



# Southern Guilford Storm Energy Wise Team

## It's All About Teaching

Mark Case, Sr. Advisor



**Robotics  
Sub Team**



**Recycle Sub Team**



**Education Outreach Sub Team**

This year, Southern Guilford Storm Energy Wise Team formed three sub teams which focused on specific tasks: Robotics, Recycling and Education Outreach. We also had four students that did independent study projects that furthered our outreach.

## **Goal # 1 - Healthy Living Reduces Energy (Outreach Sub Team)**

### **School: Southern Guilford High (Form 1 of 7) Activity #1**

#### **ENERGY CONTENT ACTIVITIES**

Students on this team recognized that the flu could spread quickly and easily. Each student and teacher out for the flu put all learning behind schedule. Extra learning labs after school and on Saturdays. Extra copies. Extra work all costs money. By conducting 'clean sweeps' during energy audits, we can cut down on spreading germs.

#### **STUDENT LEADERSHIP**

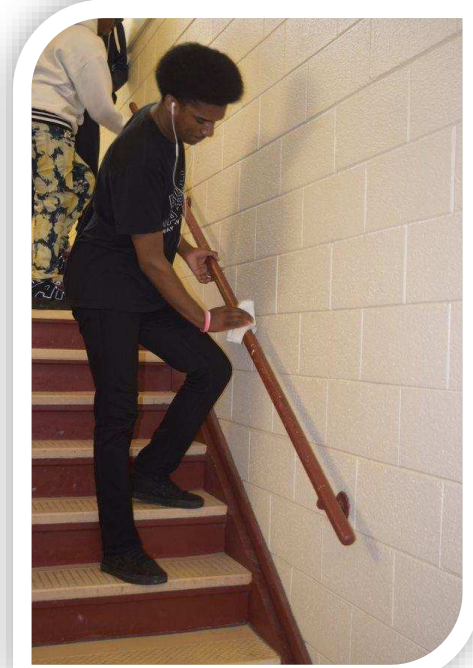
Students planned clean sweep patrols three times a week during different senior classes. Students go supplies donated for this ongoing project.

#### **RESOURCES**

Materials for cleaning surfaces. Attendance data from office

#### **EVALUATION**

All 1260 people in school benefitted from the clean sweeps. The amount of flu spreading IN school reduced drastically.



## Goal # 2 - Sponsor Energy Audits (Education Outreach Sub Team)

### **School: Southern Guilford High (Form 2 of 7) Activity #2**

#### ENERGY CONTENT ACTIVITIES

The education outreach team used the energy audit kits and taught students at local elementary schools how to use them and collect data. Kill-A-Watt meters were loaned to students and parents for two days at a time. As each meter was returned, the data was transferred to a master file.

#### STUDENT LEADERSHIP

Students from Physical Science classes loaned out the meters and transferred the data to a master file. We then calculated the data using the Plug-Load Worksheet.

#### RESOURCES

NEED Blueprint for Success, NEED Secondary Energy Infobook, worksheets and Kill-A-Watt meters

#### EVALUATION

From the completed forms, we found on average, families have 4.5 TV sets, two gaming systems and eight phone chargers plugged in at any given moment. There is an average of 1.9 microwaves in each home. Students determined the largest use of electricity in homes was television sets, gaming systems and phone chargers. Students calculated approximately \$138,362 a year is being wasted by 'ghost' current by leaving devices plugged in when not in use. This was a strong reflection on energy use. Nearly 1,850 people were reached by this project.



## Goal # 3 - Recycle, Recycle, Recycle (Recycle Team)

**School: Southern Guilford High (Form 3 of 7) Activity #3**

### ENERGY CONTENT ACTIVITIES

The recycle team expanded from just batteries to include electronic waste as well as the regular patrols to collect paper, plastic and metal.

### STUDENT LEADERSHIP

Students created recycle containers for the office, the science and math departments and the technology wings in our school. Once a quarter, the batteries were collected, weighed and brought to Energizer for processing. Aluminum, metal and E-Waste was brought to a recycle center where we were paid. Paper, cardboard and plastic were placed in recycle bins outside the school and collected every Thursday by Waste Management.

Students spread the word through posters, weekly announcement on the PA system and creating slides for the school website.

### RESOURCES

NEED Blueprint for Success, NEED Secondary Energy Infobook, Energizer Community Outreach Specialist, 5 gallon buckets and collection containers from Energizer.

### EVALUATION

Batteries over the past decade have now exceeded 2400 pounds! E-Waste weighed over 2,200 pounds this year. We recycled just over 800 pounds of aluminum and total paper, plastic and cardboard weighed over 16,000 pounds according to Waste Management.

This project impacted 1,154 students, faculty and staff weekly! That's over 21,000 contact hours!





Southern Guilford High School

5700 Drake Road, Greensboro, NC 27406  
336-674-4250



## Goal # 4 - Reach and Teach

### (Education Outreach and Independent Study Sub Team)

**School: Southern Guilford High (Form 4 of 7) Activity #4**

#### ENERGY CONTENT ACTIVITIES

Students on the outreach, art and independent study teams participated at the North Carolina A&T State University Energy Day. They showed the transfer of energy from potential to kinetic by using roller coaster physics. Participating students would mass a hot wheel car, measure the height and calculate the potential energy. Using Vernier Photogates, students would then measure the velocity of the hot wheels and calculate the kinetic energy. When the two energies were subtracted, the loss was attributed to heat.

#### STUDENT LEADERSHIP

The multi team project grew out of a classroom activity. The teams designed the experiment, wrote grants for the hot wheel cars and the Vernier photogates.

