

Let's improve water awareness!

Today's students are tomorrow's citizens

Ground Water Institute for Teachers™

A workshop for Teachers and Educators

An education program from the American Ground Water Trust (a 501(c)(3) non-profit education organization)

This great learning, training and information-exchange opportunity is organized in cooperation with the Kregel Windmill Museum, Nebraska City and the Groundwater Foundation, Lincoln.

Sponsored by the Kimmel Foundation and Wirth Foundation



WATER TOPICS FOR TEACHERS (NE, IA, KS, MO)

- WHEN:** Wednesday/Thursday - May 29, 2019 - 8:30am to 4:00pm, May 30, 8:30 - 3:45pm
- WHERE:** Kimmel Education & Research Center, 5985 G Rd, Nebraska City, NE 68410
- COST:** \$25 Registration (To be returned on first day at registration) & \$50 Stipend (Upon completion of workshop)
Includes lunches, snacks and a (big) bunch of handouts
- GRADES:** Middle & High School and also educators involved in public outreach
- ELIGIBILITY:** Any teacher/educator in traditional or non-traditional education in Nebraska, Iowa, Kansas and Missouri

BACKGROUND: The American Ground Water Trust has organized over 70 training programs for teachers in 17 states attended by close to 2,000 teachers and educators. This will be the fourth year of a "Water Topics" workshop in Nebraska City in partnership with the Kregel Windmill Museum.

The program is a great opportunity for teachers to explore aspects of water that are relevant to the Midwest. Water science and water management experts from the water industry, agriculture, universities and government agencies will be presenting the program. We recognize that teachers in all grades must adhere to state standards for content and required learning objectives, and so our approach, through class sessions, demonstrations, discussions and handouts, is to show how to integrate water topic subject matter into existing curricula and traditional subject areas.

The workshop will get teachers excited and focused. There are thousands of school storerooms groaning with unused curriculum materials. The institutes get teachers fired up to make use of the many excellent materials that are already available. We hope students impacted by water-savvy teachers will recognize the connected and integrated nature of the environment and be empowered to play an active role in protecting resources for sustainable use. For us to be effective stewards of our water resources there must be greater awareness and understanding of the science behind the resource.

MIDAMERICA

PUMP & SUPPLY This program has received additional support from Mid-America Pump & Supply, Hastings, NE

Program schedule

8:30 – 8:45 WELCOME & INTRODUCTION

Lee Orton, Executive Director, Nebraska Well Drillers Association, Lincoln, NE

Emily Folkerts, Executive Director, Kregel Windmill Factory Museum, Nebraska City, NE

- Origins of this program
- What we hope you will take away from the workshop

8:45 – 9:45 SEVEN BUILDING BLOCKS TO HYDROLOGIC LITERACY

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

- The importance of a foundation of basic environmental concepts
- Adding “water and environmental issues” to traditional subjects
- Earth Systems – connections of geology, hydrology, atmosphere and biology
- The basic “water” concepts we want our students to understand

THE BASICS OF ROCKS & WATER

- Geology fundamentals (rock types and origins)
- Geologic structure/ aquifer geometry
- “The Geologists are Coming”
- Class exercise – which rocks are the oldest?

9:45 – 10:30 UNDERSTANDING THE HYDROGEOLOGICAL CHARACTERISTICS OF AN AQUIFER AND GROUNDWATER AS A NATURAL RESOURCE

Michele Waszgis, CSD Geological Sample Repository Curator, University of Nebraska, Lincoln, NE

- What is an aquifer and how is groundwater stored?
- How do geologists/hydrogeologists study aquifers and groundwater?
- The High Plains/Ogallala Aquifer as a Natural Resource in Nebraska

10:30 – 10:45**BREAK****10:45 -11:05 HISTORICAL PERSPECTIVE: DEVELOPMENT, MANAGEMENT & CONTROL OF NEBRASKA'S WATER**

Lee Orton, Executive Director, Nebraska Well Drillers Association, Lincoln, NE

- Early settlers – what was it like when they arrived?
- Establishment of management controls and oversight
- Compacts and agreements with neighboring states

11:05 – 11:30 HOW WATER WELLS ARE DESIGNED, DRILLED & EQUIPPED

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

- Video “Water Well Basics”
- Typical Nebraska well construction for domestic wells and high-yield agricultural wells

11:30 – 12:15 ALL YOU EVER WANTED TO KNOW ABOUT PUMPS AND HOW THEY WORK

David Kill, P.E. Training Consultant, Xylem Goulds Water Technology, St. Paul, MN

Terry Jordan, Territory Manager, Xylem Goulds Water Technology, Ralston, NE

- How pumps lift water
- The basic components of pumps and pump motors (hands-on demonstration)
- Typical types of water pump in use in Nebraska
- With so many sizes and designs available – how does a farmer/engineer/contractor choose which pump to use?
- Simple calculations about energy costs of pumping water

