

White Oak District CAMPOREE 2019

Science, Technology, Engineering and Math (STEM)

April 26, 27, 28, 2019

Camp Bennett

20501 Georgia Ave, Brookeville, MD 20833



***PLEASE READ THIS COMPLETE DOCUMENT
PREPARATION REQUIRED***

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ALL TROOPS WHO ATTEND NEED TO VOLUNTEER TO HELP

Registration

Register online at: <https://www.ncacbsa.org/white-oak/>

Cost is: \$10.00 per attendee till NOON on 4/24/19, then \$15 per attendee

ADMINISTRATION - A

Please communicate this information to each member of your Troop, parents, and drivers.

1. This is a SCOUT Event. Arrow of Light WEBELOS who have not finished their Arrow of Light Requirements ****MAY**** attend with the Troop they will transition into.
2. This event is ****NOT**** for younger Cub Scouts or siblings.
3. Please leave your PETS at home.
4. Water is available on site. Bring your own containers and transportation to get it from the hose to your site
5. All fires must be in containers built above ground so that no scaring of the grass happens. Bring your own wood. Completely cold and wet ashes may be placed at the tree line.
6. Campsites will be allocated based on the size of your unit and the event you support.
7. **PLEASE TELL ALL DRIVERS:**
 - Drive only on the road. Pass at the turnout passing areas. Do not drive off the road.
 - All parking will be perpendicular to the entrance road and not in any site.
 - If it rains and “car tracks” are left anywhere, please take a moment and help stomp them flat before your unit departs the camporee.
8. Porta johns will be available. Only body waste please. All feminine products need to be packed out.
9. All trash must be carried out.
10. Leave the camping area in as good or better condition than you found it.

ADMINISTRATION - B

- A1. Campfire Builders, Extinguishers, & Cleanup
- A2. Campfire Program
 - A2a. Campfire Event Coordinators & emcee
 - A2b. OA Callout
 - A2c. Campfire Skits & Stories
 - A2d. Flag Retirement
- A3. Flag Pole & Flag
- A4. Morning & Evening Colors on Saturday
- A5. **Parking Directors/ Giving Direction to Campsite Locations**

TROOP-in-CHARGE

- Troop 457 (Scott Smith)
- Troop 759 (Jeff Lin)
- OA Chapter (Spencer Lanning)
- Each Troop SPL
- Troop 772 (Michael Snyder)
- Troop 264 (Dennis Bogan)
- Troop 19 (Claudette Lanning)
- Troop needed to help**

INFORMATION

1. Please read each event description carefully – **PREPARATION BEFORE ARRIVAL IS REQUIRED.** NOTE that you are responsible for bringing some material and equipment with you.
2. **Troops running an event **MAY**** modify the event on site as required to make the event function better or become more challenging. Use the basics outlined in this document and your creative imagination to add to the excitement. Bring any additional material that is required if you make changes that will require additional material. Keep the event SAFE!
3. Rotations and competitions will be by PATROL. Teamwork! Some events will have individual projects to develop *****BEFORE***** coming to the event. BE PREPARED.

SCHEDULE OF EVENTS

Friday, April 26, 2019

Sunset: 7:57

NOON Trailers may arrive and be parked in the assigned campsite. Early adults mat set up camps.

3:00 Arrive any time after 3:00pm and set up your campsite

8:30 Scoutmasters & Sr. Patrol Leaders Staff Meeting

10:00 Quiet Time Starts

10:30 Lights OUT

Saturday, April 27, 2019

Sunrise: 6:14; Sunset 7:58

6:30 Reveille

6:30 8:00 Breakfast & Cleanup

7:30 8:00 Best Poached Egg & Toast Competition – delivered to judges promptly at 7:30

8:00 8:15 ALL TROOPS - Colors; Opening Ceremonies

ROTATION EVENT

This will be an OPEN ROTATION event by Patrol.

Each Patrol Leader is responsible for getting his patrol to each event during the day.

Go to an event that has the shortest wait time

Note that some events will start and stop at specific times.

