Engaging Students in Fundamental Biological Concepts Through UN Sustainability Goals

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Abstract

Advanced Biological Systems is year-long introductory biology course for Juniors at IMSA. It is aligned with the United Nations Sustainable Development goals, the use of which has been identified as an initiative for curriculum development. These goals help to bring purpose to students' learning. We have identified three of the seventeen goals as guideposts for our curriculum. These are clean water and sanitation, sustainable cities and communities, and good health and well-being. In this presentation, we will share our curriculum development process and examples of instruction linked to these UN goals.

Status Quo

- Introductory Science program consisting of semester long courses
- Sole reason was to separate inquiry in Science education from disciplines
- 14 years of an electives dominated program

Need Driving Change

- Students could opt for discipline isolation
- Students not receiving sound foundation in all disciplines
- Particular to Biology: student were not prepared for performance in elective; little practice with higher order thinking

Trial and Error

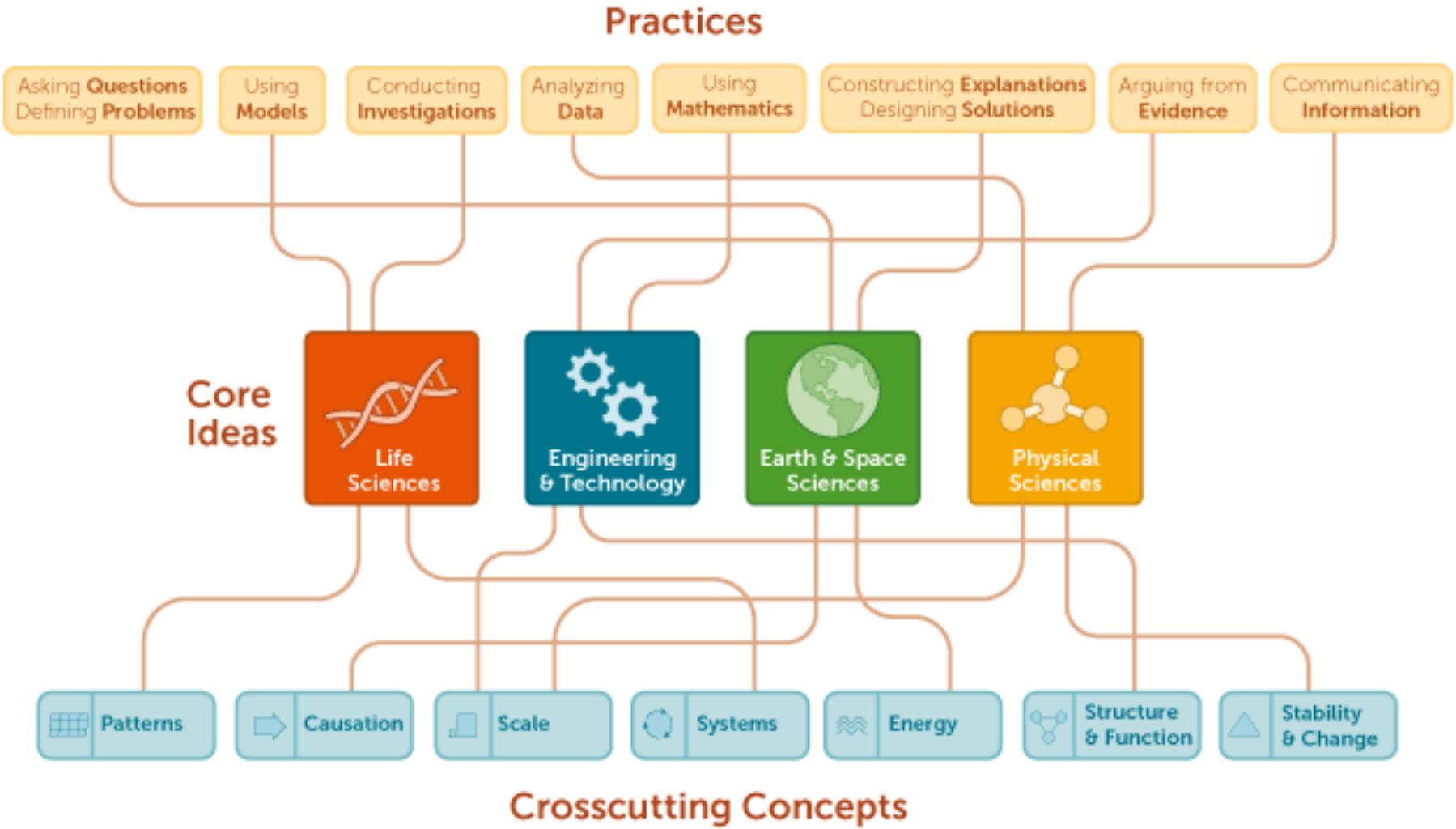
- In past years, we placed students in Biology core class into four strands – Molecular Genetics, Ecology, General Biology, and electives.

- Resulted in skewed population of students.
  - students in electives lacked common foundation.
  - students in the three introductory strands were scattered

Conclusions

- We decided to pursue a year-long course to provide more time to reflect on NGSS standards and UNSDGs
- Would provide more time to explicate depth in learning
- Students provide fuller articulation of understanding

NGSS



NCSSS
National Consortium of Secondary STEM Schools

UNSDGs

Key focal point: to build an ecosystem, you must first understand it; goal is to be sustainable

Feeding the masses: clean water is not as much of an issue in Chicago as in Houston, but still we need to conserve

Crowded conditions lead to potential pathogenesis; the basic requirements to sustain life

Highlights

- Building a sustainable city – accumulation of short video recordings
- Presentation mode, interviews, data presentations

https://tinyurl.com/ABSdocumentary

https://tinyurl.com/ABSdisrupted

Assessment Philosophy

- Fewer formalized assessments, more hands-on activities and authentic assessments
- APART
  - Acquire knowledge
  - Problem solving
  - Analytical thinking
  - Representational thinking
  - Transfer of knowledge

https://tinyurl.com/ABSmirandapaper

https://tinyurl.com/ABSunittest

Research/Reflections

- First year of ABS: juniors in a year-long course
- Instruction linked to UNSDGs, measuring whether context from this experience enhances learning
  - Cohort studies for pre/post tests
  - Behavioral and attitude studies
- In particular, looking to enhance analytical thinking and transfer knowledge
  - College and work readiness assessment (CWRA+)