ALL ABOARD!
Bringing STEAM to Your School

Virginia Career VIEW
VCA 2015 Convention
• Contents

Why STEAM?

Activity: Defining STEAM

Integrating Careers

STEAM Week!
STEM vs. STEAM vs. ...  

- Science Technology Engineering **Art** Mathematics (STEAM)  
- Science Technology Engineering Applied Mathematics (STEAM)  
- Science Technology **Reading** Engineering **Art** Mathematics (STREAM)  
- Science Technology Engineering Mathematics **Health Professions** (STEM-H)  
- Science Technology **Robotics** Engineering Mathematics (STREM)  
- environmental Science Technology Engineering Mathematics (eSTEM)
Why STEAM?

STEAM is a movement championed by Rhode Island School of Design (RISD) and widely adopted by institutions, corporations and individuals.

Objectives of the STEAM movement:
• transform research policy to place Art + Design at the center of STEM
• encourage integration of Art + Design in K–20 education
• influence employers to hire artists and designers to drive innovation

Why Now?

WHY ARE STUDENTS MAJORING IN STEM?

- 68% THEY FIND IT STIMULATING AND/OR CHALLENGING
- 68% SAY GOOD SALARY
- 66% SAY JOB POTENTIAL

WHY DO PARENTS THINK STEM SHOULD BE A PRIORITY?

- 53% SAY TO ENSURE THE U.S. REMAINS COMPETITIVE IN THE GLOBAL MARKET
- 51% SAY TO PRODUCE NEXT-GENERATION INNOVATORS
- 36% SAY TO HAVE WELL-PAYING CAREERS
- 30% SAY TO HAVE FULFILLING CAREERS

MICROSOFT UNDERSTANDS THE IMPORTANCE OF STEM AND IS WORKING TO MAKE TECHNOLOGY EASILY AVAILABLE TO STUDENTS IN ORDER TO GET THEM EXCITED IN STEM WITH DIGIGIRLZ, IMAGINE CUP, DREAMSPARK AND KODU GAME LAB.

SOURCES:
2. "Why the Focus on STEM?" the Massachusetts STEM Advisory Council; 2011
6. "STEM Perceptions: Student & Parent Survey;" Harris Interactive online survey of 500 STEM college students and 854 parents of K-12 students; May 2011.

Why for your students?
Adding the “A”

• Case Studies
  • Sesame Street
  • Reading is Fundamental
  • Institute of Play + Mission Lab

• Sydney & Simon...Full STEAM Ahead!
By Paul Reynolds and Peter Reynolds
Sydney & Simon   FULL STEAM AHEAD!

Twin mice solve a problem using STEAM—science, technology, engineering, arts and mathematics—in this series opener.

When a heat wave threatens to kill the window-box flowers the twins need for their much-anticipated Art in Bloom show, they have to both figure out why their third-story window won’t open (the water cycle is to blame) and how to get water to the thirsty flowers (an invention of Archimedes’ is the answer). Luckily, several dei ex machina lead the twins to some people who can help them spark some ideas. Sydney and Simon, the offspring of an inventor mother and poet father, are steeped in the arts and sciences that will help them in “thinkering” about their problem and finding a solution. Sydney expresses herself through drawing, using her spiral-bound Wonder Journal to jot down ideas, record hypotheses and draw what she observes. Simon’s Wonder Journal is on a tablet, allowing him to take pictures, record video and sound, and combine all these into something new. Sydney and Simon are solid, though perhaps idealized, models for those aspiring to STEAM careers—though in this chapter book, readers accustomed to STEM programs will be struck by the emphasis on the arts piece. (STEM to STEAM is a Rhode Island School of Design initiative to add the arts and design to STEM). Ink-and—watercolor-wash illustrations complement the text.

Inspiration for young scientists, artists and inventors. (glossary, author and illustrator’s note) (Fiction. 7-10)
ACTIVITY 1: What does STEAM mean to your students?
EXAMPLE 1

STEAM in Roanoke

Science: VT Carilion Research Institute
Angels of Assisi

Technology: 
ITT
VDOT
Meridian

Engineering: 
Railroad: Norfolk Southern
GE
Proposed Pipeline

Art: 
Taubman Museum, local galleries
Roanoke Community Gardens
Mill Mountain Theater
Public art at the skate park on the Greenway

Mathematics: 
VT Carilion School of Medicine
Lewis Gale Hospital
Pharmacies
What does S.T.E.A.M. mean to you?

A way of approaching projects and problems:
- Asking questions
- Problem solving
- Critical thinking
- Computational thinking
- Seeking out evidence
- Creating
- Design
- Reporting

Not about memorizing discrete facts in math, science, technology, engineering, and art.

In our school(s), we want to support students in investigating information, problem solving, and creating— not just memorizing.

We can use examples of local S.T.E.A.M. practices.
- You can find S.T.E.A.M. in any career and any community.

