Presenting the 2nd Annual

WNY BRAIN CHALLENGE

A Rube Goldberg Style Competition for Students in Grades 6-12
A true STEAM experience fully aligned with Common Core & NGSS

Dear Fellow STEAM Enthusiast:

Enclosed you will find everything you need to prepare your team for the 2nd Annual WNY Brain Challenge, held in coordination with WNY Tech Wars at ECC South on May 24, 2018.

MISSION: IGNITE Powered by Computers for Children is bringing back this Rube Goldberg style competition to Western New York to promote STEAM learning through this fun and exciting event.

Each team of up to 6 students is expected to work closely with a mentor organization in the development of a contraption where the final task is to turn on a light. Ideally, sponsor organizations will develop long-term partnerships with your school to encourage STEAM skill development and provide real-world problem solving and work experience.

Upon registration (through our website) a representative from MISSION: IGNITE will contact you to help arrange for your mentor. You will receive a welcome packet, including informational letters to parents, permission forms, as well as the rules.

Have FUN but work hard. EACH member of the first-place team from both divisions (middle and high school) and their supervising teacher will win a laptop! And every registered contestant will leave with an amazing swag bag loaded with gear!

Any questions? Visit our website wnybrainchallenge.wixsite.com/2018 or email Alex at alex@missionignite.org.

We look forward to seeing you and your innovative contraption in May!

STEAM
WNY BRAIN CHALLENGE

WNYTEA

MISSION: IGNITE
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SUNY ECC

WNY BRAIN CHALLENGE

LOCATION: ECC South Campus Cafeteria

TIME: 8:00 am Set-Up, 9:00 am – 1:00 pm Competition

LEVEL: Middle School / High School Grade 6 - 12

COST: There is no cost to the team to register. MISSION: IGNITE is partnering with corporate sponsors to support this initiative. If there is an organization your school works closely with please let us know and we will be glad to connect with them.

TRANSPORTATION: If your school needs assistance to secure transportation please contact us directly. Sponsor contributions may be used to assist.

OBJECTIVE: Each team must design, build and present a Rube Goldberg Device created to perform the tasks outlined here.

TEAMS: Teams must have a maximum of 6 members and a supervising teacher.

RUN TIME: No more than 60 seconds

STARTING TASK: The initial task must be a ball and ramp. The ball cannot be released by hand. (example: a gate/barrier must be removed for the ball to roll.) Be creative!

ENDING TASK: The device must end by turning on a light (complete a circuit).

SPACE: Each team will be assigned an 8 x 10 foot area. The machine may not exceed 125 cubic feet and must fit entirely inside the team's assigned space. All team members and machine must fit into the 8 x 10 foot area.

VOLUME: The overall dimensions of your machine may not exceed 125 cubic feet; using the formula: area x height = machine volume. Height is measured from the lowest to the highest point of your machine. (NOTE: if the entire machine sits on a table, the height of the table may be excluded from the height of the machine. If only one section of the machine uses the table, then the height of the table must be included in the height of the machine.)

REGISTRATION: A school may register multiple teams, each with a unique machine. Please visit our website to register: http://wnybrainchallenge.wixsite.com/2018 or contact Alex Passarell for more information: alex@missionignite.org

WNYTEA

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WNY BRAIN CHALLENGE

Between the start task and ending task, there must be a minimum of eight discernible steps. The device will earn points by executing a series of mechanical energy transfers between different simple machines. The simple machines are:

1. Wheel & Axle
2. 1st, 2nd & 3rd class levers
3. Pulley
4. Wedge
5. Inclined Plane
6. Screw

Each type of machine may be used up to 3 times for points, however, each class of lever may only count once. (For clarification: you can have extra steps in your sequence, you might want to use a pulley 5 times but it would only count for points the first 3 times)

Each simple machine must be preceded by and followed by a completely different simple machine (or bonus task).

Screws and wheels must do at least 1 full rotation.

There are THREE bonus tasks that you can use in your action sequence.

