Center for Wind Energy
James Madison University

CISE
COLLEGE OF INTEGRATED SCIENCE & ENGINEERING
James Madison University

Engaging a Multidisciplinary Group of Students in Wind Energy Education through the Planning and Execution of a KidWind Challenge at James Madison University

Remy Pangle[1], Kyle Gipson, PhD[2], Jonathan Miles, PhD[1,3], Grace Mauro[4], & April See[4]

[1] Center for Wind Energy at James Madison University
[2] College of Integrated Science & Engineering; Engineering Department
[3] College of Integrated Science & Engineering; Integrated Science & Technology Department
[4] School of Hospitality, Sport and Recreation Management; Hospitality Management Program

For: North American Wind Energy Academy 2015 Symposium

Virginia Tech - Blacksburg, Virginia, June 10, 2015

4A: Panel Session: Workforce Development & Education

JAMES MADISON UNIVERSITY

A public regional university located in Harrisonburg, VA

~20,000 students across all academic programs with ~1,700 enrolled within a graduate program

CENTER FOR WIND ENERGY

Located at James Madison University

Focuses on research, education & outreach pertaining to wind, solar and energy efficiency

Serves the entire Commonwealth of Virginia and engages stakeholders at local, state, regional & national levels

CrEATE a KidWind Challenge Event Course

Collaborative Educational Activities that are focused on Technology for renewable Energy

A course constructed to be an educational experience for students and faculty from multiple disciplines in teams to design, prototype, implement, manage and execute age appropriate educational activities for K-12 students during the East Coast Regional KidWind Challenge Event

MOTIVATION

Avenue to gain understand about a structure of an enterprise

Opportunities to discover broader applications of the disciplines through the renewable energy platform

An endeavor that fosters an enhanced sense of civic responsibility

OVERVIEW

Project funded
- Course - 4VA JMU
- Challenge - Dominion Virginia Power

CISE level course

Disciplines sought/**participated**
- Education, Psychology, **Hospitality, Engineering, ISAT**

Project based learning, experiential learning
- 10 big questions from KWC rule book
- Mock KidWind Challenge

Non-profit business canvas

GOALS

To provide opportunities for students to:

Apply academic knowledge and skills within a “real world” setting

Improve leadership skills

Enhance connection to professional responsibility

Establish effective working relationships with supervisors, peers, and others

Expand view of multiple disciplines in terms of community engagement

Engage personally with new communities and in self-regulated learning

OBJECTIVES

Students will be able to:

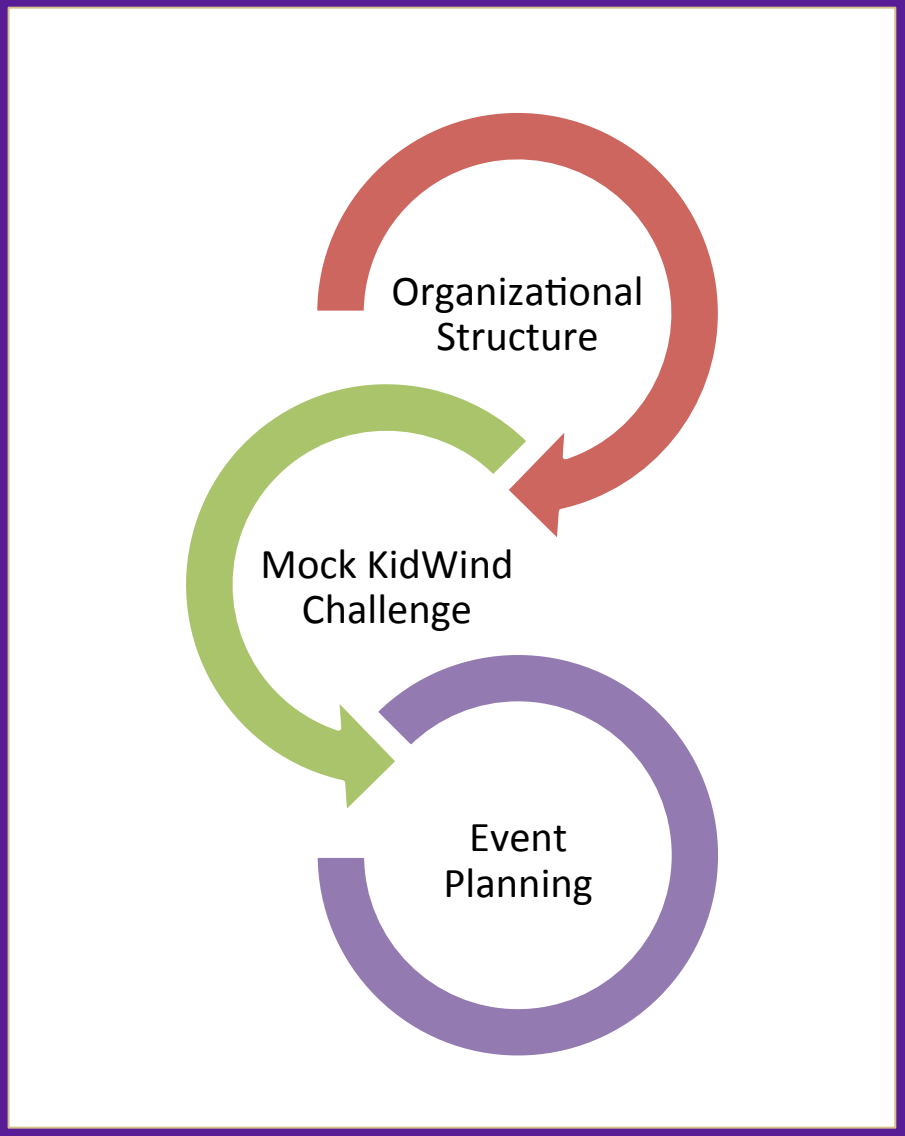
Work toward solutions of student-identified issues within the framework of the KidWind Challenge