12:15 – 1:15**LUNCH**

1:15 – 2:15 **EXAMPLES OF THE USE OF SCIENCE & TECHNOLOGY IN GROUNDWATER AND WATER WELL DECISIONS**

Neil Mansuy, Vice President, Subsurface Technologies, Kansas City, MO

- There are living things down there: Microbiology of aquifers and wells
- There is no such thing as pure water: What determines the quality (chemistry) of groundwater?
- Let's go down the hole: How to tell where water flows into a well
- Want to increase well yield? – Mechanical energy from CO2

2:15 – 3:00 **BACKGROUND TO THREE MAJOR WATER SUPPLY/ENVIRONMENTAL CONCERNS**

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

- “Fracking” – environmental impacts of the use of hydraulic fracture by the oil and gas industry
- PFAS, (per- and polyfluorinated alkyl substances) - legacy contamination impacts on water supply
- Changes in weather patterns (Climate change) - long term impacts on water availability

3:00 Travel to Nebraska City water treatment plant

3:15 **TOUR OF THE NEBRASKA CITY WATER PLANT**

Mark Lant, Superintendent, Nebraska City Water Plant, Nebraska City Utilities, Nebraska City, NE

- Purification process from well to drinking water tap

3:45 -4:00 **WRAP-UP OF DAY ONE**

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

Thursday May 30 – 2019 8:00 - 8:30 SIGN-IN (Coffee, fruit & pastries)

8:30 – 10:00 **TOUR AND EXPLANATION OF THE KREGEL WINDMILL FACTORY MUSEUM**

Emily Folkerts, Executive Director, Kregel Windmill Factory Museum, Nebraska City, NE

- 112 years of technology and manufacturing history
- Renewable power of the wind...How is rotating motion converted to up & down pumping?
- How do wind-pumps automatically protect themselves in high winds?
- How was Nebraska's rise as a food producer dependent on water pumping technology?

10:00 Return to Kimmel Education and Research Center

10:15 – 11:00 **RECHARGING GROUNDWATER EDUCATION: THE MISSION AND PROGRAMS OF THE GROUNDWATER FOUNDATION**

Sara Brock, Program Manager, Groundwater Foundation, Lincoln, NE

- Why is groundwater education important?
- Experience the Awesome Aquifer Kit hands-on groundwater modeling tool.
- Review supplemental activities and resources to complement phenomena-based curriculum
- The Hydrogeology Challenge

11:00 – 11:30 **GROUNDWATER QUALITY ISSUES**

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

- Sources of biological and microbiological threats
- Sources of chemical compounds that could impact water quality
- Saline soils resulting from high groundwater levels
- On-site waste-water disposal systems (great when they work!)
- What can be taught in schools that will help change behavior and increase resource protection?

11:30 – 12:15 **WATER ON THE MOVE: RIVERS, LAKES, WETLANDS AND WATER BUDGETS**

- How water moves through the landscape (where is it, how did it get there, where is it going?)
- Water budget concepts (rain, snow, evaporation, flow in rivers, storage underground)
- Water from springs (What keeps the water flowing?)
- The use of “Water footprints” in the classroom. (Putting monetary value on water use)

12:15 -1:00 LUNCH

1:00 – 1:30 **INTERACTION OF THE WATER AND ENERGY SECTORS WITHIN AGRICULTURE AND THE FOOD PRODUCTION INDUSTRY**

Caleb Milliken, Program Associate, Water for Food Institute, University of Nebraska, Lincoln, NE

- The mission of the Water for Food Institute
- What does sustainability mean?
- How can we ensure global food security with the challenge of changing climate?
- Institute research projects and partnerships

1:30 – 2:30 **CLASSROOM EDUCATION OPPORTUNITIES & HOW TO USE IN THE CLASSROOM**

Emily Folkerts, Executive Director, Kregel Windmill Factory Museum, Nebraska City, NE

- Overview of the classroom discovery kits
- Demonstration of the discovery kits
 1. “Day in the Life of a Factory Worker”
 2. “Where Does our Water Come From?”
 3. “Making use of the Windy Prairie”
 4. “Nebraska Ground Water & Conservation”
- Procedure for rental of discovery kits and tour programs available at the museum

2:30 – 3:30 **FOOD, FIBER & GROUNDWATER followed by TOUR OF KIMMEL ORCHARD & VINEYARD**

Vaughn Hammond, Orchard Operations & Education Team Leader, Kimmel Orchard & Vineyard, Nebraska City

- Water utilization at the Kimmel Orchard & Vineyard
- Tree T-pee water conservation
- Tour of the Kimmel Orchard & Vineyard facilities

3:30 – 3:45 **PROGRAM ASSESMENT – COMPLETION OF PROFESSIONAL DEVELOPMENT PAPERWORK**

Andrew Stone, Executive Director, American Ground Water Trust, Concord, NH

3:45 **ADJOURN**

