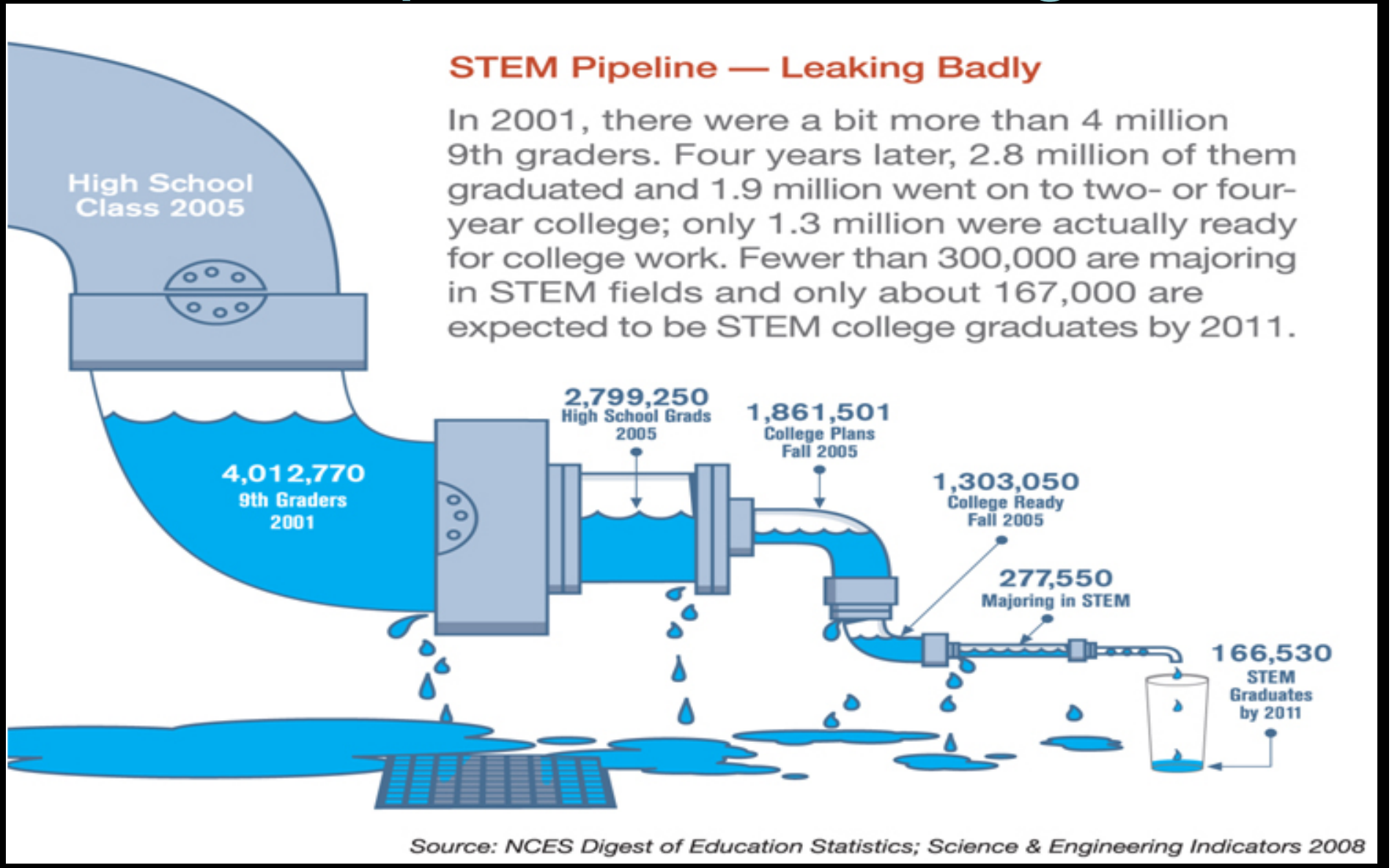