8:20 9:40 Solar Project; Rain Garden

9:40 11:00 Solar Project; Rain Garden

11:00 12:20 Solar Project; Rain Garden

12:20 1:50 LUNCH

1:15 Best Steamed Bread & Hot Dog Competition – delivered to judges promptly at 1:15

1:50 3:10 Solar Project; Rain Garden

3:10 4:30 Solar Project; Rain Garden

4:30 5:50 Solar Project; Rain Garden

5:50 8:00 SUPPER

8:00 Best Dutch Oven Dessert Competition – deliver to judges promptly at 8:00

8:20 9:40 Campfire (Will include OA Call Out)

10:00 Quiet Time Starts

10:30 Lights Out

Sunday, April 28, 2019

Sunrise: 6:13; Sunset 7:58

7:30 Reveille

7:30 11:30 Breakfast; Scouts Own (at Troop Level); Cleanup; Break Camp
Please remember to flatten any car tracks near your campsite

12:00 All Units out of campsite

STEM EVENTS

E1. Catapult/Trebuchet – accuracy; distance

E2. Weight and Moment

E2a. Balance the load – time

E2b. Move the Barge – time

E3. Human Robot Maze – time

E4. Solar Project

E5. Rain Gardens

E6. Towers of Hanoi – time

E7. Egg Survival Drop Challenge

E8. Dirt Battery

E9. Demonstration Telegraph; Morse code

E10. Cooking Contest

E11. Flag Competition (Vexillology)

TROOP-in-CHARGE

Troop 1444 (Steve Bettinger)

Troop 1441 (John Wnek)

Troop 457 (Scott Smith)

Montgomery County Coordinator

Troop 96 (Derek Walker)

Montgomery County Coordinator

Troop 1444

(Eagle Scout Alex Jones)

Troop needed to help

Troop 440 (Patrick Stuart)

Troop 763 (Joe Moeller)

Troop 264 (Dennis Bogan)

Tom Horne

Troop needed to help

Individual Troops

(Appointed Judges)

James Lehman

Troop needed to help

1. CATAPULT ****OR**** TREBUCHET – ACCURACY; DISTANCE

WHAT: BUILD A CATAPULT OR TREBUCHET using only Scout Staves (or similar wood in size and length) and Lashing. Use the below diagram as a guide for building your machine, but use your imagination. Make sure your sling is large enough to hold and launch a soccer ball. **THINK SAFETY!**

GOAL: A soccer ball will be supplied as your payload. Your objective will be:

- A. To see how far you can launch the payload.
- B. In a second shot, how close you can get to a target.

