2019 MESAS MAIL-IN CONTEST
Sponsored by the South Carolina Academy of Science

Get Additional Copies of the 2019 MESAS Contest at
https://artsandsciences.sc.edu/cse/front-page

Ref: 2019 South Carolina Academy of Science MESAS Mail-in Contest Grades 4 - 8

To: All of South Carolina: Please Share

Principals, 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 (To all of South Carolina)

Please find enclosed information about the mail-in contest for the Middle/Elementary School Academy of Science (MESAS) sponsored by The Center for Science Education (CSE) at USC & 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 SCJAS and SCAS newsletters and the SCAS Bulletin. The deadline for entry is Monday, March 4, 2019. The authors of the 2019 contest include Dr. Don Jordan, Susan Jordan, Isaac Jones, Kristen Jackson, & Gabrielle Herrin of USC and the late Dr. Tom Roop of Francis Marion University. In addition, many members of SCAS and 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 will be Saturday March 30, 2019, at Francis Marion University in Florence, South Carolina. We hope to announce the winners of the SC Academy of Science MESAS Mail-in Contest by April 15, 2019.

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/April of 2019. Check with your regional science fair director whose address can be found on the web at Center for Science Education site

Click Here to visit CSE Home, College of Arts and Sciences, University of South Carolina
Then click programs - then MESAS

If you have questions, please call me at 803-777-7007 or better email djordan@sc.edu
https://artsandsciences.sc.edu/cse/front-page

Sincerely,

Don Jordan, USC
State Executive Director & Founder, MESAS
Contest Rules for E & M Contest:

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 sign and mail entry and $5.00 fee 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 Monday, March 4, 2019. (note contest is emailed in early January 2019)

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

5. A student 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.** In 2018 we had 339 winners out of 542 participants (approx 62.5% 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 contest for his or her excellent effort! Grand and State Winners and sometimes Regional Winners receive cash awards.

9. Winners will be announced on the **Arts & Sciences, Center for Science Education** website. 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

{Teachers/Parents duplicate any parts of this test as needed. Check [HERE](https://artsandsciences.sc.edu/cse/front-page) for Center for Science Education CSE}
# Official E CONTEST Grades 4 - 6

Entry Form for SCAS MESAS Mail- In Contest

2019

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

<table>
<thead>
<tr>
<th>STUDENT’S HOME INFORMATION</th>
<th>SPONSOR’S INFORMATION (see above)</th>
</tr>
</thead>
<tbody>
<tr>
<td>NAME</td>
<td>NAME:</td>
</tr>
<tr>
<td>ADDRESS</td>
<td></td>
</tr>
<tr>
<td>CITY, STATE, ZIP</td>
<td>WK. PHONE:</td>
</tr>
<tr>
<td>AREA CODE/ PHONE #</td>
<td>EMAIL:</td>
</tr>
<tr>
<td>GRADE IN SCHOOL</td>
<td></td>
</tr>
<tr>
<td>SPONSOR NAME</td>
<td></td>
</tr>
<tr>
<td>STUDENT’S SIGNATURE (REQ'D)</td>
<td></td>
</tr>
</tbody>
</table>

## SCHOOL INFORMATION

<table>
<thead>
<tr>
<th>NAME of SCHOOL</th>
<th>ADDRESS OF SCHOOL</th>
</tr>
</thead>
<tbody>
<tr>
<td>CITY, STATE ZIP</td>
<td>AREA CODE/ PHONE #</td>
</tr>
<tr>
<td>SCHOOL DISTRICT</td>
<td>PRINCIPAL’S NAME</td>
</tr>
<tr>
<td>SPONSOR’S SIGNATURE (REQ'D)</td>
<td>* If the parent is the sponsor then the parent signs</td>
</tr>
</tbody>
</table>

**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. *(Teachers/Parents duplicate any parts of this contest as needed. Check Center for Science Education CSE)*
   - [https://artsandsciences.sc.edu/cse/front-page](https://artsandsciences.sc.edu/cse/front-page)
   - Click **HERE** for CSE Home – College of Arts and Sciences – University of South Carolina Then **programs** - then **MESAS** as well as dates and other important information.
3. Place all answers to MESAS contest 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 4, 2019**.
6. Mail to: **Dr. Don M. Jordan, USC / Center for Science Education / Sumwalt Room 321 Columbia, SC 29208.**
PROBABILITY

The Nickel Example

This example is one where intuition {what you think or insight} can help in assigning a probability to an event.