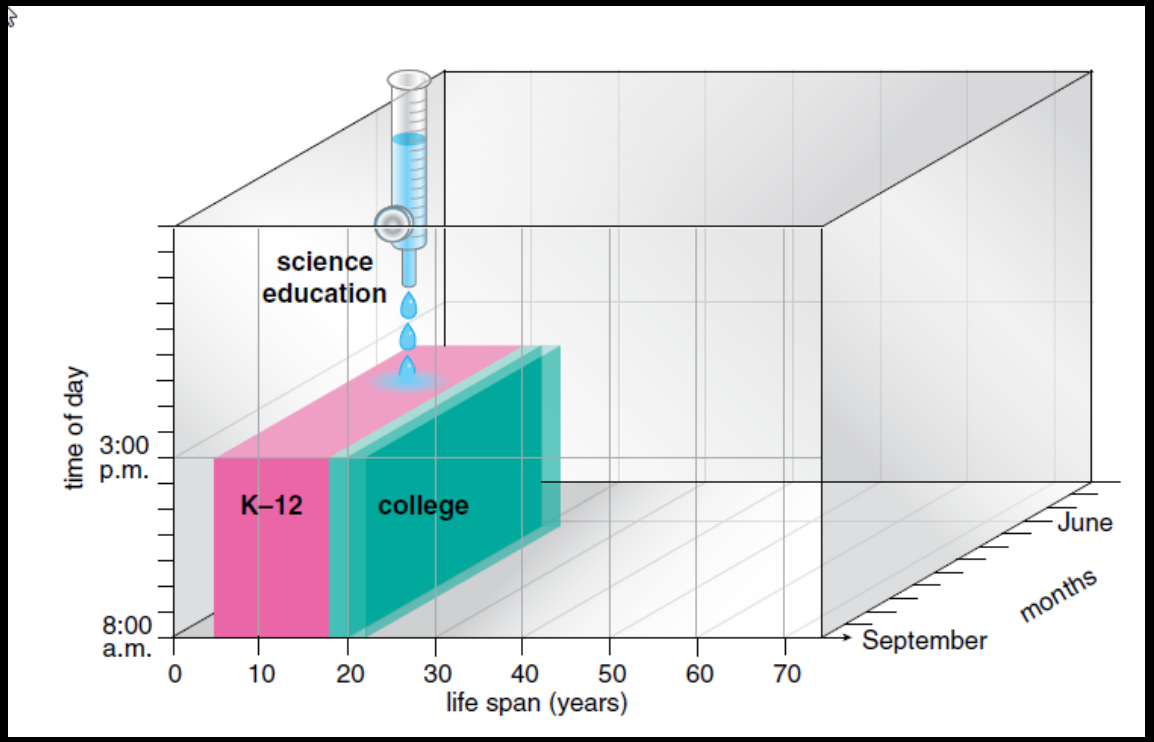
Challenges and Opportunities