Work outside of disciplinary boundaries on multidisciplinary teams

Demonstrate and apply discipline related knowledge to multidisciplinary issues

Explore environmental, economical, technical and societal dimensions in regards to the KidWind Challenge Event

Course Structure



Kenn Barron, PhD
Professor
Psychology

Reg Foucar-Szocki, PhD
Professor
School of Hospitality

David Slykhuis, PhD
Associate Professor
College of Education

Organizational Structure

Individual and Group Business Canvas

Organization Name and Mission Statement

Identify Committees

Interview Students and Place on Committees

The Non-profit Business Model Canvas

Designed for: CrEATE Class – group canvas

Designed by:

On: 1/19/15

Iteration:

Key Partners

- KidWind
- Dominion
- JMU
- Other 4VA universities
- 4VA
- CrEATE class
- Wind Industry
- Emergency Services
- Outreach and Engagement

Key Activities

- Planning and logistics
- Activities and exhibits
- Communications and promotions
- How To Manual
- Assessment

Key Resources

- Money
- Location
- Research
- Time
- Labor available
- Expertise

Value Proposition

- Educating students on renewable energy in an engaging way that reflects positively on JMU

Relations

- Good relations with Dominion
- With KidWind
- JMU with KWC
- Class with 4VA universities
- Teams with KidWind
- Class with teams

Channels

- Website
- Social media
- phone/groupme
- Email/listserv
- Youtube videos
- Webinars

Co-creators

- JMU
- K12 students
- University students
- K12 teachers/coaches
- Wind Industry
- Dominion

Value-streams: outlay and costs

- Time
- Cost of resources
- Prizes
- Note: we have $4000 for this Challenge!

Value-streams: returns

- More students in CrEATE class next year
- Leadership
- Teamwork
- Students to JMU
- More students in wind energy majors/jobs
- Have fun!
- Awareness about wind/renewables

GOALS: Education, entertainment, and recruitment!

Mock KidWind Challenge

Overview of KidWind Challenge and Rules

Research Phase – Investigation Stations

Design Phase – Prototyping and Modifying

Challenge and Judging

Event Planning

About the Hosts

KidWind

KidWind was founded in 2002 by Michael Arquin, a middle school teacher from Monterey, California. A decade later, his organization blossomed into an international project that has trained over 10,000 teachers and impacted more than 900,000 students. Their data shows that they have helped teachers and students build over 60,000 experimental wind turbines.

After founding KidWind, Arquin wanted to scale up his classroom effort by putting on a large-scale event with more students and teams. In 2009 the first official KidWind Challenge was sponsored in New York through a grant from the New York State Energy Research and Development Authority (NYSRDA). The KidWind Challenge is now in its sixth year and is being held in many states throughout the country. Find more information about KidWind at KidWind.org.

Center for Wind Energy

The Center for Wind Energy at James Madison University (JMU) strives to provide educational and technical opportunities, support, and resources to foster the advancement of sustainable energy in Virginia. The CWE focuses on research, education, and outreach to advance wind energy deployment. We focus on research projects with national, regional, and local implications, and are performed with the assistance of undergraduate and graduate students. Our educational efforts reach a wide range of audiences including K-12 students and educators, undergraduates, and post-graduates. Our outreach efforts aim to create a more educated and aware citizen base in Virginia, including local planners, county officials, the JMU community, and the general public.

Challenge Judges

Richard Pleasants, Pleasants Industries
Billy Weitzenfeld, Association of Energy Conservation Professionals
Cindy Kleveckis, JMU Integrated Science and Technology Department
Kevin Comer, ANTARES Group
Heather McLeod, JMU Engineering Department
Bradley Schneider, Recovered Energy Resources
Scott French, SunRNR
Jenny French, SunRNR

Activities & Tours

All activities are 45 minutes long and are offered at 11:30 am, 12:30 pm, & 1:30 pm.

