

**Addressing The Strands Of Learning Within A Teen Science Café**  
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With the release of the Learning Science in Informal Environments (NAS, 2009) we have been evaluating how the form of the Café program aligns and supports the strands of learning in informal environments. We outline below many examples of how these are achieved.

Strand 1: Sparking Interest and Excitement is a central goal of the Café. We achieve this through most every aspect of the program. Several teens told us before our Spying with Google Earth Café that a parent had shown them the software sometime earlier, and they found it “boring”. After the Café program, these same teens volunteered that the experience had changed their mind and they were going to download the software at home so they could create fly-bys, snoop on others, and explore the surface of Earth.

Strand 2: Understanding Scientific Content and Knowledge  
Café programming teaches new content and reinforces the knowledge youth already have. In a survey, teens rated the frequency of learning something new about science at 4.5 and 4.7 respectively, where 5 means “happens almost all the time in Cafés”. The Café also has helped students put the science content they learn at school in a context for greater understanding, as shown by these spontaneous comments from teens.

"Wow, we did an experiment like that in physics last week. I just thought it was another physics lab. I did not realize that you use the same approach to build things that matter, like the MagViz machine."

"I thought chemists just mixed chemicals together all day. I had no idea a chemist would do something like this."

Strand 3: Engaging in Scientific Reasoning  
Youth deciphered DNA sequences to identify which DNA set matched a crime scene, debated issues related to local and global water use, and weighed the evidence for storage of nuclear waste at Yucca Mountain. In each case, they had to bring their prior knowledge and the evidence at-hand to resolve several major social problems facing societies around the world.

Strand 4: Reflecting on Science  
The practice of science requires routine reflection and evaluation of new evidence to reassess prior knowledge. It also requires examination of the implications for scientific discoveries. In the Café, youth are regularly presented with stories of scientific advances made when a scientist applied an old idea to a new problem. They also discussed advances that are controversial, such as the ethics and probabilities associated requiring young girls to be vaccinated for HPV, the moral and scientific pros and cons of genetically modified foods, and nuclear non-proliferation strategies.

Strand 5: Using the Tools and Language of Science

By integrating hands on experimentation in our program, we give youth the opportunity to use the tools of science regularly. As noted in the examples above, they were routinely using the tools and language of science.

Strand 6: Identifying with the Scientific Enterprise

One of the most positive results of our Café program is that teens now see scientists differently. They see them as interesting, friendly, funny and real people and “not like their parents”. We regularly get comments from participating youth, such as, "I see science everywhere now... in the grocery store, walking down the street, and all around."

Youth comments and "ah ha" moments when they have made the connection between the science in schools and the work of real scientists or observations that science is everywhere demonstrates that youth are taking steps toward seeing themselves differently in the scientific enterprise.

Whether all Cafés include all elements or all youth experience all elements of these six learning strands, it is clear that our best Café experiences include most if not all elements of these strands, giving youth multiple ways to enhance their learning of STEM.