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Vivian Counts, Benedict College, 2015
Sandra Gray, Clemson, 2015
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Tom Abrahamson, Midlands Technical College, 2016
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Mel-Quin Chan, The Citadel, 2017
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Melissa Pilgrim, USC – Spartanburg, 2017
Bill Wahberson, Savannah River Site, 2017
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Jim Privett, USC-Spartanburg, Emeritus
David Strong, France Marion, Emeritus

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Governor’s Awards, Bill Phillips & Don Jordan co-Chair
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Necrology, Pearl Fernandez
Membership, Don Jordan
Publicity, Waltoma Simpson and Vivian Counts
Electronic Journal, Michele Harmon
Website, Tom Abrahamson, John Kaup, Laurie Fladd
High School Research Awards, John Kaup
SCJAS, John Kaup, Linda Sinclair, Eiko Steele, Jim Privett
Teacher of the Year, Linda Sinclair, John Kaup

January 15, 2016

2016 MESAS MAIL-IN CONTEST
Sponsored by the South Carolina Academy of Science

Get Additional Copies of the 2016 MESAS Contest at
http://artsandsciences.sc.edu/cse/mesas

To: All of South Carolina:

Teachers; District Leaders; Parents and Students.

All Regions: Western Region I; Midlands Region II; Upstate Region III, Sandhills Region. IV; Low Country Region. V: Aiken Savannah River Region and, Sea Island Region VII

Please find enclosed information about the mail-in contest for the Middle/Elementary School Science Fair (MESAS) sponsored by The South Carolina Academy of Science (SCAS) and produced by faculty and staff at the University of South Carolina & members of SCAS.

I have attached two MESAS Contests for your students (one for grades 4-6 “E Contest” and one for grades 6-8 “M Contest”). Please make as many copies as you need and distribute to your students. I hope your students have fun and learn something by competing in the contest. Each student who participates will be recognized and each school that participates will have at least one winner. Winners will be announced in the SCAS and MESAS newsletters and the SCAS Bulletin. The deadline for entry is Tuesday, March 1, 2016. The authors of the 2016 contest include Dr. Don Jordan, Sofia Chaluissant, Adarius Hagoood, Amber Atkinson, and Frank Jordan, USC and many members of SCAS, with support from the Center for Science Education.

We encourage students to use reference resources of all types, including the internet. However, we strongly discourage parent’s assistance in finding the answers. This is a competitive contest meant to teach the children new methods of learning and exploring. We love the parent’s involvement, but require the students find the answers on their own for this contest. Questions are prepared with respect to the standards for SC.

The South Carolina Academy of Science Annual Meeting is Saturday, April 16, 2016 at Winthrop University Rock Hill, South Carolina. We hope to announce the winners of the SC Academy of Science MESAS Mail-in Contest by that date.

There will be lots of winners, not just one or two. We recognized at least one winner at each school and sometimes at each grade level. Certificates and prizes will be mailed out to each student’s principal so that the awards can be presented at the school’s Awards Assembly. We have four levels of winners: School, Region, State, and Grand Winners.

Results will be returned to Teachers/Parents/Principals. (See contest rules next page for more details)

We also encourage MESAS students to participate in their regional science fair in March of 2016. Check with your regional science fair director whose address can be found on the web at http://www.scacademysci.org then click on Science Fairs at Top for specific dates.

If you have questions please call me at 803-777-7007 or better email djordan@sc.edu

Sincerely,

Don Jordan, USC
State Executive Director & Founder, MESAS
South Carolina Academy of Science M Contest

South Carolina Middle/Elementary School Academy of Science

2016 MAIL-IN CONTEST FOR SOUTH CAROLINA

Contest Rules:

1. Mail your contest to:
   Don Jordan, Executive Director SCAS/MESAS, Science Education Center, College of Arts & Sciences, Sumwalt Room 321, Columbia SC, 29208; Phone (803) 777-7007. Email: djordan@sc.edu (There is a $5.00 entry fee for each contest)

2. **Entrants must complete all questions on entry form and sign and mail to:**
   SCAS MESAS CONTEST c/o Dr. Don Jordan, Science Education Center, College of Arts & Sciences, Sumwalt Room 321, Columbia SC, 29208. **If the entrant AND sponsor do not sign this form, they cannot receive any possible award.**

3. **Deadline:** Entry must be postmarked by **Tuesday, March 1, 2016.** (note contest is emailed in early January 2016)

4. There will be lots of winners, not just one or two. Each school will have **at least one** winner.

5. A student member of SCAS/MESAS can enter only **one** contest- either the MESAS E-Contest for grades 4-6 or the MESAS M-Contest for grades 6-8. (Students in the sixth grade have the option of choosing either the E 4 - 6 or M 6 - 8 contest.)

