

Developing University STEM Programs Using Culturally Relevant Socio-Scientific Issues

LA Mauger¹, S Vokos², DL Smith³, EM Walter⁴, A Macalalag⁵, Z El-Naggar⁶, A Abd El-Aziz⁶, FJ Merlino¹, H Elserafy⁶, R Abouserie⁶

¹21st Century Partnership for STEM Education, Wayne PA, USA; ²California Polytechnic State University, San Luis Obispo CA, USA.

³Design for STEM, Allentown PA, USA; ⁴California State University Fresno, Fresno CA, USA

⁵Arcadia University, Glenside PA, USA; ⁶21st Century Partnership for STEM Education, Cairo, Egypt

STEM Teacher Education and School Strengthening Activity (STESSA)

Program Goals:

USAID contract introduced to prepare future teachers for the STEM schools and support the growing STEM school system in Egypt

- ❖ Develop and implement 4-year Undergraduate and 1-year post-Baccalaureate STEM High School Teacher Preparation programs
- ❖ Support Egyptian faculties in developing and teaching new undergraduate courses across 5 majors and 5 Egyptian universities.

What is a socioscientific issue (SSI)?

- ❖ SSIs are ill-defined, debatable problems found in science that necessitate an examination of ethical choices as they cannot be resolved through science alone (Zeidler, 2016).
- ❖ SSI can offer an authentic immersion into why science can matter to everyone beyond simply academics (Layton et al., 1993)
- ❖ For teachers, this can mean designing curriculum and instruction around the exploration and addressing of SSI to be the driver of student learning (Sadler, 2009).



Grand Challenges of Egypt



How can socio-scientific issues be used to develop university level courses in a STEM teacher preparation?

BIO D211 Application of Basic Genetics in Public Health

Phenomenon: mRNA Vaccines
Content Addressed: Central Dogma
Example Activity: create an infographic for the general public about how mRNA vaccines work

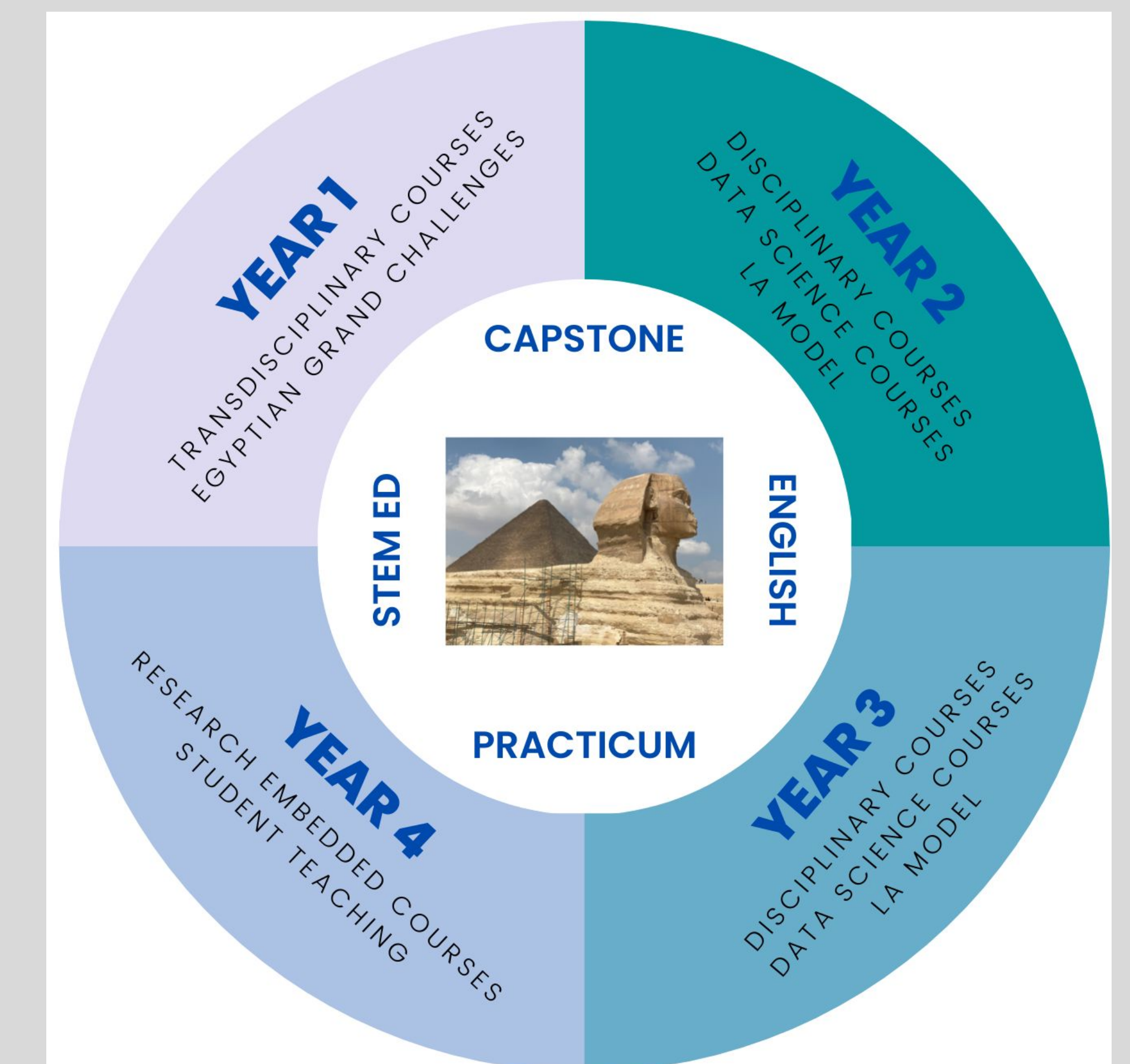
Phenomenon: Antibiotic Resistance
Content Addressed: Function and Malfunction of Genes
Example Assessment: Simulate antibiotic resistance on Petri plates

CHEM D221 Chemistry of Energy Production & Consumption

Phenomenon: Solar Powered Water Heater
Content Addressed: Laws of Thermodynamics
Example Activity: Thermodynamics simulation lab

Phenomenon: Fuel Cell Technology
Content Addressed: Electron transfer
Example Assessment: Energy source debate

Undergraduate Program for STEM Teachers



US Partners

Arcadia University
 Drexel University
 Cal Poly
 CSU Fresno

Egypt Partners

Ain Shams University
 Assiut University
 Minia University
 Mansoura University
 Zagazig University

