Science Made Simple

Support for Elementary School Science Teachers

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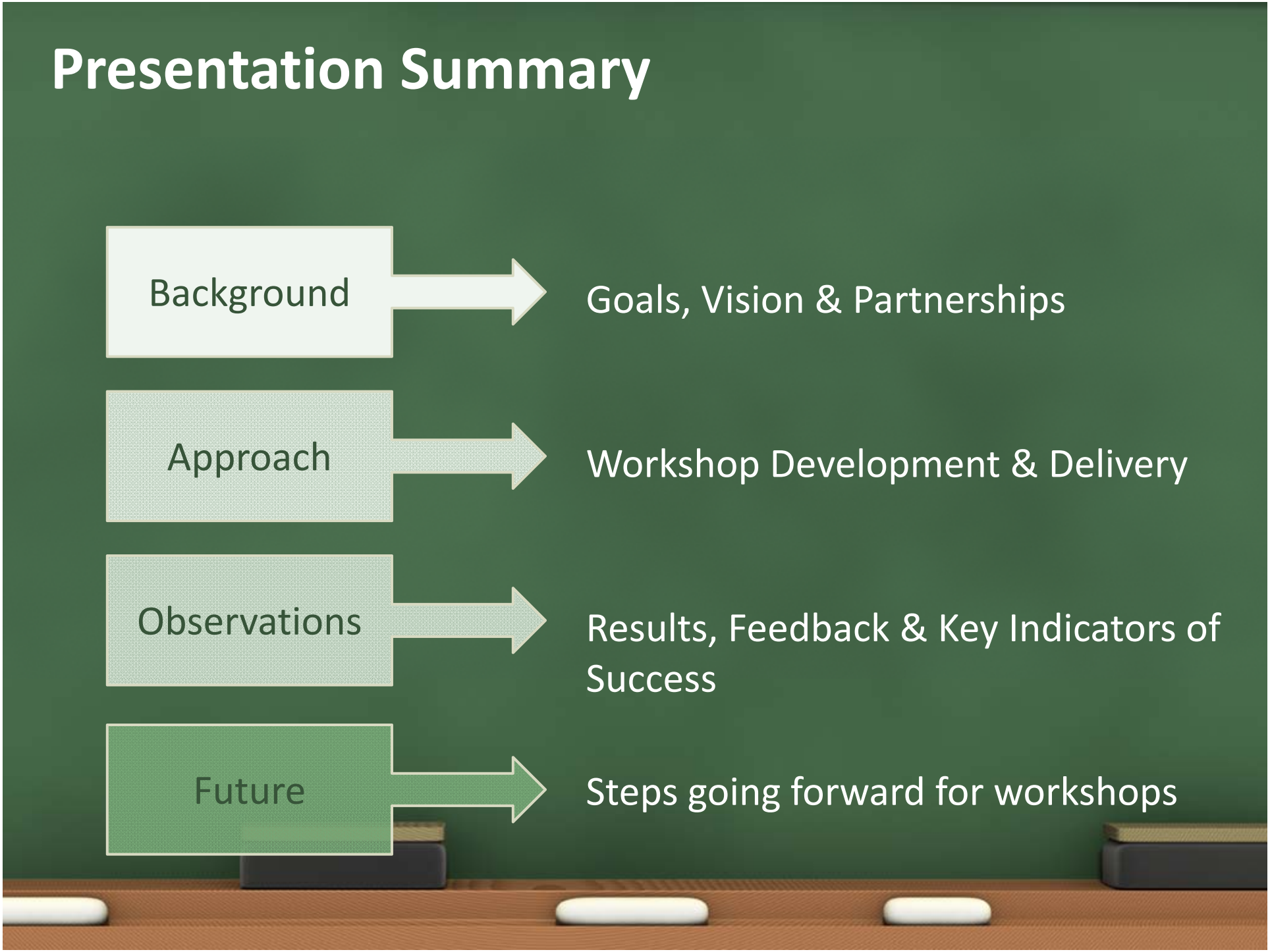
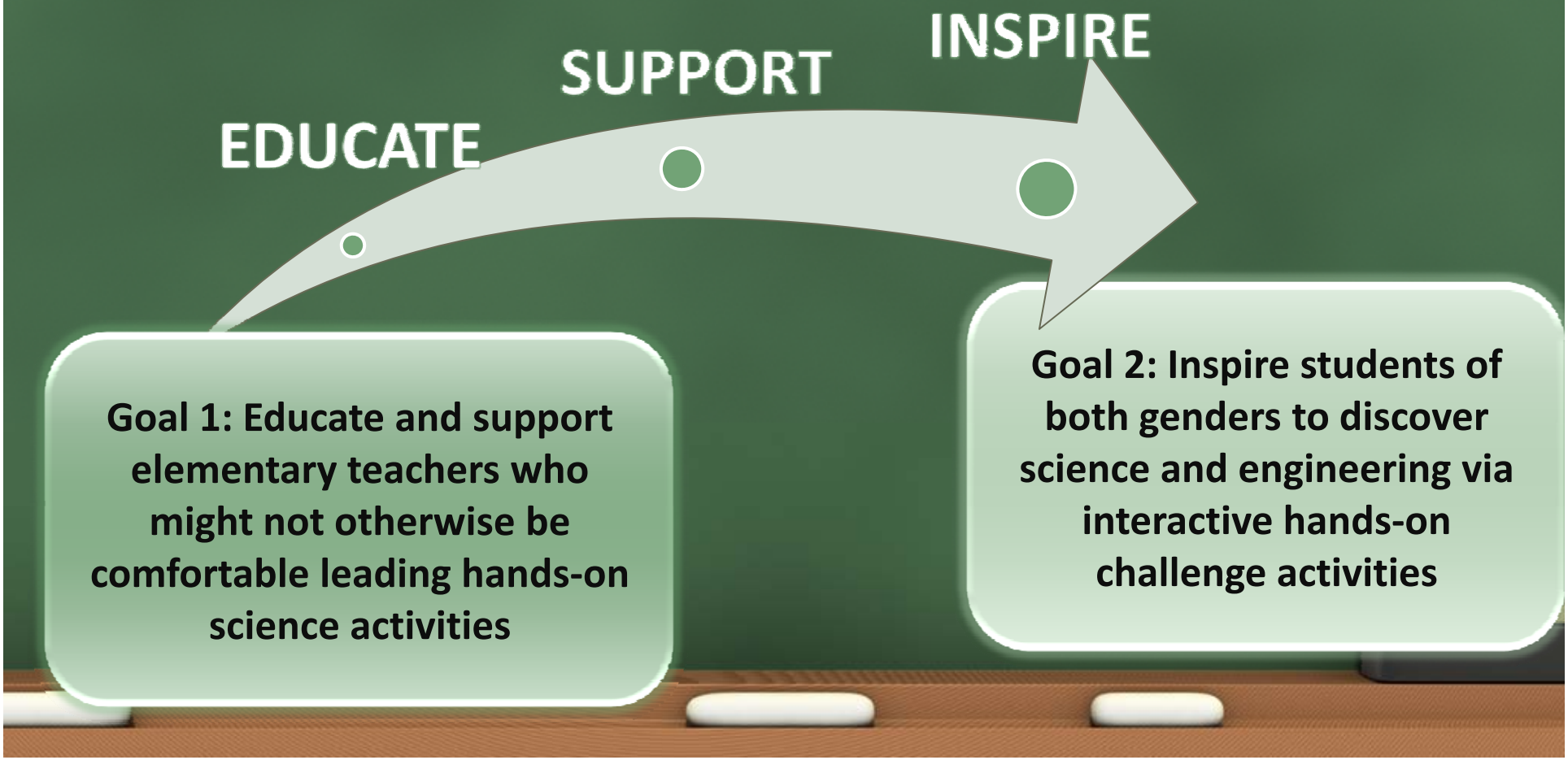
Presentation Summary



