



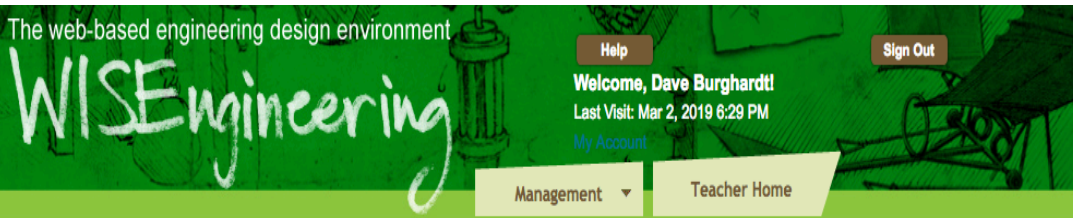
# Wise Guys & Gals

## A STEM Program for Boys & Girls Clubs

**Dr. Dave Burghardt**

Founder and Co-director Center for STEM  
Research, Hofstra University

# WISEngineering Online Learning Environment



### Quick Links

- Quickstart Guide
- Browse Activiti
- Grade & Manage Classroom Runs

### Messages

Good evening!

Your project run **Secret Agent (1248)** has been open since Oct 22, 2018. Do you want to archive it now? [Yes / Remind me later]

Your project run **Designing Like a Spider (1227)** has been open since Oct 3, 2018. Do you want to archive it now? [Yes / Remind me later]

Your project run **soft serve (1204)** has been open since Sep 14,

### Recent Activity

TEACHER HOME

Active Runs	Students	Grading & Tools				
<b>Secret Agent</b> Student Access Code: <b>chat376</b> Run ID: 1248 Run Created: Oct 22, 2018 Project ID: 1477 Copy of Project: 1362 <a href="#">* Edit Run Settings</a>	<table border="1"><thead><tr><th>Period</th><th>Students</th></tr></thead><tbody><tr><td>1</td><td>0 registered</td></tr></tbody></table> <a href="#">Manage Students</a>	Period	Students	1	0 registered	<b>Grade by Step:</b> Latest Work   All Revisions <b>Grade by Team:</b> Latest Work   All Revisions  Project: <a href="#">Preview</a>   <a href="#">Design Journal</a>   <a href="#">Info</a>   <a href="#">Edit Content</a>  <a href="#">Share with Another Teacher</a> <a href="#">Manage Announcements</a> <a href="#">Researcher Tools (Export Student Data)</a> <a href="#">Archive (End Run)</a>
Period	Students					
1	0 registered					
<b>Designing Like a Spider</b> Student Access Code: <b>pizza914</b> Run ID: 1227 Run Created: Oct 3, 2018 Project ID: 1456 Copy of Project: 1424 <a href="#">* Edit Run Settings</a>	<table border="1"><thead><tr><th>Period</th><th>Students</th></tr></thead><tbody><tr><td>1</td><td>4 registered</td></tr></tbody></table> <a href="#">Manage Students</a>	Period	Students	1	4 registered	<b>Grade by Step:</b> Latest Work   All Revisions <b>Grade by Team:</b> Latest Work   All Revisions  Project: <a href="#">Preview</a>   <a href="#">Design Journal</a>   <a href="#">Info</a>   <a href="#">Edit Content</a>  <a href="#">Share with Another Teacher</a> <a href="#">Manage Announcements</a> <a href="#">Researcher Tools (Export Student Data)</a> <a href="#">Archive (End Run)</a>
Period	Students					
1	4 registered					

## WISEngineering:

- Smart device accessible
- Robustly tested and refined
- Can be used in intermittent wifi
- Designed for Boys & Girls Clubs

# What is the WGG Project?

With \$2.7 million from the National Science Foundation, (DRL 1422436) we created the project Wise Guys & Gals—Boys & Girls as WISEngineering STEM Learners. Participants gain engineering design thinking skills while engaged with 20+ activities. WISEngineering is our research based online learning environment that houses the activities. To date, the activities have been used

- with 16 BGCs
- serving over 2500 youth
- in three states

# Digging a Little Deeper

**WISE v4** Full Screen My Work Flagged Journal Design Wall Scratch Wacky Tales Home / Sign Out

**Secret Agent**  
Welcome Test User!

**Introduction**

Cryptography is the practice and study of techniques for secure communication in the presence of third parties called adversaries. The use of secret codes has been a part of human history for quite some time. Modern day applications of cryptography protect electronic commerce, computer passwords and military communication. You will learn how to encrypt and decode a message, so only you and someone whom you give the encryption key to will be able to know what is written.