ACS Demo Show: This will put your hair on edge. With demos like colored flames, disappearing water, and maybe even a little liquid nitrogen. You will get to experience some awesome demos, so please join the JMU Chapter of ACS in their intense show. *Location: Room 240.*

Virginia Clean Cities (VCC) : VCC is a coalition in partnership with JMU. This coalition "serves as a cornerstone program in the Institute for Energy and Environmental Research (IEER)." The program is funded by the Department of Energy. Clean Cities works toward reducing dependence on imported petroleum by promoting and enabling the use of alternatively fueled vehicles. *Location: Room 2210.*

Wind Energy Facility Tour: The Center for Wind Energy at JMU hosts a demonstration wind and solar facility on campus. Participants will tour the facility and learn about wind and solar energy and their applications for residential and commercial use. We will also discuss the importance of measuring the wind before installing a wind turbine and explore different measurement devices such as kites, wind socks, and anemometers. *Meet at Check-In.*

East Campus Dining Hall Tour: Come and see the inner workings of one of JMU's Leadership in Energy & Environmental Design (LEED) certified buildings. This 700 seat dining hall has been awarded Green Building Council's Leadership in Energy and Environmental Design certification. E-hall has improved building performance in energy savings, water efficiency, carbon dioxide reduction and stewardship of resources. This quick 20 minute tour will highlight some of these great innovations. *Sign-up required, offered at 11:00 and 11:30 AM, meet at Check-In.*

Open Lab - Scratch Game: During this Open Lab time, you will get to play with a new program that will allow you to better understand the physical placement of wind turbines. You get to place turbines virtually and see the kind of energy they will produce and the political issues they may raise. *Location: Room 248.*

Egg Drop Instant Challenge

Location: Room 246

During this activity students will design protection for an egg, which will prevent it from breaking when dropped from a pre-specified height. Each group will be given an egg and limited materials to build. Students will have the opportunity to test their design in the classroom first before testing at the drop site. This activity will enhance skills in design thinking and prototyping as well as discovering the impact of energy transfer.

Rules:

- Each team will receive a maximum of two eggs
- Each team will be given a predetermined set of materials to build their egg protection
- There will be two drop sites:
  1. Second floor down to first floor (one-story)
  2. Second floor down to basement (two- stories)
- A test drop will occur in the classroom before moving to the drop sites – if your egg breaks you will be given a new egg and the opportunity to update your protection.
- Scoring will be based on when the egg breaks and how many eggs are used

Scoring:

5 – One egg used, Egg does not break when team makes the two-story drop
4 – Two eggs are used, Second egg does not break when the team makes the two-story drop
3 – One egg used, Egg does not break when the team makes one-story drop
2 – Two eggs are used, Second egg does not break when the team makes the one-story drop
1 – Both eggs break in classroom testing
0 – Team does not compete in Instant Challenge

Schedule of the Day

Event	Time	Location
Check-In & Tour Sign-ups	8:00—9:00 AM	First Floor HHS
Welcome, *President Alger, JMU*	9:15—9:25 AM	HHS 2301
Keynote Address, *Charlie Johnson, Apex Clean Energy*	9:25—9:45 AM	HHS 2301
Open Testing	9:45—10:15 AM	ISAT 236
Judging	10:15—2:15 PM	HHS 2202, 2204
Testing	10:45—3:00 PM	ISAT 236
Instant Challenge	11:00—3:00 PM	ISAT 246
Activity Rotations*	11:30—2:30 PM	Various
Open Lab—Scratch Game	11:30—1:30 PM	ISAT 248
Post-Event Survey	1:30—3:30 PM	ISAT 250
Awards Ceremony	3:30—4:00 PM	HHS 2301

