



# Igniting a Spark for Future Engineers

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Coordinator*





# KEEN – KYTC Engineering Outreach

## • Community Outreach

- FUN hands-on classroom presentations expose elementary & middle school children to engineering at a young age
- High school Career Fairs and activities
- KEEN promotes KYTC programs:
  - Civil Engineering Scholarship
  - Civil Engineering Technology Scholarship
  - Construction Management Scholarship
  - Minority Internship Program
  - Transportation Mechanic Apprenticeship Program





# KEEN – KYTC Engineering Outreach

## EXAMPLES OF ACTIVITIES

- **Build a bridge with toothpicks and a K'NEX building set**
- **Make a boat from aluminum**
- **Locate Utilities**
- **Learn about the environment – erosion, watersheds, & pollution**
- **See how snow & ice removal works with a Vehicle Day at school**
- **Discover careers in civil engineering**



# HANDS-ON ACTIVITIES

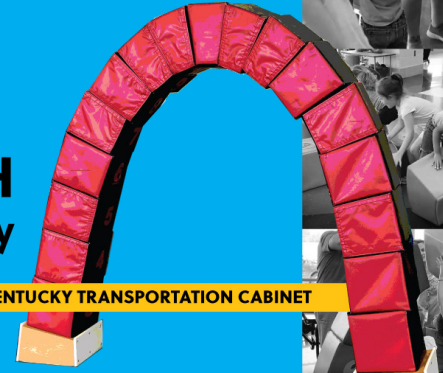


**AGE RANGE:**  
ALL AGES



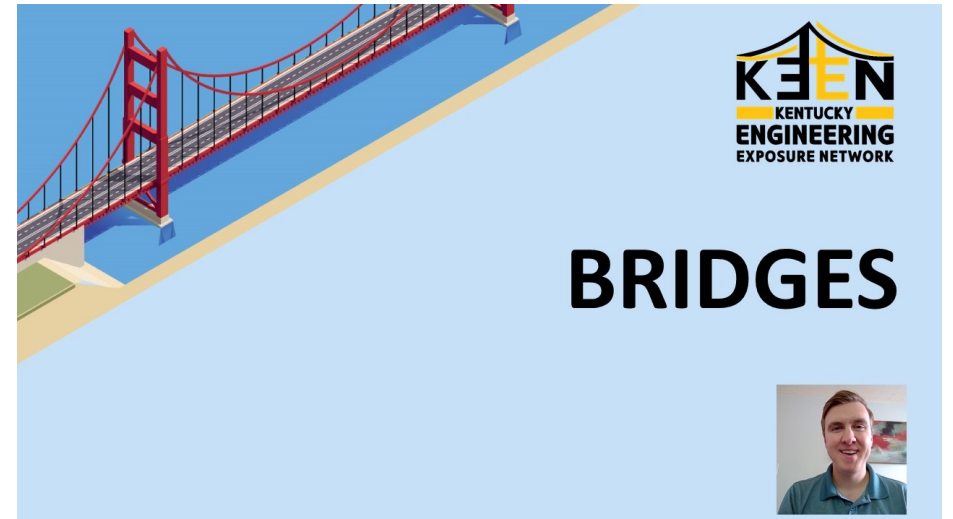
## Foam BLOCK ARCH Classroom Activity

ENGINEERING OUTREACH FROM THE KENTUCKY TRANSPORTATION CABINET





# HANDS-ON ACTIVITIES



**AGE RANGE:**  
4<sup>th</sup> Grade to High School



# BRIDGES

## Bridge Building Activities:

- Plan
- Build
- Test

## Two types

- K'nex
- Gumdrops and toothpicks



K'Nex Set



Gum Drop  
with toothpicks



# BRIDGES

## ENGINEERING PRINCIPLES:

- Bridge Materials
- Types of Bridges
  - Beam and Girder Bridge
    - Compression and Tension
  - Truss Bridge
    - Triangles
  - Arch Bridge
    - Tension and Arch Shape
  - Suspension Bridge
    - Tension
  - Cable Stayed Bridge
    - Tension
- Weakest Point of Bridge





# HANDS-ON ACTIVITIES



**What are utilities?**

- Electricity
- Gas
- Crude oil
- Water
- Sewage
- Other fluid
- Phone and Cable

\*Conveyed to or for the public, for compensation  
Kentucky Revised Statute KRS 278.010

A person is using a yellow 'Loki' ground penetrating radar (GPR) device to scan a chalk-drawn map on the ground. The map is drawn on a green surface and features a black road with white dashed lines and a white cross. The background shows a grassy area and the legs of a person standing nearby.