6. **Everyone participating will be recognized.** Teachers/Parents will collect the entries and mail as a package to the above address. Results will be returned to Teachers/Parents/Principals.

7. Prizes will vary in value. **All winners at each level will be recognized or awarded prizes.**

8. **We recognized at least one winner at each school and sometimes at each grade level.** We had **387 winners** out of 673 participants (approx 57.5% of the total number of participants were winners). Certificates and prizes were mailed out to each student’s principal so that the awards could be presented at each school’s Awards Assembly. We congratulate each and every contestant for his or her excellent effort! Grand and State Winners and sometimes Regional Winners receive cash awards.

9. Winners will be announced on the **SCAS web-site, Arts & Sciences, Center for Science Education web-site and Bulletin.** In addition, results have been published in the **SCJAS Newsletter in May/June**. Schools will be asked to announce winners at one of their assemblies for students. Winners will receive honors certificates from the S.C. Academy of Science.

10. Each student is held to the **code of ethics** for entry into this contest. **The use of resource materials is encouraged. Each student must work on his/her own except for the group or team activities (if any).** Group activities can include parents, friends, or classmates.

________________________________________________________________________
Student Signature                                                  Sponsor (Teacher/Parent) Signature

See [www.artsandsciences.sc.edu/cse/mesas](http://www.artsandsciences.sc.edu/cse/mesas) or [www.artsandsciences.sc.edu/cse](http://www.artsandsciences.sc.edu/cse) Under Programs (left side) then select MESAS for 2016 contest
**Official M CONTEST Grades 6 - 8**

**Entry Form for SCAS MESAS Mail- In Contest**

2016

*(Whoever is mailing this form in should be considered the sponsor)*

<table>
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<tr>
<th>STUDENT’S HOME INFORMATION</th>
<th>SPONSOR’S INFORMATION (see above)</th>
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<td>PRINCIPAL’S NAME</td>
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* If the parent is the sponsor then the parent signs

**INSTRUCTIONS:** *(Failure to follow these instructions properly can lead to disqualification of the entrant’s contest. However, they will still receive a certificate of recognition for entering.)*

1. Print CLEARLY in the boxes above. Have your teacher, parent or legal guardian fill in the sponsor’s information. Finally, ask your teacher/sponsor to fill in the school/teacher information.
2. You can find a copy (or extras, if needed) of the South Carolina Academy of Science MESAS Mail-In Contest at [www.artsandsciences.sc.edu/cse/mesas](http://www.artsandsciences.sc.edu/cse/mesas) as well as dates and other important information.
3. Place all answers to MESAS test questions on the pages of the contest.
4. This contest is for **students ONLY**. We encourage their use of any and all resources available, including the internet. Adults supplying the answers take away from the spirit and goals of this contest: to allow children to find new ways of learning, and encouraging the use of various methods of research, especially the scientific method.
5. Attach and return all entry & rule forms with your completed contest and entry fee of $5.00 (see below) by **Tuesday, March 1, 2016**.
6. Mail to: **Dr. Don M. Jordan, USC / Center for Science Education / Sumwalt Room 321 / Columbia, SC 29208.**
PERIODIC SOUTH CAROLINA
(Each question is worth 2 points. Write the correct answer in the space provided in blue ink.)
FILL IN THE ELEMENT NAME AND THE ATOMIC NUMBER FOR EACH OF THE FOLLOWING

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19. What is the SUM of the atomic numbers of all of the elements that spell SOUTH CAROLINA? _________

(Each of the following questions are worth 5 points. Circle the correct answer)

20. How many elements on the periodic table occur naturally?
   A. 40  B. 56  C. 90  D. 100

21. What is the heaviest of the naturally-occurring Noble Gases?
   A. Helium  B. Argon  C. Xenon  D. Radon

22. Answer using element symbols from the periodic table; Which Renaissance astronomer and mathematician created a model of the universe that placed the Sun at the center, rather than the Earth?

