Project VICTORY

Virtually-**I**nfused **C**ollaborations for **T**eaching and Learning **O**pportunities for **R**ural **Y**outh:

Implementation and Evaluation of Online and Face-to-Face Delivery in High-Needs Schools

CENTER FOR RESEARCH & DEVELOPMENT IN DUAL LANGUAGE & LITERACY ACQUISITION

EDUCATION LEADERSHIP RESEARCH CENTER
TEXAS A&M UNIVERSITY

AGGIE STEM
TEXAS A&M UNIVERSITY

JOHNS HOPKINS UNIVERSITY

OFFICE OF
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Education Innovation and Research

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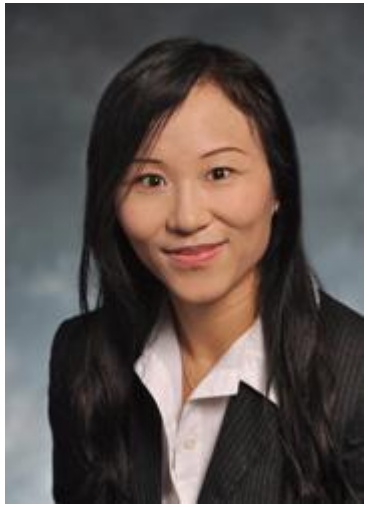

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Project VICTORY goals

- support grades 3-5 teachers in building instructional capacity to integrate literacy into science instruction
- cultivate student interest in STEM, particularly in science
- reduce disparities between rural and non-rural students
- examine impact of standards-aligned literacy-infused science lessons (lessons and curriculum materials provided)
- compare traditional face-to-face instruction and online instruction
- determine influence of additional science supports including family involvement in science and science mentors
- utilize technology to bring innovations to high-needs students in rural areas

Benefits

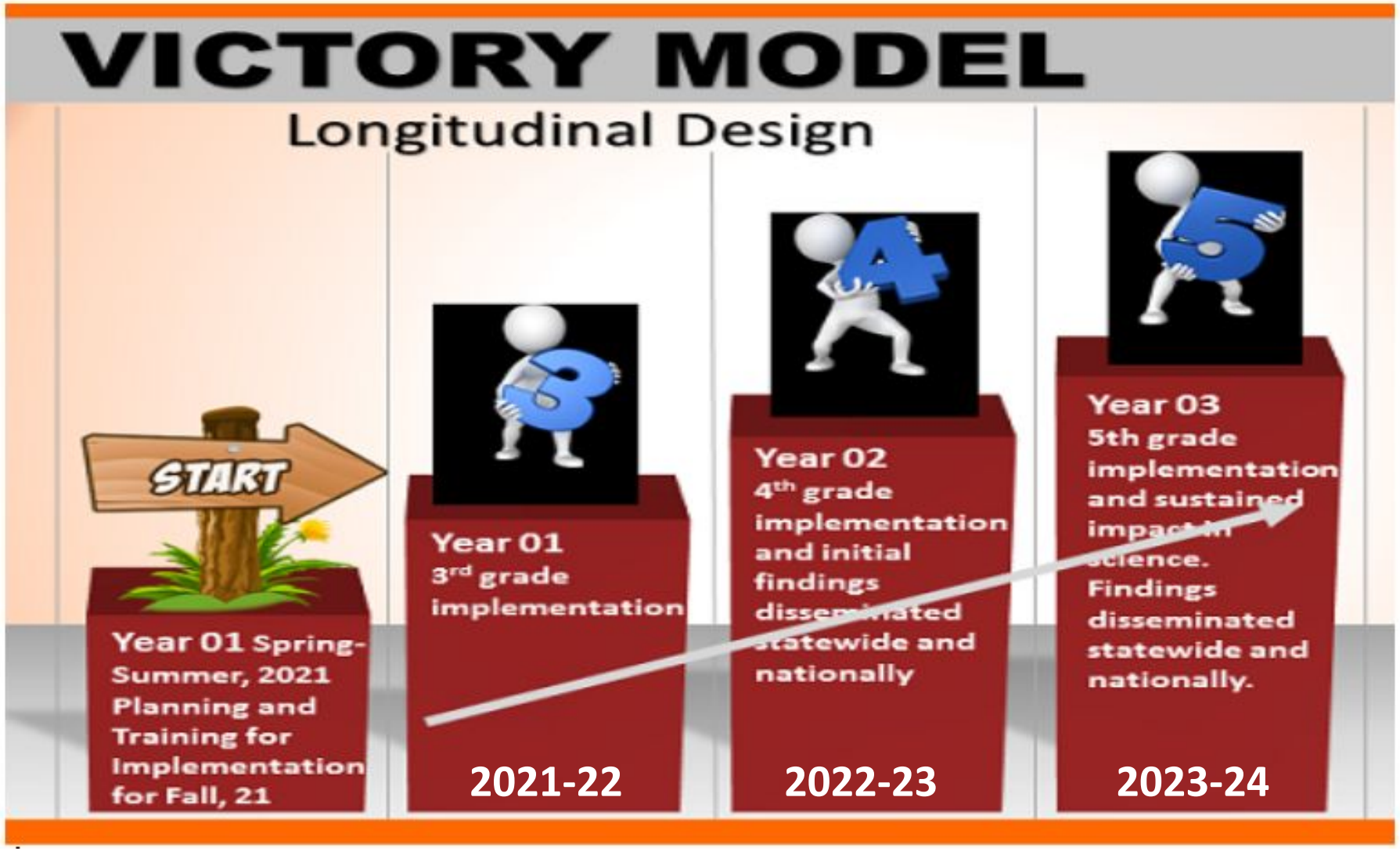
- No-cost, professional development support to build instructional capacity to integrate literacy into science instruction (including teacher laptop to be used for virtual training, virtual observations, and virtual mentoring and coaching)
- Science curricular innovations for treatment classrooms (science manipulatives, student tablets, university science mentors, family take-home science activities)
- Potential improvement in students' science and reading/writing literacy achievement on local, standardized, and state science assessments
- Based on participation - teachers, district IT support, and district data-retrieval receives stipend
- Participating parents/family receive incentive for supporting at-home learning (FIS, attendance and engagement of online students)

