EMC/FFA Wiring Contest

A guide to the EMC/FFA Electrification Career Development Event.

A competitive educational program offering scholarships which promotes the safe, efficient use of electrical energy.

2008-2009 School Year Edition

Sponsored by Georgia's Electric Membership Corporations and the Georgia Association FFA

FOREWORD

Education in our nation can never reach limitations in stressing the importance of the learning process. Formal training and education are invaluable in shaping each life as it matures. We learn from other people and experiences. Those who become the "best they can be" take advantage of the broadest possible range of opportunities. They may try, fail, and ultimately learn from their mistakes. Leaders develop best when they are enthusiastic participants in change.

Your local electric membership corporation or EMC and its statewide association Georgia EMC are very enthusiastic about the opportunity of working with the FFA in support of today's young people. We believe that this EMC/FFA Electrification Career Development Event is an opportunity for change offering potential lifetime knowledge, and maybe even a career choice. This project which is rich in successful history and tradition is a mutually beneficial activity which develops leaders. With the encouragement of safe electrical wiring, an awareness of electricity, and methods of energy conservation, tomorrow's citizens are informed individuals. With a firm belief that the spirit of competition brings forth the vest in individuals in their striving for success, it is to the benefit of both the EMCs and local communities to support FFA involvement in programs like this EMC/FFA Electrification Career Development Event.

The 42 electric cooperatives in Georgia are proud of our state's FFA chapters and offer assistance to make sure this organization provides the best educational opportunity for its young leaders. Your local EMC has printed materials, program and teaching aids available, as well as personnel to assist you in answering questions about this project.

You are invited to contact your local EMC to assist you and ask them for information about this event as well as about the cooperative "way of life."

TABLE OF CONTENTS

Foreword i
Table of Contents ii
Overview 1
CDE Regional/Area Map 4
CDE Contacts by Region/Area 5
EMC Map 7
CDE Contacts by EMC 8
EMC/FFA Testimonial Letter/Quotes 9
History of the EMC/FFA CDE 11
History of Georgia's Electric Membership Corporations 12

Individual Competition
- Panel Wiring Instructions 15
- Bill of Materials 17
- Application 18
- Presentation/Demonstration Score Sheet 19
- Example Problem-Solving Questions 20
- Wiring Problem Score Card 22
- Sample Problems/Panel Design 23

Awards …….. 31
How to claim your scholarship 32
Public Relations - news release 33

GEORGIA FFA ASSOCIATION

AGRICULTURAL ELECTRIFICATION (EMC)

CAREER DEVELOPMENT EVENT

I. OVERVIEW

The Agricultural Electrification (EMC) Career Development Event is an activity, which provides opportunities for FFA members to demonstrate their skills in electrical wiring, critical thinking, and communications. The Electric Membership Corporations throughout Georgia sponsors these activities as a means of promoting education in the safe, efficient use of electrical energy.

II. PURPOSE

The overall objective of the Agricultural Electrification (EMC) Career Development Event is to promote and expand educational programs in electrification for students enrolled in agricultural education. To achieve this objective, the CDE reinforces the classroom instruction and FFA supervised activity projects in three (3) stages consisting of a problem-solving exercise, practical wiring exercise, and an oral demonstration.

III. ELIGIBILITY

Any active FFA member who is in grade 9, 10, 11, or 12 in the State of Georgia is eligible to participate in this activity. Chapters are limited to one (1) CDE contestant per chapter. The top two (2) individuals in the area CDE's may participate in the state CDE during the same year**.** ***A contestant in the State Agricultural Electrification CDE placing 1st may not participate in this CDE again.***

IV. RULES

<u>Presentation/Demonstration</u>: (10 points or 10%) Each CDE contestant will use effective communications skills in describing actual electrical wiring tasks. All participants will use the same topic: Materials, props, etc. will be provided. CDE contestants are encouraged to fully explain all necessary steps in performing the required electrical tasks. A panel of judges will score each CDE contestant on this phase of the CDE and will arrive at an average score of 1 – 10 points. These points will be included in the CDE contestant's total overall score. No written speeches will be allowed at rostrum, only 3" x 5" note outline cards.

