Creating Instructional Resources: Agriscience Menus

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Introduction

In 2015, California agriculture teachers, in conjunction with the University of California Curriculum Integration (UCCI) program developed a three-course outline for an agriscience pathway that articulated both Next Generation Science Standards (NGSS) and California Agriculture and Natural Resources (ANR) standards. The pathway included a Biology, Chemistry, and interdisciplinary (both life and physical science) course (*University of California Curriculum Integration: Course Catalog*, n.d.). While this pathway was readily adopted by teachers in the state, there hasn't been a concerted effort to develop and share curricula since the course outlines were released. This lack of resources led to the development of this project, which was launched to fill the need by developing agriscience menus. These curricula matrices are designed by agricultural teachers to be used to select instructional tools based on agricultural phenomena that address both NGSS and California ANR standards. The development of these instructional tools included a multi-step process that engaged pre-service and in-service teachers, instructional coaches, subject matter experts, and teacher educators.

How it Works

Phase 1: Recruit Resources

This project began with a review and collection of pre-existing instructional resources suited for the UCCI agriscience courses. The scope of the search included nationally accessible curriculum databases, previous agriscience laboratory manuals, and social media. This investigation of resources was used to guide in-service teachers in developing more curricula; particularly by indicating what types of resources already exist and NGSS standards not being addressed.

Phase 2: Curriculum Development

A list of seasoned and innovative in-service agriscience teachers were compiled based on recommendations from state Agricultural Education staff and were subsequently invited to attend a three-day in-person curriculum development session. Twenty-one teachers gathered and were split into the three course groups (Biology, Chemistry, and Interdisciplinary Science) to facilitate discussions on the following topics: quality/inclusion of pre-existing resources, format/organization of curriculum, agricultural phenomena/topic alignment to NGSS, and needed agriscience teacher professional development. Teachers were supported by access to instructional coaches and subject matter experts (Animal Science, Plant Science, and Food Science) to answer questions relating to resource content or structure. This three-day process of meeting in course groups established a usable structure and a clear plan for additional work.

Phase 3: Asynchronous Curriculum Development

Since the in-person curriculum development addressed many organizational aspects of the agriscience menus, the resource development was adjusted to be completed asynchronously by in-service teachers. Teachers identified subunits of interest within each course and were assigned to create three instructional resources for each subunit.

Phase 4: Edit & Revise

Once the asynchronously developed curricula were collected and organized into the agriscience menus, instructional coaches and state Agricultural Education staff were employed to give a

complete review of the overall resource for each course. Emphasis was placed on evaluating if the instructional resources addressed both NGSS and California ANR standards. Agriscience teachers statewide were afforded the opportunity to review the agriscience menus at the California Agricultural Teachers Association Summer Conference curriculum committee. Both reviews addressed areas of usability, quality of materials, and accessibility of the resource. These recommendations were used to revise and edit the agriscience menus to address teacher needs.

Phase 5: Marketing

Accessibility and strategic dispersal of resources is essential to teacher adoption of new curriculum. In addition to introducing the agriscience menus at the statewide curriculum committee, the new instructional resources were incorporated into various agriscience professional development opportunities spread throughout the teacher's Summer Conference. Three workshops were presented by experienced agriscience teachers on various components of the UCCI classes (i.e. how to read NGSS; basics of chemical reactions). Each presenter showcased the agriscience menus as tools for learning each skill and as a ready-to-use resource for planning for the next academic year.

Results to Date

This project successfully created three agriscience menus for the following course: Biology and Sustainable Agriculture, Chemistry and Agriscience, and Advanced Interdisciplinary Science for Sustainable Agriculture. Each menu contains agriculturally based phenomena, instructional activities, and laboratory investigations available for teachers to incorporate into their curriculum. Instructional resources are aligned to NGSS and California ANR standards and contain teaching notes describing how to instruct each resource. Three professional development workshops were created and executed to improve teacher agriscience pedagogy skills and to advertise the use of the agriscience menus.

Future Plans

The coming year will include various activities to expand and strengthen the quality of these agriscience menus. Curriculum will be strengthened through a pilot program. In each course, teachers will incorporate newly developed resources into their curriculum and provide focused feedback to improve resources. An additional curriculum development session will be hosted in the spring of 2023 to continue creating more instructional resources. Furthermore, additional professional development workshops will be organized to support teachers in executing key NGSS pedagogy skills including incorporating science and engineering practices, developing guiding questions, and developing and revising models.

Costs/Resources Needed

Personnel are the most essential resources needed to execute this project which included project directors, graduate assistants, in-service teachers, state staff, instructional coaches, and subject matter experts. Costs fluctuate depending on the compensation of personnel for providing deliverables and the use of in-person or virtual curriculum development sessions. This project is supported by a $500,000 grant from the USDA National Institute of Food and Agriculture, AFRI Professional Development for Agricultural Literacy Priority Area, award #2021-67038-36256.

References

University of California Curriculum Integration: Course Catalog. (n.d.). Retrieved July 6, 2022, from https://ucci.ucop.edu/courses/course-catalog.html