**Activity rotations are available while other teams are competing*

Keynote Speaker

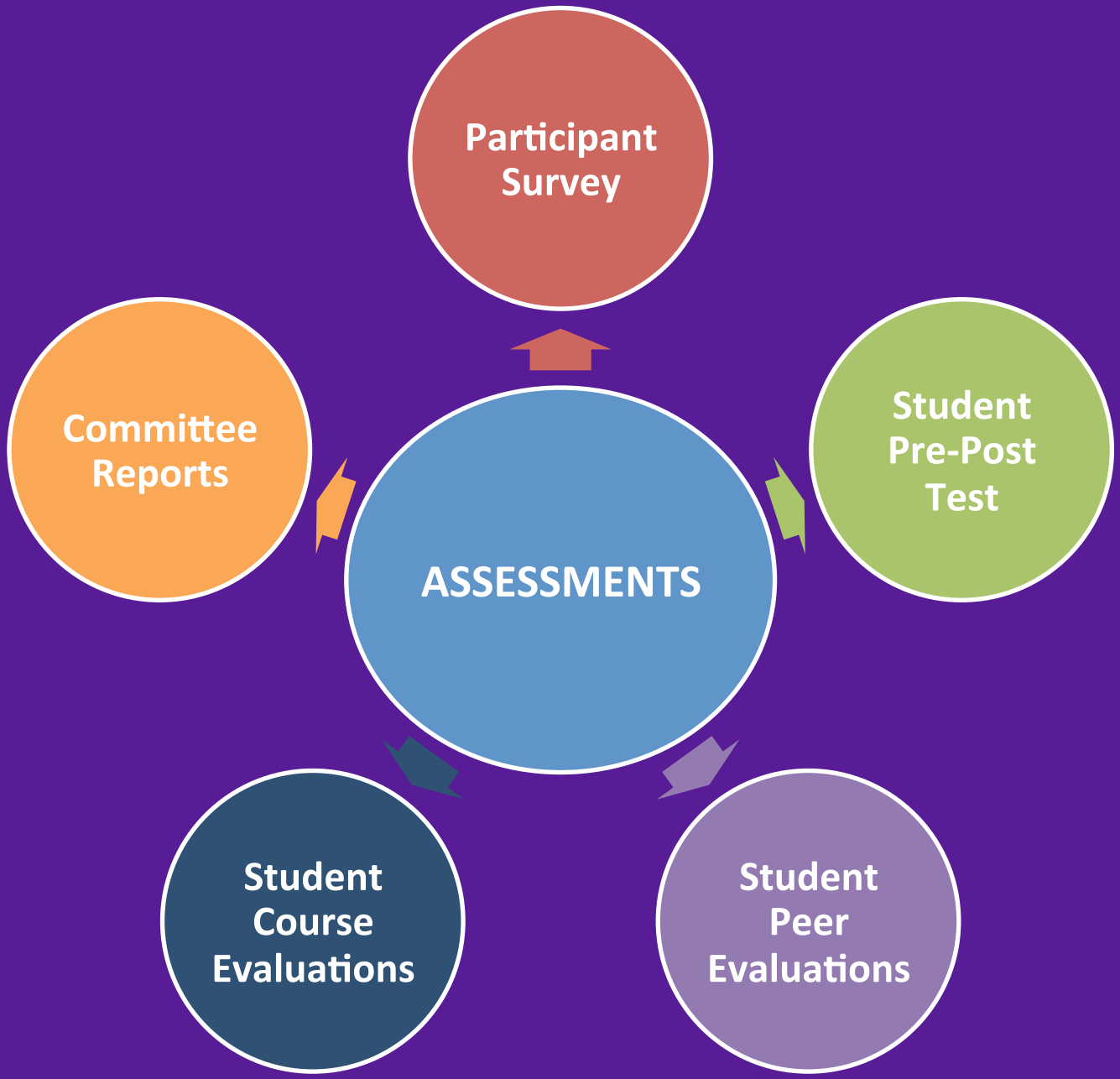
Charlie Johnson is a 2012 graduate from the ISAT program at James Madison University. He concentrated in Energy through the ISAT major, developing a strong interest in wind energy, which led him to intern with the Virginia Center for Wind Energy during his time here. After graduation, Charlie moved to California to work in the wind industry before moving back to the east to Charlottesville, VA, where he currently works as a Development Manager for Apex Clean Energy. Charlie works to develop wind projects located in the Mid Atlantic region from Maryland to South Carolina.

Committee Mission Statements → Committee Guiding Documents → Staff Meetings → KidWind Challenge Regionals at JMU → Committee Reports and Presentations

