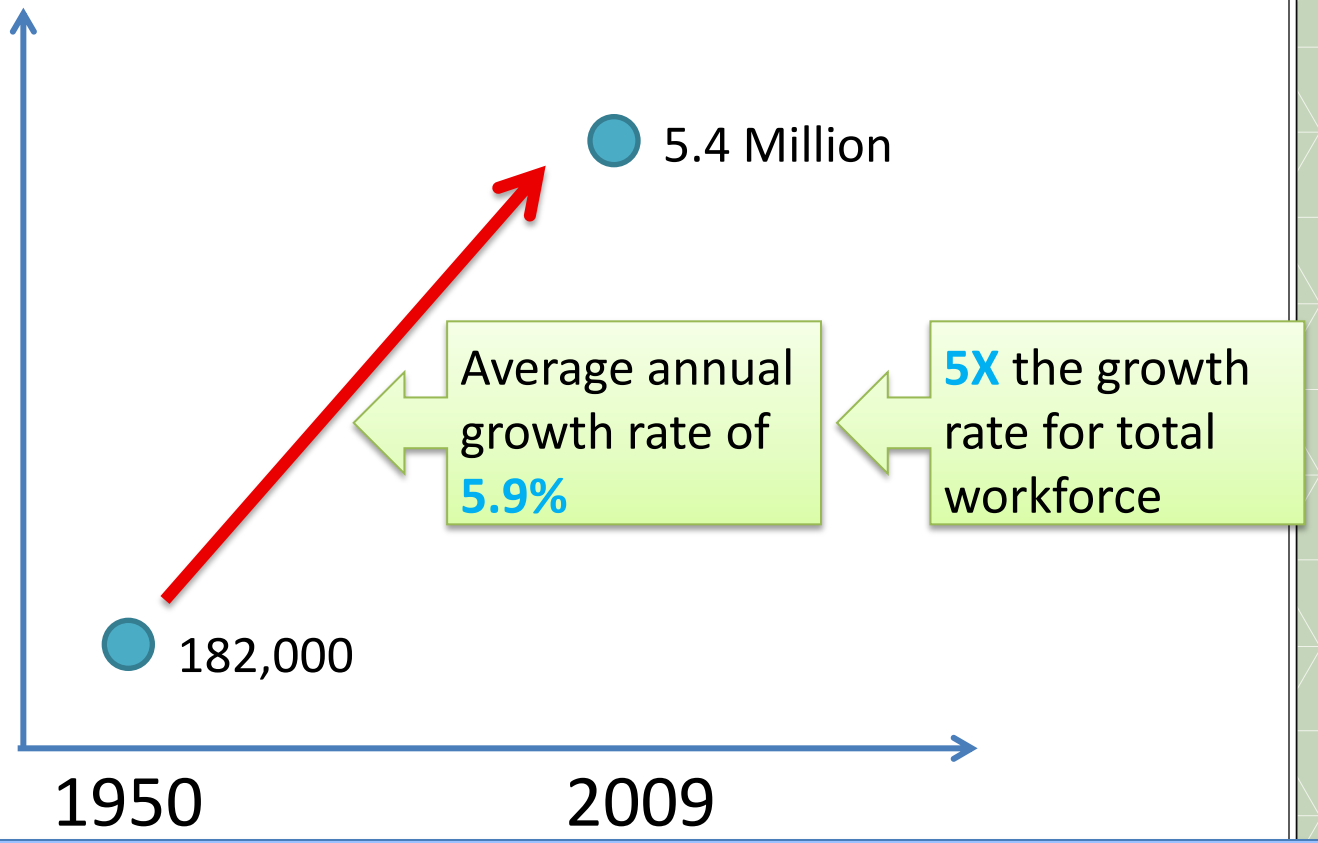
Extrinsic: Job Security

Numbers of workers in **science** and **engineering** occupations



7 out of 10 of the fastest growing occupations (requiring at least a 2-year degree) are in STEM

Extrinsic: Higher Pay

Occupation title	Annual mean wage
Petroleum Engineers	$147,470
Architectural and Engineering Managers	$133,240
Computer and Information Systems Managers	$129,130
Financial Managers	$123,260
Physicists	$114,150
Astronomers and Physicists	$112,900
Nuclear Engineers	$107,140
Geoscientists	$106,780
Actuaries	$106,680
Aerospace Engineers	$104,810
Computer Hardware Engineers	$103,980
Computer and Information Research Scientists	$103,670
Software Developers, Systems Software	$102,550
Astronomers	$102,550
Chemical Engineers	$102,270
Mathematicians	$101,280
Engineering Teachers, Postsecondary	$100,100
Sales Engineers	$99,290
Engr & Architecture Teachers, Postsecondary	$96,330
Marine Engineers and Naval Architects	$96,140
Electronics Engineers, Except Computer	$95,250
Computer Network Architects	$94,000

Occupation title	Annual mean wage
Electrical and Electronics Engineers	$93,380
Engineers, All Other	$93,330
Software Developers, Applications	$93,280
AEMS Sciences Teachers, Postsecondary	$91,930
Electrical Engineers	$91,810
Mining and Geological Engineers	$91,250
Biomedical Engineers	$91,200
Engineers	$90,960
Software Developers and Programmers	$90,470
Atmospheric and Space Scientists	$90,010
Materials Scientists	$89,740
Biochemists and Biophysicists	$89,470
Financial Analysts	$89,410
Physics Teachers, Postsecondary	$88,470
Materials Engineers	$87,490
Medical Scientists	$87,040
Environmental Engineers	$85,140
Mechanical Engineers	$84,770
Mathematical Science Occupations	$84,740
Computer and Information Analysts	$84,520
Civil Engineers	$84,140
Industrial Engineers	$82,100

If you include all jobs directly using STEM skills, including those in health and medicine, STEM jobs represent 70% of the highest 150 paying jobs in the country.