Evidence based research

VICTORY, a randomized control trial study, is based on successful research from two prior grants:

- Middle School Science for English Language Learners, MSSELL (NSF, Project MSSELL (DRL-0822153)
  - Grade 5: moderate evidence (WWC) literacy-infused science intervention produced higher academic achievement in both science and reading outcomes on district-wide standards-based measures of science and reading and standardized tests of oral reading fluency
- English Language and Literacy Acquisition – Validation, ELLA-V (I3, U411B120047)
  - Literacy-infused science (LIS) reading to learn in science with specific reading/writing skills embedded instruction and curriculum

    Grade 3: implementation impacted students' science learning, sustained impact measured in G5


VICTORY MODEL
Longitudinal Design
START
Year 01 Spring-Summer, 2021 Planning and Training for Implementation for Fall, 21
Year 01
3rd grade implementation
2021-22
Year 02
4th grade implementation and initial findings disseminated statewide and nationally
2022-23
Year 03
5th grade implementation and sustained impact in science. Findings disseminated statewide and nationally.
2023-24

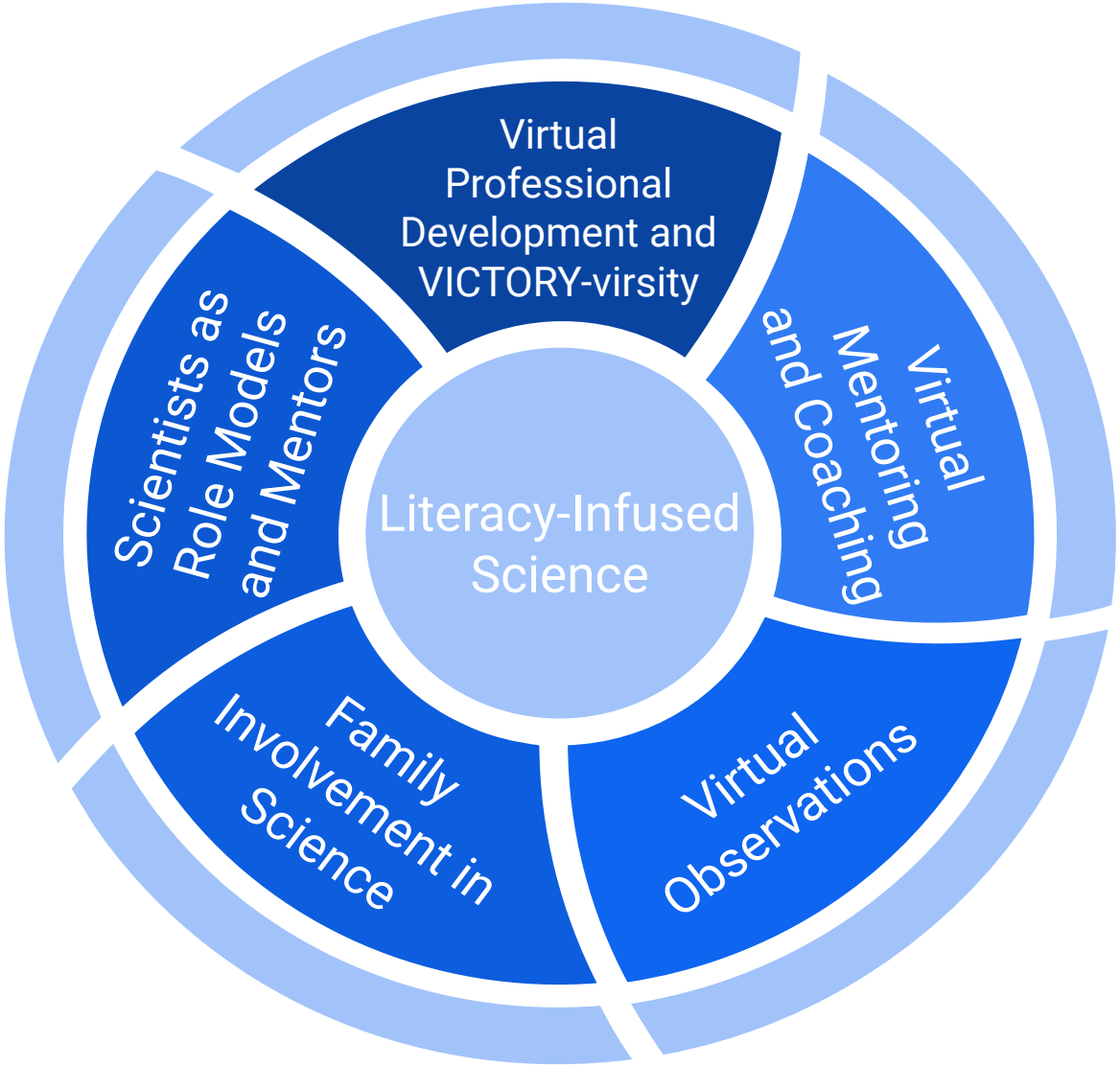
Recruitment Goals

*approximately **60 campuses**

Due to longitudinal design of the study, preference will be given to districts/campuses -