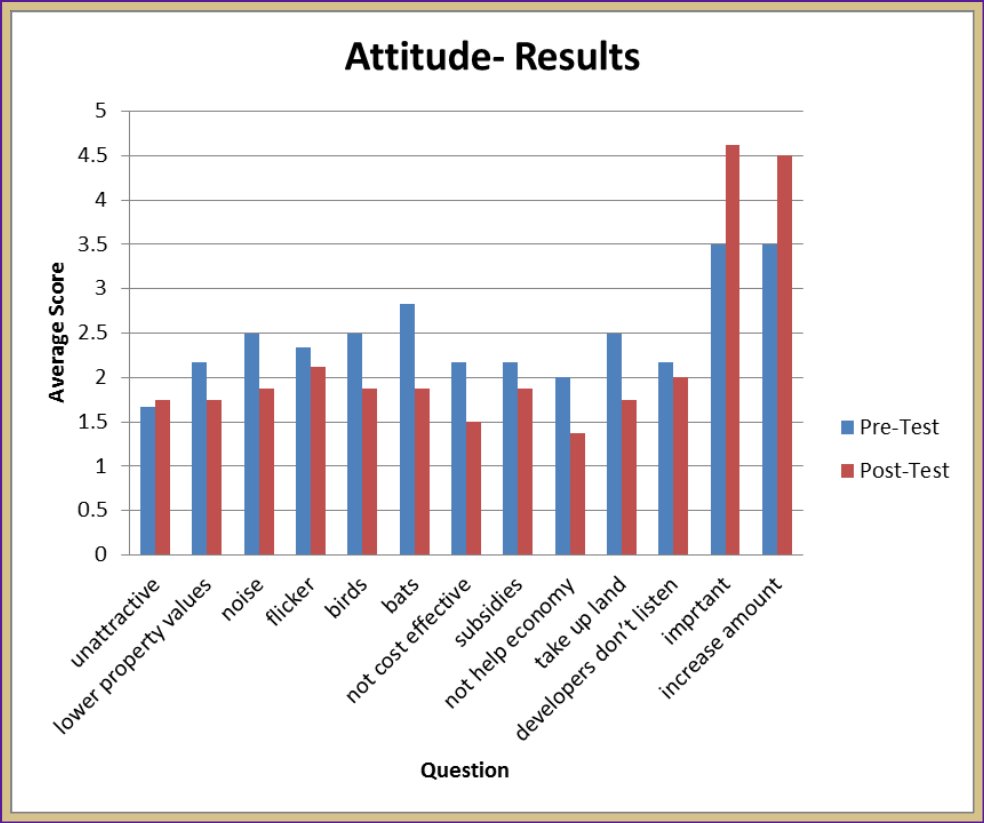
Course Results

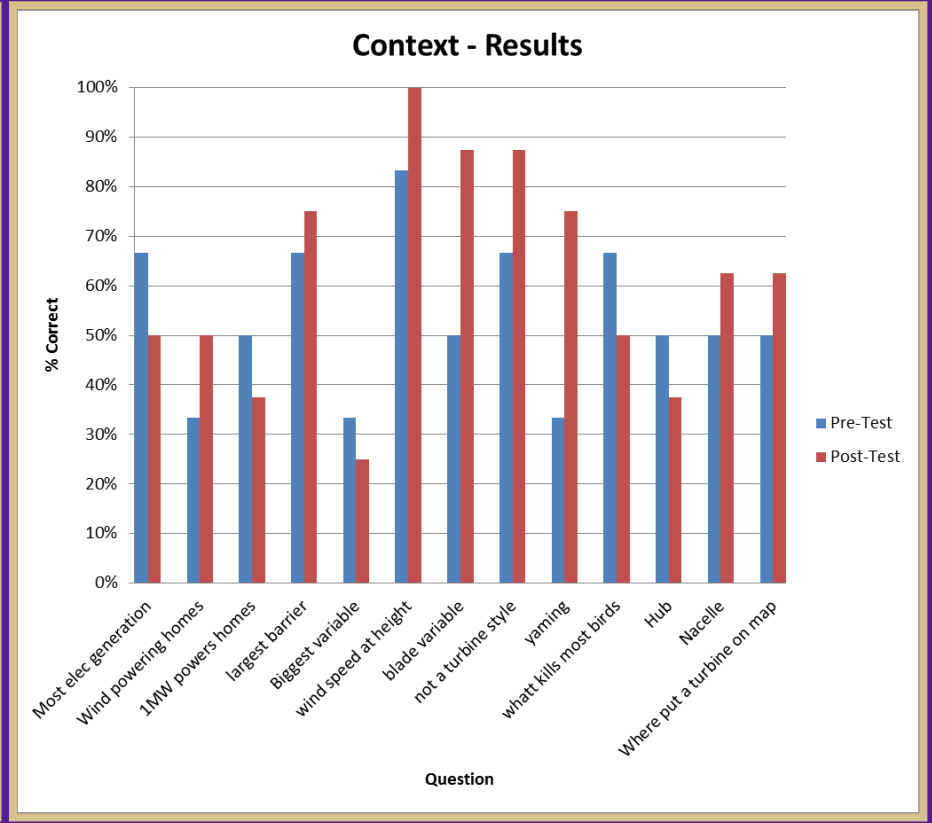
Virtual Tour

KidWind Eastern Regional Finals: April 25th, 2015

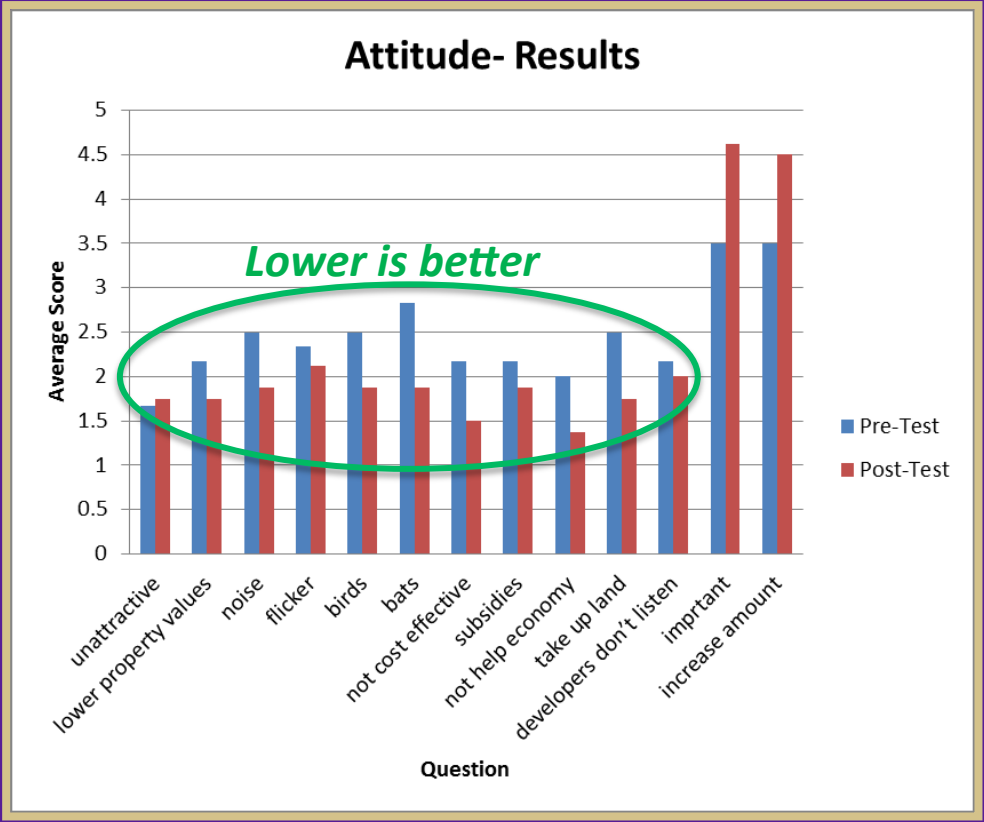

Participant Survey
Committee Reports
Student Pre-Post Test
ASSESSMENTS
Student Course Evaluations
Student Peer Evaluations