--------------------------------------------------------------------------
THE UNIVERSE, SPACE AND STARS

(Each question/blank is worth 5 points. Please circle the correct answer or write the correct answer in the space provided in blue ink)

1. Out of the following, which of the listed apparent magnitudes would describe a star that appears the brightest?
   A. −5   B. 15   C. 5   D. 10
   Answer: ______________________

2. ______________________ is the instrument used to separate light into different colors.
   A. Spectroscope   B. Kaleidoscope   C. Prism   D. H-R Diagram
   Ans: ______________________

3. The process in which smaller atomic nuclei particles are combined into larger nuclei is known as which of the following?
   Answer: ______________________
   A. Time Distance of Arrival   B. Butterfly Effect   C. Hydrogenesis   D. Nuclear Fusion

4. How far (approximately) above the Earth is the International Space Station on Average? Ans: __________
   A. 161 km   B. 1 Light-year   C. 401 km   D. 786 km

5. The Space Shuttle Endeavour completed how many orbits around the Earth before its retirement in 2011?
   A. 3,265   B. 1,402   C. 4,671   D. 5,786
   Ans: _____________

6. What is the term given when a planet is the farthest point away from the Sun? Ans: ________________
   A. Diphelon   B. Eclipse   C. Aphelion   D. Revolution Apex

7. Which astronaut from South Carolina served in the Marine Corps and is the current Administrator of the Aeronautics and Space Administration? Ans: ______________________
   A. Charles Bolden   B. Frank Culbertson   C. Catherine Coleman   D. John Casper

LABEL THE SHADOW ZONES CORRECTLY BY USING THE BLANKS PROVIDED
(Each question/blank is worth 5 points.)

1. ______________________
2. ______________________
Metric / Biology / Geometry

(Answer the following Multiple Choice / Fill in the Blank Questions. (Each Question counts 5 points: Circle the multiple choice answers in Blue Ink and write the correct answer in the space provided when possible.)

1. True or False: Metric use in the US is far more widespread than most Americans realize. Since the 1990s all America Cars have been metric and have been built to metric specifications. Many Americans are unaware of this fact since automobile manufacturers use legacy units in their advertisements.

(a) TRUE  (b) FALSE  {circle one} Answer: ________________

Write True or False

A frightening story: In November of 2015 it was reported that a certain pharmacy had labeled the dose of liquid–form narcotic pain reliever hydrocodone for a nine-year old patient as being two and one-half tablespoons, which translate in an actual volume of 37.5 ml, which is a very high dose of hydrocodone. The institute for Safe Medication Practices (ISMP) has recommended that oral liquid medication be stated in milliliters only. Please answer questions 2 & 3 below:

2. What is the approximate equivalent of one tablespoon in milliliters? Ans: ___________________________

(a) 50 mL  (b) 5 mL  (c) 10 mL  (d) 15 mL  {Circle One}

3. What is the approximate equivalent of one teaspoon in milliliters? Ans: ______________________

(a) 3 mL  (b) 5 mL  (c) 10 mL  (d) 15 mL  {Circle One}

4. The world’s longest living insect is the ____________________________.

(a) housefly  (b) cockroach  (c) termite queen  (d) ladybug  {circle one}

5. The mass (weight) of the longest living insect is in the approximate range of _______ g to _______ g

And length in the range of __________ mm to ______________ mm {fill in the blank}

6. Name and describe the three subatomic particles in atoms.

Answer: ___________________________________________________________________________________

*** ______________________________________________________________________________________

7. How many bones are in the human body? Answer: ________________________________

(a) 5,000  (b) 78  (c) 206  (d) 544  {Circle One}

8. Antarctica belongs to which Biome? Answer: ______________________________

(a) Savanna  (b) Grasslands  (c) Tundra  (d) Rainforest  {Circle One}

9. Subdivide the interval [0, 2] into four equal subintervals. What is the length of each subinterval? Ans: ___________

(a) 0.5  (b) 0.25  (c) 1.0  (d) 0.75  {Circle One}

10. Brick and Plane Intersection:
If the brick intersects a plane, what possible figures can be obtained by the intersection? Counting the number of figures you obtained above and including as one the empty set (case where the plane does not intersect the brick), how many figures did you obtain.