**AGE RANGE:**  
4<sup>th</sup> Grade to High School



# HANDS-ON ACTIVITIES



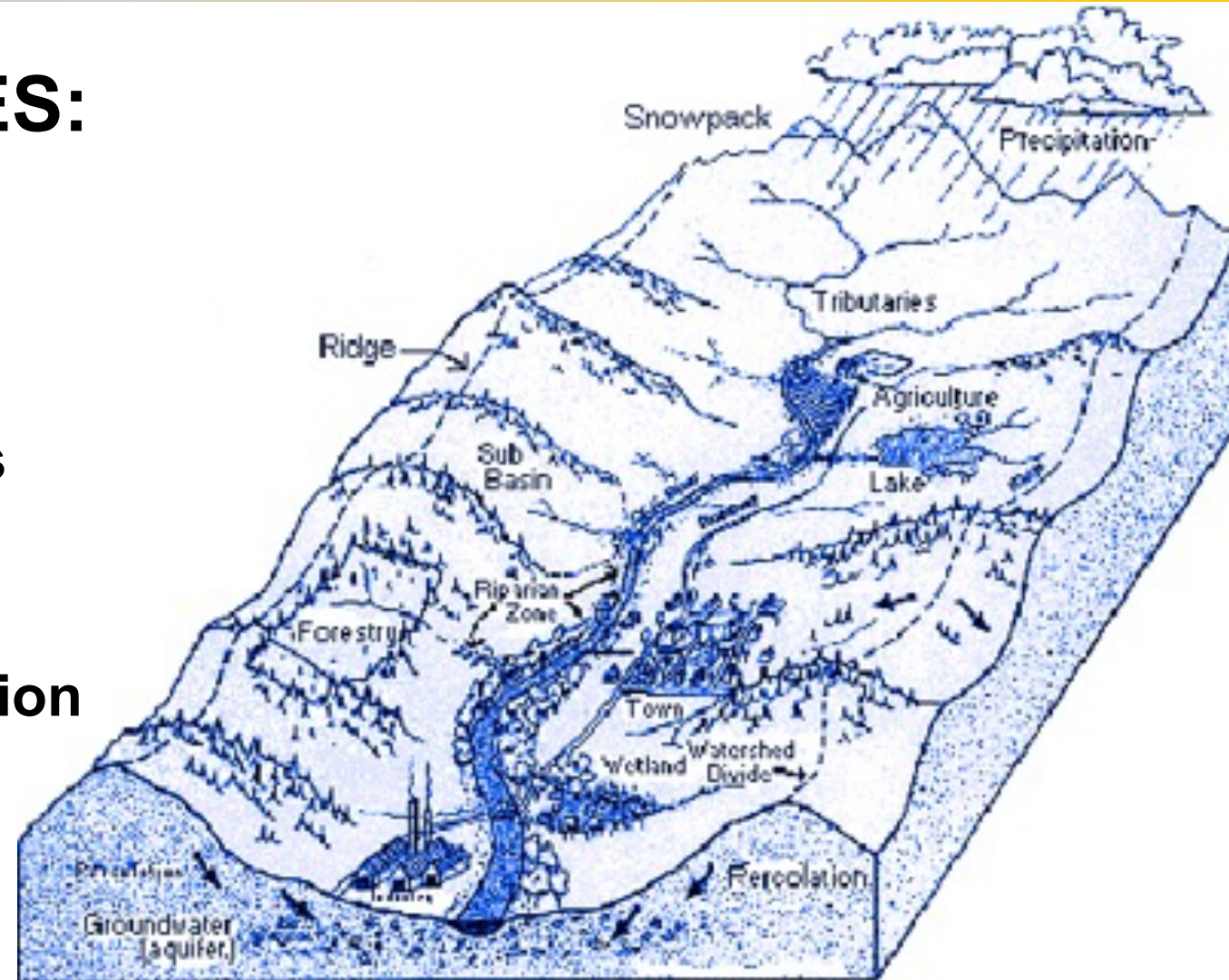
**AGE RANGE:**  
Kindergarten to 4<sup>th</sup> Grade



# ENVIROSCAPE

## ENGINEERING PRINCIPLES:

- Watersheds
- Topography Maps
  - How Elevation affects projects
- Pervious vs Impervious Surfaces
- Point vs Non-Point Source Pollution
  - Examples