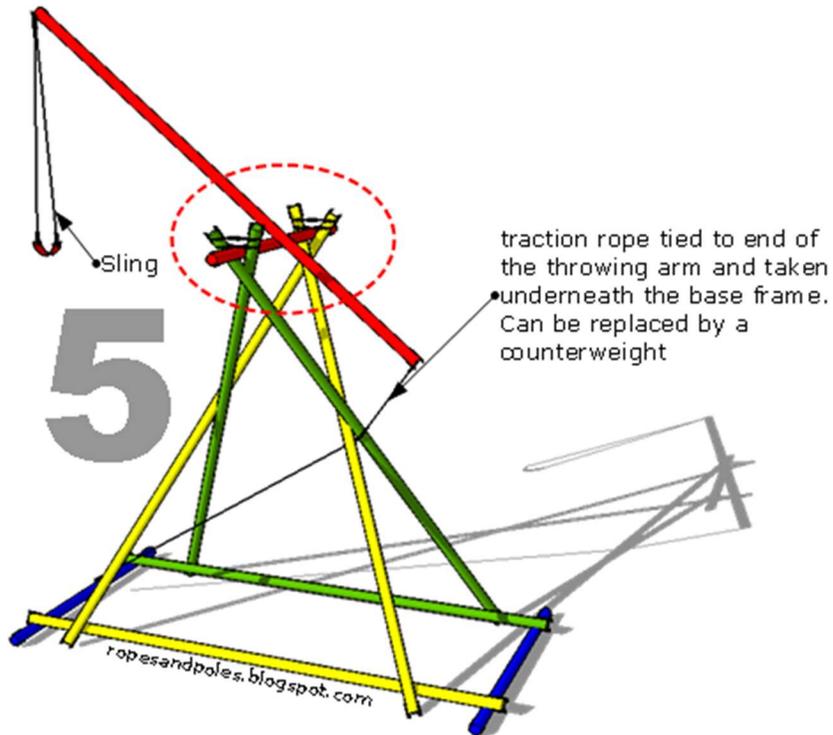
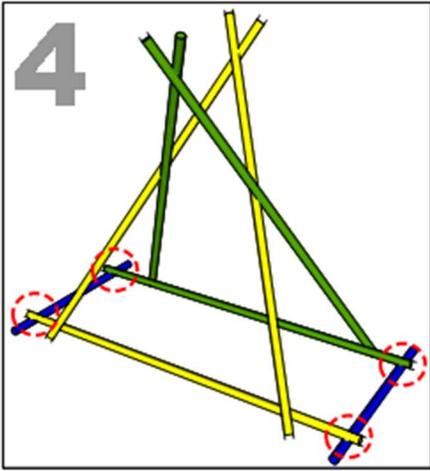
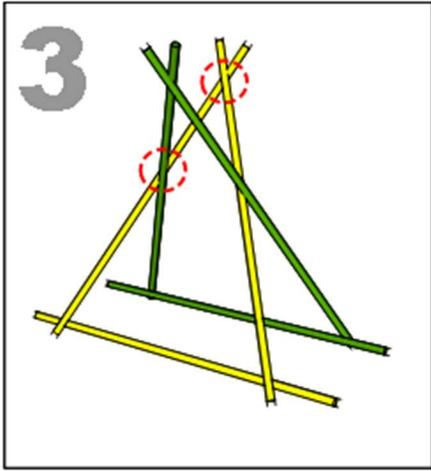
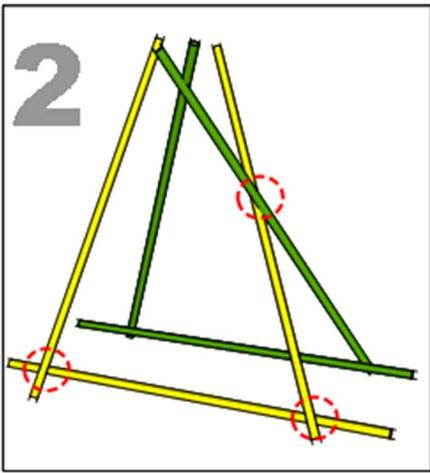
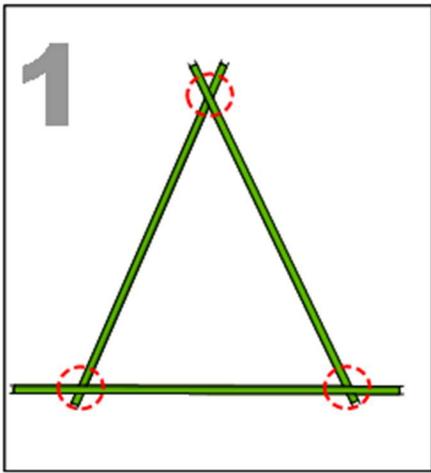
PHYSICS: How A Trebuchet Works

A trebuchet is a battle machine used in the middle ages to throw heavy payloads at enemies. The payload could be thrown a far distance and do considerable damage, either by smashing down walls or striking the enemy while inside their stronghold.

The trebuchet was preferred over a catapult due to its greater range capability and greater accuracy.

A trebuchet works by using the energy of a falling (and hinged) counterweight to launch a projectile (the payload), using mechanical advantage to achieve a high launch speed. For maximum launch speed the counterweight must be much heavier than the payload, since this means that it will "fall" quickly.

The motion of a trebuchet during launch can become fairly complicated, and cannot be fully understood using intuition alone. Therefore, one must analyze trebuchet physics in full in order to make accurate predictions.



2. WEIGHT AND MOMENT

2a. Balance the load

Scouts must place themselves on a balance board so that the weight of the patrol is equally distributed on both sides of the board.

- This is a timed event: 15-minutes maximum time allowed.
- Points are awarded for
 - Teamwork
 - Participation
 - Leadership
 - Success/Time.
 - Patrol Spirit
- Point values to be assigned in accordance with other event point values.

Equipment Needed

- 12" to 15" diameter log 3 -4 feet long
- 12 foot 2 x 12 board, reinforced
- Bathroom scale
- Calculations sheet

Process

- Patrol arrives at site, provides patrol yell.
- Patrol is provided the rules of the challenge.
- Patrol leader is given THE command to start.
- TIMING STARTS
- Patrol leader and patrol figure out how to complete THE challenge.
- All scouts in the patrol must participate.
- Scouts must be placed on both sides of the board in balance.
- WHEN ALL patrol members are ON BOARD, they must hold the balance for 5 seconds.

