Watersheds and Water Quality: Educating the Next Generation
Fostering Citizenship and Stewardship in the Classroom

Robbin Dunn,
Public Works Program Coordinator,
City of Davenport, Public Works
How Did We Get Where We Are?

- Trial and Error
  - Afterschool programs
  - At-will classrooms
- Meaningful, Sustainable Programming

Inspiring, Engaging, Lasting, Time, Outcome, Effort
Inquiry-based/Place-based Education

- **It is a goal/ideal situation to be teamed up with a teacher/classroom that would be interested in working with me to put together a program** that could be used by others. (Interested in more than one grade, but would have to work on one grade at a time.)
  
  - **Looking to develop a program that provides fun, meaningful learning, community connectedness and meets core curriculum/standards.**
  - Through program development, a resource list would be produced.
  - **Makes best use of Public Works resources and supports Davenport’s schools/staff.**
Shifting to Sustainable Programming
– Earth Grant Presentation Jan 2011

Program Outline/Thoughts

- Entry Event (North High Rain Gardens, Aging Infrastructure/More Pervious Surface)
- Brainstorm and explore possible solutions (Could be as simple as raising public awareness)
- Driving Question - How can we reduce contaminants? How can we reduce velocity?
  - Develop requirements for the project.
  - Inquiry and Innovation (related questions - what are the pollutants, how do they get there)
  - Feedback and Revision
  - Publicly presented product
    - A publicly presented product would be great to help spread education on water quality issues. Imagine if the program were used for a specific grade throughout the school system and an event where the outcome could be displayed (maybe similar to the event being planned for May).
5th Grade Water and Our Urban Environment

- Students will never look at a stormdrain the same way again
- Utilizes Citizen Science
  - IOWATER
  - CoCorahs
  - Crowd Hydrology (Coming Soon!)
- Celebrates Student Learning and Achievement by Showcasing It!
5th Grade Water & Our Urban Environment

- Meets Iowa Core and National Standards
- Pilot period, 3 years
- Integrated 2013/2014
- Monetary investment to outfit classrooms with support materials
- Combination of existing lessons/activities and connections to the Community/world around students
Tracing the Path of Water
From Rooftops and Roads
Pervious and Impervious Surfaces
Field Investigation
Observation, Hypothesis, Conclusions
Next Generation Standard

- **5-ESS3-1 Earth and Human Activity**: Students who demonstrate understanding can: Obtain and combine information about ways individual communities use science ideas to protect the Earth’s resources and environment.
Outcomes/Showcase of Learning

- Students who are excited.
- Students who want to share what they have learned.
- Students who are more engaged members of our Community.
- Students (and families) who understand their personal impact on water quality
Community Quote

Paul S., Grandparent – When talking to an individual about Blackhawk Creek, Paul stated “I don’t know what they are doing up at that school [Hayes], but they are doing something right. The kids get it.”
Pilot Teacher

"I am amazed at the interest, energy and enthusiasm that I am seeing in our students. When I recently heard students explaining erosion and its effects on water quality, I was truly impressed with the knowledge that they were sharing, which convinced me that these students will make positive improvements in our environment."

Carey, 5th Grade Teacher
"Our partnership with Davenport Public Works has given my students a wonderful opportunity to learn where the water in our storm drains goes and the lasting environmental impact pollutants have on our creeks and the Mississippi River. My students have gained a true understanding of their personal responsibility as stewards of our water supply through authentic, hands-on experiments in the classroom and out in the field." … “This has been an incredible experience for our students and I am looking forward to continuing the partnership.” Lisa, 5th Grade Teacher
Living with Floods

- University of Iowa Initiative
- 5 - 6th Grade Teachers from DCSD, Approx 40 across the state
- Interdisciplinary
- Social Studies, Science, Art and Music
Living with Floods

- A version of pilot being incorporated into 6th grade lessons this Spring
- Interdisciplinary difficult but on-going effort to pilot
# Resources

<table>
<thead>
<tr>
<th>Title</th>
<th>Type</th>
<th>Author</th>
<th>jig Research</th>
<th>ST Sim</th>
<th>Run-off Resources</th>
<th>Type</th>
<th>Author</th>
<th>Standard</th>
<th>Process</th>
<th>Substances</th>
<th>Source</th>
<th>Other</th>
</tr>
</thead>
<tbody>
<tr>
<td>P Stop Pointless Personal Pollution</td>
<td>Article</td>
<td>EPA</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P Streams in the City</td>
<td>Article</td>
<td>EPA</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>P Improving Old MacDonald’s Farm</td>
<td>Article</td>
<td>EPA</td>
<td></td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Water Rocks Watershed Game</td>
<td>Activity</td>
<td>Water Rocks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Lin 17 DWPTS Watershed Approach</td>
<td>Activity</td>
<td>USDA/NRCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X How Wet is Our Planet</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Watershed</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Aquatic Roots</td>
<td>Article</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Life and Death Situation</td>
<td>Activity</td>
<td>HWHP Project Wet</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Incredible Journey</td>
<td>Activity</td>
<td>Discover Floods PIW</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Lesson 1 DWPTS</td>
<td>Activity</td>
<td>USDA/NRCS</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Water Cycle Relay</td>
<td>Activity</td>
<td>EPA</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Water Cycle Relay Race</td>
<td>Activity</td>
<td>Utah State University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Water Cycle Drama</td>
<td>Activity</td>
<td>Utah State University</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X What’s in the Air</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Beautiful Basics</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Blue Ribbon Niche</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Design a Habitat</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Everybody Needs a Home</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Ecosystem Concept</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Microtek Treasure Hunt</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Shrinking Habitat</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Which Niche</td>
<td>Activity</td>
<td>Project Wet IA Ext</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>X Wetland in a Pan</td>
<td>Activity</td>
<td>HWHP Project Wet</td>
<td>x</td>
<td>x</td>
<td>x</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Dead Zone</td>
</tr>
</tbody>
</table>

