The Science Games

On Thursday evening, January 31st (6:00 pm to 8:00 pm), VMS will host a science night. We're calling it the **"The Science Games"**, and it will have two key components taking place simultaneously. The main component will consist of six events in which six teams of four students each will compete. Teams will be subdivided into two pairs to compete in three events each for a total of six competitions for each team. The second component will offer a variety of hands-on science and art activities for visitors.

Competitions:

1. *Hot air balloon weight lifting competition* for which team can get airborne first and lift the heaviest weight. Materials will be thin, lightweight plastic (dry cleaner's bags) and scotch tape. (Will take place in room C1 – Mr. Black's Video Tech. classroom)

2. *Trebuchet target strike contest* will use pre-built historical war engines to see who can strike given targets with the greatest frequency. Points will be given for ability to hit helium balloon targets and simulated castle wall with the greatest frequency. They will use tennis balls as projectiles, and be able to adjust direction of trebuchet, add or subtract weight to the trebuchet, and add tape streamers to tennis balls to help control projectile direction and height. (Will take place in MPR)

3. *Egg drop from Helium lofted weather balloon*. Design package to prevent egg breakage. See which team can obtain greatest height, in given time, with lightest packing material (will take place in MPR)

4. *Mousetrap / Balloon Car Speed and Distance Contest*. Teams will be given all needed supplies (water bottles, bottle caps, CDs, straws, dowels, toothpicks, balloons, mousetraps, string, rubber bands, etc.) they have to build and see which car goes the fastest and greatest distance. (Will take place in B7)

5. *Zip line carriage race* side by side on two identical zip lines to see which makes it to the end first and with the best time for the night. Students can vary weights and aerodynamics of carriage.

They will start out with five test runs without score keepers recording times or place on scorecards except for the last one (time all test runs to give teams data on design speed improvement). The last test run will have the time recorded on scorecards and students will be required to calculate speed to the nearest tenth on a "sticky note" and give to judge for this run and all remaining runs. (Design & test run stage should last no longer than 10

minutes. Some of teams may not achieve 5 test runs, in this case record there last test run data on the scorecard when 10 minutes have elapsed. You may need to alert them at the 8 minute mark that this is their recorded test run).

Following the test run stage students should be prepared to race their opponent. Both carriages will be taken to top of run and released at the same time. Students and judges will record times (to the hundredth and called out by judge) and calculate & record speeds. Teams will switch cable & pulley systems then repeat race and record as said above. Students will then have two minutes to make design adjustments then they race again using the same described format. Students will need to correctly calculate carriage speeds to the nearest tenth for 0 or 1 point. (Will take place in MPR)

6. *Cable rocket precision contest*. Students will build air rockets by rolling paper around ½" PVC pipe, taping the edge and top to prevent air leakage. They will create and trim stabilization fins out of clear tape, then tape to a small tube that rides on an inclined cable. They will insert rocket launch tube (made of ½" PVC) into the rocket body, pump up launch system to desired pressure with a bicycle pump, then throw the switch.

The object is to rocket up to two predetermined marks (painted marks on cable) and have their rocket dialed in to stop as close as possible to each of these marks without hitting the wall. Points will be assigned based on distance undershot or overshot targeted mark. Rockets that hit the wall will be given zero points for that attempt. (Will take place in room C4)

One team pair will compete in only three events against other team pairs, and their points will be totaled with the other pair on their team to determine the total score for the team of four.

Hands-on Art & Science Activities This facet of the evening activities will offer a variety of hands-on science and art options in rooms B1/B2, B3, B4, B5 and B6 for both young and old to participate. Some possibilities are as follows:

a. Art activities (room B1/B2; Art award given).
b. Mousetrap catapult build activity with mouse traps (room B3; Most accurate catapult award).
c. Bernoulli's principle demonstration (room B3).
d. Balloon incline rocket (room B4; Fastest/longest rocket run award).
e. Zip line carriage build and race activity (room B4; Fastest zip line car award).
f. Aquariums & touch tanks (support from Cabrillo Aquarium; room B4).
g. Balloon powered car activity (room B5; Fastest balloon car award).
h. Balloon powered boat races in rain gutters (room B5; Fastest balloon boat racer).

i. Triple beam balance and graduated cylinder use (room B5).
j. Cheek cell examination under the microscope (room B7; Best cheek cell sketch award).
k. Onion cell examination under the microscope (room B7; Best onion cell sketch award).
l. Pond water microscope activity (room B7; Best pond water sketch award).
m. Dissection scope use (room B7; Best dissection scope sketch award)
n. Computer probe ware activities (room B4 or B7).
o. Tesla coil demonstration (MPR).

Awards, Timing and Logistics The night will end with awards ceremony. We will first announce the ribbon award winners for the 10 hands on activities. Secondly, we will announce the first three places for "The Science Games" competition (bronze, silver & gold metals). After metals are hung on competitors the Star Spangled Banner will be trumpeted as the flag is slowly raised in front of the awards podiums.

The overall schedule is as follows: About 15 minutes for game & hands-on activities introductions; 25 minutes for each competition (all six of the listed competitions will run three times) with 5 minute transitions; plus about 15 minutes will be reserved for the awards ceremony at the end. Hands on science and art activities would be concurrent with competitions.

Teams have been pre-selected and given details of each competition so they all have access to prep, read-up, and plan ahead. Many competitions would allow for 10 to 15 minutes of test runs/launches prior to actual competition (e.g. rocket zip line car, trebuchet, etc.).

Scoreboard Team points following each contest will be put into Excel and projected onto big screen in MPR to provide dynamic scoreboard standings following each event transition.

Invitations We have invited our VMS students and families as well as LVMS, and elementary students, within our district, to watch the competitions and participate in hands-on activities.