A disk (use a nickel) 21 mm (approx. 2 cm) is thrown at random on a tiled floor, where each tile is a square with sides 42 mm (approx. 4 cm) in length. Let C be the event that the disk (nickel) will land entirely on one tile.

Draw a square approximately 42 mm on a side. Place the nickel in the interior of the square. Mark the center of the nickel. Move the nickel around in the square, but keeping the nickel entirely inside the square. Hint: Move the nickel from corner to corner and watch the movement of the center of the nickel. {It will trace a square inside the bigger square}

In what region must the center of the nickel lie to assure that the disk (the nickel) lies entirely inside one square?

1. That is; What is the size (Area) of the interior (inner) square? _____________________________________ (10)

2. What portion (area) of the square is this interior (inner) square? ___________________________________ (10)

3. Assign a probability to the event C, based on your intuition and observations about the size of the nickel and the size of the square: Prob(C) = _________________________ (10)

On a sheet of paper (use the entire sheet ) make a grid with each grid approximately 42 mm. Perform the experiment 50 times and record your results. {That is Toss the nickel 50 times onto the grid you made.}

4. Number of times the nickel lies on a grid line = __________________________  (10)

5. Number of times the nickel lies completely within a grid = __________________________  (10)

6. From these results assign a probability to the event C. Prob (C) = _________________ (10)

If you have trouble with this page ask your teacher or parent to coach you a little.

Theoretical Probability is what we expect to happen, where Experimental Probability is what actually happens. When we try it out the probability is still calculated the same way, using the number of possibility ways an outcome can occur divided by the total number of outcomes.
Physical Education Science Equations

1. What is the difference between an anaerobic and an aerobic exercise? _____________________________ 5
   ________________________________

2. Why should you never use your thumb to take your pulse? _________________________________ 5
   ________________________________

3. How do you find your age related maximum attainable heart rate? ______________________________ 5
   ________________________________

Dog-Eat_Dog

4. Googol Plex loves hot dogs! He ate 132 for breakfast. He had 264 for lunch. And he chowed down on 375 for dinner. On a calculator, add up how many wieners Googol Plex ate. Then turn the calculator upside down to find out how he felt. ____________________________ 5

DOTS ALL, FOLKS!

5. Can you connect these dots by drawing only four lines? Here’s the catch: You can’t lift your pencil off the page! Practice first, find your solution and then draw your solution here.

   ● ● ●
   ● ● ●
   ● ● ●

See drawing for Solution _____ (15)

PUP TENT

6. Yotta Dodaday put up a tent. She placed 10 posts on each side of the square tent. How many posts did she use? (Hint: Draw a picture!) Answer: __________________________ 5

7. What Am I?
I’m a building in Washington D. C.
Five sides make up one of me.
I’m a shape that you often see.
What shape can I possible be?
8. What am I? Answer: ________________________________ 5

The above four are contributed to: Dots All, Folks!, by Abigail Doran Indiana, Pennsylvania; Dog-Eat-Dog by Emily Bohan Rockport, Maine; PUP TENT by Jeffrey Bryan Spokane, WA; What Am I by Morgan A. Luthi Solomon, KS.

Mathematical Presidents:
Historically, some chief executives have possessed mathematical talent. One was George Washington, an accomplished surveyor; another was Abraham Lincoln. And of course Ulysses S. Grant, who showed such mathematical promise while a cadet at the U.S. Military Academy at West Point.

9. What president published an original proof of the Pythagorean Theorem? ________________________________ 5
Hint this president was born near Cleveland Ohio and was shot while boarding a train in Washington.