For all methods

- *Scouts must cooperate by standing still on board*
- *SCOUTS FALLING OFF WILL REQUIRE A FULL RESTART.*

Method one

- Start clock
- PL selects a scout, places scout on board
- PL selects second scout, placing scout on opposite side of the board, moving the scout to a balanced position.
- PL repeats placing scouts until board is balanced.

Method two

- Start clock
- PL arranges scouts by weight, using bathroom scale available.
- PL places scout on board according to weight

Method three

- Divide scouts into two similar groups,
- Place one group on one side of the board
- Carefully have the other group get on the other side of the board until balanced

2b. Move that Barge

Scouts will have to move a pallet containing 6 bags of sand over a 50' distance within a 15 minute time period.

Points are awarded for

- Teamwork
- Participation
- Leadership
- Success/time
- Spirit

Point values to be assigned in accordance with other event point systems at the camporee.

Process

- Patrol arrives at site
- Provides patrol yell
- Patrol is provided the challenge requirements
- Patrol leader is given the command to start.
- Timing starts.
- Patrol leader/patrol figure out how to complete the challenge
- All scouts must participate

Equipment available

- One 4' by 6' wooden pallet One 2' by 4', 8 foot board
- 4 wooden rollers, 4' by 5" 6 - 50 lb bags of sand.
- Lay out a 50 ft course over level ground.

Rules

- Sand bags must remain on pallet throughout the challenge.
- Scouts are expected to use the rollers under the pallet to move it, working as a team.
- The 2x4 is to be used as a level to lift the pallet to slide the rollers under it.

3. Human Robot Maze

Goal

- Guide your “ROBOT” through a maze in the shortest amount of time.

Robot

- Two blindfolded Scouts, the RIGHT leg of each scout connected side-by-side at the ankle and thigh, in a three-legged-race configuration, except they will be facing opposite directions.

Control

- A Scout who will give directions to the Robot using directions and number of steps to take.
- Go straight “X” steps; turn right/left; go Y steps, etc.
- A different Scout in the patrol will give direction for each segment of the course till the Robot reaches the finish line.

Media

- Voice commands.
- (How does one patrol prevent the interference of commands from other patrols running their maze directions).

Maze

- A rope pinned to the ground laid out in a diagram provided at the time of the event.
- Two or more mazes laid out in different configurations will be used by different patrols at the same time.

Rules

- At least one patrol per maze will run the maze course at the same time.
- If time permits, patrols will run each maze course and times averaged to obtain final score.

4. Solar Project

Goal

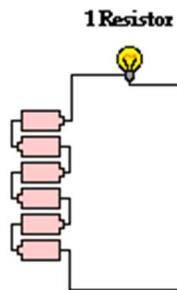
Learn about solar cells and the electrical power they can produce from a Montgomery County Energy expert.

HOST TROOP will need to learn the material in the morning and teach the material in the afternoon.

Project

1. Using provided materials: Propeller, motor, solar cell, construct a solar powered machine.

Consider connecting additional solar cells together (as shown in the battery diagram below) to see how fast you can get the propeller to turn. Add one solar cell at a time.



You may keep the project materials for further experiments at home.

2. Investigate constructing a solar cell from a CD/DVD, copper wire, glue, and 3 zener diodes (homework).

Reference: <https://www.youtube.com/watch?v=lix7TxquHR8>

5. Rain Gardens (RainScapes)

Montgomery County personnel and an Eagle Scout will discuss the process of constructing a rain garden and providing information on how you can make your own.

Reference: <https://www.montgomerycountymd.gov/water/rainscapes/index.html>

HOST TROOP will need to learn the material in the morning and teach the material in the afternoon.

A RainScape is a landscape or design technique that helps reduce stormwater runoff from individual properties. They include:

- Rain Gardens
- Conservation Landscapes
- Green Roofs
- Water Harvesting
- Permeable Pavement
- Pavement Removal

RainScapes can be installed on any kind of property, but those on private residential, institutional, and/ or commercial properties may be eligible for financial assistance: RainScapes Rewards Rebates.

Rain Gardens can be a great Eagle Scout or Troop project for your Chartered Organization or other local facility.