Activity: Compare Salaries

Find a salary calculator at:

http://www.jobsearchintelligence.com/NACE/jobseekers/salary-calculator.php

Identify a career that is **not** STEM, and compare that starting salary to a starting STEM salary.

STEM Career Salary $ _____

Non-STEM Career Salary $ _____

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Prestige: Respect

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Prestige

- The most common undergraduate degree among Fortune 500 CEOs is engineering.
- 1 in 5 CEOs have an engineering degree.

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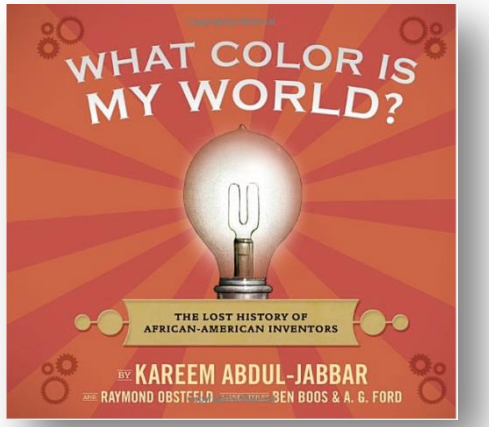
Source: Spencer Stuart 2005 Report

Prestige: Fame

Kareem Abdul-Jabbar, a famous basketball player, wrote a book about African American inventors

http://www.kareemabduljabbar.com/kajtedcon/



Danica McKellar, a famous actress, has written several books about how math can be fun for girls

http://t.co/Tdg2N0eq

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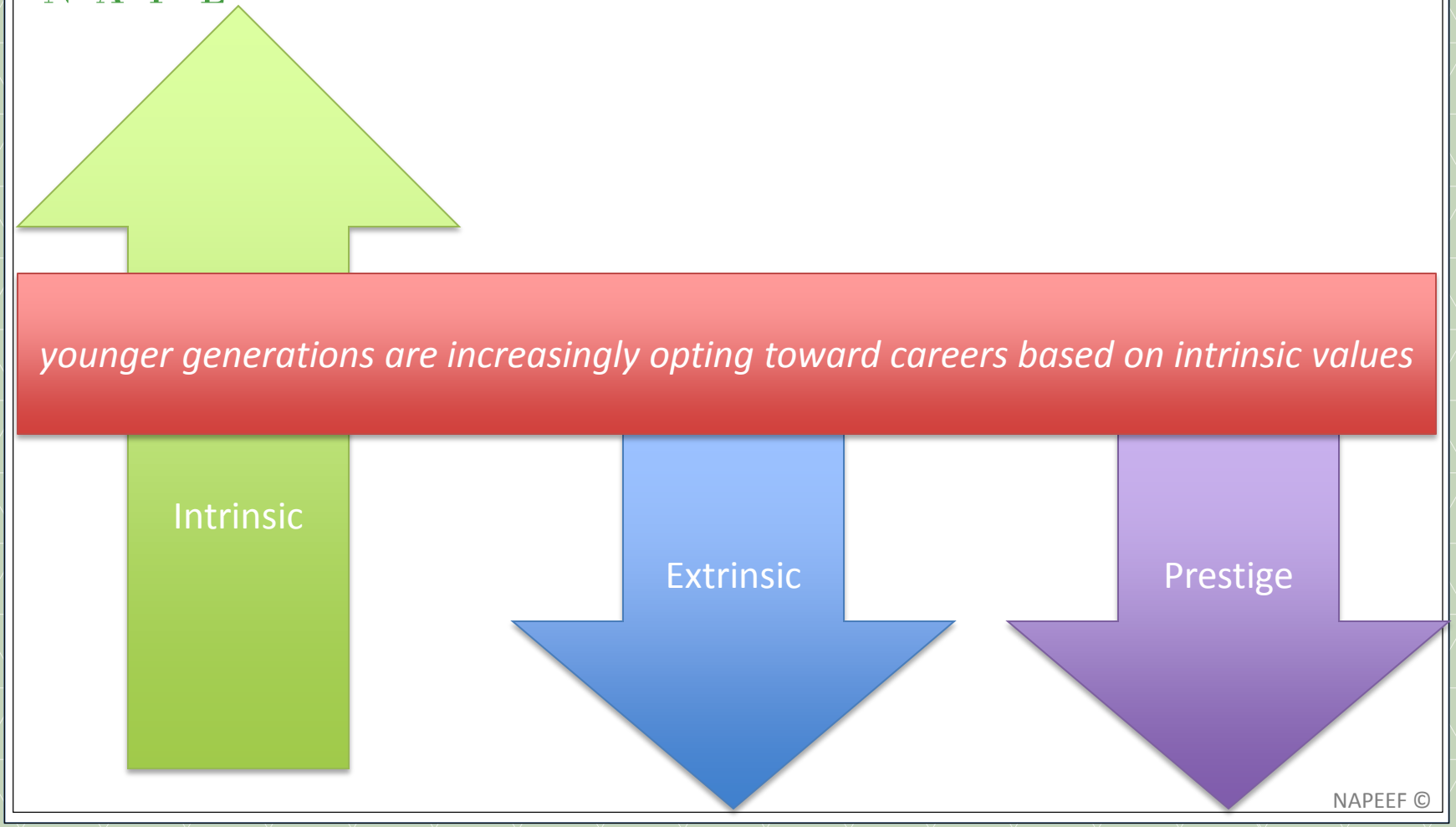
Intrinsic: Interest



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Intrinsic: Interest and Autonomy

STEM Is the Ultimate Launching Pad

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Changing the Conversation: Revisited

STEM Professionals

make a world of difference and help shape the future.