Background

- Goals and Challenges for Elementary Science Educators
- Collaborating team: RIM, CWSE-ON, Perimeter Institute, STAO, Scientists in School, Engineering Science Quest



Approach: Workshops for Educators

Helping elementary school teachers with hands-on science

DEVELOPMENT PHASE

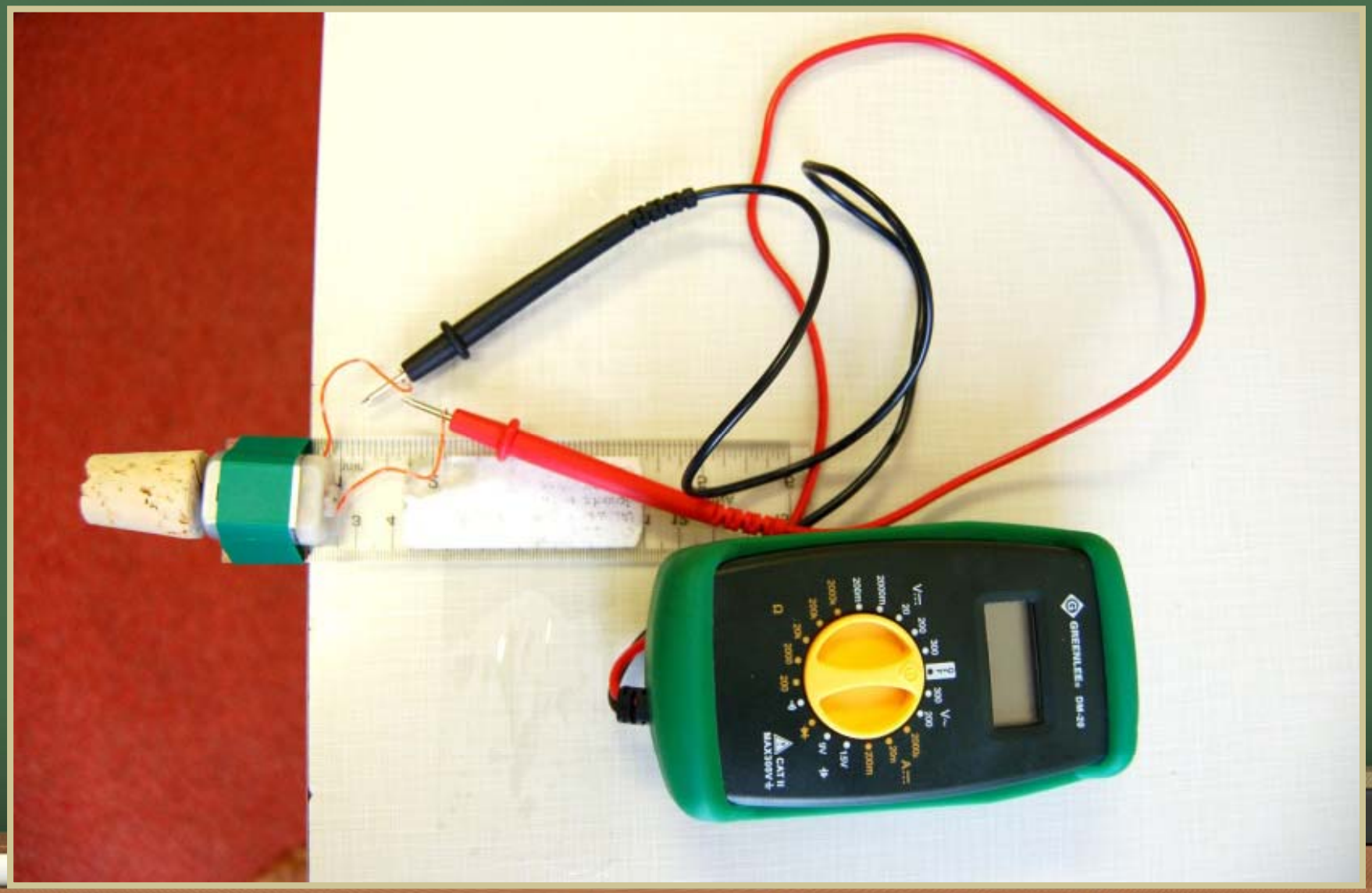
- Planning meetings
  - RIM organizers, science consultant, science teacher
  - Advice on effectively transferring learning to the classroom setting
  - Tips on how to connect with teachers and provide the most useful resources
- Dry run
  - Feedback on the actual activity