<u>Problem-Solving</u>: (30 points or 30%) Each CDE contestant will complete a 30-item problem-solving activity within a 45 minute time limit. Each item will be a multiple-choice question relative to actual wiring practices, requirements of the National Electrical Code, and/or knowledge of rural electrification and electric cooperatives. Reference materials, which may be helpful in solving problems, will be available for use by the CDE contestant. No reference materials will be for available for the rural electrification and electric cooperatives problem-solving questions. Each problem-solving item will count one point toward each CDE contestant's total score.

<u>Wiring Problem:</u> (60 points or 60%) Each CDE contestant will complete an assigned wiring problem. Judging will be based on the current National Electrical Code. The problem will be scored (60 points maximum) on workability of assigned problem, safety, efficiency in use of materials, time required to complete the problem, and neatness. Wiring materials will be provided. Each CDE contestant must furnish his/her own tools. Cordless drills and cordless screwdrivers may be used to install device boxes and service entrance strap. Cordless screwdriver 4.0 volts or less may be used to tighten conductors to device screws, devices to device box, and device coverplates to the device, ***<u>cordless drills may not be used beyond the installation of device boxes to the wiring frame and installing the service entrance strap</u>*. No type of razor-cutting devices may be used.**

Incomplete Wiring Problem

An incomplete wiring problem is the result of a contestant calling "Time" before the 90 minute cut-off in order to receive time credit. Even though the problem may work correctly as assigned, the contestant has not met the following criteria for a completed problem:

1. Secured branch circuit cables to frame with a minimum of five (5) staples.
2. Attached all devices to box.
3. Installed all cover plates.
4. Installed the service entrance cable into service entrance panel through the cable connector.

The problem is considered to be incomplete if the above criteria have not been met and the points that the contestant would have earned on time will be reduced to zero (0).

V. EVENT FORMAT

Individual students of FFA Chapters in grades 9 – 12 compete in one of six area Career Development Events with the top two (2) winners from each area participating in a final state CDE. The CDE contestants demonstrate skills in three (3) areas. The skills encompass the following:

1. <u>A problem-solving exercise</u> that examines the student's knowledge of electric cooperative operation and history, electrical facts and knowledge, National Electric Code Book (NEC) usage, wiring circuit schematic interpretation, and circuit planning skills.
2. <u>A practical wiring exercise</u> of a specific electrical circuit that requires the CDE contestant to read a schematic, then plan and actually wire the circuit. This exercise provides a means to examine correct planning and wiring methods, efficiency and safety considerations in wiring.
3. <u>An oral demonstration/presentation</u> to strengthen leadership skills and abilities to communicate, using an assigned topic concerning some component of an electrical system.

VI. SCORING

Scoring for Agricultural Electrification (Georgia Electric Membership Corporation) career development will consist of three parts: speech/demonstration activity (10% of the total score), problem-solving activity (30% of the total score), and wiring problem (60% of the total score).

VII. TIE BREAKERS

In the event of a tie, first the CDE contestant with the highest wiring score, second the CDE contestant with the highest problem-solving score, third the CDE contestant with the highest speech/demonstration score will be declared the winner of the individual placing.

VIII. AWARDS

Awards shall be determined each year by the Board of Trustees of the Georgia FFA Foundation. This event is made possible through the Georgia Electric Membership Corporation as a special project.

IX. REFERENCES

National Fire Protection Assn. – "National Electrical Code" – Current Edition

The American Association for Vocational Instructional Materials (AAVIM) – "Electrical Wiring" – Current Edition

The American Association for Vocational Instructional Materials (AAVIM) – "Understanding Electricity" – Current Edition

The American Association for Vocational Instructional Materials (AAVIM) – "Electrical Controls" – Current Edition