STEM Careers

are essential to our health, happiness, and safety.

STEM Professionals

are creative & collaborative problem-solvers.

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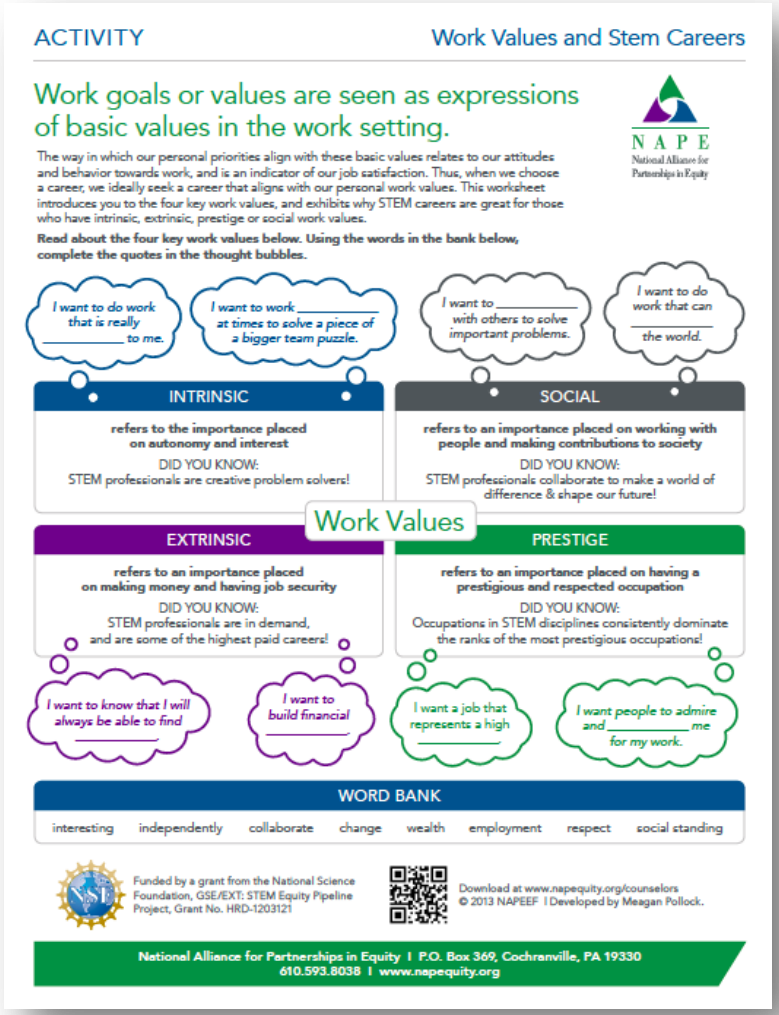
Activity: Work Values



ACTIVITY — Work Values and Stem Careers

Work goals or values are seen as expressions of basic values in the work setting.

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The way in which our personal priorities align with these basic values relates to our attitudes and behavior towards work, and is an indicator of our job satisfaction. Thus, when we choose a career, we ideally seek a career that aligns with our personal work values. This worksheet introduces you to the four key work values, and exhibits why STEM careers are great for those who have intrinsic, extrinsic, prestige or social work values.

Read about the four key work values below. Using the words in the bank below, complete the quotes in the thought bubbles.

I want to do work that is really _____ to me.

I want to work _____ at times to solve a piece of a bigger team puzzle.

I want to _____ with others to solve important problems.

I want to do work that can _____ the world.

INTRINSIC

refers to the importance placed on autonomy and interest

DID YOU KNOW:
STEM professionals are creative problem solvers!

SOCIAL

refers to an importance placed on working with people and making contributions to society

DID YOU KNOW:
STEM professionals collaborate to make a world of difference & shape our future!

Work Values

EXTRINSIC

refers to an importance placed on making money and having job security

DID YOU KNOW:
STEM professionals are in demand, and are some of the highest paid careers!

PRESTIGE

refers to an importance placed on having a prestigious and respected occupation

DID YOU KNOW:
Occupations in STEM disciplines consistently dominate the ranks of the most prestigious occupations!

I want to know that I will always be able to find _____

I want to build financial _____

I want a job that represents a high _____

I want people to admire and _____ me for my work.

WORD BANK

interesting | independently | collaborate | change | wealth | employment | respect | social standing

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Reflection

1. Extrinsic
2. Intrinsic
3. Social
3. Prestige

In your Reflection Journal, create a plan for how you will engage students in exploring STEM careers related to their work values.