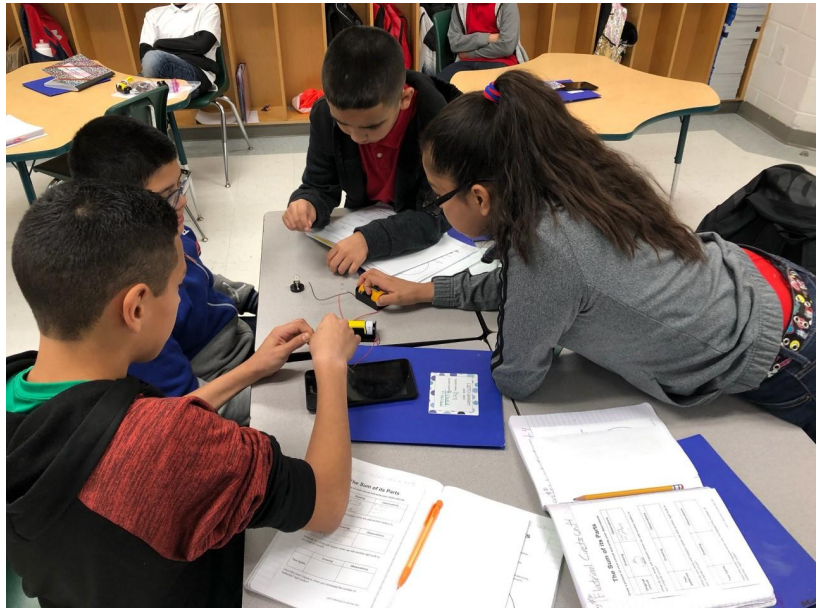
- have grades **3-5 on the same campus**, OR
- have only **one elementary school (3rd-4th) feeding into one intermediate (5th)**
- target - average of **25 consented students per campus** (1-2 teachers per campus)

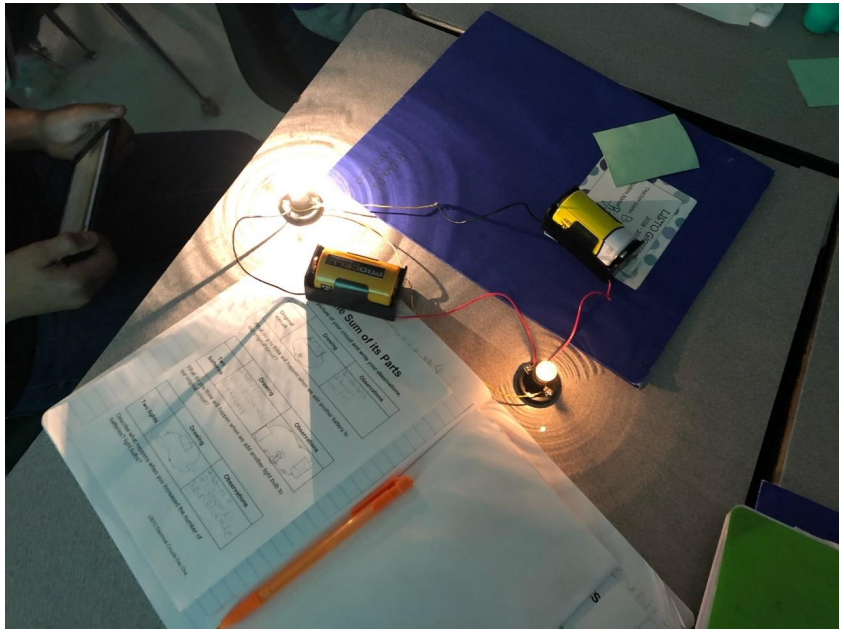
Project VICTORY components



Literacy-Infused Science

- Standards-aligned science lessons with components to facilitate student reading, comprehension, and development of academic science concepts
- Strategic opportunities for students to listen, speak, read, and write
- Integrated hands-on science activities





nearpod

Literacy-Infused Science

- 9 weeks of researcher-developed curriculum
- 2 – 45 minute lessons per week
- includes lessons and science materials, manipulatives at no cost
- lessons include scaffolded vocabulary instruction, scaffolded science reading text, and before, during, and after reading supports, writing opportunities
- 9 weeks of VICTORY lessons will support science Reporting Category 3: Earth and Space - one of lowest performing categories on STAAR, good opportunity to support science teachers in content area knowledge
- We ask that the district allow flexibility in the district science scope and sequence during the 9 week implementation of the project, to allow participating teachers to implement VICTORY twice a week earth science lessons twice a week during Fall semester – to help ensure student participants both in face-to-face and online receive equal exposure to the selected science topic.

Literacy-Infused Science

Scaffolded vocabulary instruction

Deconstructing vocabulary

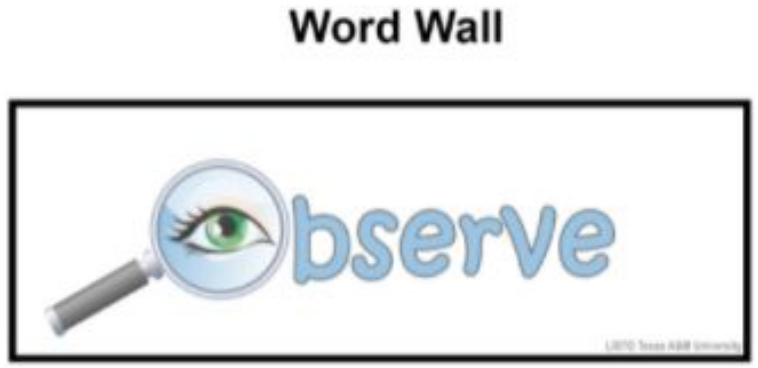
- ❑ Syllable breakdown
- ❑ Part of speech
- ❑ Student-friendly definitions

Engaging connections

- ❑ Authentic images

Immediate opportunities to use vocabulary

- ❑ Sentence stems
- ❑ Discussion prompts



Literacy-Infused Science

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Before reading strategies

- Preview vocabulary
  - Model/practice pronunciation of tricky words
- Preview expository text features
- Preview graphic organizer
- Preview target questions

Scaffolded reading passages

- Text selection
  - Readability
  - TEKS alignment
- Expository text features
  - Headings & subheadings
  - Boldface terms
  - Captions
  - Images
  - Diagrams

Scaffold Pronunciation

her bi vore

car ni vore

trans fer

o ver lap

What's for Dinner?