- "Learning in the Wild / Much of what people know about science is learned informally. Education policy-makers should take note (Nature 464, 813-814 (8 April 2010) | doi: 10.1038/464813b)

Scope of the challenge



Where we learn science…



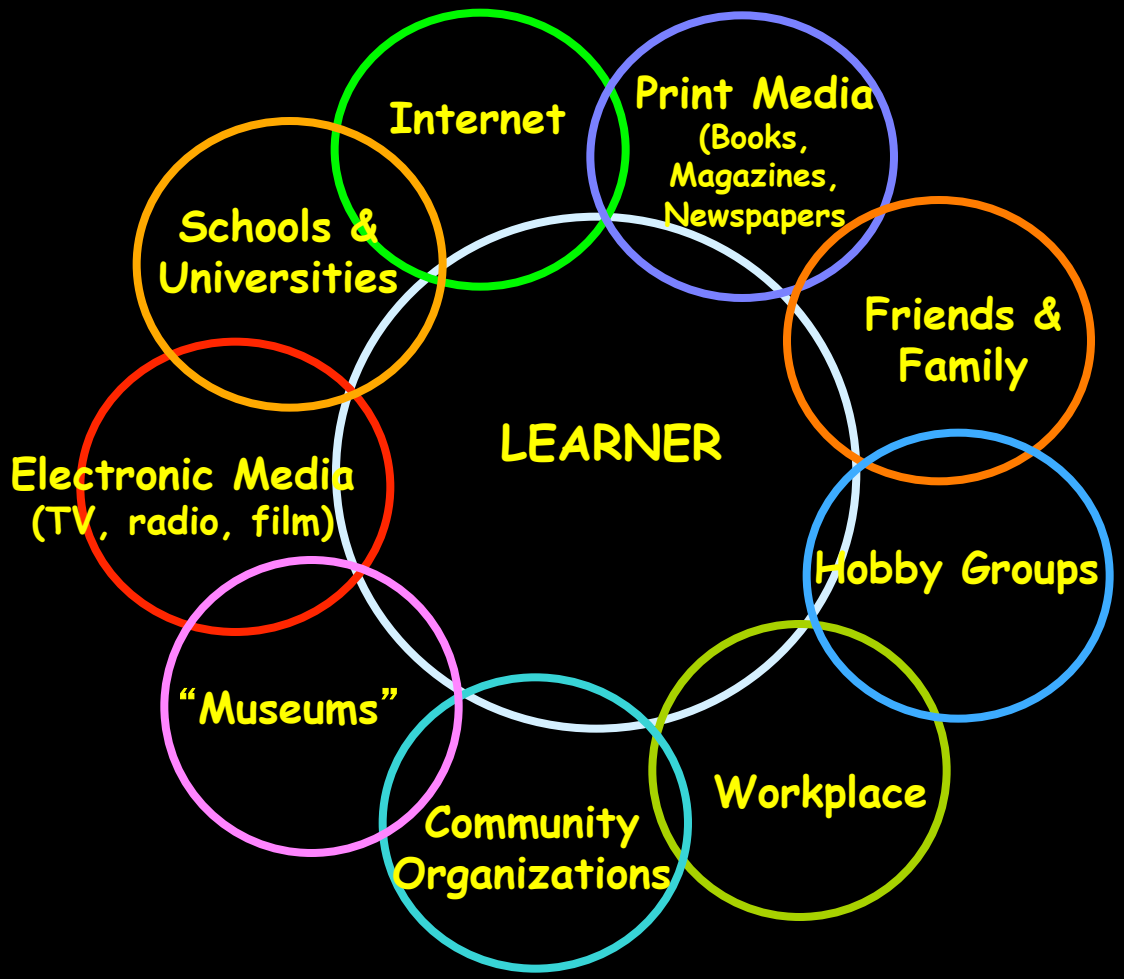
On average, only about 5 percent of an American's lifetime is spent in the classroom, and only a small fraction of that is dedicated to science instruction.

Emerging data suggest that the best way to increase the public understanding of science is to reach people during the other 95 percent of their life (Falk & Dierking, 2011)

Issue #1: Leveraging the Science Learning Infrastructure

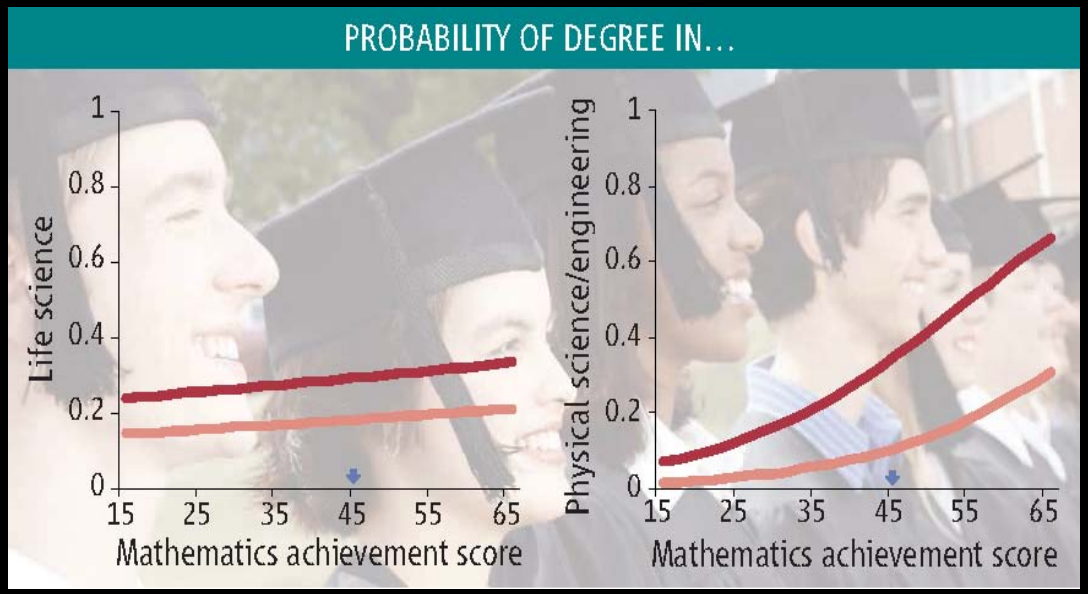
How to leverage the entire learning infrastructure?

Major challenge: how to coordinate between so many excellent programs?