6. Towers of Hanoi - A MATH CHALLENGE.

HOST TROOP must supply material for the game:

- At least 2-sets of at least 3 or more tires of different sizes.
- Three post tall enough for each set of the tires to be placed over'

GAME PLAYERS

Accept the challenge of moving several tires, one at a time, from one post to another post via yet another post.

The Tower of Hanoi (also called the Tower of Brahma or Lucas' Tower and sometimes pluralized) is a mathematical game or puzzle. It typically consists of three rods and a number of disks of different sizes, which can slide onto any rod. The puzzle starts with the disks in a neat stack in ascending order of size on one rod, the smallest at the top, thus making a conical shape.

The objective of the puzzle is to move the entire stack to another rod, obeying the following simple rules:

1. Only one tire can be moved at a time.
2. Each move consists of taking the upper tire from one of the stacks and placing it on top of another stack or on an empty rod.
3. No larger tire may be placed on top of a smaller tire.

With 3 tires, the puzzle can be solved in 7 moves. The minimal number of moves required to solve a Tower of Hanoi puzzle is $n-1$, where n is the number of disks.



How Does Tower of Hanoi Algorithm Work?

The Tower of Hanoi Formula and the Steps For Moving N Disks from Source Tower to Destination Tower:

- Move $N-1$ Disks from Source Tower To Temporary Tower
- Move N th Disk from Source Tower To Destination Tower
- Move $N-1$ Disks from Temporary Tower To Destination Tower (using Source Tower as Temporary Tower)
- For a total of n disks, $2n - 1$ moves or disk shift are required.

7. Egg Survival Drop Challenge

A. **Bring all of your own materials:**

- 2 raw eggs per patrol
- You can bring two shipping containers or drop the same device twice with different eggs.
- Using the same device is probably not a good idea as the device will most likely be damaged during the deceleration.
- If time permits the patrols will be allowed to make addition drops. So consider bringing additional eggs.
- Use your imagination; you might consider including:
 - Masking tape
 - Foam
 - Cardboard

B. Construct a “Shipping Container”

- Create the smallest, lightest “Shipping” container that will allow your egg when dropped ~20 feet to survive.
- The shipping container must be able to be opened easily to determine your egg survived.
- The shipping container containing your egg will be dropped onto a 8’ x 8’ plywood surface covered in plastic
- Maximum Size: 1 ft. x 1-ft. x 1-ft.
- The Judge will release your shipping container with the bottom of the container at the drop height.
- The entire shipping container must be dropped from the drop height. Your egg cannot be lowered on a string, bungee cord or tether.
- Not allowed: motorized parts, powdered soap, flammable substances, glass, or any substance that may cause harm to a person or property.
- No recovery systems allowed. (Streamers, parachutes, balloons, etc)
- Shipping containers will be weighed before and after the egg is inserted, but before the competition.
- A sandwich bag will be provided to wrap the egg in prior to placing it into the “Shipping Container”

C. Scoring

- Scoring is based on egg survival, and container weight, in that order.
- The container with the minimum mass and which survives the fall without breaking or cracking the egg, is declared the winner.
- Egg Survived: 75 for broken egg, 0 for survival
- Mass of “Shipping Container” less the egg in Ounces times 10
- Lowest score will be the winner
- In the event of a tie, the physically smaller device will win.
- The longest dimension of the shipping container, before the drop, will be used to determine the size; that could be the width or the height.

8. Dirt Battery

Create a “dirt” battery from materials provided

- 1 Old style ice cube tray
- X galvanized nails (one for each cube in the ice tray plus one)
- X pieces of 4-inch long copper wire (one for each cube in the ice tray plus one)
- Moist dirt (use water or you may also try adding vinegar rather than water to see if your results are different).
- LED Pin Light bulb

Process

- Fill the tray with moist dirt
- Wrap one end of the copper wire tightly around the galvanized nail.
- Place the Nail/wire assembly in one cube
- Put the free end of the copper wire into the next cube.
- Continue around the tray (down one side and back up the other) in this fashion).
- In the cube where you started stick a piece of copper wire next to the nail.
- In the cube where you finish add a single nail next to the copper wire.
- Using LED bulbs provided, place their wires into the dirt between two cubes.
- Measure the voltage created between the single nail in the last cube and the copper wire in the first cube.
- See if more or less voltage is generated by adding water and then vinegar.
- See how much voltage can be created by hooking additional trays together made by other patrol members.