What do organisms eat?

All organisms need energy to live. The type of energy each organism needs is different depending on the species. For example, a plant needs sunlight and water to make its own energy, while a tiger needs to hunt for prey.

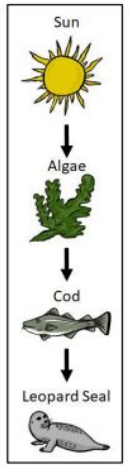

Figure 1: Marine Food Chain

Scientists use **food chains** and **food webs** to model how energy **transfers**, or moves between one organism and another. For an ecosystem to remain stable or healthy, the energy must constantly flow through the system. What does that mean? It means that organisms interact and rely on each other to get their energy and nutrients.

Food chains show the flow of energy in a community. We use arrows to show the feeding relationship between species. The arrow always points from an energy source to an organism that needs energy. An example of a marine food chain can be seen in Figure 1. The arrow from the cod to the leopard seal shows that the leopard seal eats the cod. The energy from the cod is moving to the leopard seal.

The **producers** are always the first organisms in a food chain. Producers create their own food and bring energy from the Sun into the ecosystem. Special types of **consumers** come next called **herbivores**, which eat only plants. These organisms are followed by **carnivores**, which eat other animals. Could we add **decomposers** to our food chain?

In an ecosystem, there are many different food chains. Most organisms eat a variety of other organisms. We use a food web to show how food chains **overlap** and transfer energy in an ecosystem. A food web can show the feeding relationships between multiple organisms and which organisms might compete for the same food. Figure 2 shows an example of a Marine Food Web. What organism is the producer in this food web?

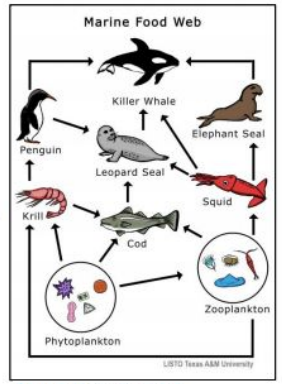

Figure 2: Marine Food Web

Literacy-Infused Science

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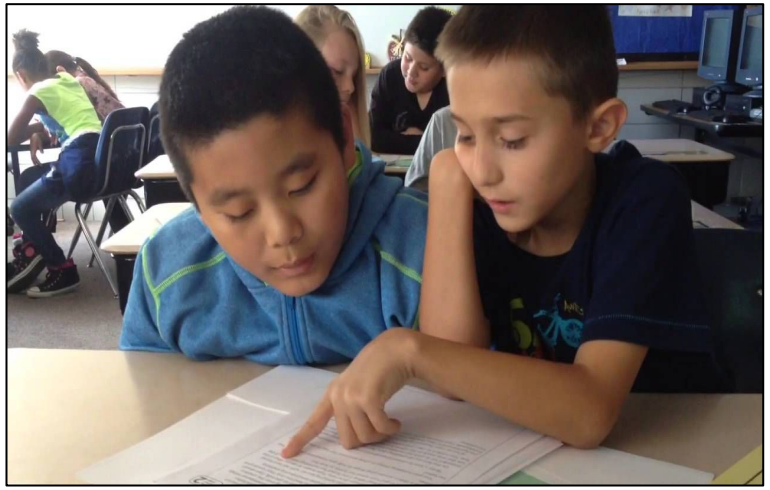
During reading strategies

- Strategic partner reading
- Reinforce text features
- Partners discuss comprehension



Teacher Name: _____ Date: _____

Science Class/Rotation: _____

	Partner A	Partner B
Group 1		
Group 2		
Group 3		
Group 4		
Group 5		
Group 6		
Group 7		
Group 8		
Group 9		
Group 10		
Group 11		
Group 12		
Group 13		
Group 14		
Group 15		

Partner Reading Guidelines

1. Sit close to your reading partner.
   - Partner A reads the sentence/paragraph aloud.
   - Partner B reads along silently.
2. When you come to a new paragraph, switch roles.
   - Partner B reads paragraph aloud.
   - Partner A reads along silently.
3. Help each other sound out and read tricky words. Discuss the text features (pictures, captions, tables, charts, headings).
4. Continue switching roles until the reading is completed.
5. Work together to complete the Reading Guide.