#### RESOURCES

NEED Blueprint for Success, NEED Secondary Energy Infobook, Hot Wheel cars and tracks, Vernier PhotoGates, calculators

#### EVALUATION

Over 3500 elementary students attended Energy Day at NC A&T. We were one of 22 exhibits and were busy all day long. Elementary students were asked to fully explain kinetic and potential before and after the demonstration. Nearly 100% of the students 'got it' that it was more than stored and moving. They understood it was a transfer of energy from one to the other and energy was conserved.

We received emails and cards from half a dozen schools asking for our lesson plan and how we got the tools we used. NC A&T has asked for our team to come back next year.

**Goal # 4 - Reach and Teach- Potential to Kinetic**



## Goal # 5 - We Got The LOW Power (Robotics Sub Team)

School: Southern Guilford High (Form 5 of 9) Activity #5

### ENERGY CONTENT ACTIVITIES

Energy education and community outreach

### STUDENT LEADERSHIP

The Energy Wise Team robotics sub group continued to use the low voltage motors and batteries for competition. The engineering involved to compete against teams with regulation motors and power cells is complicated. The team reached out to Bob Gusek to help teach the team how to design and build special gears and parts with the 3D printer to compensate for the low voltage.

### RESOURCES

NEED Blueprint for success, NEED Secondary Energy Infobook, FTC Robotics handbook, PITSCO.COM, 3D printers

### EVALUATION

The StormBots did not fare well during competition in 2019. However, three other robotics teams have adopted the low voltage batteries and motors for their robots. Overall, these low voltage motors outperformed other traditional motors. Stormbots demonstrated these motors at a Lego League competition, two robotics competition and the state playoffs this year. An estimated 2,700 people watched the StormBots in competition.





Southern Guilford High School

Drake Road, Greensboro, NC 27406  
336-674-4250

## Goal # 6 - Peer Teaching Means Peer Learning (Outreach sub team)

**School: Southern Guilford High (Form 6 of 7) Activity #6**

### ENERGY CONTENT ACTIVITIES

Energy education, conservation and community outreach

### STUDENT LEADERSHIP

The Energy Wise Team was invited to two elementary schools to teach about energy sources, conservation and conservation. 12 classrooms (25 students in each) benefitted from high school students teaching other students.

### RESOURCES

Primary Energy Infobook (NEED), Energy kits

### EVALUATION

Fourth grade students scored significantly higher in 2019 on the standardized test questions than students from 2018. The Energy Wise team learned how difficult it was to make lesson plans and implement for high energy elementary students. About 1200 contact hours were reached by this activity





## Goal # 7 - Energy Awareness Campaign?

### (Energy and Art Sub Team)

School: Southern Guilford High (Form 7 of 7) Activity #7

#### ENERGY CONTENT ACTIVITIES

Energy Education

#### STUDENT LEADERSHIP

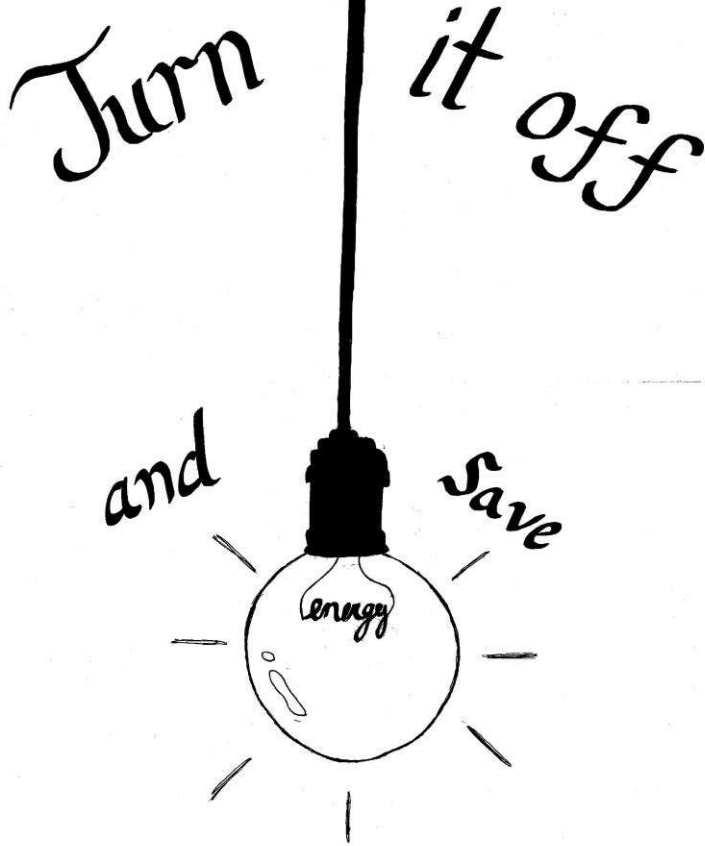
Greensboro Maintenance Department has an annual energy awareness poster contest. The Energy and Art Sub Team took the reigns and went to each science and art class to promote the contest. They secured judges in school and selected the school winning poster. This poster was one of 10 selected by the district to represent energy awareness.

#### RESOURCES

NEED Blueprint for Success, NEED Secondary Energy Infobook, Paper, markers and crayons.

#### EVALUATION

There were 232 entries submitted at the school level which made the selection difficult. Several rounds of voting took place which exposed the student body to energy awareness at least 5 times. With 1054 students, that is over 5000 contacts for energy awareness! (although, we will only count 1000 bodies reached!)





Southern Guilford High School

5700 Drake Road, Greensboro, NC 27406  
336-674-4250



## Reflecting Upon Success

- As the Energy Wise team entered our 10<sup>th</sup> year, we realized that many groups have learned from our example and are doing things on their own. It is hard to record what others do, but gratifying that others are now taking ownership
- By reaching out and getting others involved, over 40,000 contact hours from every club and sub team from our example.

