Science Literacy through Animal and Food Sciences

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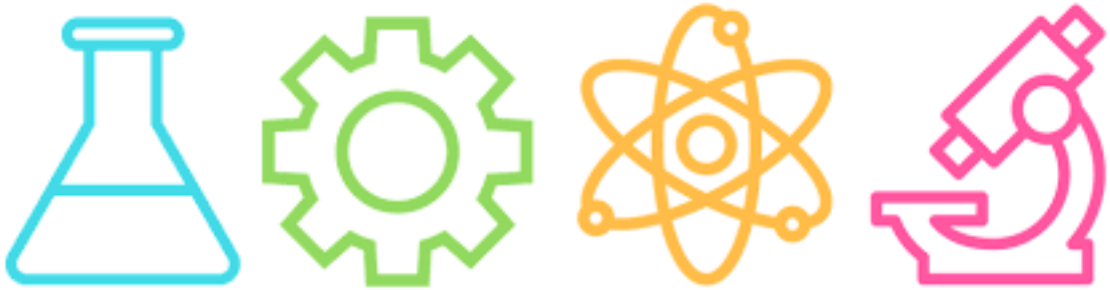
Background

- Over 50% of high school students in the U. S. lack proficiency in science (Partnership for 21st Century Skills, 2008)
- 27% of 11th grade students in Nebraska lack proficiency in science (Nebraska Department of Education, 2015)
- Nebraska Coordinating Commission of Postsecondary Education Funded this project



Project Goals

- Enhance science literacy in Nebraska by
  - providing secondary life science educators with a year long professional development (PD) program
  - Teaching real-world science through
    - genetics,
    - muscle biology,
    - microbiology,
    - nutrition
  - Using inquiry-based teaching methods

Project Objectives

1) Improve secondary life science educators' content knowledge within the sciences (genetics, muscle biology, microbiology, nutrition)

2) Improve secondary life science educators' instructional approaches through incorporation of inquiry based learning techniques

3) Increase secondary life science educators' ability to use principles of animal and food science, as a context for teaching science

Components of the PD

- Face-to-Face Workshop (2 day)
- Zoom webinars
- Curriculum development and implementation
- Face-to-face Workshop (1 day)

Physiology and Chemistry of Nutrition

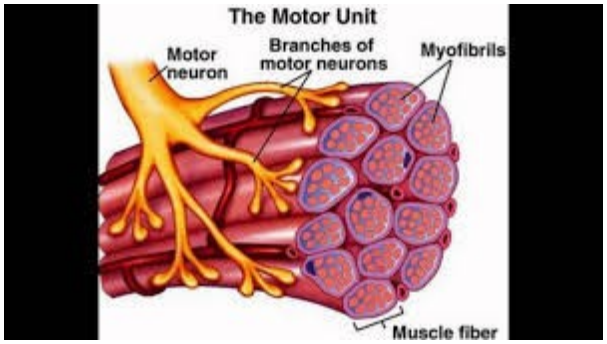
- Lab activity-Junkyard Digestion (Hill, 2002)
  - Design and build a digestive system
    - Household materials
    - Must function like a digestive system
- Design an experiment to test the digestion of feed under different conditions
  - Chemical digestion
  - Enzymatic digestion
  - Mechanical digestion

Microbiology and Food Safety

- Microbiological Warfare (Hoefnagels & Walvoord, 2006; Zahid,& Fleming, Randall,2010)
  - Design an experiment to quantify the bacterial growth in ground beef of two different thawing methods
  - Design an experiment to test the effectiveness of various decontamination or food preservation methods
    - Cooking or heating
    - Freezing or refrigeration
    - Dehydration or smoking
    - Chemical preservatives

Muscle Biology

- Muscle Contraction (Biology-resources.com, 2017)
  - Investigation of the effect adenosine triphosphate (ATP) has on muscle tissue
    - Uses strips of meat, ATP solution, glucose solution
    - Students will measure the lengths of the muscle filaments
    - Students will calculate the amount of contraction and percentage of contraction



Moving Forward

- 3 two day workshops summer of 2017
  - Regional workshops
- Zoom Meetings throughout 2017/2018 school year
- Development of additional lesson plans
- 3 one day workshops summer of 2018
- Project evaluation
  - Science teaching Efficacy
  - Inquiry-based teaching techniques scale
  - Life science and inquiry-based attitude survey

Thank You!

Any Questions?