Literacy-Infused Science

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After reading strategies

- Check for understanding
- Text evidence
- Write to respond

What's for Dinner?
Reading Guide

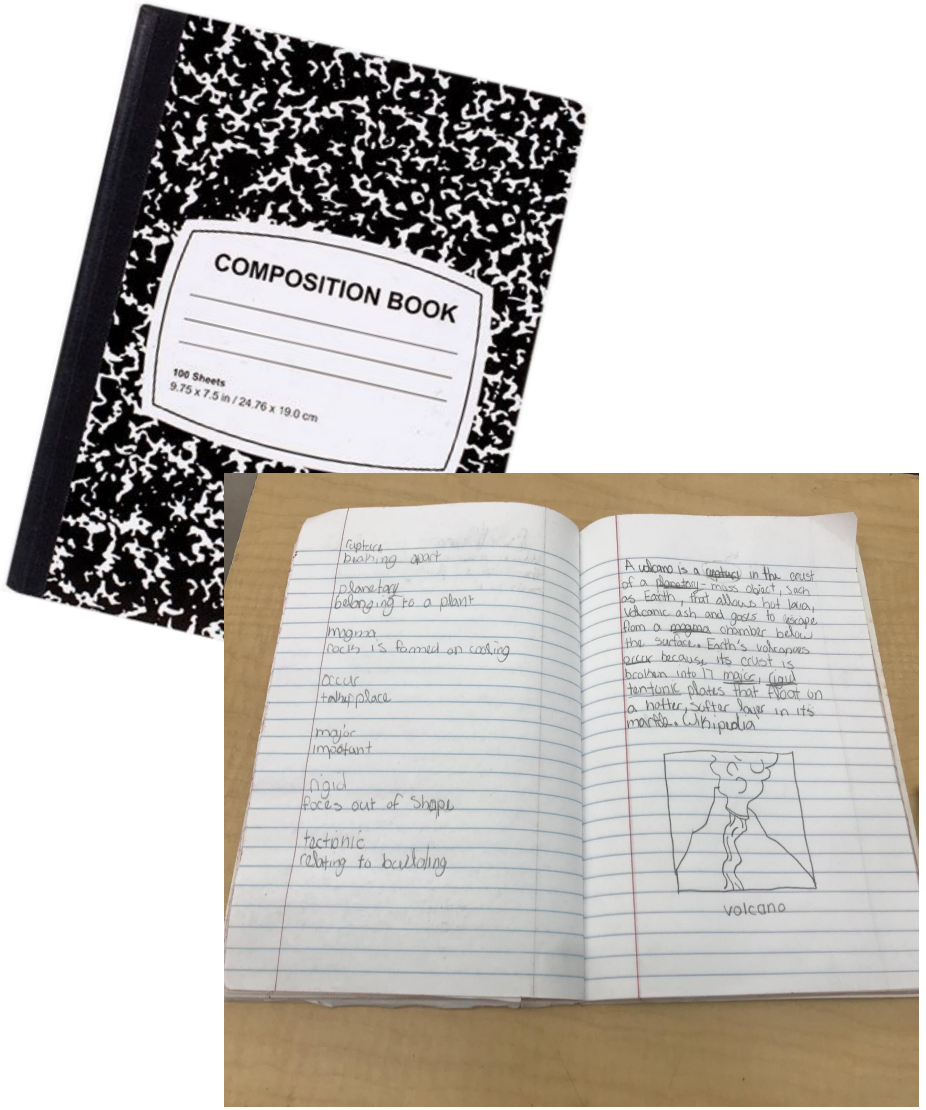
Read *What's for Dinner?* with a partner and complete the notetaking guide.

herbivore – an organism that eats only plant material
carnivore – an organism that eats other animals
transfer – move from one place to another
overlap – covers parts of the same area

Food Chains

Food Webs

Tells us what eats what in an ecosystem



Scientists as Role Models and Mentors (SRM2)

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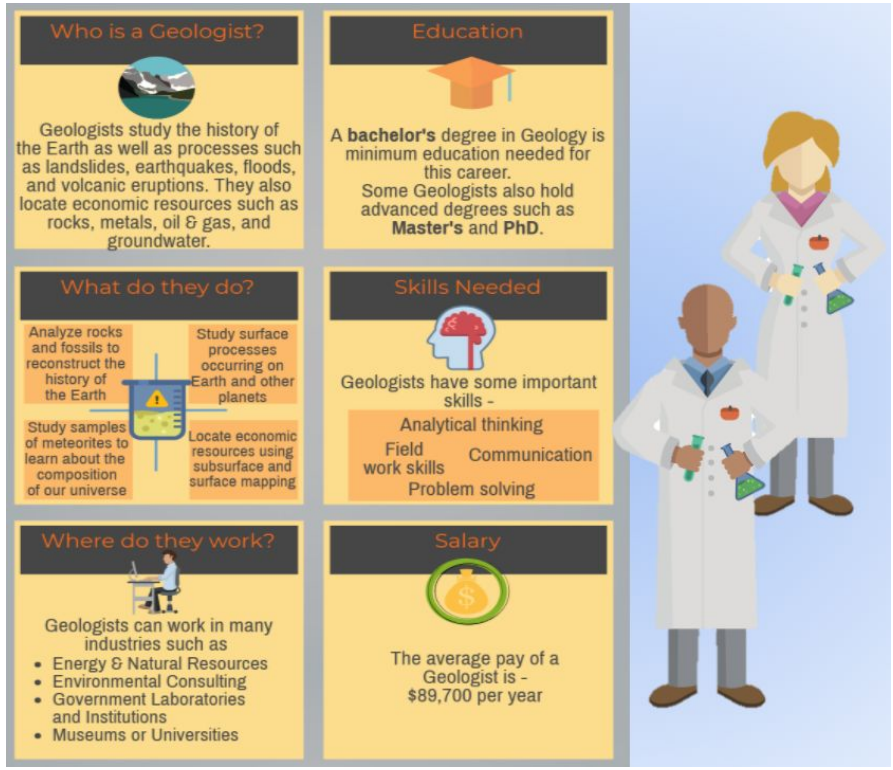
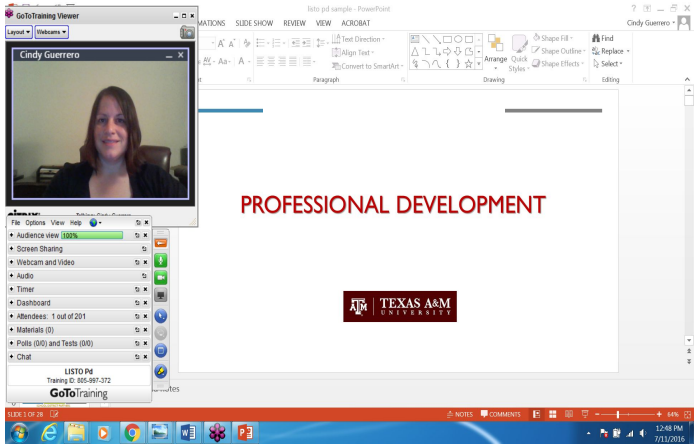
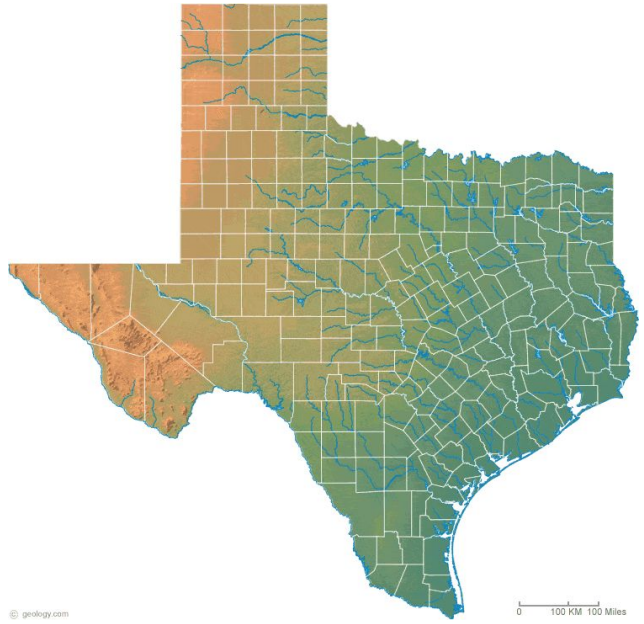
- Connects university science majors as mentors to student (teacher facilitated)
- Designed to motivate students about STEM and science-related careers



