twig SCIENCE

Twig Science Logic Model

Twig Science is a pre-k through 8th grade comprehensive science core curriculum built for the Next Generation Science Standards (NGSS). It is designed to support three-dimensional learning to make sense of phenomena and solve problems. Twig Science is composed of a suite of instructional materials specifically designed for prekindergarten, elementary school, and middle school.

The following logic model provides a conceptual model of how Twig Science is intended to work, the resources required to make it effective, and the outcomes that teachers can expect students to demonstrate.

Program Inputs

TWIG SCIENCE

- Science curriculum that is aligned with national instructional standards including the NGSS, Common Core, WIDA English Language Development, and others.
- Blended use model including interactive digital, print, and hands-on kits.
- Instructional design centered on real-world phenomena, problems, and creative STEM storylines that drive student learning.
- Three-dimensional learning opportunities that integrate the disciplinary core ideas (DCIs), crosscutting concepts (CCCs), and science and engineering practices (SEPs) to support student sensemaking.
- Embedded research-based language routines that foster scientific discourse.
- Independent and collaborative multimodal activities, including reading, writing, modeling, hands-on activities, videos, and digital investigations.
- Exposure to a multitude of STEM careers.
- Three-dimensional assessments, including pre-assessments, formative assessments, performance-based assessments, and summative assessments.
- Teacher resources, including pacing guides, detailed lesson plans, background knowledge, videos, and comprehensive guides.
- Digital assessment reports for teachers and administrators to see student data on specific assessments, questions, and standards.

IMAGINE LEARNING

- Onboarding and implementation support.
- Professional learning for teachers and administrators.
- Customer support to troubleshoot issues.
- In-product Help Center for self-service needs.

DISTRICT

- Networked devices with proper memory, media appliances, and headsets.
- Adequate classroom or lab space.
- Online access to Twig Science and appropriate bandwidth to support use.
- School or district implementation plan and learning goals.
- Teacher-provided materials from in-product lists.

Classroom Activities

STUDENT ACTIVITIES

- Complete multiple lessons per week depending on grade level and instructional path.
  - Pre-K includes 72 lessons.
  - Elementary Full Course includes up to 132 lessons per grade level.
  - Elementary Fast Track includes up to 73 lessons per grade level.
  - Middle School includes 150 lessons per grade level.
- Engage with natural or designed phenomena or a real-world engineering design challenge through multimodal experiences (videos, texts, hands-on activities, and digital interactives).
- Construct explanations of module phenomena and propose solutions to module engineering design challenges using the SEPs, CCCs, and DCIs.
- Develop investigable questions about phenomena and problems.
- Apply SEPs and CCCs to investigable questions.
- Collaborate with teammates on hands-on activities, digital interactives, and performance tasks.
- Engage with a variety of non-fiction text types to read for evidence.
- If assigned, engage with Leveled Readers as an additional resource to enhance knowledge of phenomena, related STEM careers, and real-world applications (elementary only).
- Complete video investigations.
- Participate in group discussions, sharing and revising thinking based on evidence.
- Complete pre-assessments, formative assessments, performance-based assessments, and summative assessments.

TEACHER ACTIVITIES

- Complete any curriculum training and/or webinars and reference the in-product Help Center to prepare for classroom use.
- For each module, review pacing guides, background knowledge, videos, and comprehensive guides.
- For each Driving Question, review detailed lesson plans, slides, student lessons, Phenomena Tracker, and if applicable, the Hands-On Guide (middle school only).
- As applicable, set up and prepare materials for hands-on activities.
- Use language routines to facilitate scientific discourse.
- Regularly review student work and provide feedback.
- Apply scaffolding and differentiation supports based on individual student needs.
- For Performance Tasks (elementary), Embedded Formative and Summative Assessments (middle school), and Benchmark Assessments (Grades 3-8 only), use the provided rubric to evaluate student work.
- Modify instruction based on student performance on formative and summative assessments.

Outputs

STUDENT OUTPUTS

- Engagement as demonstrated by participation in classroom discussions, hands-on activities, and completed lesson activities and assignments..
- A portfolio of learning artifacts, including explanations, drawings, models, prototypes, reports, and trackers that show three-dimensional learning.
- Performance on formative and summative assessments demonstrating content proficiency or mastery, increased proficiency in the use of scientific language, and the successful application of the SEPs, CCCs, and DCIs.

TEACHER OUTPUTS

- Having completed all professional learning sessions and reviewed necessary resources, teachers feel prepared to implement Twig Science.
- Teachers make informed calibrations of content taught to individual students or entire classes based on student performance in formative and summative assessments.
- Teachers access in-product monitoring reports as applicable.

Outcomes

SHORT-TERM

- Improved student engagement and interest in science.
- Improved student science knowledge as demonstrated by performance on NGSS-aligned formative and summative assessments.
- -Improved student performance on NGSS-aligned state science tests.
- Expanded student understanding of STEM careers.
- Enhanced scientific reasoning, metacognition, problem-solving skills, and use of scientific language and practices.

LONG-TERM

- Increased student interest and readiness for STEM careers.
- Improved student performance in later K-12 science classes.
- Increased enrollment in science courses and degree programs in secondary education institutions.