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Super Strategies

- Incorporate the benefits of STEM careers into discussions that will appeal to the work values of students of different class, race, and gender
- Conduct the work values activity (lesson plan) and worksheet into your class

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STEM Pathways for Every Student

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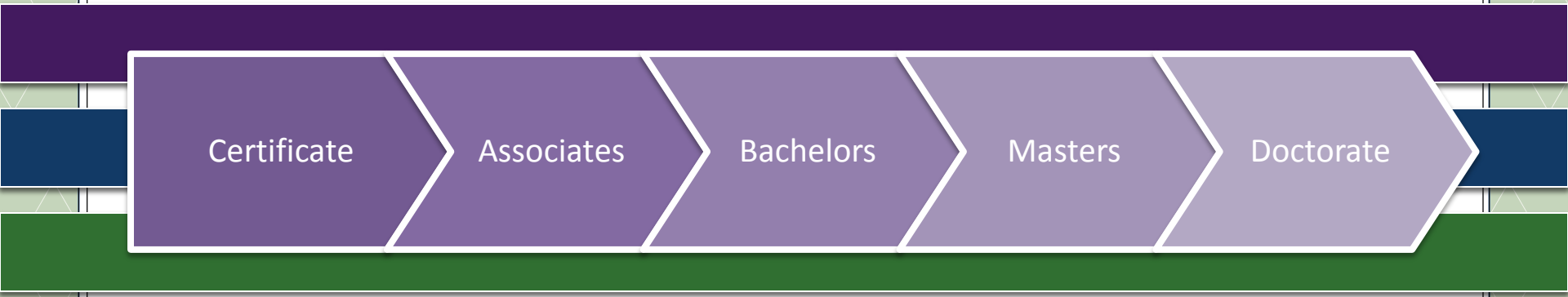
Pathways

There are multiple pathways to and opportunities in STEM careers.



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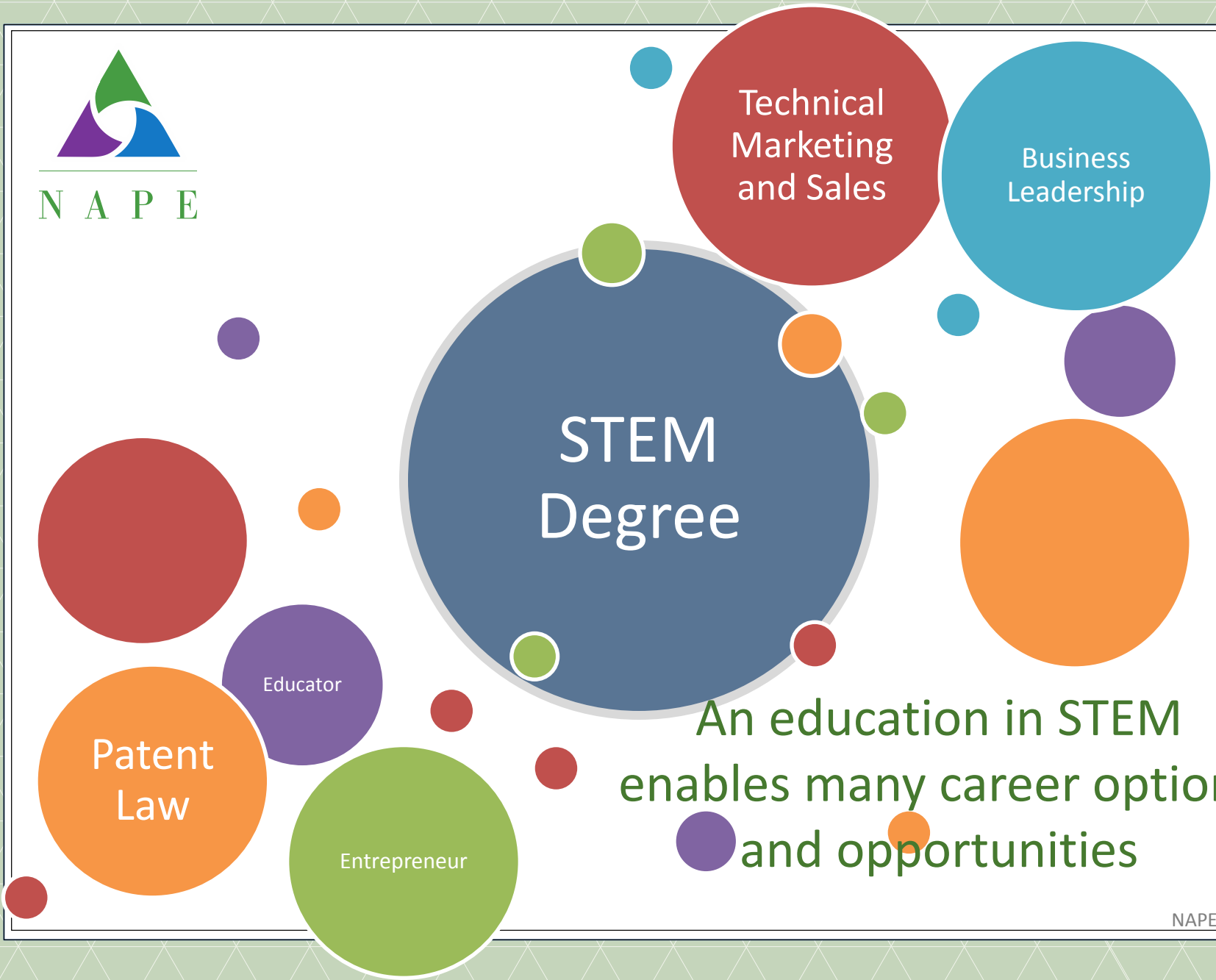
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Technical Marketing and Sales
Business Leadership
STEM Degree
Educator
Patent Law
Entrepreneur
An education in STEM enables many career options and opportunities
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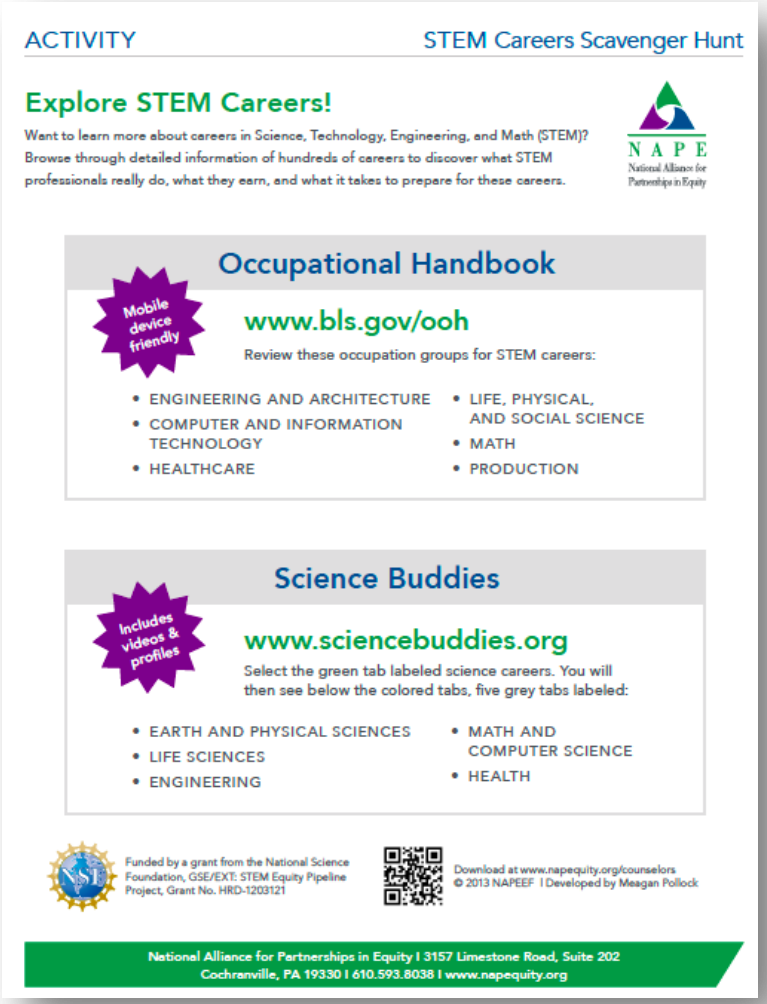
Activity: STEM Careers Scavenger Hunt