Virtual Professional Development (VPD)



CITRIX GoToTraining

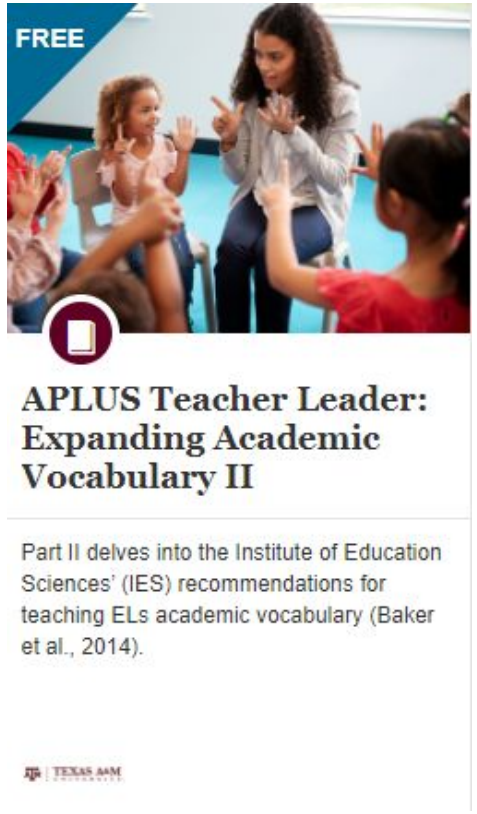


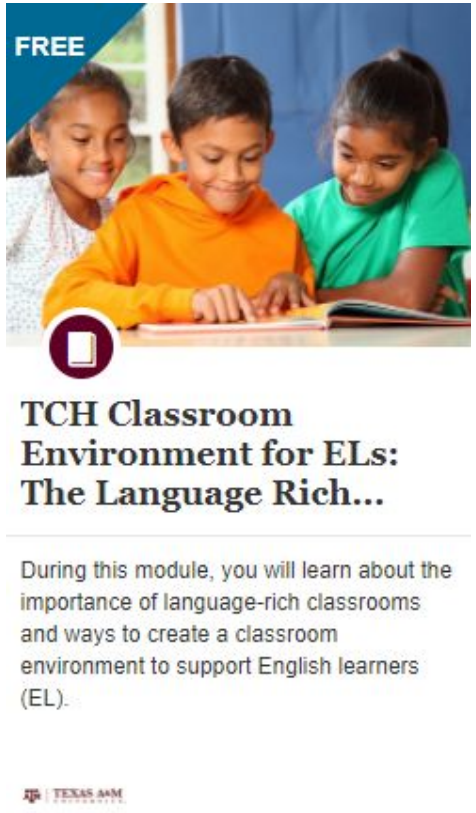
Teachers use APEXIS hardware to attend synchronous, interactive VPD delivered via GoToTraining video conferencing to build capacity for science and literacy teaching.

VICTORY-Virsity

WHAT IS A MOOPIL?

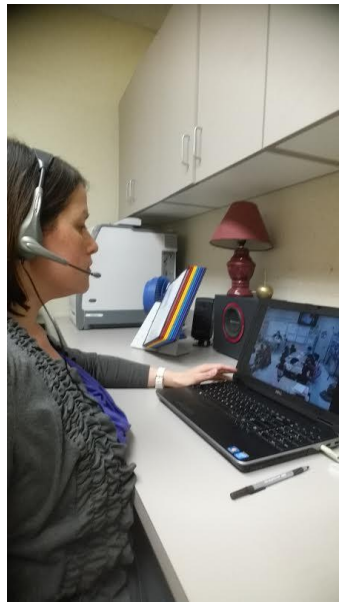
To help meet the needs of educators in our state, we will deliver virtual professional development called Massive Open Online Professional Individualized learning (MOOPILS)





Virtual Mentoring and Coaching (VMC)