**Secret Agent**

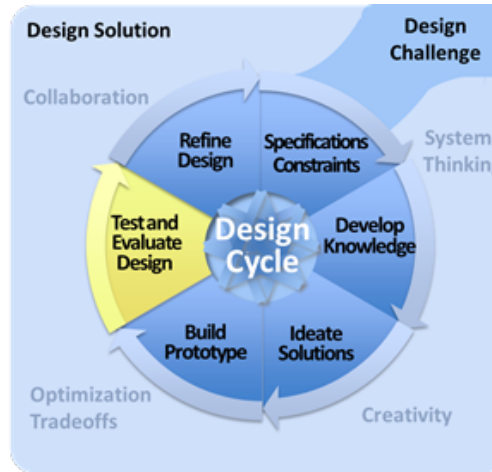
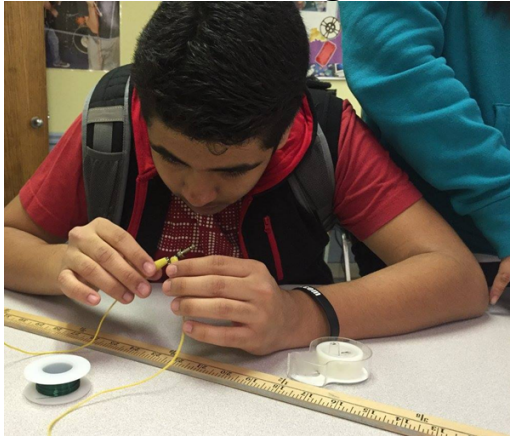
- Step 1.1: Introduction
- Step 1.2: Design Challenge
- Step 1.3: Specifications and Constraints
- Step 1.4: Design Criteria
- Step 1.5: Develop Knowledge
- Step 1.6: Self-quiz!
- Step 1.7: Create Your Own Cypher
- Step 1.8: Testing Encrypted Message
- Step 1.9: Test and Evaluate Your Design Solution
- Step 1.10: Reflection
- Step 1.11: Design Solution

Here's an idea of a beginning challenge

- Notice the buttons along the top.
- All work goes into the Design Journal—pics, responses
- Work can be shared by pushing to Design Wall, so others in your group can view and comment.

# The Engineering Design Process Guides Each Activity

## The Challenge:



Build a speaker with just a few materials

## Test & Evaluate:



## Design Criteria:

Speaker Rating	1	2	3
Sound Quality	<u>Cannot</u> clearly identify musical and non-musical sounds	<u>Can</u> clearly identify musical <u>or</u> non-musical sounds	<u>Can</u> clearly identify musical <u>and</u> non-musical sounds
Sound Volume	<u>Can</u> barely hear sound when placing ear next to speaker	<u>Can</u> hear sound when placing ear next to speaker	<u>Can</u> hear sound without placing ear next to speaker
Speaker Cost	Cost \$7.00 or more	Cost \$5.00–\$6.99	Cost less than \$5.00