DELIVERY PHASE

- Full day of workshops for science teachers at the junior level (grades 4-6), 41 teachers attended
- Teachers rotated through hands-on workshops on the following topics:
  - VandeGraaff generator: electricity
  - Hot Air: forces, motion, light
  - Roof Design: water conservation
  - Wind Energy: energy transformations and conservation, electricity

The Project: Wind Turbine Blade Design

Design and test a working wind turbine



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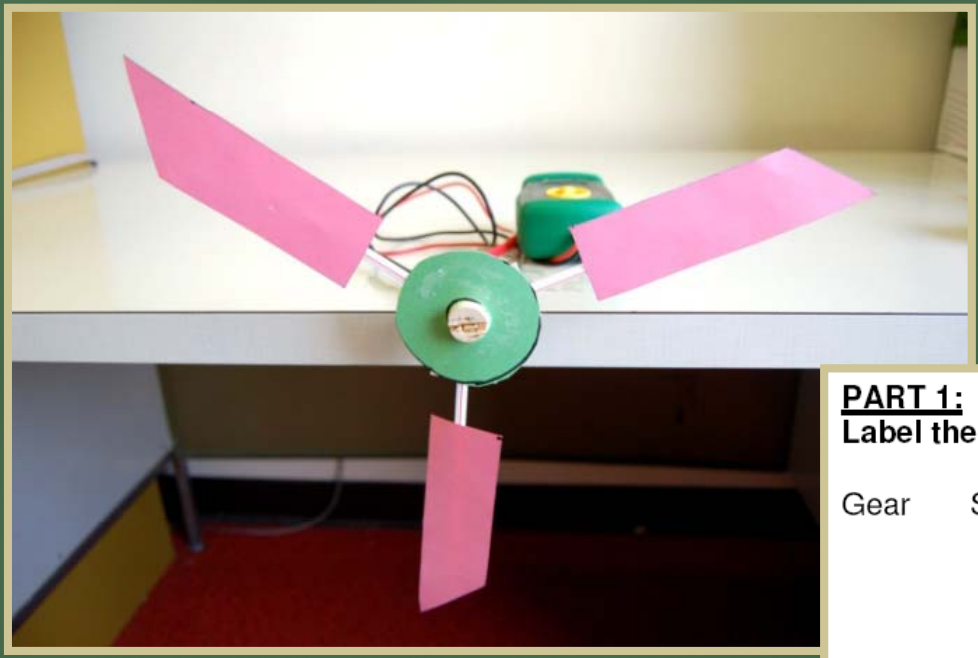
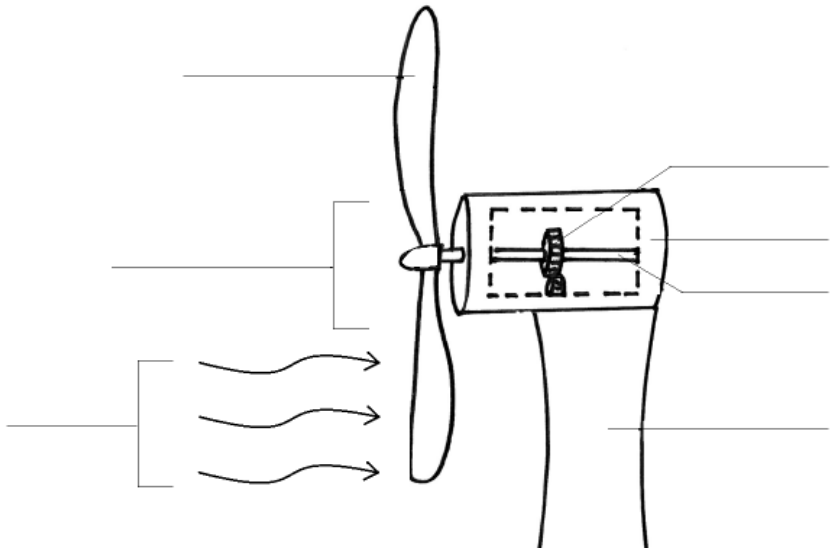