Produced by Lane Council of Governments



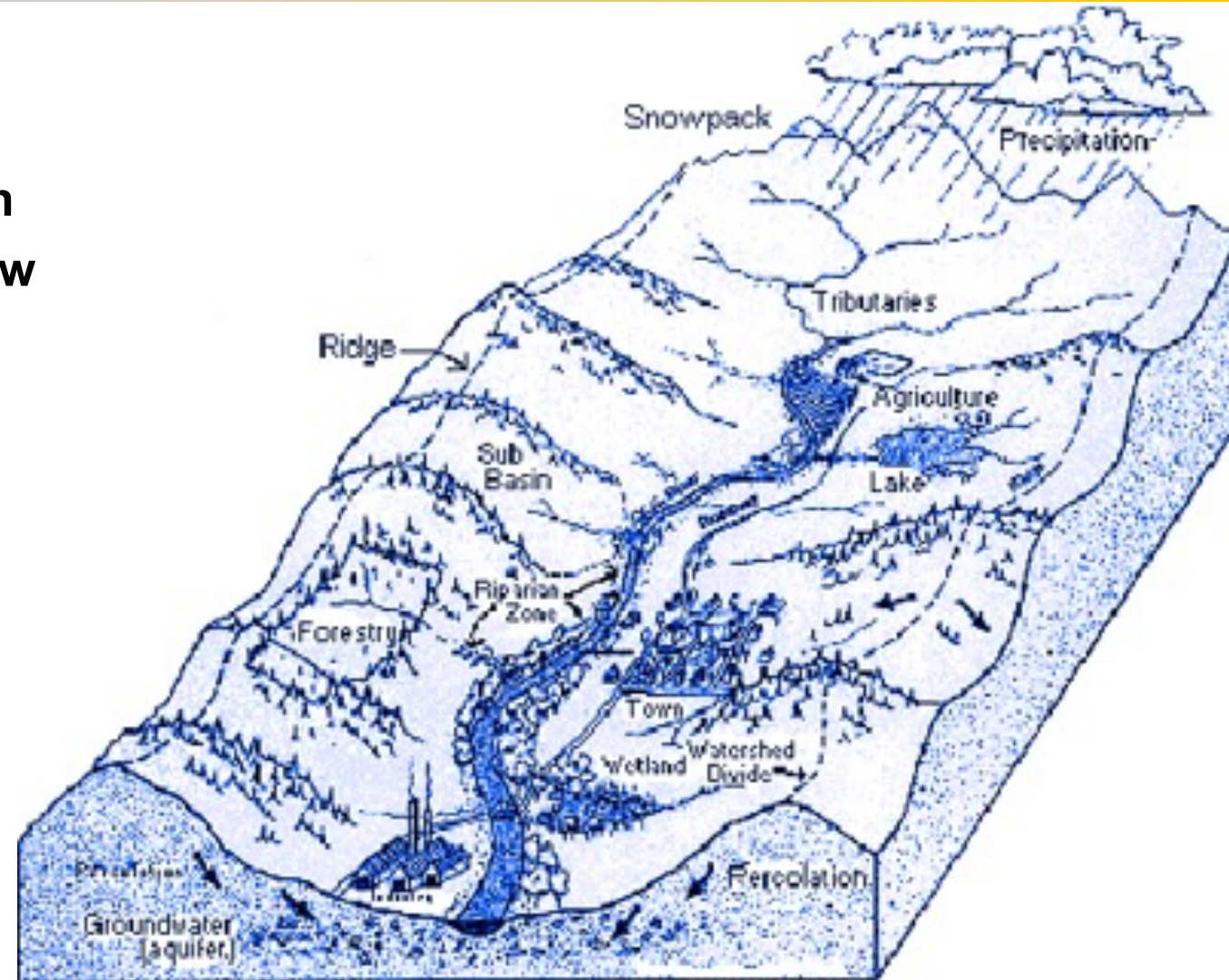
# ENVIROSCAPE

## Activity:

- Place various types of “pollution” on Envrioscape Board to demonstrate how watershed works and pollutants move
- Rainstorm
- View Watershed water

## Review:

- Types of Pollutants
- How the students can reduce their pollution



Produced by Lane Council of Governments



# HANDS-ON ACTIVITIES



The graphic features a paper boat on blue water with a small flag on top. The flag has the KEEN logo. In the top right corner, there are two small inset photos: one of a classroom and one of a child working. The text 'Aluminum BOAT Classroom Activity' is prominently displayed in the center-right. At the bottom, a yellow banner contains the text 'ENGINEERING OUTREACH FROM THE KENTUCKY TRANSPORTATION CABINET'.

**KEEN**  
KENTUCKY  
ENGINEERING  
EXPOSURE NETWORK

## Aluminum BOAT


Classroom Activity

ENGINEERING OUTREACH FROM THE KENTUCKY TRANSPORTATION CABINET

**AGE RANGE:**  
4<sup>th</sup> Grade to High School



# ...AND MORE PRESENTATIONS



## GEOMETRY IN ENGINEERING:




## ENGINEERING CAREERS IN TRANSPORTATION

Presentation by:

On Month Day 2022

## RIBBONS ACROSS THE LAND

THE STORY OF THE  
INTERSTATE HIGHWAY SYSTEM



Authored by JEFF MOORE, AICP  
Presented by Jennifer McCleve






**New  
careers or  
transitions**


Current Scholarship Trainee

# THREE SCHOLARSHIPS

1. Construction Management  
up to **\$59,000**
2. Civil Engineering  
up to **\$59,000.**
3. Civil Engineering Technology  
up to **\$14,800** (\$3,700 per semester)



**..or new  
paths**



**Paid internships while going to school and a job  
with KYTC when you finish your education.**

Deadline to apply for this scholarship is February 1



# INTERNSHIPS

**CO-OP AND INTERNSHIP PROGRAMS** provide hands-on experience in select fields for high school seniors and college students.