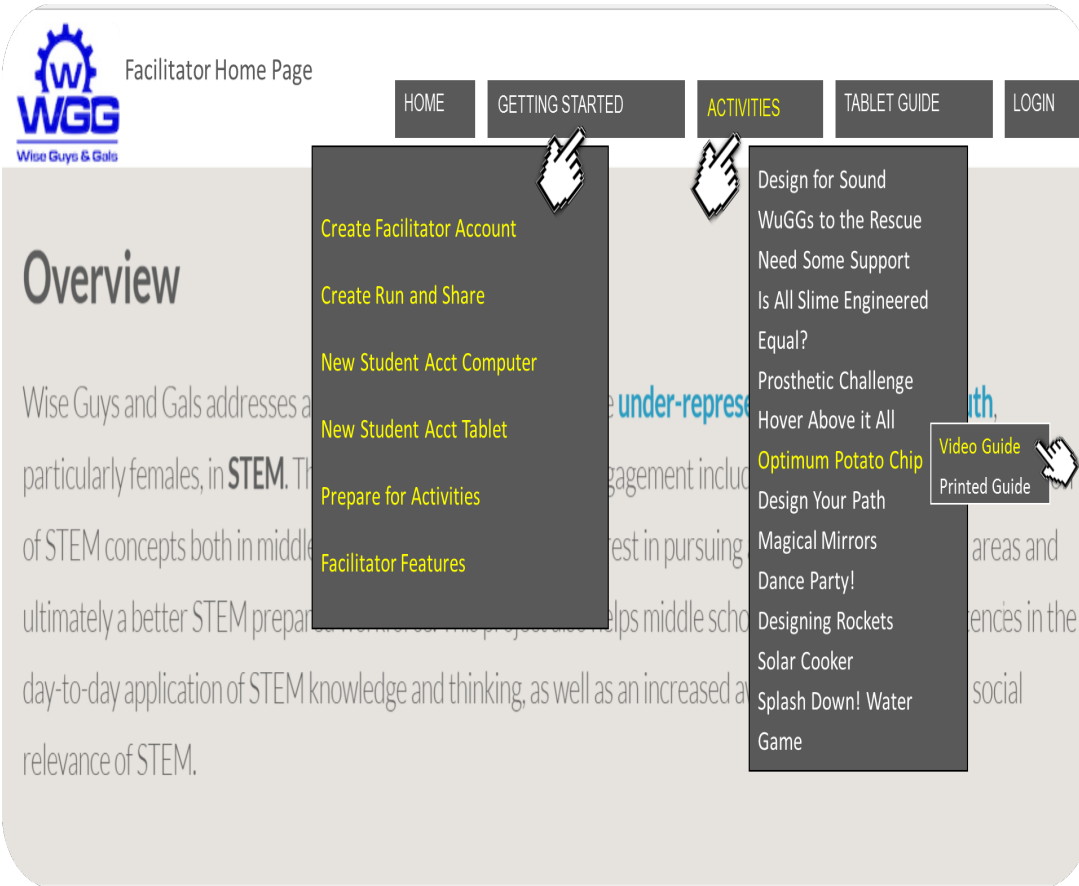
# All the Content Delivered Online through WISEngineering

Sophisticated learning environment engages youth, enhances learning

- Multi-media content enriches experience
  - Social media like features
  - Badging and STEM Certificates
- Facilitator training all delivered online



# Proven Virtual Facilitator Training

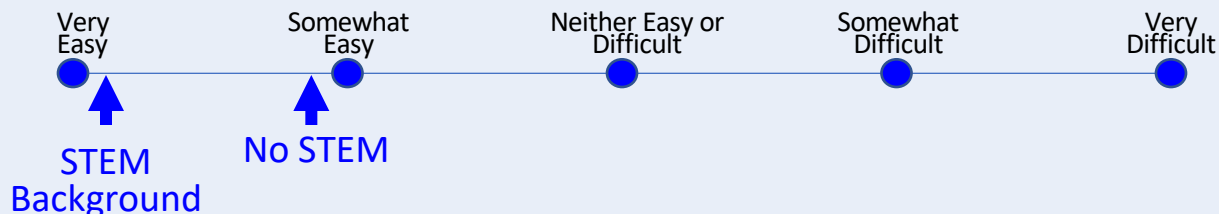


A key feature of WGG is the virtual facilitator training

- No STEM background needed
- Available video and printed pdf text support
- Accessible from smart devices
- Available 24/7
- Tested and refined in multiple settings and with multiple Facilitators

# The Output: Virtual Professional Development which Enabled Implementation

How difficult is it for you, in general, to understand what needs to be done for the WGG activities?



*"I prepared at least 20 minutes prior to each session, organizing materials, **opening video links and any other documents that could develop thought.**"*

Facilitator with STEM

*"It's an engaging program, where members get to apply knowledge while they are having fun. **It's easy to facilitate if you don't have a stem background.**"*