Score

- Check the highest voltage achieved
 - By an individual
 - An average voltage for a patrol



9. Demonstration Telegraph; Morse Code

Goal: Understand the principals of one of the first “rapid” communication systems

Concept: A telegraph system, using original working land line telegraph apparatus including the Battery, Jack Boxes, Keys, Lightning Arresters, Register, Relays, and Sounders will be established at the campsite, and several telegraph offices will be connected. A single wire telegraph line using the original ground return technique for the other side of the circuit will be used.

Scouts will learn about the equipment and concepts used in this process and be able to send their own names from one “office” to another.

Code choices will include: Morse Code or International Radio Telegraph Code.

10. Flag Competition (Vexillology)

Score sheet for _____ Patrol. Troop _____

A. Demonstrate that your scout patrol knows how to properly fold the U.S. flag.

Procedure:

- PL may speak and discuss the procedure with the Patrol before they start.
- When the Patrol is “ready”, the PL will tell the Judge “READY”.
- Time will start when the Judge says “GO” and stop when the PL says “DONE”.
- Two unfolded flags will be available. CHOOSE ONE FLAG
 - FOLD the BIG FLAG (12 x24) 20 points
 - FOLD the SMALL FLAG (4x6) 10 points
- From “GO”, Do the folding silently, correctly, and within 5 Minutes. PL Only speaks at end.
 - If talk occurs Minus 2 points _____
 - If touches ground Minus 2 points _____
 - If any RED shows when PL says “DONE” Minus 2 points _____
 - If not a “right” triangle Minus 2 points _____
 - If not within 5 minutes NO POINTS _____
- **SCORE:** _____

B. Demonstrate that your Scout patrol knows information about the U.S. flag. (FLAG TRIVIA QUIZ -“vexillology”)

Procedure:

- Patrol may discuss the question to determine the final answer
- PL gives all answers for the Patrol.

Score:

- ADD 2 extra points for each correct answer:
 - The US flag has? _____
 - Which State flag is? _____
 - Which other national flag is ...? _____
 - Why are the stars ...? _____
 - If the flag drops on the ground ...? _____
 - What was the ... stripes the US flag? _____
 - When is a US flag? _____
 - What was the STAR ...? _____
- **SCORE:** _____

TOTAL PATROL SCORE:

- Part A – Folding: _____
- Part B – Vexillology: _____
- TOTAL POINTS: _____

Judge Initial: _____

11. Cooking Contest

Process

- Prepare your contest meal at your own campsite and deliver one plate and three utensils so that the meal can be tasted by 3-judges.
- Each meal will be scored independently of other meals.
- Use your imagination.

Scoring

- | | |
|--|---------------|
| • Each Meal will be scored for: | Points |
| ○ Presentation (looks) | 15 |
| ○ Taste | 25 |
| ○ Originality (imagination) | 20 |
| ○ Correct explanation of the Chemistry & Physics of cooking the meal | 10 |
| ○ On time delivery of the meal to the judges (don't be late) | 10 |

Breakfast

- Poached Egg on Toast
- Make it (perfectly set white and runny yellow)
- Toasted Bread
- Explain the Chemistry and Physics of making this perfect creation

Lunch

- Steamed Brown Bread with an all-beef hot dog
- Discover cooking with steam.
- Explain you cooking process.

Supper (Dessert)

- Dutch Oven Cake, Pie, or Cobbler
- Explain How a Dutch oven works and how you determine temperature

(EACH TROOP PRINT A SCORE SHEET FOR EACH OF THEIR PATROLS)

TROOP: _____

PATROL NAME: _____

STEM EVENTS	SCORE
E1. Catapult/Trebuchet distance _____	accuracy _____
E2. Weight and Moment	
E2a. Balance the load	time _____
E2b. Move the Barge	time _____
E3. Human robot maze	time _____
E4. Solar Project	voltage _____
E5. Rain Gardens	completed- YES - NO
E6. Towers of Hanoi	time _____
E7. Egg Survival Drop Challenge	score _____
E8. Dirt Battery	voltage _____
E9. Demonstration Telegraph; Morse code	completed- YES - NO
E10. Cooking Contest	Breakfast _____ Lunch _____ Dessert _____
E11. Flag Competition (Vexillology)	Score _____