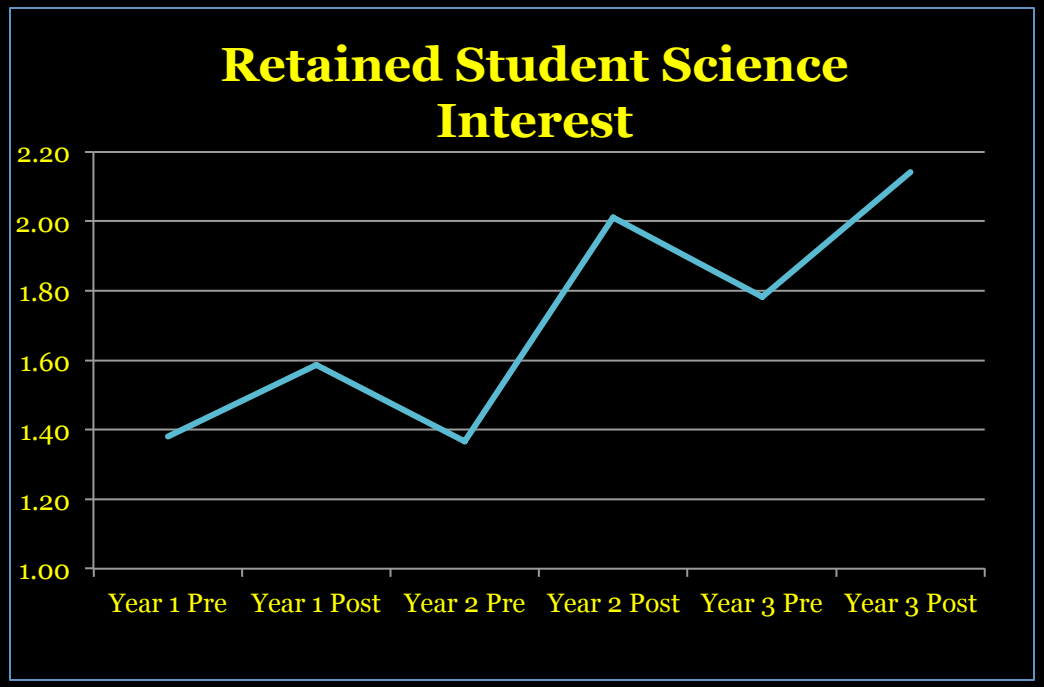
Issue 2: Expectations and Interest

- Tai and colleagues (2006) found that an average mathematics achiever with a science-related career expectation has a higher probability of earning a baccalaureate degree in the physical sciences or engineering than a high mathematics achiever with a nonscience career expectation, 34% versus 19%”
- Career expectation as an adolescent had more value than mathematics achievement in school as a predictor of winning a college degree in STEM disciplines.
-



Issue 3: How to connect and integrate informal to the formal?

- For schools the use of informal learning is typically an optional "enrichment" rather than an essential piece of the core curriculum or strategy
  - This has to change…
- Informal settings support interest development in science – whereas lots of research shows that formal science education tends to diminish science interest



Issue 4: Ensuring equitable access

- Did a quick poll of 300 Boston Public High School students
  - 6 had been to a science museum, harbor islands, etc…or aware of opportunities
  - Research has shown that quality afterschool programs improved
  - school attendance, engagement in learning, test scores and grades
- How to coordinate, integrate, and connect?

Other/Extra Slides

Challenge #1: Why do people learn Science

- Satisfy Personal Curiosity/Interest
- On-the-Job Experience/Training
- For a Hobby
- To Support the Needs of Others (e.g., children)
- Satisfy a Need (illness, environmental problem, etc.)
- For School or other Career-Related Need

Challenge #1: How to connect and integrate informal to the formal?

- Quality afterschool programs improved school attendance, engagement in learning, test scores and grades
- Frequency and duration of afterschool participation increases benefits
- High-risk youth show the greatest benefits

Challenge #2: Reaching the Populations

How Should The Relationships Between Formal and Informal Education Change?

- Should schools incorporate informal learning pathways in a more serious, structured, integral manner?
- Should museums and other informal learning organizations redesign their programs to serve formal education more directly?
- Should museums become more like schools?
- Should schools become more like museums?

Big Picture

- Learning is lifelong: 24-7-70+
- Less then 3% of life spent in formal instruction
- Traditional gatekeepers of knowledge – schools, libraries, government – no longer in total control.
- The boundaries between where, when and why we learn are disappearing
- Learning is continuous & cumulative