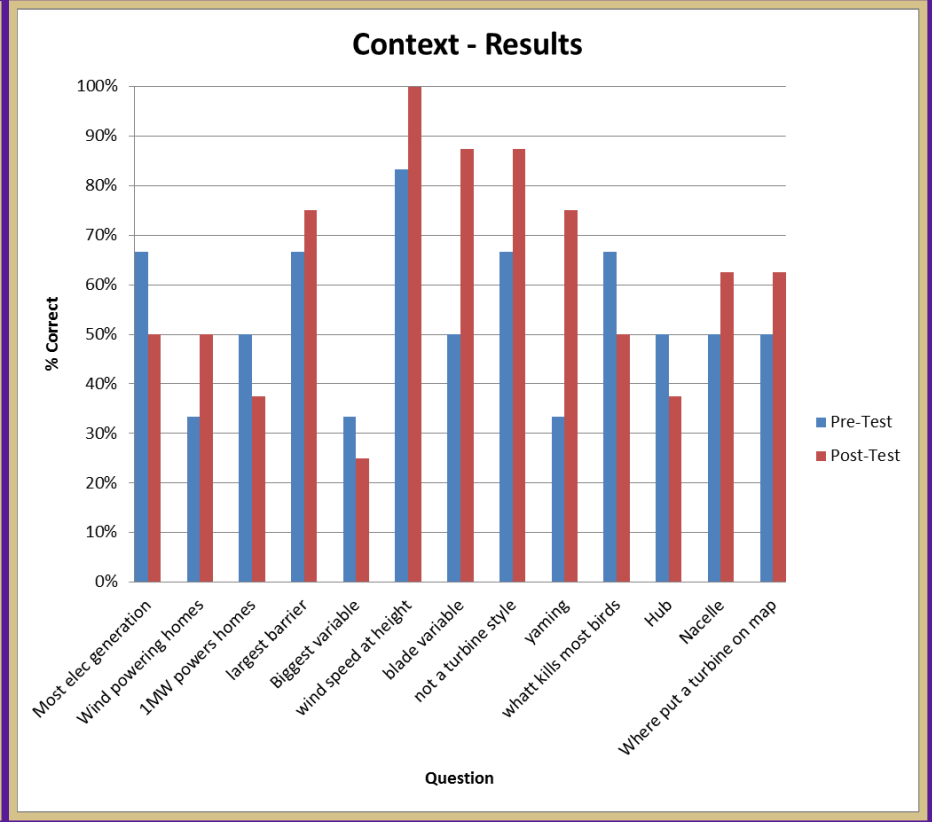
Assessment Results





Assessment Results





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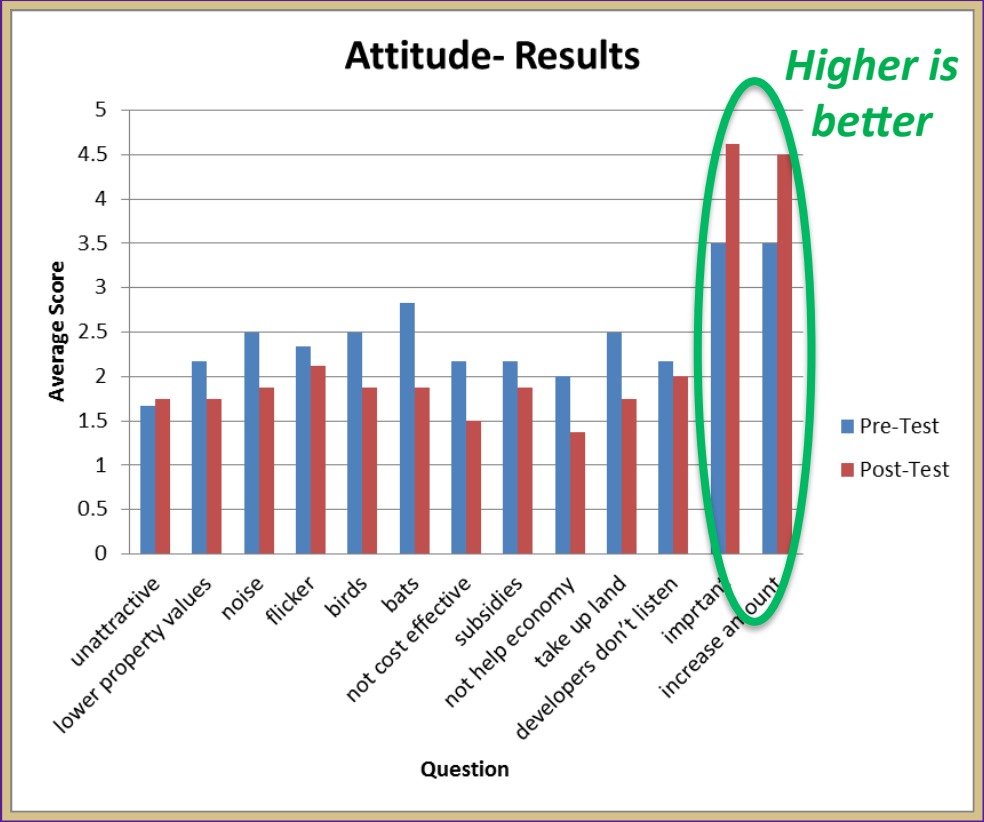