APEXIS hardware platform streams live instruction through GoToMeeting online



Teacher wears ‘bug-in-ear’ earpiece, coach provides real-time instructional feedback to treatment teachers

Secure TAMU Server

Virtual Observations (VObs)

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VOBS scheduled and collected using APEXIS hardware and GoToMeeting platform

***Innovation*:** GoToRoom with Dolby sound to record high-quality classroom observations to test machine learning

Secure TAMU Server

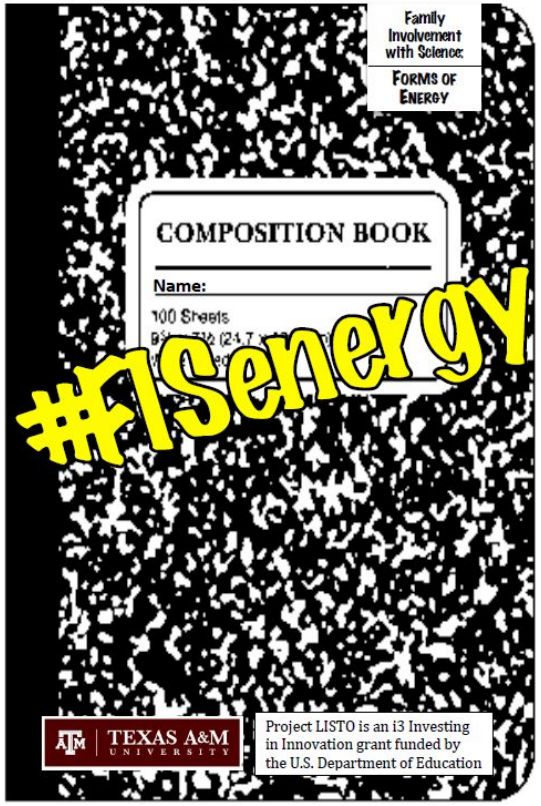
Analyses

- Science Teacher Observation Record (STOR)
- Pedagogical Observation Protocol (POP) - interactions between teachers and students

LogMeIn

Participants receive free LogMeIn account

Family Involvement in Science (FIS)



Dear family,

Your child has been learning how we experience different forms of **energy** on a daily basis. We have seen heat, electricity, light, sound, and movement follow patterns in nature. For example, light travels in straight lines until it reaches a new object or surface. Then the light rays may be **absorbed**, **reflected**, or **refracted**. These patterns help us understand how shadows, mirrors, and prisms work. We investigated how **circuits** transform electricity into light, heat, sound, and motion.

Your child is learning the same words scientists use to describe energy. Find ways to use these words in everyday conversations. This will build your child's vocabulary.

DE•CONSTRUCT•ING the Language of SCIENCE

En•er•gy	The ability to do work.
Light En•er•gy	A form of energy that moves through visible and invisible rays.
Ab•sorb	To receive light, heat, or sound energy.
Re•flect	To bounce light, heat, or sound energy.
Re•frac•tion	To bend light, heat, or sound energy.
Sound En•er•gy	A form of kinetic energy that describes an object's vibrations.
Ther•mal En•er•gy	A form of kinetic energy that describes the movement of heat.
Force	A form of kinetic energy that describes a push or pull on an object.
Cir•cuit	A closed path where electricity can flow through an electrical current.

Family Involvement in Science (FIS)

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Family Involvement with Science:
FORMS OF ENERGY

COMPOSITION BOOK

Name:

100 Sheets

Dear family,

Your child ha

different for

Family Science Activity

This week's family challenge is go outside and experiment with ice cubes. Place an ice cube in the direct sunlight. Place one in the shade. Maybe even put two ice cubes side by side to see what happens.

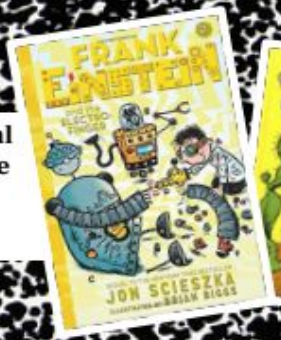
What observations can you make about how fast or slow the ice melts? How can you use words to describe why they were different? Use the space below to record your observations

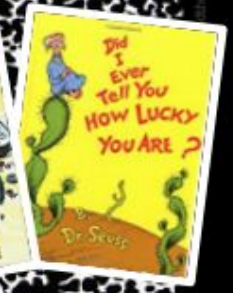
(You can use tables, you can use descriptive words, you can draw the changes you see over time—just make sure to notice how many seconds or minutes its been between observations)

Summer Thunderstorms

Summer thunderstorms can be exciting to watch from inside a building. First, you see dark clouds gathering. Suddenly, you see a bolt of lightning. Then you hear the thunder. Kaboooom! Finally, you see a lot of rain coming down. It's a good idea to wait inside rather than to go out during the storm. The storm will probably be over in about an hour but it's much safer inside than out. The bright bolt of lightning you saw is really electricity. It is the same electricity that we use to power our lights and TVs. There is a lot of energy in a lightning bolt, enough to power a light bulb for about 100 days. The Earth receives several hundred millions of lightning bolts each year. This many lightning bolts add up to a vast amount of energy. People usually hear thunder soon after they see a bolt of lightning. You can use this fact to find out how far you are from the storm. As soon as you see a bolt of lightning, start counting the seconds. When you hear the thunder, stop counting. Every five seconds from the time you see the lightning bolt until you hear thunder equals about one mile. If you counted 10 seconds, then the thunderstorm is about 2 miles away. If you see lightning but don't hear thunder, it means that the thunderstorm is more than 12 miles away. That's too far to hear the thunder.