10. Which great American use to concoct magic squares when political debates became tedious. _____________ 5
(a) Ben Franklin (c) Strom Thurman (c) Martin Luther King (d) Abe Lincoln (e) George Washington

E Contest 2019 Grades 4 – 6 (Total No of Points = ________________ out of a possible 60)
MAY THE FORCE BE WITH YOU! ⚯

FORCE and MOTION

I. A marble is rolled across a desktop and it slowly comes to a stop. What causes the marble to stop?
   Answer: __________________________  5

II. Why does one tend to fall backward on a bus when it starts out from a stand still? ________________  5

III. A person with a mass (weight) of 400 Newtons stands on a scale on an elevator.
   A. What is the scale reading when the elevator is at rest? __________________________  5
   B. The elevator starts to move up with certain acceleration. Does the scale reading increase or decrease?
      Circle one Increase or decrease ____________________________  5
   C. After an initial acceleration period, the elevator continues to move up with a constant speed.
      Now what is the scale reading? ____________________________  5
   D. The elevator begins to slow down as it reaches the desired floor. Does the scale reading increase or decrease?
      Circle one Increase or decrease ____________________________  5
   E. If the elevator cable snapped and the elevator, scale and person fell freely, what would the scale read?
      Answer: ____________________________________  5

JUST FOR FUN! Answer the Following fill-in-blank questions:

1. Who invented the Rocking Chair? ________________________________________________________________ 5
2. Where were anti-biotics discovered? ____________________________________________________________ 5
3. In what decade was the first electronic television invented? ____________________________________________ 5
4. Where was basketball invented? ________________________________________________________________ 5
5. Who were the 3 US Presidents of Dutch ancestry? _________________________________________________ 5
6. What British game did American and Canadian football grow from? _________________________________ 5
7. Who invented the electric light bulb? ______________________________________________________________ 5
8. Who invented the motion picture camera & projector? ________________________________________________ 5
9. In what country was radar invented? ______________________________________________________________ 5
10. Who invented the helicopter? _________________________________________________________________ 5
11. During what war was the first programmable computer developed? _________________________________ 5
12. What is the date of your Regional Science Fair Spring 2019 __________ and who is the director of your Regional Science Fair ____________________________ 10 Points
    Google SC Academy of Science click on Science Fairs

E Contest 2019 Grades 4 – 6  (Total No of Points = ______________ out of a possible 100)  Page 3
Estimation with
Harold and the Purple Crayon

How far can YOU go with a purple crayon? Use estimation to find your own conclusions!

YOU NEED:
A string one meter long
New crayon Standard size
Centimeter ruler

In the book, *Harold and the Purple Crayon* by Crockett Johnson, a boy’s trusty purple crayon brings his drawings to life! Harold escapes from a scary dragon by drawing a boat and sailing away. He climbs up a mountain and falls off! But he saves himself by drawing a hot air balloon in the nick of time!

Scholastic Math Power used this story to propose the question: “How far can you really draw with a standard crayon?” This can be a project you can work on with your friends, classmates, or family. We will give you some hints below. All you need is a standard crayon (preferably purple, but not necessary) your imagination, and some estimations!

**First:** Measure the length of your crayon. Don’t measure the tip. Just measure the length from the “top line” to the bottom of the crayon. Use a Crayola Crayon with a length $\leq 9.5$ cm and diameter $\leq 0.8$ cm Fill in the blank below.

My crayon is ___________ cm long. (5)

My crayon has a mass approximately _________ g (5)

Using the flat end of your crayon—not the tip—make one drawing of your choice with your crayon. Make a simple “outline drawing” like the one here. Do not color it in.

A string

**PART TWO:** Place the string on top of the lines in your drawing. Follow each part of the drawing. Ask a friend to help hold down the string. Or tape the string in place.

Mark the string where the drawing ends. Now, pull it straight and measure it. How far did the purple crayon go to help you get started drawing?

The crayon drew a line ____________ cm long on my drawing. (Fill in the blank) (5)

**PART THREE:** Get together with your friends and do some thinking. How could you estimate how far you could draw using the whole crayon? Here are some questions to get you started. How can you use the information you already have to make your estimate? Can you think of other measurements you could use? How could you and your friends get those measurements?

My Team Estimate is ___________ cm, (25) which is the same as _________________ meters. (5)

Note: There is no one correct answer [answers will vary]

Describe in 50 words or less how your team estimated “How far you can draw with a crayon”

How many people on your team? _______________ (5)

Cut and staple your 50-words or less to the back of this page (page 4). Use the Answer Sheet provided (20)

My name is _______________ & my School is _________________________________
Write your description for part III Page 4 of the E-Contest Grades 4 – 6 here and staple to the back of page 4.  
(Teachers/Parents duplicate any parts of this test as needed. Check South Carolina Academy of Science web-page for copy of contest)  
http://scacademysci.org/  

Name: _______________________________; School: ________________________________