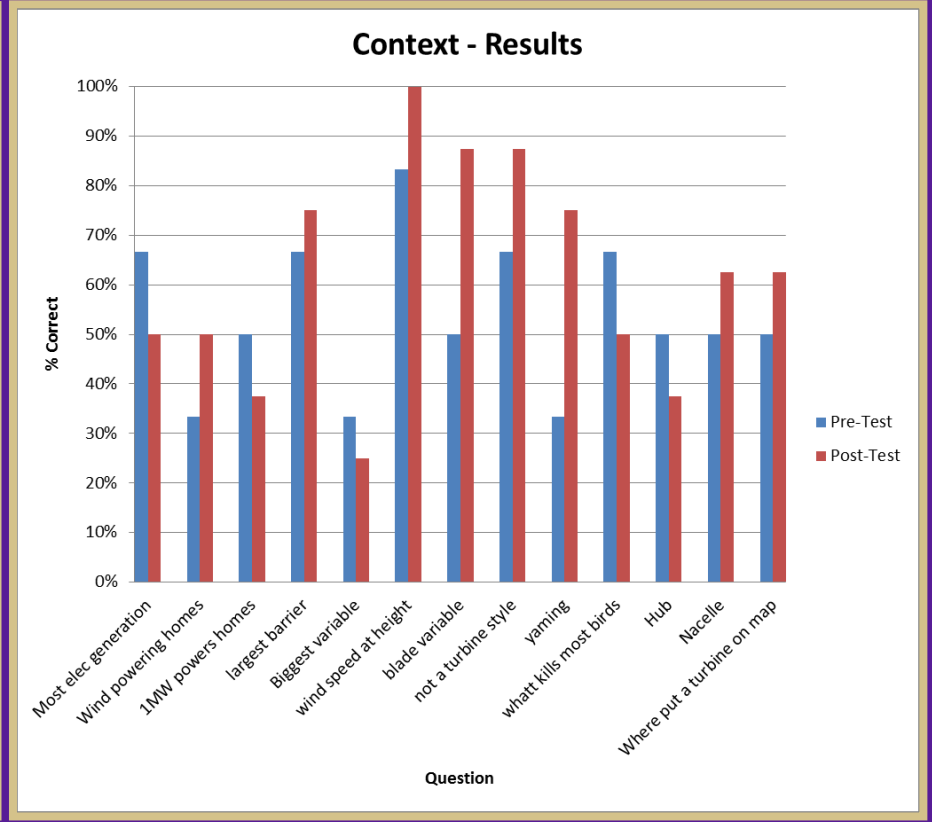

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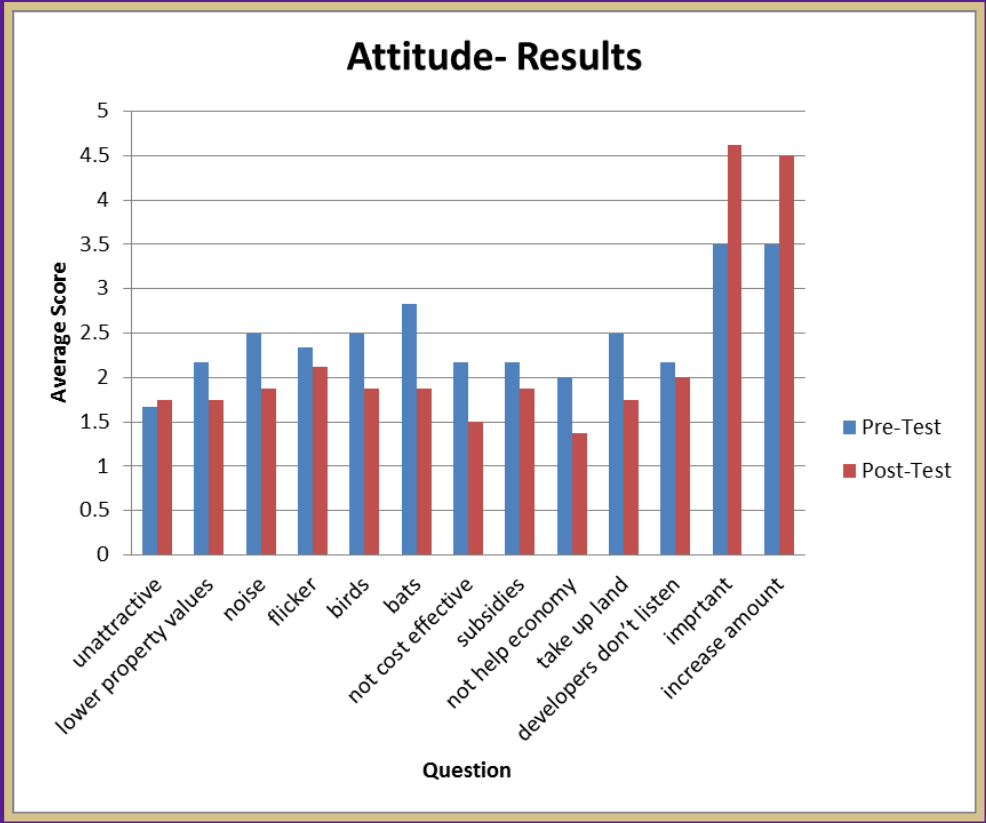
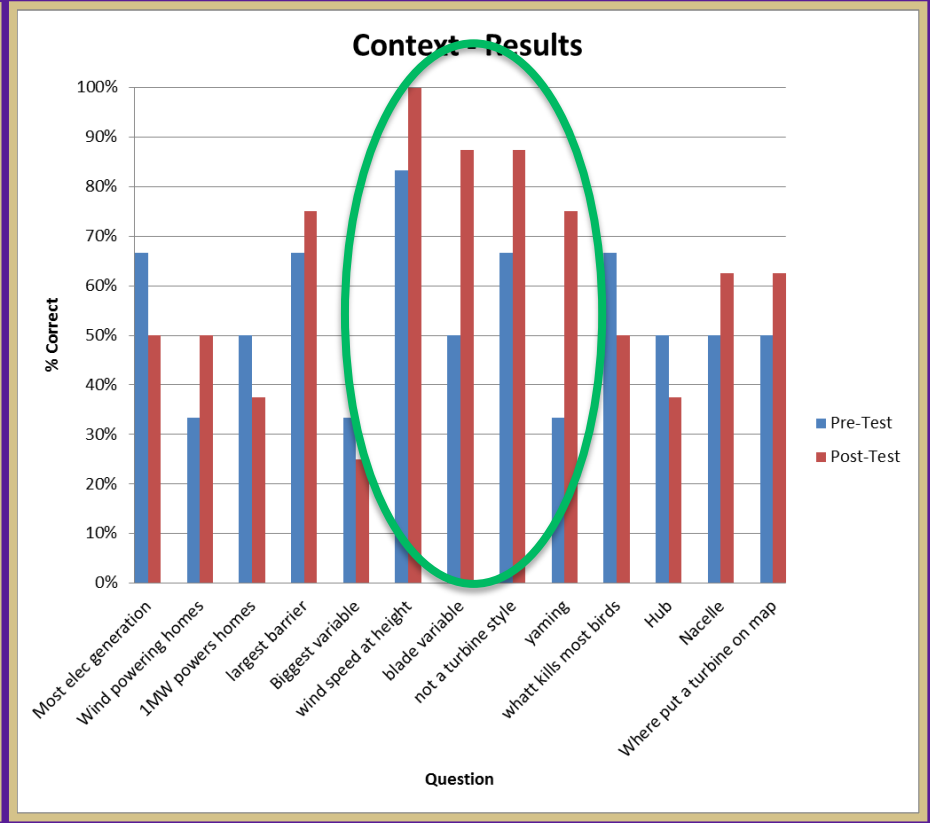


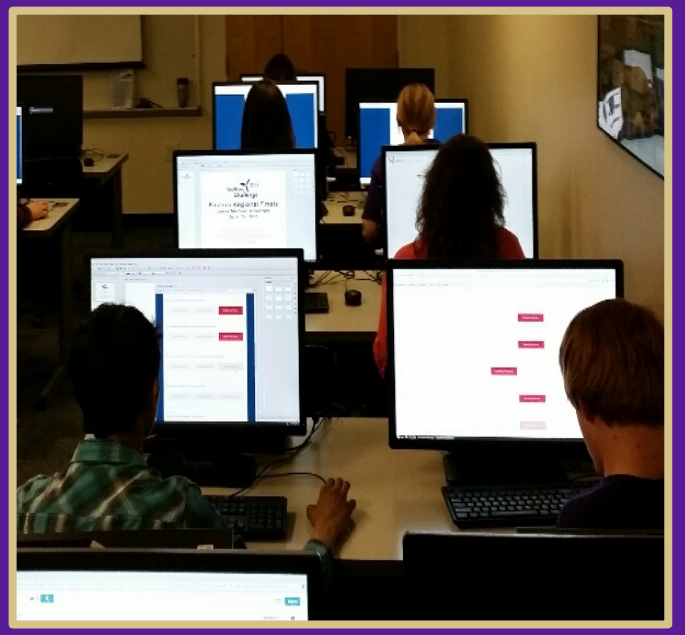


Recommendations

Challenge Participant Surveys:
- *Make sure wind tunnels put out the same wind speed*
- *More and larger variety of STEM activities*
- Longer time for testing and judging – time marshall
- More room for team tables
- Tours for older kids

Committee Recommendations:
- *Start planning earlier*
- *Pre-survey to teachers to understand what they want out of event*
- Parent/Teacher/Coach lounge – with coffee
- Meals for volunteers
- Market activities better
- More tasks for Communications Committee
- Recruit volunteers earlier

Executive Board Recommendations:
- *Use MS Project*
- *More science throughout*
- Structure telecons better
- Include Ed/Psych students



THANK YOU & QUESTIONS?


Power
0.0 mW
Potentia
0.00 V
Current
BURLEY


EXIT


Rooms
129–143 →
← 146–150

STUDENT ORG. PARTICIPATION

ACS
NSBE
SANCAS