Use your smart phone or device to connect to one of the following websites and explore!

STEM Careers Scavenger Hunt



ACTIVITY STEM Careers Scavenger Hunt

Explore STEM Careers!

Want to learn more about careers in Science, Technology, Engineering, and Math (STEM)? Browse through detailed information of hundreds of careers to discover what STEM professionals really do, what they earn, and what it takes to prepare for these careers.

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Occupational Handbook

Mobile device friendly

www.bls.gov/ooh

Review these occupation groups for STEM careers:

- ENGINEERING AND ARCHITECTURE
- COMPUTER AND INFORMATION TECHNOLOGY
- HEALTHCARE
- LIFE, PHYSICAL, AND SOCIAL SCIENCE
- MATH
- PRODUCTION

Science Buddies

Includes videos & profiles

www.sciencebuddies.org

Select the green tab labeled science careers. You will then see below the colored tabs, five grey tabs labeled:

- EARTH AND PHYSICAL SCIENCES
- LIFE SCIENCES
- ENGINEERING
- MATH AND COMPUTER SCIENCE
- HEALTH

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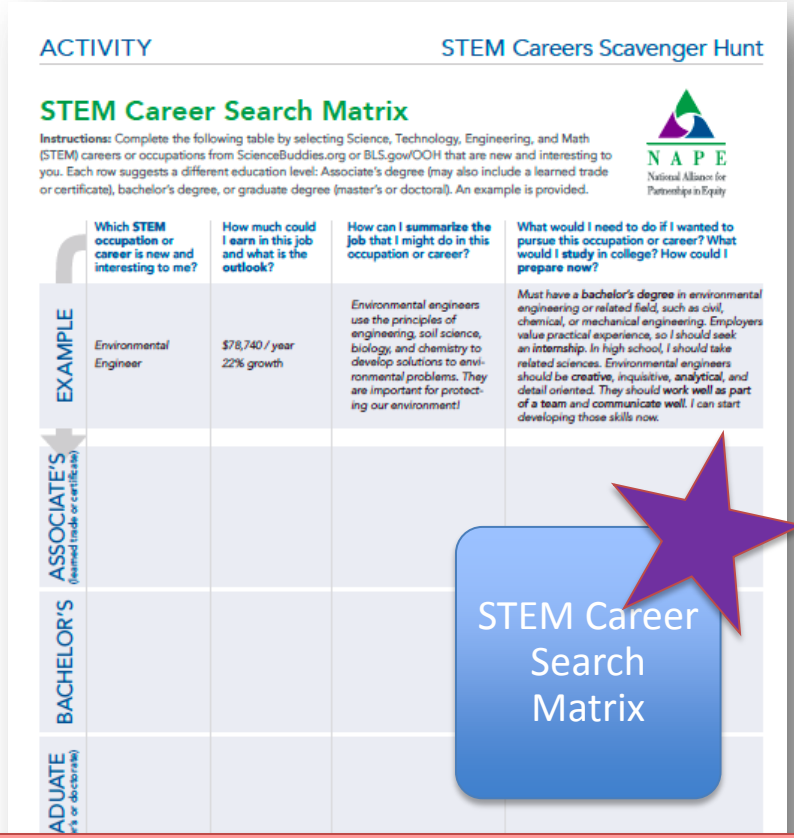
Activity: STEM Careers Scavenger Hunt

1. Work alone or in pairs.
2. Complete the following table by selecting STEM Careers that are **new** and **interesting** to you.
3. Discuss with those around you what you learned or discovered.



