

# Let's improve water awareness in Nebraska!

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.



## WATER TOPICS FOR TEACHERS

May 31 and June 1, 2017 (8:30am - 3:30pm )

Kimmel Education Center, 5985 G Rd, Nebraska City, NE 68410

**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. A "Water Topics" workshop was held in Nebraska City in May 2016.

The program is a great opportunity for teachers to explore aspects of water that are relevant to Nebraska. 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.

### TEACHERS WHO ATTENDED THE 2016 WORKSHOP: WHAT THEY SAID

*"I was amazed at the quality presenters that were brought together for this class."*

Philip Hall, Science & Math teacher, Humboldt-Table Rock-Steinauer High School, Humboldt, NE

*"This Institute helped me realize that my students are missing a huge part/section of science."*

Megan Euler, Science Teacher, Culler Middle School, Lincoln, NE

*"The interaction with the presenters was awesome and the handouts and PowerPoints will be a great addition to my curriculum"*

Ken Malone, Agricultural Educator/ FFA Advisor, Palmyra High School, Palmyra, NE

*"This was an incredible enriching experience! The knowledge shared by experts in the field will be very valuable to my efforts in water and environmental education."*

Desirae TePoel, Information and Education Specialist, Lower Platte North NRD, Wahoo, NE

*"This is an excellent workshop! It is wonderful that experts are willing to share their time with us and inform us, so we can translate our learning and pass it on to our students."*

Kirsten Smith, 7th Grade Science Teacher, Pound Middle School, Lincoln, NE

*"While I am a science teacher and focused on the "science" of the presentations, I think that any subject matter teacher could come away from this workshop with lots of ideas for integrating the information into their curriculum"*

Nancy Peters, 6<sup>th</sup> Grade Science Teacher, Culler Middle School, Lincoln, NE



**8:30 – 8:45 WELCOME & INTRODUCTION**

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

David Flatt, Executive Director, Kregel Windmill Factory Museum, Nebraska City, NE

- Origins of this program
- Partnership with American Ground Water Trust & Groundwater Foundation
- 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
- 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?)

**9:45 – 10:30 EXPLANATION OF THE GEOLOGY AND HYDROLOGIC CHARACTERISTICS OF NEBRASKA’S AQUIFERS**

Aaron Young, Geologist, Conservation and Survey, Lincoln, NE

- Geologic setting of Nebraska
- The State’s water balance (IN, OUT and changes in STORAGE)
- Major alluvial aquifers of 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

- 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

- Video “Water Well Basics”
- Well design and equipment (casing, screens) for domestic wells and high-yield commercial 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, 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 – 2:00 **HOW THE NEBRASKA AGRICULTURE INDUSTRY MAXIMIZES THE USE OF AVAILABLE WATER**

John Heaston Consultant: - economics, society and watershed health, Lincoln, NE

- Where Nebraska producers obtain irrigation water
- How irrigation technology has increased food production
- Water conservation by efficient on-farm management
- What are the implications of changing weather patterns for Nebraska agriculture?

2:00 – 2:30 **BACKGROUND OF THE NEBRASKA CITY WELL-FIELD & WATER PLANT**

Cathy Meyer, Superintendent Nebraska City Water Plant, Nebraska City Utilities, Nebraska City, NE

2:30 Travel to Nebraska City well-field

2:40 **TOUR OF THE NEBRASKA CITY WELL-FIELD**

3:10 Travel to Nebraska City water plant

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

3:45 **WRAP-UP OF DAY ONE** (on site)

Andrew Stone, Executive Director, American Ground Water Trust



Thursday June 1st – 2017

8:00 - 8:30 SIGN-IN (Coffee, fruit & pastries)

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

David Flatt & Dean Shissler, Executive Director & Assistant Director, Kregel Windmill Factory Museum

- 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 **HOW BEST TO MAXIMIZE THE EDUCATION OPPORTUNITIES OF THE KREGEL MUSEUM FOR SCHOOLS**

- Discussion and brain-storming facilitated by Jane Griffin, President, Groundwater Foundation

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

Andrew Stone, Executive Director, American Ground Water Trust

- 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 QUALITY CONCERNS AND SOURCE PROTECTION STRATEGIES**

Tom Christopherson, Nebraska Department of Health and Human Services, Lincoln, NE

- Which State or local departments/ agencies are responsible for what in sustaining & protecting Nebraska's water?
- Strategies for protecting groundwater from contamination
- What the state is doing to "clean-up" past contamination
- Examples of how research and scientific knowledge helps water policy decisions

12:15 -1:00 LUNCH (Collect lunch and then back to classroom for Kate Gibson's presentation)

1:00 – 1:30 **WATER FOR FOOD – A GLOBAL PERSPECTIVE**

Kate Gibson, Program Coordinator, 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**

Jane Griffin, President, Groundwater Foundation Lincoln, NE

David Flatt & Dean Shissler, Executive Director & Assistant Director, Kregel Windmill Factory Museum

- Demonstration of the awesome aquifer kit
- Ground water mapping software demonstration
- Overview of the classroom 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 + TOUR OF KIMMEL ORCHARD & VINEYARD**

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

- Groundwater utilization at the Kimmel Orchard & Vineyard
- 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

3:45 ADJOURN