Would YOU Drink That? Engineering Water Filtration

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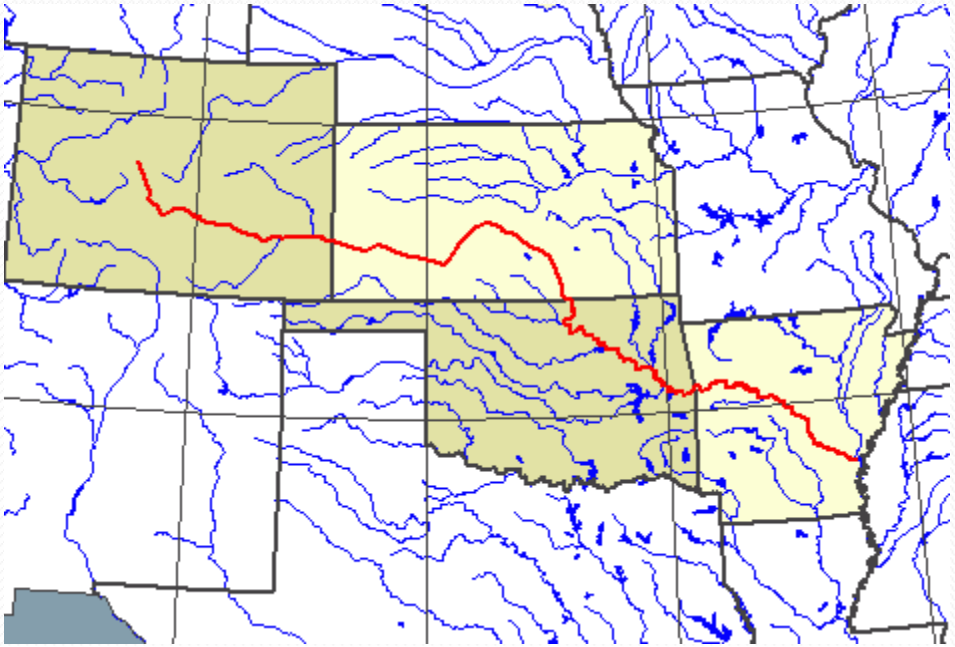
Let me tell you a story….

The Arkansas River



Source: TheNationalAtlas.gove

Now comes the fun part:

- Use the Engineering Design Process to make a device that will restore the cleanliness of the water.
- **Define:**
  - ✓ Criteria – As much "clean-looking" water as possible
    - ✓ Amount, clarity, extra stuff, color
  - ✓ Constraints – Amount of supplies, time

Now comes the fun part:

- Use the Engineering Design Process to make a device that will restore the cleanliness of the water.
- **Design:**
  - ✓ Work as a team of 3-4 people
  - ✓ Each team may pick 3 supplies from the supply list
  - ✓ Make a list of supplies that you would like to use
  - ✓ Sketch a design of your water filter
  - ✓ You must have your design and supply list approved before you begin construction

Materials and Supplies

- Everyone will get:
  - One blue funnel
  - One plastic beaker with sample
  - One labeled plastic beaker for result
  - Scissors
  - Tape
- Supply list:
  - Styrofoam bowl (1)
  - Crepe paper streamers (3 feet)
  - Cotton balls (10)
  - Rocks (1 cup)
  - Gravel (1 cup)
  - Dixie cups (3)
  - Coffee filter (1)
  - Paper towels (2 sheets)
  - Pipe cleaners (5)

Now comes the fun part:

- Use the Engineering Design Process to make a device that will restore the cleanliness of the water.
- **Optimize:**
  - ✓ Improve your design as you are going.
  - ✓ You may add ONE additional supply to your filter.
  - ✓ You must add it to your design and have it approved.

Now comes the fun part:

- Judging on:
  - Total amount of water in labeled beaker
  - Clarity of water
  - Amount of extra stuff in water
  - Color of water

Discuss:

- What worked well?

- What did not work well?

Standards

- 4-ESS3-2. Generate and compare multiple solutions to reduce the impacts of natural Earth processes on humans.
- Disciplinary Core Ideas:
  - **ESS2.A: Earth Materials and Systems**: Rainfall helps to shape the land and affects the types of living things found in a region. Water, ice, wind, living organisms, and gravity break rocks, soils, and sediments into smaller particles and move them around. (4-ESS2-1)
  - **ETS1.B: Designing Solutions to Engineering Problems**: Testing a solution involves investigating how well it performs under a range of likely conditions.
- Science and Engineering Practices
- Crosscutting Concepts: Connections

Other Disciplines

- Math
  - Assign a cost to each item, and give each team an amount of dollars to spend.
  - Make them use measuring cups to use small amounts of water at a time
- Language Arts/Writing
  - Write a story about someone who lives along the river
  - Write a letter to a congressman
- Social Studies
  - Learn about the history of the river and how it has changed
  - Make a poster for a clean-up campaign for the river

More science!

- In-depth water testing
  - Tap water vs. bottled vs. local stream vs. rain
  - Check pH levels, dissolved oxygen, etc.
  - Build a device to collect the water
- Chemical-based filter process
  - Activated charcoal
  - Boil it

Community Connections

- Partnerships through grants
- Local educational organizations
  - Museums, zoos, universities, etc.
- Local nature-based organizations
  - Nature centers, WATER center

Thank you!!!

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