**MINORITY INTERNSHIP PROGRAM (MIP)** provides career opportunities, formal mentoring, and hands-on experiences to traditionally under-represented groups. It is designed specifically for undergraduates and graduates of Kentucky colleges and universities.

**TRANSPORTATION MECHANIC APPRENTICESHIP PROGRAM (TMAP)** provides paid, practical, hands-on experience at the local level of the Department of Highways for students currently enrolled in an Automotive or Diesel Technology Program through the Kentucky Community and Technical College System (KCTCS).






# SPARKING ENGINEERING

## SPARKS Newsletter

- Inspirational stories
- Scholarship info
- Class ideas and discussion question
- New classroom activities



Issue 2 - November 2022

### Igniting A Spark in Engineering

*We hope you and your families had a Happy Thanksgiving!*


November is when snow and ice season officially begins for the Kentucky Transportation Cabinet (KYTC), and our staff and crews are on high alert to respond to winter's worst.

Planning for the next winter season begins as soon as the one season concludes. Our teams review past storms to look for improvement opportunities, restock supplies, receive training, service vehicles and explore new technologies that will improve forecasting, response, logistics, and communications. New technologies get selected and tested throughout the warm seasons and salt supplies are replenished.

As the summer turns to fall, tested technologies begin to roll out and training kicks into high gear so staff are prepared ahead of the first snowfall.

While snowfighters who drive plow trucks are some of the most visible and essential members of the team, several other business units are involved in the effort. For example:

- Response team that monitors the weather
- Information Technology (IT) team tracks and analyzes data and technology
- Information officers in every district and at headquarters who inform the public of crew activities and issue safety messages



### Community Focus: KYTC Careers Eastern Kentucky Flood Disaster

By Jennifer McCleve and Will Holmes

KYTC is dedicated to serving our communities every day. Our employees, including but not limited to inspectors, equipment operators, construction workers, and engineers, are working hard to ensure the safety and reliability of our transportation system.

Every day, our workforce has an opportunity to go the extra mile. The Eastern Kentucky July flooding event set the landscape on fire. On July 28, 2022, the Eastern Kentucky region was devastated by flooding, including earth slides, road washouts, extensive debris, and damaged infrastructure. The flood impacted 13 counties and thousands of Kentucky residents.

Responding to a disaster event requires prioritizing and executing a plan. KYTC first responders provide life-saving help, ensuring the safety of our citizens and infrastructure.



### KEEN Activities

#### Foam Block Arch Classroom Activity

ENGINEERING OUTREACH FROM THE KENTUCKY TRANSPORTATION CABINET

### Foam Block Arch Activity

The arch is a structural element that has been used since the second millennium B.C. in Mesopotamian brick masonry. The arch was used by the ancient Romans, who were the first to use the arch in a wide range of structures. They laid the groundwork for many of the advancements in architectural history by developing the arch. The arch became a vital part of Roman engineering, and aqueducts, which in turn were integral to the Roman Empire.

The Foam Block Arch Classroom Activity is educational, engaging and most of all, fun. It allows students to experience the process of building a structure from numerous systematically shaped building blocks. This activity is designed to help students understand the value of teamwork, quickly realizing that it is not practical to achieve without assistance from other team members. The activity is designed to be a fun and safe activity. Of course, safety knocking the structure down is not the goal.

This activity is best with groups of 4-8 students and can be adapted for different grade levels. Background information and instruction is provided in the form of a video. Students can be grouped into smaller units and encouraged to compete to see which smaller group can assemble the arch first.



### How Engineers Plan Transportation Projects

by Scott Thomson

Engineers aren't just designers...they often have to be dreamers. In transportation, projects are conceived after studying a variety of inputs. Transportation planners rely on the public's input to discover problems and hear their ideas for solutions.

How people choose to move from place to place is called their "mode of transportation".



# KEEN – KYTC Engineering Outreach

## Invite KEEN:

- Classrooms
- Youth Groups
- Camps
- Career Fairs
- Youth events





**Help us ignite  
the engineering  
spark in children**





**QUESTIONS?**





transportation.ky.gov

# CONTACT INFORMATION

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