Arts serve as an engaging way to think about S.T.E.A.M. concepts.
PLUS Art processes are essential to ANY S.T.E.A.M. career.
Scenarios: Integrating Careers

• Use *Full STEAM Ahead* bound booklet
• Use online resources
• 30 minutes
• Use poster as a guide
**EXAMPLE 1: 3rd grade**

Kindergarten through Fifth Grade
Integrated Career and Classroom Content Activity

Planning Scenario

**What's happening in the classroom?**
Art!
This activity should be planned to be associated with art class.

**Academic and Career Plan Objectives**
- SOL: Understand the relationship of individual effort, hard work and persistence to achievement
- FCPS: Demonstrate the decision-making process
- ECPS: Demonstrate goal setting

**Teacher Objectives & SOLs**
- Visual Communication and Production
  - 5.2: The student will describe and use steps of the art-making process, including brainstorming, preliminary sketching, and planning, to create works of art.

**What careers are related to these objectives?**
Any careers that require brainstorming and planning can apply, including Scientists and Engineers.

**Activity Brainstorming**

**Instructional Goal**

**Who?**
3rd grade students

**Where & When?**
During class at home

**What?**
Creating a brochure for a job of their choice, including pictures, descriptions of pay, related class subjects, and examples of what they could be like.

**With What?**
- Paper, crayons, markers,
- Computer and software

**Think**
- Ability to research careers
- Plan a brochure layout - make a preliminary sketch
- Decision-making of information to include in brochures
- Create a final product with pictures, texts, etc. - see fruit for specific audience criteria.
EXAMPLE 2: 6th grade

Sixth through Eighth Grade
Integrated Career and Classroom Content Activity

Planning Scenario

What's happening in the classroom?
This activity should be planned to be associated with art class.

Academic and Career Plan Objectives
- MC. Demonstrate employability skills such as individual initiative, teamwork, problem solving, organization, and communication
- MCII. Use research skills to locate, evaluate, and interpret career and educational information

Teacher Objectives & SOLs
Visual Communication and Production
- 7.1: The student will use, and record in a sketchbook/journal, steps of the art-making process, including research, to create works of art.

What careers are related to these objectives?
Any careers that require research and documenting your work can apply, including Scientists and Engineers. Careers in the arts include: Artist, Art Director, Art Therapist, Architect, Architectural Drafter, Civil Engineering, Civil Drafter, Commercial & Industrial Designer, Creative Writer, Fashion Designer, Interior Designer, Multimedia Artist & Animator, Performer; and Video Game Designer.

Activity Brainstorming

Instructional Goal
Who?
6th grade students in Exploring Sequence (art)

What?
Introducing students in an art exploratory class to careers in the arts, and more generally STEM.

Where & When?
Provide handouts for students (attached) Speak during class/ reach out to teachers for relevance Give With What?
In class exercise HW Class project

What steps do the learners need to do in order to achieve the goal?
Think in terms of observable behaviors. Consider prior knowledge and tools the learners will need to carry out those behaviors. Decide on the criteria that will be used to determine if the observed behavior is considered acceptable for completing each step.

1. Groupwork for brainstorming
2. Use VA Career View website for researching
3. Making the information relevant to their class and their own interests.
4. Opportunity to explore their own career.
5. At home project connecting their class (prior and new knowledge) with the careers
EXAMPLE 3: 7th grade

Sixth through Eighth Grade
Integrated Career and Classroom Content Activity
Planning Scenario

What’s happening in the classroom?
Art!
This activity should be planned to be associated with art class.

Academic and Career Plan Objectives
• MX. Demonstrate employability skills such as individual initiative, teamwork, problem solving, organization, and communication.
• MC7. Use research skills to locate, evaluate, and interpret career and educational information.

Teacher Objectives & SOLs
Visual Communication and Production
- 7.1: The student will use, and record in a sketchbook/journal, steps of the art-making process, including research, to create works of art.

What careers are related to these objectives?
Any careers that require research and documenting your work can apply, including Scientists and Engineers.
Careers in the arts include: Artist, Art Director, Art Therapist, Architect, Architectural Drafter, Civil Planning Aid, Civil Drafter, Commercial & Industrial Designer, Creative Writer, Fashion Designer, Interior Designer, Multi-Media Artist & Animator, Performer, and Video Game Designer.

Activity Brainstorming

Instructional Goal

Who?
7th Grade Students

What?
Ways to present data (histograms)
- 3-D Art - Box plotted
- Using Technology - PowerPoint
- Posters - Drawing (3-D)

How & Where?
Science classes use histograms to demonstrate science data & information related to science SOLs

With what?
- Computers
- Paint
- Newspaper, boxes, media
- Ceramics (project)
- Water ending (project)

What courses might use this data or presentation ideas?

What steps do the learners need to do in order to achieve the goal?
Think in terms of observable behaviors. Consider prior knowledge and tools the learners will need to carry out those behaviors. Decide on the criteria that will be used to determine if the observed behavior is considered acceptable for completing each step.

1. Determine what data they will represent
2. How can this data be represented in the most interesting creative way?
3. List ideas on how to show this data using a histogram & materials to use for the histogram
4. Draw the data in a histogram
5. Create materials lists for the histogram
6. Assign students different roles in creating the histogram

Created with Virginia Career VIEW - Virginia Tech School of Education www.vacareerview.org 800-542-5870
A Week of STEAM in Your School: A different take on Career Day

- **Calendar of Activities**
  - Grades K-5, 6-8
  - Includes links to games and activities
  - Ideas for ways to engage students in STEAM
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