Facilitator with no STEM

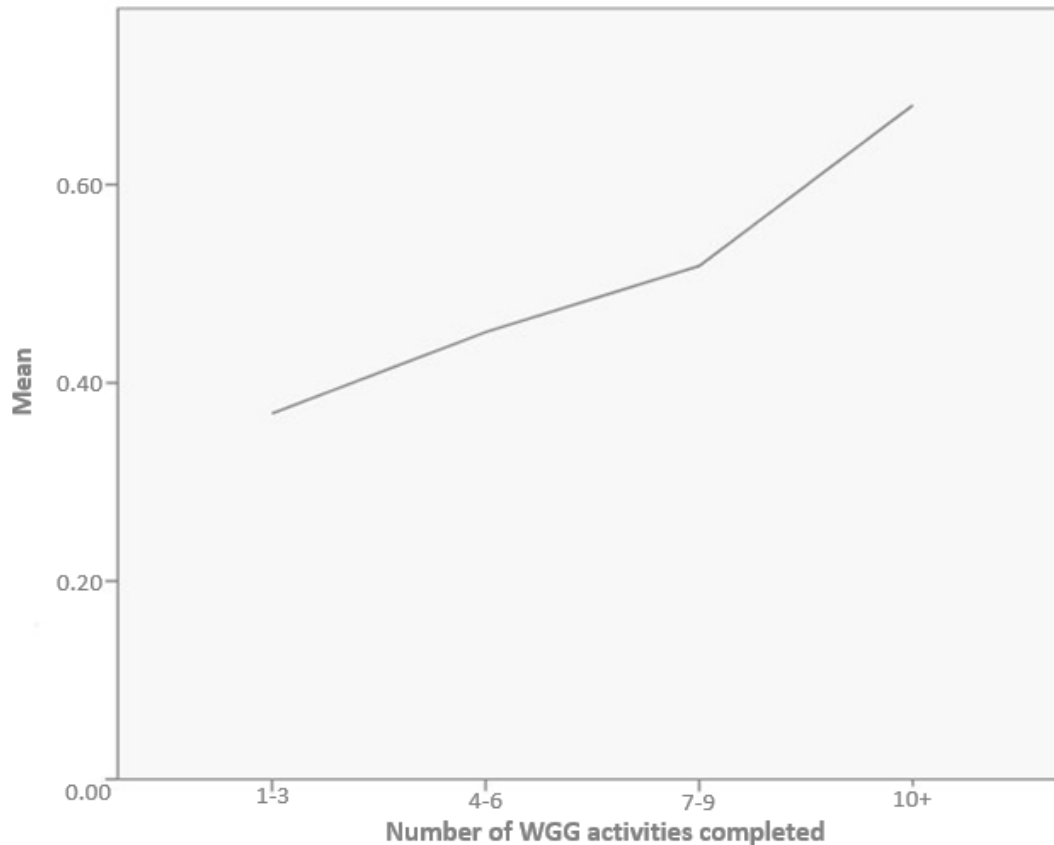
*"Everything you need as a facilitator is spelled out very clearly. **It's nice that time is spent with kids rather than preparing.**"*

B&GC Board Member &  
Volunteer



# And Youth are Learning

Overall Engineering Design



- Research based findings show that participants gain engineering design thinking skills as they complete activities
- Further, they are able to apply STEM knowledge to refine and revise their designs

# What About STEM Careers?

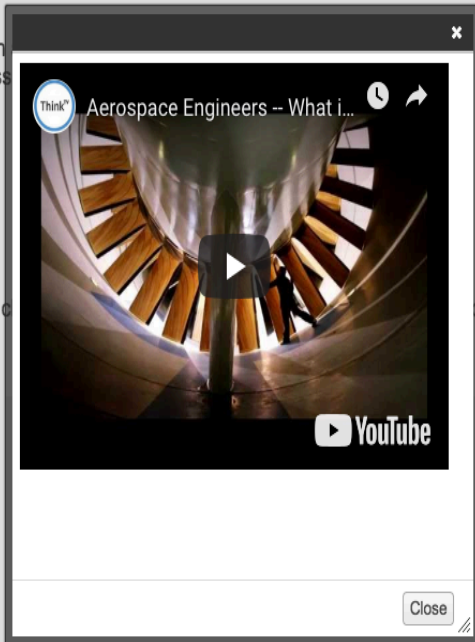
## Designing Rockets

Have you ever wondered how to make something fly? Today you are going to design rockets that fly! [Aerospace Engineers](#) can make a difference by designing aircraft or spacecraft.

Your challenge is to work with a rocket that flies as high as possible.

- 1 film canister
- Alka Seltzer tablets
- Water
- Tape
- Rocket template

You will design your rocket by using the alka seltzer to make it fly the highest.



- All activities have links to STEM career videos.
- These videos show different careers ranging from food scientists to aerospace engineers.
- Videos stress engineers doing engaging and important work

# A 10,000 Foot Overview:

**5**

Years of research & development

**4+/5**

Facilitator rating of WGG activity “Engagement”

**15**

Hands-on STEM activities with tech platform & training

**2500**

B&GC Youth participated in WGG

**10,000+**

STEM experiences delivered