

# STEM EQUITY PROJECT

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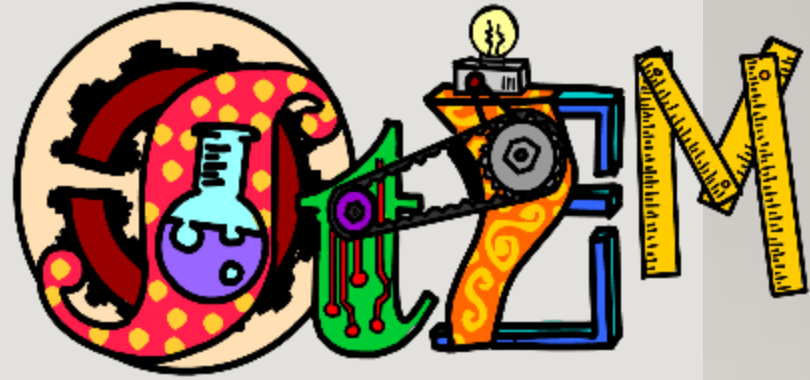


# ABSTRACT

The purpose of this Equity Project to develop and create Navajo infused Educational teaching modules: Curricula design and material development; Faculty development and teacher preparation; Student experiential learning; Student recruitment and retention; Instructional delivery systems and strategic partnership. The design of this program is in two-parts; 1) to prepare interdisciplinary science students for entry-level positions in food, agriculture, natural resources and human sciences through a 5-week summer STEM Curriculum development program in collaboration with Center of Dine Teacher Education. 2) Provide continuing educational professional development workshops for Navajo Nation teachers to integrate STEAM into their curriculum/lessons. Increase youth participation in STEAM related activities through Dine College. Findings of recent phases of this Equity project is making an impact on moving forward with improving project management; Keeping STEAM Team on course, defining the project goals and objectives, creating deadline, and working with sufficient team skills. In conclusion, the project will incorporate multiple evaluations to monitor the progress and efficacy of the program. The project will include school outreach activities, advisory meetings, teacher workshops, and k-12 summer student programs.

# STEM OBJECTIVES

- Curricula design and material development
- Support STEM Methods Courses
- Design & Implement Workshops
- Design and Implement an annual STEM Festival
- Design and Implement a STEM Summer Camp
- Establish and Convene an Advisory Board



# CURRICULA DESIGN AND MATERIAL DEVELOPMENT



## 3-5th Grade Diné / Western Water Module

**Background:** The Diné have a high regard and respect for rain. When drought hits, they pray for rain. There are lessons young children are taught as to how one should act when it starts to rain and during rainfall. These lessons are learned by our people through watching how birds and animals act when rains come.

**Duration:** Five class periods  
 Day 1: Introduce, Explain  
 Day 2: Explore, Engage  
 Day 3-4: Elaborate/STEM  
 Day 5: Presentation/Evaluation

**Lesson Summary:** Students will learn that respect for rain was taught to the Diné through watching birds, how they settle down when they hear thunder and sit on the branches of the tree while it rains and do not move until the rain had passed and the rainbow emerges. Then they celebrate by chirping happily while flying around. The horses and sheep stop their grazing and stand reverently while it rains and then commence grazing after the rain stops. Sheep and cattle may run to puddles to taste the fresh rain water in appreciation and gratitude. From witnessing this, the people learned to show respect for rain. Children are taught to sit still while it rains. They cannot go outside and run in the rain. They may go outside after the rain has stopped and smell the moist earth, but they cannot splash in the puddles which is a show of disrespect. In this regard, they are also showing respect and reverence for the rain. In essence, the western society's concept of "running in the rain." is not practiced, nor accepted.

