

Project Title: Integrated Science for Secondary Classrooms and Careers

Timeline: May 29, 2018 - August 1, 2019

Amount of Funds Requested: \$59,050

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Abstract of Proposal:

Integrated Science for Secondary Classrooms and Careers will provide educators with Open Educational Resources (OER) and professional development that aligns with the state’s newly adopted science standards and college and career readiness expectations. These standards are driving change in today’s science classroom. Currently, there are few if any commercially available, truly integrated, science curricular resources available at the secondary level. Well developed, integrated science curricular materials that are open source and fulfill the requirements of postsecondary education and the workforce are a necessity. This proposal is an extension of work already completed by the Core Team of O’Neill’s secondary science teachers, under the direction of the Nebraska Department of Education (NDE) Science Director Sara Cooper.

In Phase 1 of our proposal the Core Team will complete the task of creating a curriculum map for three core secondary science courses to be taught at the Freshman, Sophomore, and Junior levels. The content of these courses are integrated across the disciplines of Physical Science, Earth and Space Science, Life Science, with Engineering. In Phase II of the proposal, the team will share their vision with educational leaders from around the state at the Nebraska Council of School Administrators (NCSA) Administrators’ Days prior to the start of the 2018-19 school year. During Phase III in the Fall of 2018 the Core Team will present at the Nebraska Association of Teachers of Science (NATS) during their annual conference. Additionally, the Core Team will coordinate with Educational Service Unit (ESU)

specialists to host a gathering of 50 science educators at an event called the Integrated Science Seminar (ISS) to introduce them to this developing science curriculum. By providing an opportunity to inform educators about this developing educational resource, this event will serve as a gateway to recruiting 25 educators passionate about furthering this work into a broader Action Team that will complete Phase IV of our proposal, an event called our Integrated Science Institute (ISI). The ISI will begin with a round table discussion including 7-10 additional invited participants: post secondary experts, along with business and industry leaders to outline what they see as the needs of students preparing to enter their respective fields. Following this discussion, the Action Team will set out with a goal of creating OER on a digital platform to deepen the pool of phenomena, materials, activities, assessments etc. to support this curriculum. These newly developed resources will be accessible to all science educators and benefit their students by providing science curriculum that emphasizes the disciplinary core ideas, crosscutting concepts and practices of scientific research, business, and industry. Finally, in Phase V of our proposal we plan to revisit the Administrators' Days in the Summer of 2019 to update statewide educational leaders on the progress of our work.

Vision and Purpose:

This [video](https://youtu.be/FzgBi_3pP84) (url pasted below) produced by our Core Team outlines the vision we hope to pursue for the benefit of students across the state of Nebraska: https://youtu.be/FzgBi_3pP84

The goal of our proposal is to produce a viable integrated science curriculum aligned to the newly adopted state science standards. Our vision is to prepare students for their futures by providing them with better understanding of practical science phenomena applicable to both postsecondary educational experiences and those of the workforce. We will accomplish this by creating and curating digital OER through collaboration and professional development. These resources will be accessible by secondary science educators anywhere for the benefit of the students they serve.

Needs Statement:

One of the stated goals of the Nebraska Department of Education is to facilitate the implementation of a more integrated science curriculum which emphasizes the disciplinary core ideas, crosscutting concepts and science and engineering practices of research, business and industry. Collaboration with key stakeholders involved in this stated goal seems the best approach to achieving an outcome that is both well developed and well utilized. Currently, there are few if any commercially available, truly integrated, science curricular resources available at the secondary level. With limited funding available to schools OER are essential for producing quality educational outcomes for their students.

The Core Team has crafted a vision that will communicate to the key stakeholders (educational administrators; area science curriculum specialists; secondary science educators; post secondary experts, business and industry leaders; and secondary students) in a timeline designed to maximize collaboration, productivity, and impact in all phases.

Goals and Objectives:

- Design an integrated science curriculum map for grades 9, 10, 11 that aligns to the newly adopted state science standards and college and career readiness expectations.
- Communicate vision with educational administrators, ESU science specialists, secondary science educators, post secondary experts, and business and industry leaders.
- Recruit 25 secondary science educators to serve as the Action Team tasked with generating OER on a digital platform with input from 7-10 post secondary experts, and business and industry leaders.
- Update stakeholders on completed outcomes and potential impact on student growth and readiness.

Impact on Career and Technical Education:

Integrated Science for Secondary Classrooms and Careers seeks to impact...