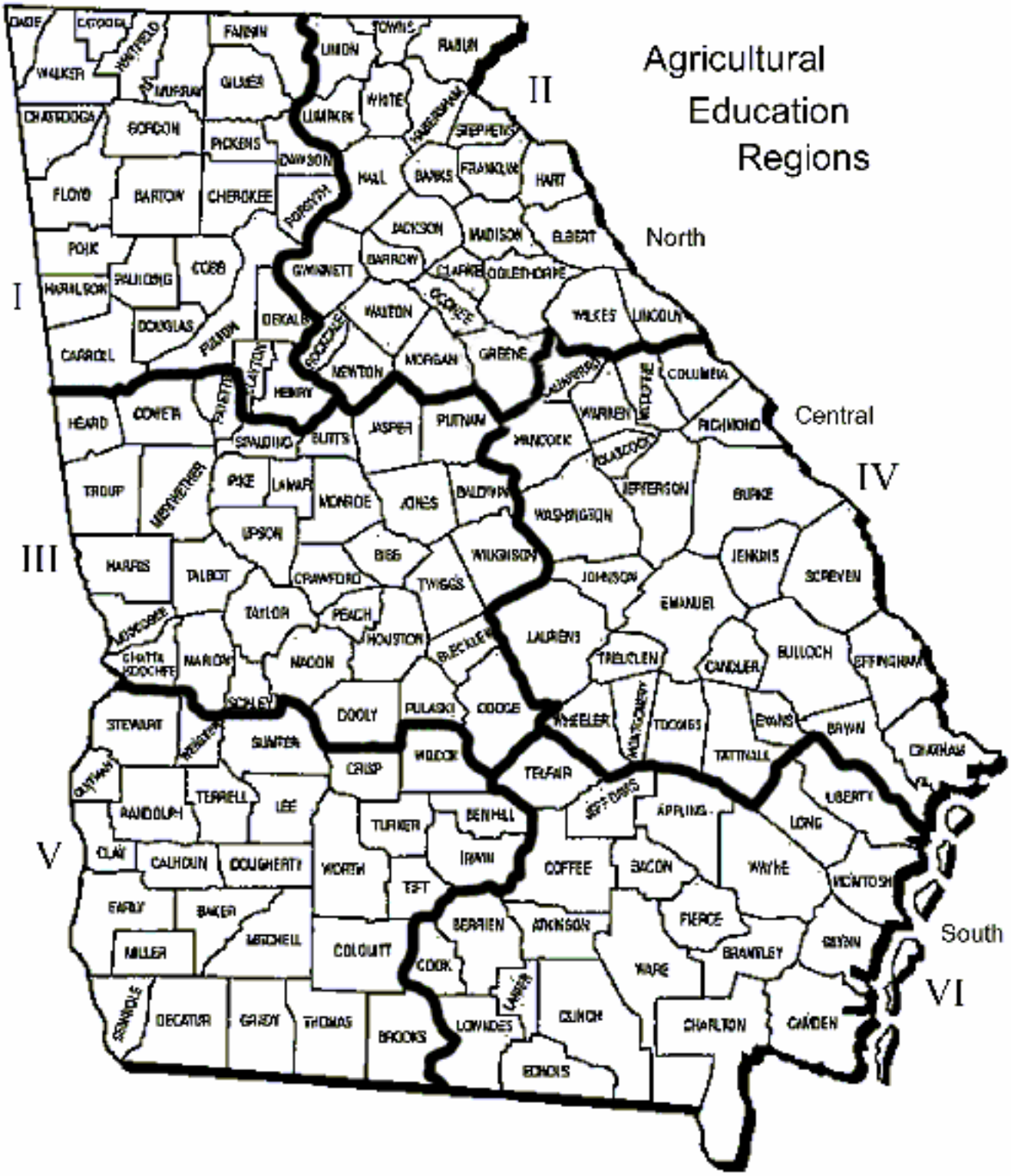
The American Association for Vocational Instructional Materials (AAVIM) – "How Electric Motors Start & Run" – Current Edition

National Food and Energy Council – "Agricultural Wiring Handbook" – Current Edition

Georgia Electric Membership Corporation – "History of Georgia's Electric Membership Corporations" – page 12 of this publication.