ACTIVITY — STEM Careers Scavenger Hunt

STEM Career Search Matrix

Instructions: Complete the following table by selecting Science, Technology, Engineering, and Math (STEM) careers or occupations from ScienceBuddies.org or BLS.gov/OOH that are new and interesting to you. Each row suggests a different education level: Associate's degree (may also include a learned trade or certificate), bachelor's degree, or graduate degree (master's or doctoral). An example is provided.

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	Which **STEM occupation or career** is new and interesting to me?	How much could I **earn** in this job and what is the **outlook**?	How can I **summarize the job** that I might do in this occupation or career?	What would I need to do if I wanted to pursue this occupation or career? What would I **study** in college? How could I **prepare now**?
EXAMPLE	*Environmental Engineer*	*$78,740 / year 22% growth*	*Environmental engineers use the principles of engineering, soil science, biology, and chemistry to develop solutions to environmental problems. They are important for protecting our environment!*	*Must have a **bachelor's degree** in environmental engineering or related field, such as civil, chemical, or mechanical engineering. Employers value practical experience, so I should seek an **internship**. In high school, I should take related sciences. Environmental engineers should be **creative**, inquisitive, **analytical**, and detail oriented. They should **work well as part of a team** and **communicate well**. I can start developing those skills now.*
ASSOCIATE'S (learned trade or certificate)				
BACHELOR'S				
ADUATE (master's or doctorate)				

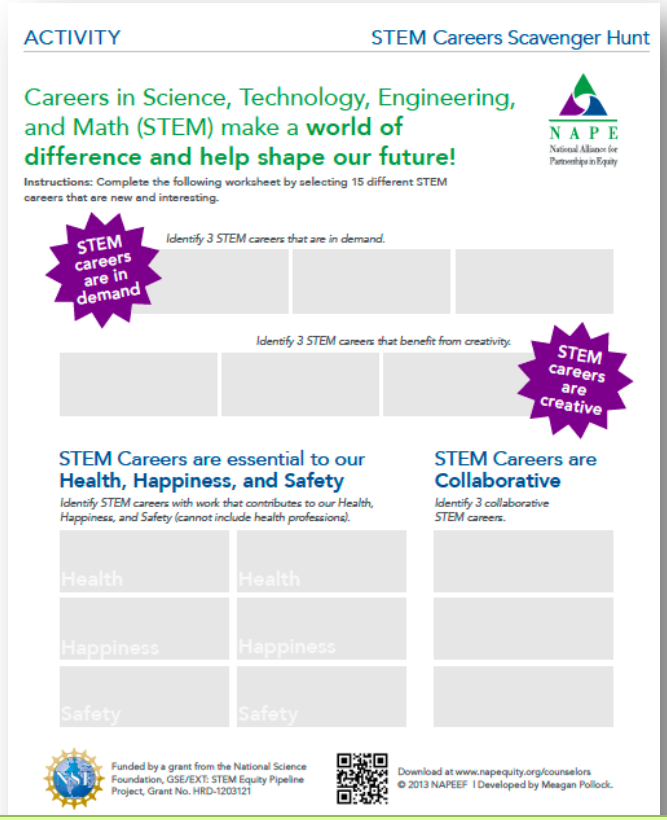
STEM Career Search Matrix

7 out of 10 of the fastest growing occupations (requiring at least a 2-year degree) are in STEM

Activity: STEM Careers Scavenger Hunt

1. Work in small groups.
2. Complete the following worksheet by selecting **15 different** STEM Careers that are **new** and **interesting**.
3. Discuss.

STEM Career Scavenger Hunt, Part 2



ACTIVITY STEM Careers Scavenger Hunt

Careers in Science, Technology, Engineering, and Math (STEM) make a **world of difference and help shape our future!**

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Instructions: Complete the following worksheet by selecting 15 different STEM careers that are new and interesting.

STEM careers are in demand

Identify 3 STEM careers that are in demand.

Identify 3 STEM careers that benefit from creativity.

STEM careers are creative

STEM Careers are essential to our Health, Happiness, and Safety

Identify STEM careers with work that contributes to our Health, Happiness, and Safety (cannot include health professions).

Health Health

Happiness Happiness

Safety Safety

STEM Careers are Collaborative

Identify 3 collaborative STEM careers.

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To improve equity and accessibility, messaging matters.

Reflection

1. Online Tools (OOH & Science Buddies)
2. Career Search Worksheet
3. Scavenger Hunt Worksheet

In your Reflection Journal, create a plan for how you will engage students in exploring STEM Careers using this activity and these online tools.

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Super Strategies

- Conduct the STEM Career Activity (lesson plan and worksheets) with your students.
- There are STEM Pathways for ***every*** student. Encourage every student to explore their options and opportunities.

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Preparing Every Student for a STEM Career: Micro-Affirmations

