The South Carolina Academy of Science

January 30, 2012

2012 MESAS MAIL-IN CONTEST
Sponsored by the South Carolina Academy of Science

***Get Additional Copies of the 2012 MESAS Contest at* www.cas.sc.edu/cse/jordan**

To: All of South Carolina: Teachers; District Leaders; Parents and Students.
(All Regions: Western Region I; Midlands Region II; Upstate Region III, Sandhills Reg. IV; Low Country Reg. V; Aiken Savannah River Region and, Sea Island Region VII)

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

I have attached two MESAS Contests for your students (one for grades 4-6 and one for grades 6-8). 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 SCJAS and SCAS newsletters and the SCAS Bulletin. The deadline for entry is **Monday, March 5, 2012.** The authors of the 2012 contest include Dr. Don Jordan, Eric Steinecke, USC, and Frank Jordan USC and with support from the Center for Science Education and the Department of Biology.

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 parent's involvement, but require the students find the answers on their own for this contest.

The South Carolina Academy of Science Annual Meeting is Saturday, April 14, 2012 at the University of South Carolina – Aiken

Announcement: Please let your students know that they can prepare a research paper or science project and present a 10 minute oral presentation in the Middle/Elementary School category at the SCAS Annual Meeting. Sometimes monetary awards are issued to the top five to ten oral presentations. The deadline for abstracts is **February 17, 2012.** Send abstracts to: Dr. James Privett, Judging Coordinator / USC Sumter / 200 Miller Rd. / Sumter, SC 29150-2498 / PHONE: (803) 938-3758 / FAX: (803) 938-3713 / e-mail: jamesp@uscsumter.edu .

We also encourage MESAS students to participate in their regional science fair in March of 2012. Check with your regional science fair director whose address can be found on the web at www.scacadscience.org for specific dates.

If you have questions please call me at 803-777-7007

Sincerely,

Don Jordan, USC
State Executive Director & Founder, MESAS

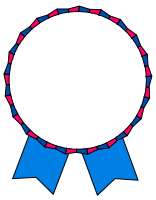
PS, Due to funding restraints there will not be as many cash prizes this year!

South Carolina Academy of Science

Mail-In Contest

South Carolina Middle/Elementary School Academy of Science

2012 MAIL-IN CONTEST FOR SOUTH CAROLINA



Contest Rules:

1. Entrance fee is $5.00. Checks should be made out to MESAS – CONTEST and mailed with your contest to Dr. Don Jordan, Executive Director SCAS/MESAS, Science Education Center, College of Arts & Sciences, Sumwalt Room 323, Columbia SC, 29208; Phone (803) 777-7007. Email: djordan@sc.edu

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 323, 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 **Monday, March 5, 2012**.

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. Cash prizes from 1996 through 2008 ranged from $25 to $100. ***We recognized at least one winner at each school and sometimes at each grade level***. We had **211 winners** out of 463 participants (**approx 46% 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! Due to Budget Cuts there were few cash awards in 2011.

9 Winners will be announced on the **SCAS web-site and Bulletin**. In addition, results have been published in the **SCJAS Newsletter in May**. 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

Update January 27, 2012

OFFICIAL M Contest Grades 6 - 8
Entry Form for SCAS MESAS Mail- In Contest
2012

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

STUDENT'S HOME INFORMATION		**SPONSOR'S INFORMATION (see above)**
NAME		NAME:
ADDRESS		
CITY, STATE, ZIP		WK. PHONE:
AREA CODE/ PHONE #		
GRADE IN SCHOOL		EMAIL:
SPONSOR NAME		
STUDENT'S SIGNATURE **(REQ'D)**		

SCHOOL INFORMATION	
NAME of **SCHOOL**	
ADDRESS OF SCHOOL	
CITY, STATE ZIP	
AREA CODE/ PHONE #	
SCHOOL DISTRICT	
PRINCIPAL'S NAME	
SPONSOR'S SIGNATURE **(REQ'D) ***	

* 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.cas.sc.edu/cse/jordan** 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 **Monday, March 5, 2012.**
6. Mail to: **Dr. Don M. Jordan, USC / Center for Science Education / Sumwalt Room 321 / Columbia, SC 29208.**

SOUTH CAROLINA ACADEMY OF SCIENCE

[Founded 1924]

MAIL-IN
MESAS
M CONTEST
Grades 6-8

Name: _____

Sponsor: _____

Sponsor Email: _____

School: _____

Score: Total of _____ out of 210 Points

SOUTH CAROLINA TRIVIA

1. What is the highest peak in the state of South Carolina? _____

2. How many state sponsored parks are there in South Carolina? _____

3. Give the scientific name for the tree that was used to build Fort Moultrie _____

4. Which body of water in South Carolina is considered to be North America's largest free flowing black water river? _____