Georgia Electric Membership Corporations "History of the EMC Electrification Career Development Event" Current Edition - page 11 of this publication

Georgia Electric Membership Corporation – Student Guide to Wiring


Agricultural
Education
Regions
I
II
III
IV
V
VI
North
Central
South

EMC/FFA Electrification
Career Development Event Contacts

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Contact information for all state Agricultural Education staff can be found at http://aged.ces.uga.edu

Region Contacts:

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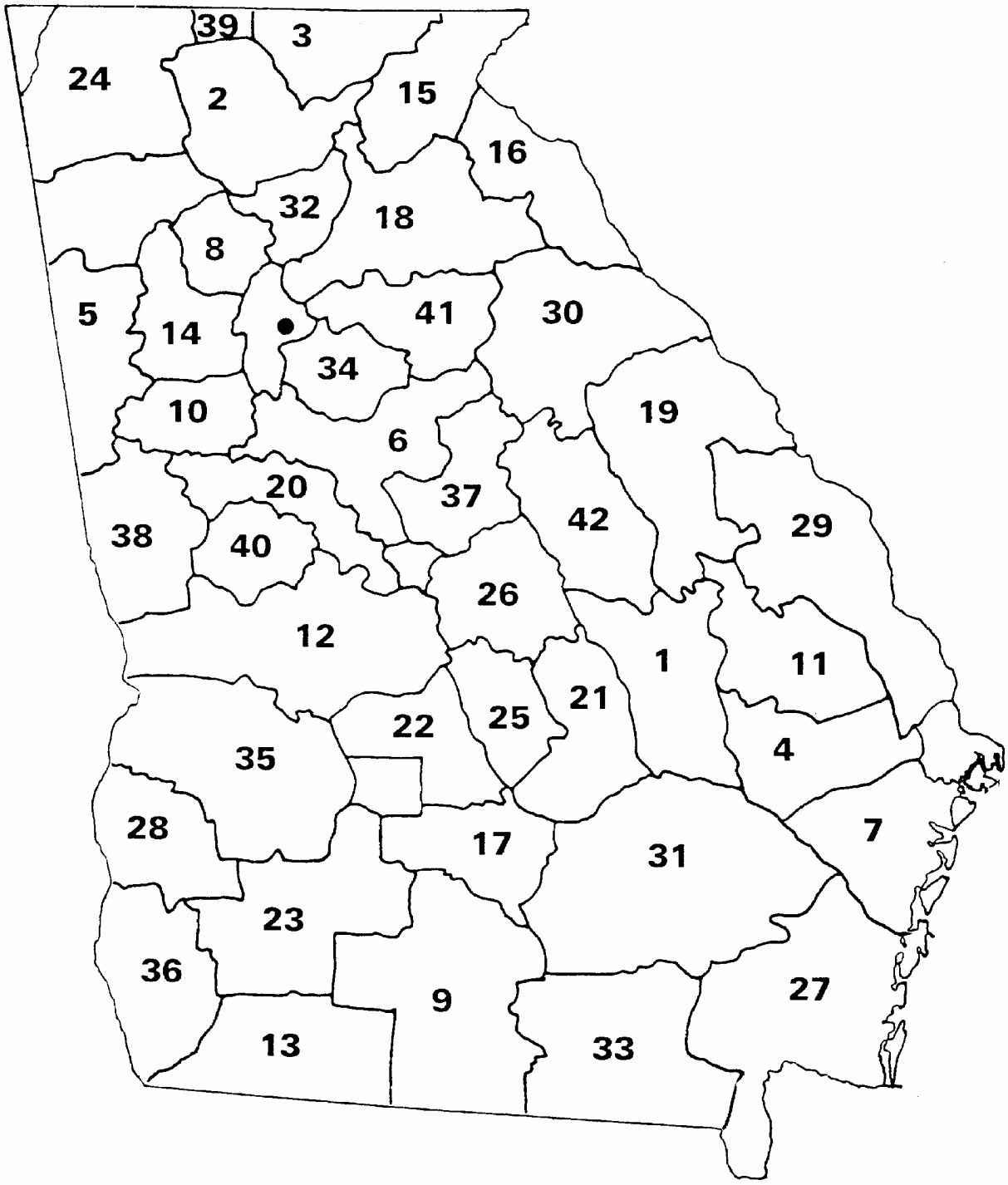
The Electric Membership Corporations of Georgia



EMC/FFA ELECTRIFICATION

CAREER DEVELOPMENT EVENT CONTACTS

Links to the Web sites of Georgia's EMCs listed below can be found at www.georgiaemc.com in the EMCs of Georgia section