Check your local library for some of these silly science stories





1. Make shadow puppets with your hands. Change their size by moving them closer or further from the light source.

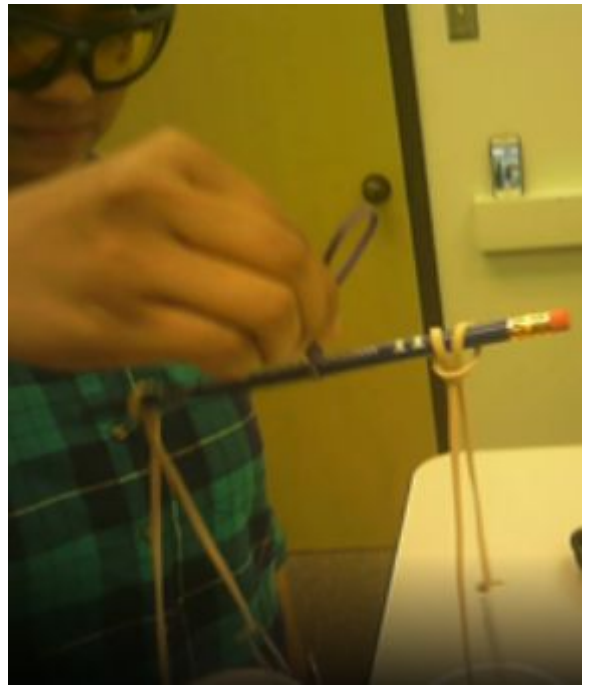
Explore energy with more fun extension activities

2. See how many family members you can get to experience light, heat, sound, and motion all in one picture. Share your picture with #FISenergy.

3. Put an ice cube in a plastic baggie and then race your friends or family to see who can make the ice melt fastest only using their hands

Family Involvement in Science (FIS)

	Strongly Agree	Agree	Not Sure	Disagree	Strongly Disagree
(Student) It was fun to do science with my family.	62%	36%	1%	1%	
The instructions for the science activity were easy to follow.	41%	47%	7%	3%	2%
The activities in the FIS kit didn't take too long.	45%	45%	6%	3%	1%
It was easy to use the science vocabulary during the activities.	39%	50%	7%	3%	1%
I could easily find the materials needed to complete the activities.	46%	42%	9%	2%	1%
This has encouraged me to have more science conversations at home.	31%	56%	13%		
We will look for the suggested books at our library or bookstore.	33%	27%	40%		
We will do the extension activities.	33%	33%	27%	7%	
My learner's attitude toward science improved with the use of FIS booklets.	40%	60%			



Innovation: First time, with the use of technology, to *go into the home* and observe family/student academic science engagement

Data Collection

Quantitative Data (numerical)

Assessments

- Iowa Test Basic Skills (ITBS) science subtest
- Big Idea Science Assessment
- STAAR science, reading, writing *

Classroom observations coded using

- Science Teacher Observation Record (STOR)
- Pedagogical Observation Protocol (POP)

Qualitative (non-numerical: video, participant perspectives and experiences)

Teacher surveys

Teacher focus group interviews

Teacher reflections

Principal surveys/interviews

Student science interest survey

Student work samples

Family involvement in science recordings

* Student level district data provided by district 'data retriever'

Teacher Participation

- Teacher participation typically one year only (3rd grade 2021-22; 4th grade 2022-23; 5th grade 2023-24)
- Participate in 15 sessions (60 min/session) of **VPD** - online professional learning
- Implement **Literacy-infused science lessons** (two 45 minute sessions per week, for 9 weeks) *Curriculum materials, science materials, tablets, and access to Nearpod provided*
- Participate in at least 2 **VMC** virtual real-time coaching and mentoring sessions, reflect on teaching practices
- Support/advocate for parent participation in **Family involvement in Science** activities
- Facilitate interactions between **university science majors** and students
- Facilitate distribution and collection of student/parent **consent forms**
- Self-record 3-4 virtual **classroom observations** during science instruction (observation technology provided)
- Facilitate **student testing** before and after the 9 week intervention
- Participate in **surveys and focus group interview**
- Stipend paid based on participation (face-to-face teachers $900; online teachers $1575)

Principal Participation

- Provide flexibility for participating teachers to implement literacy-infused science lessons for 9 weeks
- Ensure project curriculum materials (technology, curriculum resources) shipped to campus are delivered to teachers
- Communicate with project personnel (reach out with any questions/concerns, respond to email requests)
- Attend/assign campus administrator/instructional specialist to engage in VPD along with teachers
- Provide scheduling flexibility for project-related student assessments before and after the 9 week implementation (Big Ideas in Science, ITBS, science interest survey)
- Provide access for campus/district IT to provide technology support as needed to assist teachers to conduct recorded classroom observations

Family/Parent Participation

- Support student attendance and participation of online instruction (if applicable)
- Participate in at-home Family Involvement in Science (FIS) activities during the 9 weeks
- Tablets will be provided to record family interactions with the FIS activities
- Complete a survey based on their perceptions of FIS
- Participate in online/phone interview related to participation
- Gift card incentive

Next steps

- Discuss/share VICTORY opportunity with superintendent, supervisor, principal, science teachers
- We need a decision by June 16 if at all possible, you will receive a follow-up call next week
- Once recruitment is complete, list of campuses will be sent to John's Hopkins University (our external evaluators) – who will conduct the random assignment to let us know instructional mode for each campus (which campuses will be assigned to either face-to-face or online instruction).
- We will notify districts of their role in the study and send out final versions of the Memorandum of Understanding for superintendent signature
- Late July we will reach out for 3rd grade science teacher participant names
- **August** – conduct online orientation, begin consent form process
- **September** – begin online virtual professional development
- 9 week literacy-infused science implementation to start **late Sept/early Oct**

FOR MORE INFORMATION, PLEASE CONTACT

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