“Creativity is that marvelous capacity to grasp mutually distinct realities and draw a spark from their juxtaposition.” – Max Ernst

1. **From STEM to STEAM.** STEM is an acronym for the fields of study within science, technology, engineering and mathematics. There isn’t an exhaustive list of the exact disciplines it includes, but [wiki](http://example.com/wiki) has a pretty good overview. STEM has gotten a lot of press in the last 6-8 years because of the lack of American students getting STEM-related degrees. As a result, the U.S. is losing competitive ground with other first world nations. STEAM integrates art and design into STEM and is thought to be an important catalyst to innovation in new technologies, discoveries and advancements. The STEAM movement is attributed to the Rhode Island School of Design’s (RISD) President John Maeda and is beginning to catch on in the mainstream. John Maeda is a designer and former professor at the MIT Media Lab. [Georgette Yakman](http://example.com/georgette-yakman) formalized the STEAM concept several years earlier but it did not get much support. She ultimately ended up working with the South Korean government who apparently eagerly adopted STEAM as a national education initiative.

2. **Communicating Science.** From a teaching perspective, a visual representation of complex subjects is important for students conceptualizing new ideas. Therefore, inviting artists to the table is essential. From medical, botanical and zoological illustrations to the rise of “Edutainment”, creative types have been developing new ways for students to absorb and be excited about STEM subjects. Its no wonder, Learning Theorists have demonstrated that more than half of the population needs to see what they are learning. Every year the American Association for the Advancement of Science (AAAS) arranges an [International Science & Engineering Visualization Challenge](http://example.com/international-science-and-engineering-visualization-challenge), which is described in the magazine SCIENCE – artists are helping scientists explain, visualize and communicate phenomena, processes, shapes, complexities etc. where words, equations etc. fall short.

3. **Helps Formulate Different Questions.** More and more, science disciplines realize that bringing artists to the research table early on can formulate different research questions, which can lead to more comprehensive solutions to the world’s complex problems. Part of this realization comes from people recognizing that design can provide a process of problem solving by:

   Providing new ways of conceptualizing questions and information, from the beginning of the process.
   
   Providing different strategies and expertise for working through problems.
   
   By spurring technological innovation through the demands of their own creative vision.
   
   By improving future research capacity through improved retention of at-risk students, and students from diverse backgrounds.

Bone Marrow by XVIVO Scientific Animation

“Art and music require the use of both schematic and procedural knowledge and, therefore, amplify a child’s understanding of self and the world,” Kagan said at the John Hopkins Learning, Arts, and the Brain Summit in 2009.

4. **Changing Education Policy.** Congressman Jim Langevin (D-RI) introduced legislation, co-sponsored by
Congressman David Cicilline (D-RI), that would allow STEAM to be included in the Obama Administration’s current STEM funding initiative. On June 22, 2011, RISD President John Maeda, Adam Bly, SEED Media Group, Randy Cohen of American for the Arts, Martin Storksdieck of the Board of Science Education and National Research Council led RISD’s first congressional briefing. But just tracking the STEM to STEAM movement through the various news outlets, advocates have more ground to traverse to shift the conversation and public policy. It will likely stretch into the next administration as the initiative seems to have stalled in the House. Click here for more information on H.Res 319. An Online Petition in support of federally funded STEAM education can be found here.

Artist Jason Hackenwerth’s Balloon Sculpture at Edinburgh International Science Festival

5. Important to our Economic Future. In January of 2006, President Bush announced the American Competitiveness Initiative “to address shortfalls in federal government support of educational development and progress at all academic levels in the STEM fields.” (STEM-fields: Wikipedia) There is no question that STEM education is a vital part of this country’s edge, but many educators and scholars would argue that STEM is missing a key component of creativity that is critical to empowering a competitive and innovative workforce- those skills are summarized under the letter “A” for Arts. Global competition is rising and the STEAM movement is a way for the U.S. to maintain its position as the most innovative country in the world.

With our focus on higher ed and research institutions, we could be characterized as STEM architects. But we are a firm believer of STEAM. We like to ponder the question, what is the role that art and design can play in scientific research? STEM, on its own, can seem dry and boring, missing a large swath of the population because of its reputation for being intimidating, uninspiring and male-dominated. But add an “A” and suddenly we’re talking about STEM + innovations! It’s the ‘STEAM’ engine of ideas- the stuff of science fiction- the stuff that drives progress and saves the world. Art and design can drive STEM education and research to new heights. Now that’s a topic worth shouting about.

Further Exploration:

STEM to STEAM join the movement (Vimeo)

ArtsEngine’s Interim report on art-making and the arts in research universities

Congresswoman Bonamici Asks about the Importance of STEAM Education

Congressional STEAM Caucus Briefing – February 14, 2013

Capicitor, a dance, circus, aerial company, collaborates with scientists to create art experiences and entertainment which encourages contact with scientific concepts in ways that allow audiences of all ages to see