### PreK-3<sup>rd</sup> Diné Content Standards:

#### Objectives:

#### Vocabulary

Nítsá halchin	I'di'ni	K'os bee halzhin
Hooltjil	Ni'ditsi'	Honiltá'
Ni'dizhol	Nahatun	Ni'dilch'il
Tózhool yaat'i'	Ahóoltá	Náatsiilid íit'i'

Ni'dilch'il Náatsiilid íit'i'

Start with a KWL activity: "Tell me all you know about rain." Write down five reasonable responses, (optional) translate them into Diné bizaad. Assist the students with proper

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 \* KWL - Know, Want to know, Learned. KWL charts can be useful when students are using the Scientific process.



## 3-5th Grade Diné / Western Water Module

pronunciations. Students will be able to respond with some previous lessons on water or make statements from their observations.

Introduce the vocabulary words with clip art as accompaniment for K'os bee halzhin. First, have students listen as you say each word and then say it with them to get comfortable with pronunciation. Explain each word.

Focus Vocabulary: Ni'dilch'il

Náatsiilid íit'i'

### Day 1:

TPR: Sounds of the Rain

Vocabulary Study when it comes to cultural study.

Traditional Navajo Story: Horned Toad and Lightning

### Day 2:

TPR: Sounds of the Rain

Introduce the following poem. Read the following to the students. Have student read with you twice.

K'os dilhili, K'os diñhili, ha'át'íilá yini'í?  
 Hooltjilgo yish'í  
 Hooltjil, Hooltjil, ha'át'íilá yini'í?  
 Ni'ditsi' yish'í  
 Ni'ditsi', Ni'ditsi' ha'át'íilá yini'í?  
 Honiltá yish'í

K'os dilhili

Circle Diagram Activity:

Honiltá

Nítsá

Hooltjilgo

Ni'ditsi'

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# CURRICULA DESIGN AND MATERIAL DEVELOPMENT



## 3-5th Grade Diné / Western Water Module

**Western Science Activity:** Difference states of Water

Solid, Liquid, and Gas states:

Students will be imitating the different states of water. Students will understand the states of Solid, Liquid and Gas.

1. Students will start and form a line 15 feet away from the instructor
2. Instructor will call out liquid. Students will link arms with one another and move towards the instructor.
3. The instructor man than say Solid. Count to five and turn around. Students must be linked together in fours and shake. If the instructor does not see student active in the group. In at least four, they are out until next round.

### Day 3:

TPR: Sounds of the Rain

Read the following to the students. Have student read with you twice.

K'os diłhiki, K'os diñhihi, ha'át'íilá yini'í?

Hoolt'ijlgo yish'í

Hoolt'ijl, Hoolt'ijl, ha'át'íilá yini'í?

Ni'diltsi' yish'í

Ni'diltsi', Ni'diltsi' ha'át'íilá yini'í?

Honiltá yish'í

**Circle Diagram Activity Two:** Students will recite above poem while pointing to the appropriate words in clockwise manner.



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## 3-5th Grade Diné / Western Water Module

**Western Science Activity:** Capillary Action ( Rainbow Activity)

Capillary action is one of the most amazing water property. These are fun experiments. However, not only that, they also illustrate how plants absorb nutrients and stay alive, very important!

Students will be able to respond back with their observations using a recording sheet of blank images empty cups. Demonstrate the stages of the water absorbing to napkins.

**Materials:**

Clear plastic cups, [Food Coloring](#), napkins, water

Trees & Napkin experiment “walking water”

What do you think will happen to the water?

What is happening now?

Why do you think the colors are changing?

Why might the water be able to move up against gravity?

Explain to the students that water moves up the paper towels through a process called capillary action. The paper towel is made from fibers and the water is able to travel through the gaps in the fibers. The gaps in the paper towel act like capillary tubes and pull the water upward. This is what helps water climb from a plant's roots to the leaves at the top of the plant or tree. The water is able to move upward against gravity because of the attractive forces between the water and the fibers in the paper towel.

### Day 4:

TPR: Sounds of the Rain

Note: Water is your friend lesson example

Seasonal Rains

Nilt'sá Bi'áad Female Rain Fall Winter

Nilt'sá Bika' Male Rain Spring Summer

Read the following to the students. Have student read with you twice.