PART 1:

Label the wind turbine using these words:

Gear Shaft Rotor Tower Blade Wind Generator

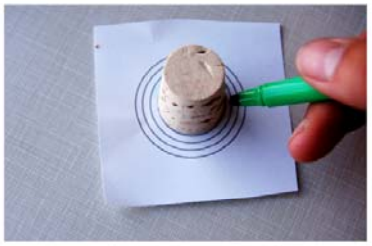


Teacher's Package

APPENDIX A: Centering Circle Template

It is important to make the hole for the generator shaft exactly in the center of the cork. Use this template to help make the hole.

1. Place the wider end of a tapered cork against the centering circle template.
2. Find the circle that is the closest to the diameter of the cork on the template.
3. Trace that circle.
4. Cut out the circle and glue it to the wide end of a tapered cork
5. Insert a pin or skewer through the center of the X in the centering circle to make a hole for the generator shaft



Centering Circle:

APPENDIX D

RESULTS AND DISCUSSION

	Design 1	Design 2
Sketch of the Blade Shape		
Observations		
Highest Observed Voltage		
Problems		
Solution		

Observations

Feedback, Response, Impact

- During the Event:
  - Teachers readily engaged, took time to analyze and ask questions about adaptations, equipment, challenge
  - Enthusiastic response to the complete package that had been provided and the tie-ins to the curriculum that were included
- RIM End-of-day Feedback Form
- CWSE-ON Follow-up Survey, 5 months after event

Observations: Evaluation Data

Educator Responses to Science Made Simple Workshops

Method:

- Pre- and post-workshop surveys (conducted on the day of the event)

RIM Evaluation Survey Question	Result
Attendees who planned to use the resources in classroom and share resources with fellow teachers	100%
Attendees who would recommend the workshop to other teachers	100%
Level of Confidence Teaching Science* 1- not confident 5- moderately confident 10- extremely confident * Teachers' self-assessment (pre- and post-workshop)	Average increase in confidence rating was greater than one full point value Post-workshop: • 0 teachers < 5 (5 teachers in pre-workshop survey) • 25 teachers ≥ 8

Observations: Follow-up and Survey Results

Educator Responses to Science Made Simple Workshops

Method:

- CWSE-ON Survey conducted online, 5 months later (specific to wind turbine activity)

Follow-up Survey Question	Result
"Have you had a chance to implement the wind workshop in your classroom?"	50% of respondents had already had a chance to use the wind activity with their classes
"Did you find this activity effective in engaging students in engineering and design?"	83% of those who had run the activity answered "YES, VERY EFFECTIVE"
"Did you see a difference in participation of girls and boys in this activity?"	83% of those who had run the activity answered "NO"

ENGAGING STUDENTS

- "Thanks for inspiring me to go back to my students and bring the 'wow' back to science and tech." – Teacher at SMS Day, Evaluation Form
- "Kids were able to use wind to generate electricity and use electricity to generate wind. They found it fascinating and were very engaged." – Gr. 5 Teacher, Online Survey
- "I used the activity as an introduction to scientific investigation […] and as a design task incorporating critical thinking. It was very engaging for the students and they were impressed with their successes." – Gr. 6 Teacher, Online