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Kudos Cards

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Wrap-up

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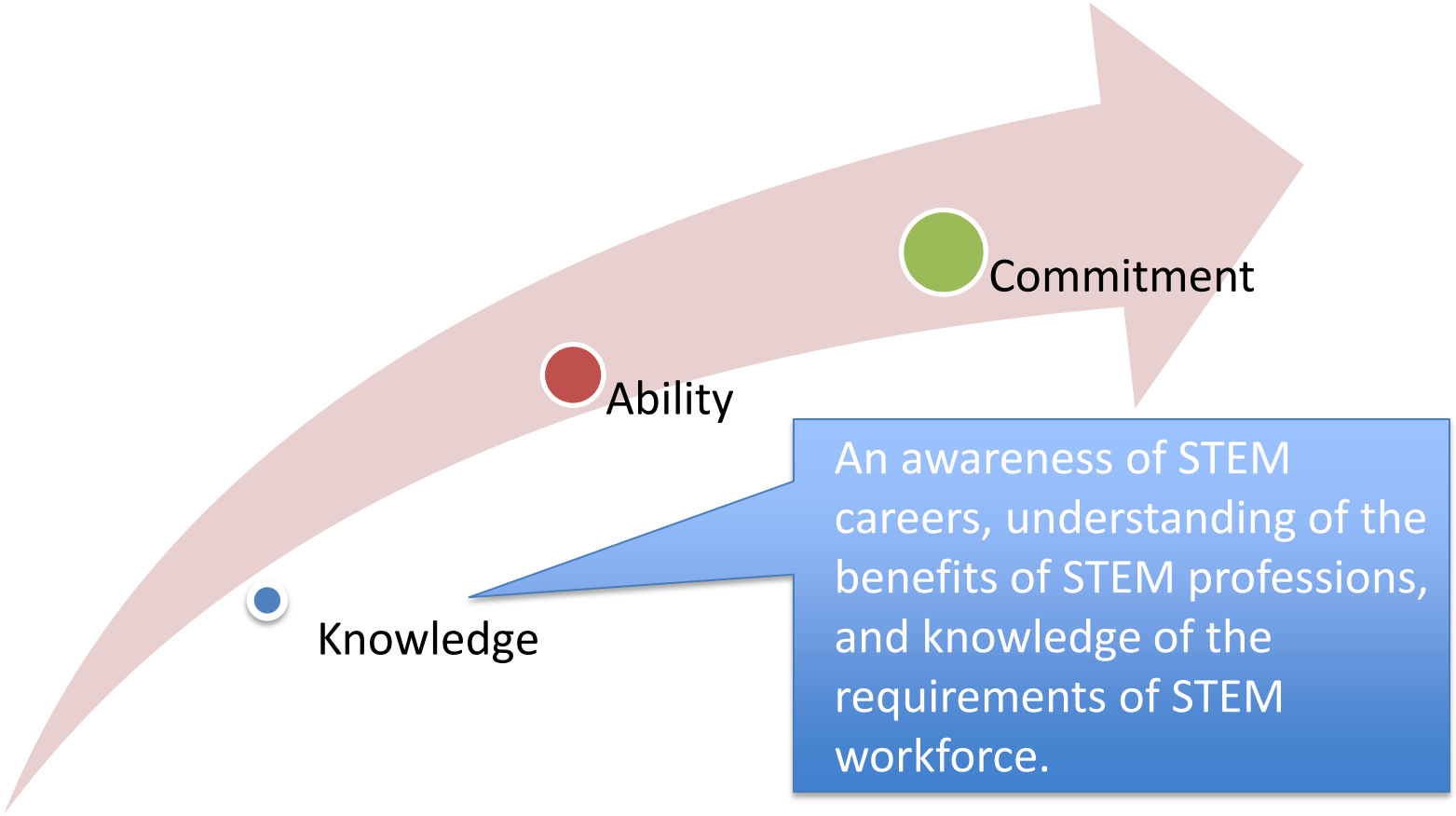
Key Takeaway Points



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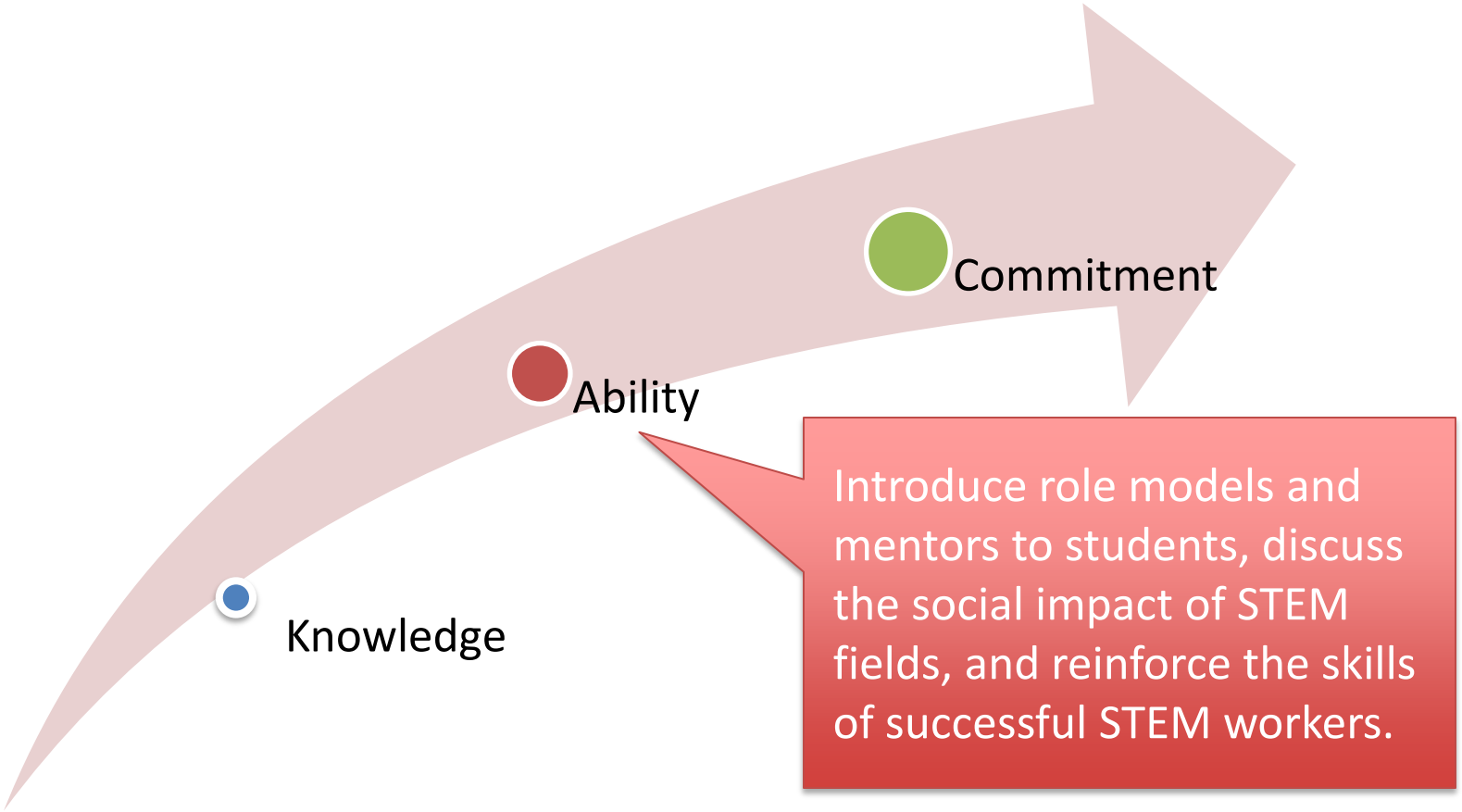
Key Takeaway Points