K'os diłhiki, K'os diñhihi, ha'át'íilá yini'í?

Hoolt'ijlgo yish'í

Hoolt'ijl, Hoolt'ijl, ha'át'íilá yini'í?

Ni'diltsi' yish'í

Ni'diltsi', Ni'diltsi' ha'át'íilá yini'í?

Honiltá yish'í

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# SUPPORT STEM METHODS COURSES

Outreach program with Lukachukai Community School & other local schools

- Sessions during enrichment hours of LCS providing STEM Activities
  - Online Coding, working with OzoBot Classroom kits, Robotics workshops kits
- Served as Science Fair Judge for LCS



# DESIGN & IMPLEMENT WORKSHOPS

STEM workshops are scheduled annually during the year for spring and fall. Workshops are hosted around school calendars to allow plans to attend the event in spring and fall seasons. Partnerships are created with organizations and institutions to bring STEM related resources to Navajo schools. MOU are created to allow students to participate in STEM enrichment workshops. During the STEM Enrichment workshops, students are given hands-on project-based learning related to STEM. During teacher workshops, professional development hours are given in a certificate form.

- Teacher workshops
- Summer Camp

# INSTITUTE FOR TRIBAL ENVIRONMENTAL PROFESSIONALS: TEACHER WORKSHOP

Partnership with STEM Equity with Institute for tribal environmental professionals in effort to Design & Implement Workshops.

Goal of this project is to develop and support awareness and understanding of water quality issues and their relationship to personal, public and environmental health among Navajo schools and teachers.

- Teacher Workshop: March 29, 2019
- Teacher Workshop: March 30, 2019
  - Certificates are created for participants
  - Teachers received 6hrs of professional development
  - Teachers receive 3 Projecte WET teacher's Guides
  - cross-curricular,
  - hands-on, inquiry-based activities and
  - lessons you can implement right away



When: Saturday, March 30, 2019  
Where: Dine College Tsalie Campus – GCB room 118  
Time: 9:30 pm to 4:00 pm (Including a lunch)  
Who: Teachers Middle School / High School  
Focus: Healthy Water, Healthy People  
Cost: FREE!!

Join us for a day of cross-curricular, hands-on, inquiry-based activities and lessons you can implement right away in your own classroom!

As a participant, you will receive:

- Certificate of Training for 6 hours
- Lunch
- Three Project WET Teacher's Guides

**Healthy Water, Healthy People:** This 248-page activity guide for educators of students in grades six through university level raises the awareness and understanding of water quality issues and their relationship to personal, public and environmental health. The guide will help educators address science standards through 25 original, interactive activities that link priority water quality topics to real-life experiences of educators and students. Teachers will also get the lab manual that provides protocols for doing water quality testing.

**Project WET Curriculum and Activity Guide:** Now in full color, Guide 2.0 offers new activities on topics such as National Parks and storm water, fully revised and updated activities from the original Guide and the very best activities gathered from all of Project WET's publications. The guide also includes numerous extensions for using the activities in Pre-K environments. Featuring 64 field-tested activities, more than 500 color photographs and illustrations, and useful appendices with information on teaching methods, assessment strategies and more, this guide is an essential classroom tool.

**Please let us hear from you ASAP to reserve one of the 20 seats available**  
Applications due by March 22, 2019

Contact: Mansel A. Nelson @ 928 523 1275 (please leave voicemail) or [mansel.nelson@nau.edu](mailto:mansel.nelson@nau.edu)

Event sponsors:

- STEM Equity Program at Dine College Tsalie main campus
- Institute for Tribal Environmental Professionals at Northern Arizona University (NAU)
- Salt River Project



# YOUTH CAMP

Camps are design to provide hands on project base learning to k-12 students on the Navajo Nation. The program also allows networking and to create partnerships with other STEM organizations to bring education on natural resources to the program. The camps usually consist of variety facilitators/presenters to provide hands on learning resources and hands on project base learning techniques to students.