5. The Boeing manufacturing plant in South Carolina makes parts for which aircraft? _____

6. Currently in the news regarding the hazards of dredging, The _____ River forms most of the border between South Carolina and _____

ADVANCEMENTS IN INFORMATION AND COMMUNICATIONS TECHNOLOGY

7. What internet and software corporation was founded in 1998 but began in 1996 as a research project by students at Stanford University? _____

8. Originally an online bookstore, what internet company that was founded in 1995 chose a name that started with an "A" to appear first in alphabetic order? _____

9. There are two types of networks, LAN and WAN. If one computer in South Carolina is connected to another computer in England, what type of network is being used?_____

10. What does JPEG stand for? _____

INVENTIONS AND INVENTORS

11. Who said "The patent system added the fuel of interest to the fire of genius." _____

12. R. Buckminster Fuller patented what type of structure in 1954? _____

13. Invented by Permacel, a division of Johnson & Johnson, Duct Tape was created for use by the U.S. Military during WWII because of a specific property; it resisted _____

14. What invention holds US patent number 174465? _____

15. In what decade were Barcode Scanners first used? _____

2 x Number of Correct Answers = _____ points for this page **Total Points = 30**

BIOLOGY AND ENVIROMENTAL SCIENCE QUESTIONS
CIRCLE the correct answer and WRITE the corresponding letter in the space provided

1. What is the smallest unit of life?

1. Answer_____

(a) Atom (b) Neutron (c) Cell (d) Virus

2. Where does photosynthesis occur in plants?

2. Answer _____

(a) Ribosome (b) Golgi body (c) Chloroplast (d) Endoplasmic reticulum

3. The term *Protista* would be an example of which of the following

3. Answer _____

(a) Kingdom (b) Phylum (c) Class (d) Species

4. What are the monomers of Carbohydrates?

4. Answer_____

(a) Disaccharides (b) Carbon, Hydrogen, and Oxygen (c) Monosaccharides (d) Polysaccharides

5. Which of the following is *not* an example of a steroid?

5. Answer_____

(a) Cortisol (b) Insulin (c) Testosterone (d) Cholesterol

6. _____ creates ATP by the movement of ions across a selectively permeable membrane during cellular respiration.

6. Answer_____

(a) Glycolysis (b) Photosynthesis (c) Transpiration (d) Chemiosmosis

7. What rivers are represented in the acronym for the ACE Basin located in South Carolina?

7. Answer_____

8. What percent of the Human Genome is comprised encoding DNA that code for proteins?

8. Answer_____

(a) 50% (b) 7.5% (c) 3.5% (d) 1.5%

9. Found in most estuarine areas of the state, *Crassostrea virginica* is the scientific name for which organism?

9. Answer_____

(a) Blue Heron (b) Ghost Crab (c) Blue Crab (d) Eastern Oyster

10. _____ is the spontaneous emission of radiation from an excited molecular entity with the formation of a molecular entity of the same spin multiplicity

10. Answer_____

(a) Luminaire (b) Phosphorescence (c) Fluorescence (d) Luminosity

Each Question counts 5 points: Total Points = 50 Points = _____

ENVIROMENTAL SCIENCE AND AERONAUTICS QUESTIONS
CIRCLE the correct answer and WRITE the corresponding letter in the space provided

1. In hydrology, the probability a "100 year flood" will occur is _____ percent every 100 years.

1. Answer_____

(a) 1% (b) 63.4% (c) 100% (d) Incalculable

2. The enamel building constituent of toothpaste is found in what eroded rock?

2. Answer _____

(a) Calcium Bicarbonate (b) Silicon Dioxide (c) Mica (d) Calcium Apatite

3. The majority of Earth's fresh water is found in _____

3. Answer _____

(a) Glaciers (b) Rivers and Streams (c) Lakes (d) Aquifers

4. Sea walls can destroy a local beach, but will facilitate beach growth _____.

4. Answer_____

(a) Down Drift (b) Up Drift (c) Not at All (d) In front

5. Would it be easier for a plane to fly higher in an atmosphere less dense than Earths?

5. Answer_____

(a) Yes (b) No

6. Movement of an aircraft along its vertical axis is called _____.

6. Answer _____

(a) Flight (b) Pitch (c) Roll (d) Yaw

7. Where on the outside of an aircraft would you find a green navigational light?

7. Answer _____

(a) Nose Cone (b) Vertical Stab (c) Right Wing Tip (d) Left Wing Tip

8. In aviation terms, what does the acronym FOD stand for? _____

8. Answer _____

(a) Forward Overwing Damage (b) Fuel Overload Debris (c) Front Overpass Dusting (d) Foreign Object Debris

9. A _____ is the shape of a wing or propeller as seen in a cross section. This cross section helps to determine the aerodynamic force.