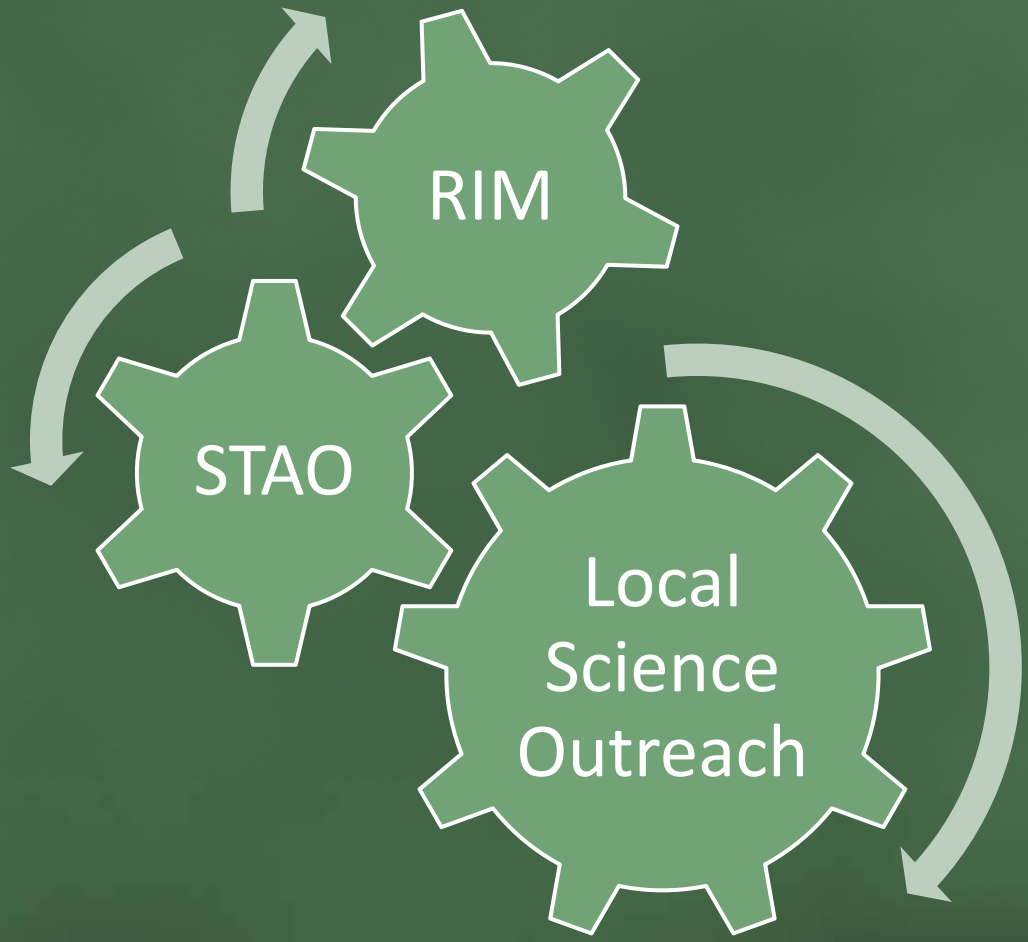
DESIGN PROCESS / PROBLEM-SOLVING

- "The students loved trying to get the best voltage possible and would re-design and re-test over and over." – Gr.7 Teacher, Online

SUPPORT

- "Thank you for visiting my school and going over the project. The workshop was great, but without follow-up I might have shelved it with other activities. This helped me feel comfortable and prepared to lead it on my own." – Gr. 6 Teacher, in person during meeting
- Thank you […] for providing an activity that will directly impact students. The provided resources make it easy to use immediately with students (i.e. saving us precious time). – Teacher at SMS Day, Evaluation Form

Future Steps

Plans going forward for Science Made Simple

- RIM's plan is to extend the project from Waterloo to other key areas where RIM has educational partners, including Mississauga, Ottawa and Halifax.
- Engaging local science outreach groups and partners