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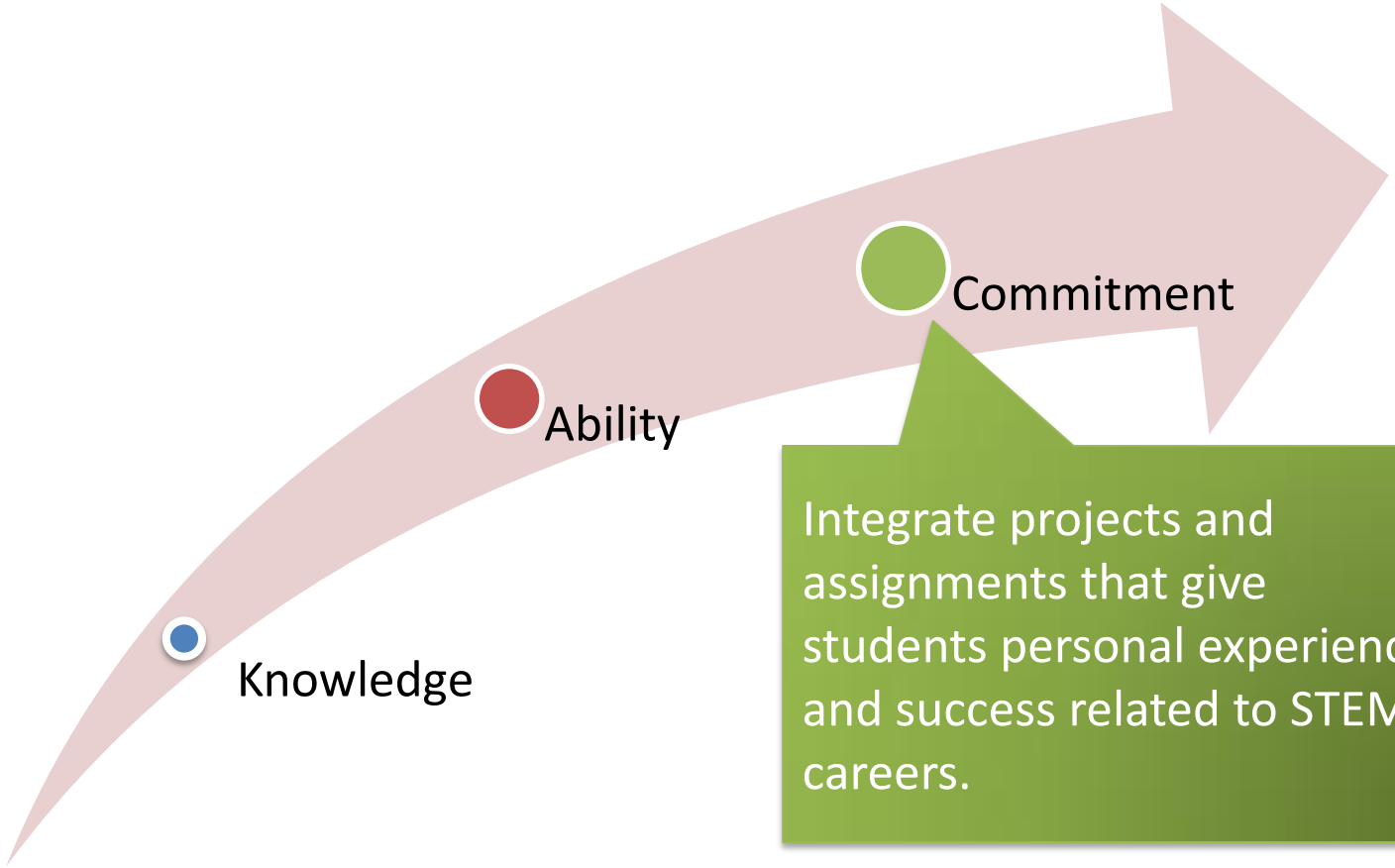
Key Takeaway Points



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Moving Forward

- Continue to integrate real-world applications into your curriculum or program.
- Continue to develop cognitive skills required for the STEM workforce.

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“Creating and managing a diverse workforce is a process, not a destination.”

— R. Roosevelt Thomas, Jr.

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