1. One of your simple machines can be 3D printed.
2. You can add a pneumatic action to the sequence.
3. You can use energy released from a stretched rubber band in the sequence.

NO electricity will be provided, nor will teams be allowed to access electrical outlets. Machines may include a maximum of 3 tasks that require battery power, including the final task of lighting the bulb (up to 12 volt). The circuit can be completed to light the bulb through a variety of ways, be creative. Buttons, switches, and physical wire connections are all permissible.

Materials are NOT allowed to leave the device during the run.

NO device will be allowed to run if it is deemed by the judge to be unsafe.

No live animals. No flames.

Liquids must be properly stored, used, and cleaned up.

The device may be made from any materials, except those specifically prohibited above.

DEVICE FLOW CHART: Each team will need to create a flow chart that outlines the process that takes their device from the start to end task. No parallel tasks are allowed. Each task must happen in a linear sequence. The chart should also track how many points are being accumulated, assuming a “perfect” run.

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COMPETITION: At the contest, the team will present their Flow Chart for inspection. The team will walk the judge through the chart and point out where the corresponding parts of the device are. The judge will ask clarifying questions regarding the theory and construction as well as reliability and safety, which the students will be scored on. After the inspection, students will be given up to 15 minutes to ready their device for their official run. The judge will record the run time and assess whether each part of the device worked as it was described during the inspection. Any parts of the sequence that do not work during the run will not be counted for points.

MATERIALS: RGMs should be "green" machines, made of recycled items, wherever possible. Everyday, household objects are best and you can use just about anything! Not just toys, but a lamp, chair, fork, your grandpa's suspenders – you name it! Try using items differently than for their original purposes – an overturned bike's wheels can generate momentum, or a chair on top of a table can give you the power of gravity. We ask that teams don't spend money on materials.

CREATIVITY IS KEY: Look in the basement, garage or junk drawer, rummage around for old keys, check out a yard sale for weird stuff no one else wants! Note: Rube Goldberg never used dominoes in any of his machines! Marble runs and falling dominos are fun to look at – but they're not very creative. We encourage you to be resourceful and find alternatives in creating your machine's energy transfers.)

HUMOR: Rube Goldberg was a cartoonist – he was very funny! RGMs should work but they also need to capture attention. Theatrical and funny machines are very engaging and draw a crowd! The most successful teams have members with diverse skills including; engineers, entertainers, mathematicians, and comedians working together!

PLANNING: Making something look easy is hard – and it takes a lot of time. We recommend about two months to build, test and ready your machine for competition. Run your machine often- make sure the steps are all working as they should. The most successful machines are not built the week before the competition!

TRAVEL: Travel is tough on machines! Make your machine in small, sturdy sections which can be transported easily and safely – and quickly and simply set up. Duct tape and cardboard machines usually fall apart on their way to competitions. Bring extra materials to the competition, just in case! Double-check the dimensions of doorways, elevators, hallways and stairwells at the competition site – and whatever vehicle you're using for transport - and make sure your machine fits!

WNY BRAIN CHALLENGE

INSPECTION COMPONENT: 50 PTS AVALIABLE

CRITERIA	POINTS AVAILABLE	POINTS EARNED
Flow chart sequence matches device	10	
Flow chart tracks potential points	10	
Judges questions are addressed	10	
Data of trial runs presented	10	
Device does not exceed 125 cubic feet	10	

DEVICE OPERATION COMPONENT: 280 PTS AVALIABLE

CRITERIA	DID IT WORK?	POINTS AVAILABLE	POINTS EARNED
Ball & Ramp		10	
1st Class Lever		10	
2nd Class Lever		10	
3rd Class Lever		10	
Pulleys		10 each instance	
Wheel & Axles		10 each instance	
Inclined Planes		10 each instance	
Screws		10 each instance	
Wedges		10 each instance	
3D Printed Machine Part		30	
Pneumatic action		30	
Elastic action		30	
Run Time	Tally	-1 per sec after 60	
Student touches	Tally	-5 per instance	
		TOTAL POINTS EARNED	
		TOTAL DEDUCTIONS	
		FINAL