- ** jig Research: ** Whether the resource is available for jig research
- ** ST Sim: ** Whether the resource is available for ST simulation
- ** Run-off Resources: ** Type of run-off resources
- ** Type: ** Type of resource (Article, Activity, Book, Video)
- ** Author: ** Name of the author
- ** Standard: ** Whether the resource meets the standard
- ** Process: ** Whether the resource is process-related
- ** Substances: ** Whether the resource is related to substances
- ** Source: ** Source of the resource (For example, USDA/NRCS)
- ** Other: ** Additional notes (For example, could be used in Earth-Science Expedition, Dead Zone)
Next Generation Science Standards

Human Impacts:

Constructing explanations and designing solutions.
Outcomes/Showcase of Learning

Not Just a Drop in the Bucket!
Why Water Quality Matters to Wood Students!

Join us as we share what our Wood Intermediate’s 6th grade science has learned about several pressing Iowa water issues. Topics include, flooding, water quality, wetlands, impacts on wildlife, wastewater treatment/management, and much more!

May 16, 2013

Where:
Wood Intermediate
Outcomes/Showcase of Learning

- From Jim H., Davenport Stormwater Advisory Committee Member, after visiting a Showcase of Learning for 6th Grade Students completing the Living with Floods pilot – “I was very impressed with everything I saw. The students seemed knowledgeable about their topics and very concerned with water and water related issues. The projects reflected real interest by them. Getting young people involved is very important if we have any real hope for improving our water management practices. Hopefully the curriculum can be expanded and more students involved. Thanks for all you are doing.”
Rain Gardens at North High School

- Environmental Science
- Rain garden lesson with extensions tied to existing curriculum
- Class eliminated
- Earth & Space and Biology?
Earth & Space and Biology

- Working with EICC/SCENE Grant
- Earth & Space
  - Erosion
  - Cost Comparison
  - BMP’s
  - Watershed Game
  - Sustainable Community
- Biology
- All looking for real world/local connections
Next Generation Standards

- ESS2-2, ESS2-5 and ESS3-2: Analyze Geoscience Data, Investigate the Properties of Water and Its Effects on Earth’s Surfaces, Evaluate Competing Design Solutions.

- ESS3-3: Create a Computational Simulation to Illustrate Relationships among Management of Natural Resources.

- ESS3-4: Evaluate or Refine Technological Solutions that Reduce Human Impacts on Natural Systems.
So, Where are We at Now?

- **5th Grade**
  - Last hurdle, teacher training
  - Maintain and grow

- **6th Grade**
  - Implementation set for April
  - Maintain and grow

- **9th Grade**
  - Abort Environmental Science
  - Earth & Space
    - Erosion – Implementation 2014/2015 School Year
    - Green Infrastructure – Implementation 2014/2015 School Year
    - Sustainable School/City Lesson – Implementation set for April

- **HS Biology**
  - Goal 2014/2015
Where Are We Going?

- On-site infiltration practices and service learning
- Environmental Literacy Assessment
  - First round 5th Grade will be 9th Grade in 2014/2015
  - Measurement tool that might benefit many
- Watershed and Environment Partners
- Public Works Services and Careers
How Did We Get Here?

- Progressive School District Interested in Opportunities to Provide Authentic Learning Experiences
- Introduction of DPW as a Resource
- Timing and Opportunity
  - Jan 2011 Earth Grant
  - Oct 2012 Living with Floods
  - Apr 2013 Rain Gardens at North High
The Rest of the Story

- Collaborate
  - Offer of Resources
  - Opportunity
  - Hard work/Commitment
  - Patience
  - Monetary Funding/Resources

- Cultivate Partnership

- Integration

- Student Achievement, Citizenship, Stewardship

- Cascading Effects: Reaches beyond lessons in classroom
Challenges

- Finding the opportunity
- Teacher out-of-contract time, pilot
- Teacher out-of-contract time, training
- Understanding the needs and overall process
- Having patience
- District-wide focus on reading
- Getting others on board
- Different resource needs: Elementary, Intermediate, High School
Partnership - Fostering Citizenship and Stewardship in the Classroom

- Davenport School Board Meeting
  07/08/2013, 2:57 and after
  - http://www.youtube.com/watch?list=PLzilS7TgRMdJpMz1CETQIVsEAb3I-x2&v=6KOYEatGPuA&feature=player_detailpage

- 2011-2013, 4 Council Updates/Presentations on Projects
Showcase of Learning

- 5th and 6th Grade
- Davenport Public Works
- 05/17/14, 12:30 to 4pm
Questions?

Robbin Dunn
City of Davenport
Public Works
rrd@ci.davenport.ia.us
(Student photo’s removed for publishing)