- 50-100 school administrators and ESU science education specialists through its introduction at Administrators' Days.
- 50-100 secondary science educators will be informed of the project vision through attending workshops at the annual NATS conference in the Fall of 2018.
- 50 secondary science teachers will get an up close look at the curriculum map and OER digital platform at the ISS.
- 25 secondary science teachers recruited as the Action Team to receive input from 7-10 post secondary experts, business and industry leaders in a collaboration to produce OER including phenomena, materials, activities, assessments etc.
- Thousands of students in classrooms throughout the state whose teachers choose to utilize the integrated curriculum and/or OER.

Integrated Science for Secondary Classrooms and Careers creates an open source, viable curriculum centered around the disciplinary core ideas, crosscutting concepts and practices of scientific research, business, and industry. The curricular materials generated as a result of this proposal will be created with a focus on the tenets of Nebraska career readiness standards, specifically: applying appropriate academic and technical skills, communicating effectively and appropriately, using critical thinking skills, demonstrating innovation and creativity, and the utilization of technology.

Statewide Impact:

Over the course of 18 months, the Core Team will provide many opportunities for administration, ESU science specialists, and teachers to learn and collaborate, as well as build resources for integrated science. The Core Team will start by offering an integrated workshop at Administrators'

Days in July of 2018 where administrators can learn and ask questions about the integrated science curriculum. In the Fall of 2018 the model will be presented to teachers at the NATS conference, which includes science teachers from across Nebraska. Through a partnership with regional ESUs a 2-day Integrated Science Seminar will be coordinated in the Fall, which will reach science teachers within our regions. At the seminar we will conduct an impact survey to evaluate how many teachers plan to implement the model, who would be interested in developing OER, and how many students would be impacted. Once the Core Team has examined the surveys, an Action Team of 25 teachers passionate about implementing an integrated curriculum will be assembled for the 4-day ISI. Post secondary experts, business and industry leaders will be invited to take part in a round table with our Action Team. The round table discussion will occur on the first day of the ISI; the goal of the institute is to deepen the pool of phenomena, materials, activities, assessments etc. to support this curriculum by allowing dialog between professionals and teachers. The resources developed, will be open and available to every teacher in Nebraska. This could be particularly impactful for new teachers, schools experiencing budget constraints, and smaller districts whose science departments are typically staffed by low numbers.

A natural synergy exists between the Nebraska Career Clusters and the new Nebraska State Science Standards. Students will benefit from a curriculum that integrates Science and Engineering Practices into the cluster of Skilled and Technical Sciences. The cluster of Health Science is addressed through many of the chemical and biological standards. Agriculture, Food, and Natural Resources are a primary focus in the tenth grade course of the integrated model. During the round table, the Action Team will seek to make stronger connections between the other career clusters.

Evaluation:

- The Core Team will track the number of administrators, ESU science specialists, and teachers that we share the integrated science model with.
- The Core Team will evaluate and adjust while considering the feedback provided by teachers and administrators.
- The Core Team will conduct a potential impact survey at the ISS, which seeks to identify:
 - How many teachers plan to implement the model?
 - Which teachers are interested in developing OER?
 - How many students would be impacted?
- The NDE science director will assemble a team of experts to vet the OER created by the Action Team during the ISI.

Dissemination of Knowledge:

- Write publication for the PFI newsletter
- Write publication for Nebraska Education Association newsletter
- Present at the Nebraska Career Education Conference
- Report or Presentation to the PFI Leadership Council

- Email newsletter through Nebraska Department of Education
- Presentation at Nebraska Association of Teachers of Science (NATS) fall conference
- Presentation to ESU personnel
- Final Phase 5 presentation at Administrator Days
- Use of Social Media (Twitter, Facebook, Instagram, etc.)

Budget Plan

Budget Narrative

Phase 1 will include the continued development of an integrated science curriculum map at a cost of \$7,950. This will include the 3 project managers, who are members of our Core Team at a cost of \$30/hour for 10 days over the summer of 2018 (\$7,200). This cost also includes the cost of meals for each person at \$25/day (\$750).

Phase 2 will include the Core Team sharing the integrated science model with ESU science specialists as well as Nebraska administrators at a cost of \$1,500. The cost includes 2 of the Core Team presenting at Administrator Days in July of 2018 at \$150/day (\$600). The cost of lodging is estimated to be \$150/night for two people (\$600). Mileage will be reimbursement at the state rate and is being budgeted at \$100 dollars per person (\$200) Meals have been estimated for 2 people for 2 days at \$25/day (\$100).