9. Answer _____

(a) Airframe (b) Airfoil (c) Airlift (d) Airline

10. The term "Ozone" comes from which Greek word?

10. Answer _____

(a) Ozein (b) Ozonus (c) Ozinaut (d) Ozo

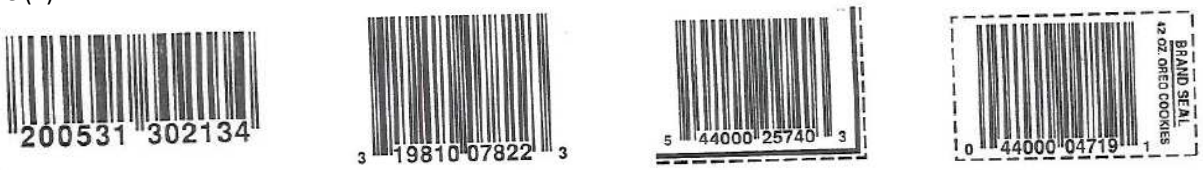
Each Question counts 5 points: Total Points = 50 Points = _____

Bar-Code Definitions and Activities

Each of the UPC bar codes is made up of two parts. The computer reads the alternating dark-white bars given in binary code. The computer can convert its binary code to the Arabic numerals. The binary code system used in UPC bar coding is not the same as the base-two number system. The bars are set up so that the scanner can read the code no matter which way the code is passed over (or hand held operated) its window and the numerals are there for an individual to read the code.

Usually twelve digits appear in the Arabic numeral system that one reads from a UPC.
The first digit indicates type of product. (Sometimes this first digit is not in line with the others).
A **"0"** in this first position indicates that the product is a national brand. A **"2"** indicates the product is a meat or cheese that has been weighed and wrapped within the store. A **"3"** in the first position identifies that the product as a health or beauty aid. A **"4"** means that the store has reduced the original price of the product, and a **"5"** in the first position indicates a manufacturer`s cents-off coupon.

Figure (1)



A. 200531 302134 B. 3 19810 07822 3 C. 5 44000 25740 3 D. 0 44000 04719 1

1. Classify the products with bar codes A – D in the figure (1) above: (10 Points)

A. _____ B. _____ C. _____ D. _____

{Answer each with the underlined portion of the definition given above.}

The next five digits after the numeral showing the product type is the manufacturer`s identification code number. This number is assigned to the company by the Uniform Code Council in Dayton, Ohio.

2. Which of the products whose bar codes are shown in the figure (1) above are made by the same company? (10 Points)

Answer: _____

The second five-digit group in the UPC is assigned by the company itself to distinguish that particular product from all others made by the same company. The twelfth digit in the code is the check digit. If the checkout person stores keys in the code (enter the numbers manually) and makes a mistake, such as hitting the wrong key or transposing two digits, the computer will refuse the code. A UPC is checked by the following method.

Multiply the sum of all the digits in the odd positions of the code by 3. (Count the position the first digit occupies as position 1, and odd position). Add this product to the sum of all the digits in the even positions.(The check digit will be the last even position). If the final sum is a multiple of ten, the code is valid and will be accepted by the computer.

Example: If the bar code has these 12 digits shown here: 0 1 5 6 4 5 1 6 6 8 0 6 we get:
$3(0 + 5 + 4 + 1 + 6 + 0) + (1 + 6 + 5 + 6 + 8 + 6) = 3(16) + (32) = 48 + 32 = 80$ and 80 is a multiple of 10 so the bar code checks.

3. Check the validity of the bar codes in Bar-Code to the right. Show all work here. (15 Points)

Show your work in this box for #

Sometimes the check digit on a UPC has not been printed. The check digit on the code to the right is missing. If it is known that the bar code is valid, the check digit can be found using the same directions given above. Let C represent the check digit that is missing. Let M represent some multiple of 10 (like 10, 20, 30 etc) we have:
$3(0 + 9 + 0 + 0 + 2+ 4) + (3 + 4 + 0 + 1 + 0 + C) = M \rightarrow 3(15) + (8 + C) = M \rightarrow 45 + 8 + C = M \rightarrow 53 + C = M$
Thus C = 7 and M = 60 (note C must be one of the digits {0, 1, 2, 3, 4, 5 6, 7, 8, or 9}

4. Find the missing Check digit for the product with bar code with Arabic numerals. Find C.

0 8 2 6 5 7 5 0 0 6 3 C

Answer: C = _____

Show your work in this box for #

Total Points = 50 Points = _____