(a) 3  (b) 5  (c) 7  (d) 9  (e) 6  Answer: _______________________

Hint: The plane can intersect the brick at one of its 12 edges (line segment)! Could the plane intersect the brick in a point?

11. List the figures you obtained in problem # 10 above (use their geometric names) ____________________________________________

***

M Contest 2016 Grades 6 – 8  No of Points = ______________ out 55 Possible Points
M – Contest 2016

(Assert the following Multiple Choice / Fill in the Blank Questions. (Each Question counts 5 points: Circle the multiple choice answers in Blue Ink and write the correct answer in the space provided when possible.)

1. **Mouse Basketball:** Approximately how many centimeters can a house mouse jump vertically?
   
   (a) 15 cm    (b) 25 cm    (c) 45 cm    (d) 80 cm  
   Answer: ____________

2. "Chinese gold Panda coins are popular worldwide. A new era for Panda coins begins in 2016. The old system using Troy ounces will be replaced by the metric system which uses grams. For the first time all gold and silver mint state Panda coins will be issued in metric units. In 2016 the 500 Yuan gold panda coin will weigh 30 grams, the ½ oz. will be 15 grams, ¼ oz. will be 8 grams, 1/10 oz. will be 3 grams and the 1/20 oz. will shrink down to ___________.
   
   (a) 2 g    (b) 1.9 g    (c) 1000 mg    (d) 500 mg  
   Answer: ____________

3. **Finances:** You purchase an item for $5,000 on an installment plan at 22% interest and agree to make payments of $100 per month until the loan is paid in full. How much do you owe after the first month’s payment of $100? To find the answer we use the following scheme; Let A₀ = original amount borrowed and let A₁ = amount owed after first payment, A₂ amount owed after second payment etc.
   
   Then we have:  
   A₁ = A₀ + (0.22/12)×A₀ = 5000 + (0.22/12)×5000 – 100 = $4,991.67 (rounded)  
   A₂ = A₁ + (0.22/12)×A₁ – 100 = $4,983.18 and  
   A₃ = A₂ + (0.22/12)×A₂ – 100 = $4,974.54
   
   Calculate A₄ = ____________

4. How many years approximately will it take to pay off the loan? Answer: ____________________________
   
   (a) 1 year    (b) 3 years    (c) 5 years    (d) 11 years
   Answer: ____________

5. After your final payment, what is the total amount you paid to purchase the item? Answer: ____________________________
   
   (a) $5,600    (b) $13,600    (c) $9,600    (d) $11,600
   Answer: ____________

6. After a loan of this sort, does the consumer pay only what the product is worth? YES or NO (circle one)

7. Consider the following three sequences of four numbers. What comes next? Fill in the blanks
   
   A: 5, 8, 11, 14, next ___________  
   B: 4, 6, 8, 10, next ___________  
   C: 10, 20, 30, 40, next ___________

8. Now that you have shown the next term in each of the sequences in problem No 7 above:
   
   Is there a formula that will work for all three sequences? YES or NO (circle one)
   
   If YES what is the formula: ____________

   **Float or not to Float: Experiment with your family at home.**

   **Materials:** Regular Coke, Diet Coke, & Container. Find a container that will hold a 355 mL can of Coke.
   
   Demonstration: Fill the container with enough water that will cover the Coke standing up. Use water at room temperature.

   9. Place the regular Coke in the container on its side. Does it float? YES or NO (circle one)

   10. Take the regular Coke out and place the Diet Coke in the container. Does the Diet Coke float? YES or NO (circle one)

   11. What is the density of water at 4°C? Answer: ____________ Density = mass/volume
   
   **Reminder:** Objects sink into water until the weight of water displaced is equal to the weight of the object. If the water weight that is displaced is less that the object’s total weight, the object sinks. Note: 355 milliliters of water at 4°C has a mass of 355 g (That is one mL of water at 4°C has a mass of 1 g)
   
   12. With the above information explain why the regular coke did not float but the diet coke did float in 50 words or less. Place your answer below:
   
   Answer: ____________