



Embryology to Educate

Supporting South Carolina Classrooms
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Embryology concepts are foundational to understanding life sciences, agriculture, and human health, yet many teachers lack age-appropriate, hands-on resources and confidence to teach this complex content effectively. This gap limits student engagement and awareness of related career pathways. To address this need, Embryology Educational Materials for Teachers were developed to strengthen instructional capacity while aligning with the 4-H Beyond Ready initiative, which prepares youth with the academic, career, and life skills needed for future success. The purpose of this effort was to equip educators with accessible, standards-aligned embryology resources that promote inquiry-based learning, critical thinking, and career exploration. Objectives included increasing teacher content knowledge, providing ready-to-use lesson plans and activities, and connecting embryology learning to real-world applications in STEM and agriculture.

Objectives

Embryology to Educate works to:

- Strengthen educator knowledge and confidence in teaching embryology
- Equip K-12 teachers, 4-H educators, and youth development professionals with the content knowledge and instructional skills needed to effectively teach embryology concepts.
- Deliver accessible, standards-aligned embryology instructional resources.
- Provide classroom-ready curricula, lesson plans, and digital tools that support inquiry-based and experiential learning across diverse educational settings.
- Increase student engagement and scientific literacy through hands-on learning
- Promote active learning experiences that enhance critical thinking, problem solving, and understanding of life science concepts.
- Advance youth career awareness and workforce readiness
- Connect embryology education to real-world applications and STEM career pathways, supporting 4-H Beyond Ready goals for academic, career, and life skill development.

Delivery Modes

The materials were delivered through professional development, digital toolkits, and classroom-ready curricula targeting K-12 teachers, 4-H educators, and youth development professionals. Instruction emphasized experiential learning, use of models and observations, and integration of STEM and workforce skills.

Target Audience

The primary target audience for this program includes K-12 classroom teachers, 4-H educators, and youth development professionals seeking to strengthen their capacity to teach embryology and related life science concepts.

The secondary audience includes K-12 youth participating in classrooms, 4-H programs, and other out-of-school learning environments, particularly those interested in STEM, agriculture, animal science, and health-related career pathways.

Program Outcomes

- Increased educator knowledge and confidence, there was a 15% increase of teach participation from the 2023-2024 school year to the 2024-2025 school year.
- Educators demonstrate improved understanding of embryology concepts and increased confidence in delivering inquiry-based, age-appropriate instruction. This was shown by the amount of additional resources and activities that the teachers shared that they had added to their embryology instruction.
- Educators effectively implement standards-aligned, hands-on embryology lessons and integrate experiential learning strategies into classroom and 4-H settings.
- Youth show increased engagement in life science learning and improved critical thinking and problem-solving skills through hands-on embryology activities. There was a 39% increase of student participation. The program grew from 1197 students to 1987.
- Expanded awareness of STEM and agriculture career pathways
- Educators and youth report greater awareness of embryology-related careers in animal science, medicine, biotechnology, and agriculture.
- Advancement of 4-H Beyond Ready competencies
- Youth develop foundational STEM knowledge, career readiness skills, and workforce competencies aligned with 4-H Beyond Ready goals.

Conclusion

The Embryology Educational Materials for Teachers program strengthened educator confidence and instructional quality while increasing student engagement in life science learning. By delivering accessible, hands-on, standards-aligned resources, the program enhanced scientific literacy, expanded awareness of STEM and agriculture careers, and supported workforce readiness in alignment with 4-H Beyond Ready goals.