- Students gain awareness and understanding of safeguarding and restoring valuable natural resources by evaluating the health of a watershed through
- collecting basic ecology data at local streams and lakes, classifying plant vegetation,
- identifying sources of pollution and human impacts, and observing wildlife habitat,
- forest,
- rangelands and watersheds.



**2019 AGRICULTURE YOUTH CAMP**

**Camp Dates:**  
June 9 - June 21, 2019  
(Age: 12 - 17 yr old)

**Camp Dates:**  
July 9 - July 13, 2019  
(Age: 8 - 15 yr old)

**Who:**  
This program is open to the following age groups. Students from age of 12 to 17 years old can attend from June 9 to June 21, 2019 and from the age of 8 to 15 years old can attend from July 9 to July 13, 2019. Students will receive hands on training through field lab, workshops and field activities. This is an overnight event, all expenses will be paid for which includes: meals, activities, and travel exp. Visit our website for application:

[www.dinecollege.edu/extension/2019](http://www.dinecollege.edu/extension/2019)

**Topics Covered:**

- Classifying plant vegetation, identifying sources of pollution and human impacts & observing wildlife habitat
- Direct shooting & livestock handling
- Farm & Ranch Tour on and off the Navajo Nation
- Assist with herd health, tagging, & record keeping on all large animals
- Students will gain awareness and understanding of safeguarding and restoring our valuable natural resources
- Fishing, water gun, and many more FUN activities

**"APPLY NOW"**

This is a "FREE" event for students, NO registration fee is required. Get your applications on the Main page of the Dine College website or contact The Land Grant Office:

[www.dinecollege.edu/extension/2019](http://www.dinecollege.edu/extension/2019)

Send Application by Mail, Fax, or E-Mail to: [extension@dinecollege.edu](mailto:extension@dinecollege.edu)

**DINE COLLEGE LAND GRANT OFFICE**  
P.O. BOX 501  
Tusula, AZ 86556  
Contact:  
Lyander: (928)-724-6941  
Dewitt: (928)-724-6940  
Fax: (928)-724-6849  
Email: [lyndegay@dinecollege.edu](mailto:lyndegay@dinecollege.edu)

**APHIS**  
**Land Grant Office**  
DINE COLLEGE

# ENVIRONMENTAL YOUTH CAMP

Students received hands-on training through field labs, workshops and field activities. The program involved middle and High School students. Students were selected based on the interest in Environmental science, agriculture, biology and water cultures.

## STEM Activity: Then & Now!

### Students:

- literature reading related to Tolani Lake past historical context.
- Identify environmental issues that impacted TLE throughout history.
- Compare past environmental issues with the ones we face today.
- Recorded students thoughts in STEM journals.



# STEM FESTIVALS

The STEM Festival emphasizes science, technology, engineering & math activities. STEM partners will consist of individuals representing different institutional research/outreach programs, faculty members, students, local community members and Universities. Activities conducted are relevant to student's grade levels where facilitators run sessions with students throughout the day.

- Non-competitive celebration of great ideas and problems in STEM
- Facilitators provide expertise & Innovative Ideas
- Organizations share valuable contacts & information
- support and services between Departments, Institutes, & Universities





# STEM FESTIVAL



Looking Forward: Fall 2019 STEM Festival



**DINE COLLEGE**  
ANNUAL  
**STEM FESTIVAL**  
Tsaile Gymnasium  
9 AM - 3 PM

Strategy, Innovation  
Come & Join us for the 2-Days  
**STEM Fest!**  
• Collaboration  
• Creativity  
• Hands On Learning  
• Support  
• Inspiration  
• & More!

**Event Dates:**  
November 13 & 14, 2019  
@ Tsaile Arizona Main  
Campus

**Schools are Invited!**  
**Free Admission!**  
**Must Be Registered**  
November 12, 2019

November 13th, 2019 - 5th grade—8th grade  
November 14th, 2019 - 9th grade—12th grade

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**QUESTIONS?**