Phase 3 will include sharing the model with other teachers at NATS. This will include Core Team for 2 days at \$150/day (\$900). The cost for registrations is \$100/person (\$300). Lodging would be need for 2 nights at \$150/night (\$900). Meals have been estimated for 3 people for 2 days at \$25/day (\$150). The Core Team will partner with the ESU to hold a 2-day ISS in the Fall. This would include the Core Team for 2 days at \$150/day. This will also include 50 teachers; the cost of sub pay would be \$100 (\$10,000). The total cost for Phase 3 would be \$13,150.

Phase 4 will include the collaboration of 25 Action Team members to develop OER at a cost of \$34,950. This will include the Core Team for 5 days at \$30/hour (\$3,600). The Core Team has one additional day to prepare for the institute. Phase 4 will also consist of 25 Action Team members for 4 days of work time at \$150/person (\$15,000). ISI will also include 7-10 post secondary experts, business and industry leaders. A stipend will not be provided for these individuals, however, meals will be provided. The meals for day 1 will include 38 individuals at \$25/person (\$950). The meals for days 2-4 will include 28 individuals at \$25/day (\$2,100). Lodging will be provided for people 60 miles or farther from the location at \$125/night (\$10,500). Mileage will also be provided for people 60 miles or farther from the location will be reimbursed at the state rate and is budgeted at \$100 (\$2800).

Phase 5 will be a follow up with administrators and ESU science specialists in the Summer of 2019. The cost breakdown for this phase will be identical to Phase 2 at a total of \$1,500. The total budget for Integrated Science for Secondary Classrooms and Careers is \$59,050.

Integrated Science for Classrooms and Careers			
Stage	Item	Description	Grant Funds
Phase 1		Developing Integrated Curriculum Map	\$7,950
	<i>Personnel</i>	<i>3 Core Team members for 10 days - \$30/hour</i>	<i>\$7,200</i>
	<i>Meals</i>	<i>10 days - \$25/day for 3 people</i>	<i>\$750</i>
Phase 2		Sharing Integrated Model with ESU Science Specialists and Administrators	\$1,500
	<i>Personnel</i>	<i>2 Core Team members for 2 days - \$150/day</i>	<i>\$600</i>
	<i>Lodging</i>	<i>2 nights - \$150/night for 2 people</i>	<i>\$600</i>
	<i>Mileage</i>	<i>\$100/person for 2 people</i>	<i>\$200</i>
	<i>Meals</i>	<i>2 days - \$25/day for 2 people</i>	<i>\$100</i>
Phase 3		Sharing Integrated Model with Teachers at NATS	\$2,250
	<i>Personnel</i>	<i>3 Core Team member for 2 days - \$150/day</i>	<i>\$900</i>
	<i>Lodging</i>	<i>2 nights - \$150/night for 3 people</i>	<i>\$900</i>
	<i>Meals</i>	<i>2 days - \$25/day for 3 people</i>	<i>\$150</i>
	<i>Conference Expenses</i>	<i>NATS Registration - \$100/person</i>	<i>\$300</i>
		Sharing Integrated Model with Teachers at Integrated Science Seminar (ISS)	\$10,900
	<i>Personnel</i>	<i>3 Core Team members for 2 days - \$150/day</i>	<i>\$900</i>
	<i>Personnel</i>	<i>50 Subs for 2 days - \$100/day</i>	<i>\$10,000</i>
Phase 4		Collaboration with Teachers to Develop OER for the Nebraska Integrated Science Model	\$34,950
	<i>Personnel</i>	<i>3 Core Team members for 5 days - \$30/hour</i>	<i>\$3,600</i>
	<i>Personnel</i>	<i>25 Action Team members for 4 days - \$150/day</i>	<i>\$15,000</i>
	<i>Personnel</i>	<i>7-10 Post Secondary Experts/Business and Industry Leaders</i>	
	<i>Meals (Day 1)</i>	<i>\$25/person for 38 people</i>	<i>\$950</i>

	<i>Meals (Day 2-4)</i>	<i>3 days - \$25/day for 28 people</i>	<i>\$2,100</i>
	<i>Lodging</i>	<i>3 nights - \$125/room for 28 people</i>	<i>\$10,500</i>
	<i>Mileage</i>	<i>\$100/person for 28 people</i>	<i>\$2,800</i>
Phase 5		Follow up with Administrators and ESU Science Specialists	\$1,500
	<i>Personnel</i>	<i>2 Core Team for 2 days - \$150/day</i>	<i>\$600</i>
	<i>Lodging</i>	<i>2 nights - \$150/night for 2 people</i>	<i>\$600</i>
	<i>Mileage</i>	<i>\$100/person for 2 people</i>	<i>\$200</i>
	<i>Meals</i>	<i>2 days - \$25/day for 2 people</i>	<i>\$100</i>
Total			\$59,050