1.	Altamaha EMC	Lyons, GA	912-526-8181
2.	Amicalola EMC	Jasper, GA	706-253-5200
3.	Blue Ridge Mountain EMC	Young Harris, GA	706-379-3121
4.	Canoochee EMC	Reidsville, GA	912-557-4391
5.	Carroll EMC	Carrollton, GA	770-832-3552
6.	Central Georgia EMC	Jackson, GA	770-775-7857
7.	Coastal EMC	Midway, GA	912-884-3311
8.	Cobb EMC	Marietta, GA	770-429-2100
9.	Colquitt EMC	Moultrie, GA	229-985-3620
10.	Coweta-Fayette EMC	Palmetto, GA	770-502-0226
11.	Excelsior EMC	Metter, GA	912-685-2115
12.	Flint Energies	Reynolds, GA	478-847-3415
13.	Grady EMC	Cairo, GA	229-377-4182
14.	GreyStone Power Corp.	Douglasville, GA	770-942-6576
15.	Habersham EMC	Clarkesville, GA	706-754-2114
16.	Hart EMC	Hartwell, GA	706-376-4714
17.	Irwin EMC	Ocilla, GA	229-468-7415
18.	Jackson EMC	Jefferson, GA	706-367-5281
19.	Jefferson Energy Cooperative	Wrens, GA	706-547-2167
20.	Southern Rivers Energy	Barnesville, GA	770-358-1383
21.	Little Ocmulgee EMC	Alamo, GA	912-568-7171
22.	Middle Georgia EMC	Vienna, GA	229-268-2671
23.	Mitchell EMC	Camilla, GA	229-336-5221
24.	North Georgia EMC	Dalton, GA	706-259-9441
25.	Ocmulgee EMC	Eastman, GA	478-374-7001
26.	Oconee EMC	Dudley, GA	478-676-3191
27.	Okefenoke REMC	Nahunta, GA	912-462-5131
28.	Pataula EMC	Cuthbert, GA	229-732-3171
29.	Planters EMC	Millen, GA	478-982-4722
30.	Rayle EMC	Washington, GA	706-678-2116
31.	Satilla REMC	Alma, GA	912-632-7222
32.	Sawnee EMC	Cumming, GA	770-887-2363
33.	Slash Pine EMC	Homerville, GA	912-487-5201
34.	Snapping Shoals EMC	Covington, GA	770-786-3484
35.	Sumter EMC	Americus, GA	229-924-8041
36.	Three Notch EMC	Donalsonville, GA	229-524-5377
37.	Tri-County EMC	Gray, GA	478-986-3134
38.	Diverse Power	LaGrange, GA	706-845-2000
39.	Tri-State EMC	McCaysville, GA	706-492-3251
40.	Upson EMC	Thomaston, GA	706-647-5475
41.	Walton EMC	Monroe, GA	770-267-2505
42.	Washington EMC	Sandersville, GA	478-552-2577

EMC/FFA CDE
QUOTES

The EMC CDE is perhaps the most challenging competition that I have had the opportunity to participate in. It takes many hours of preparation. I have participated for two years and was fortunate to win the Area and State in my senior year. My plans are to become an Ag teacher and to encourage my students to enter this great CDE. Many thanks to Georgia's EMCs for their investment in the lives of FFA members.

Dustin Hart
2008 EMC/FFA State CDE Winner
Colquitt County FFA

The Georgia FFA/EMC Wiring Contest is one of my favorites as an Ag teacher. This CDE teaches critical thinking skills and public speaking skills as well as electrical wiring skills that a student can use in whatever career path that they choose. Thank you Georgia EMC for your partnership with the FFA and the encouragement and opportunity that you give to the students.

Mr. Stacey Beacham
Honorary State FFA Degree 2007
Ag Mechanics Teacher, Colquitt County High School

Participating in the EMC/FFA CDE has given me the chance to develop and use skills that I never knew that I had. By participating in the CDE, I have found my career choice in the electricity field. This has impacted my life by gaining leadership and self-confidence. Thank you to all who work to make this a great experience.

Stephen Strickland
2006 EMC/FFA State CDE Winner
Colquitt County FFA

Participating in the EMC/FFA Electrification Career Development Event is one of the most memorable events throughout my high school career. The contest is the most difficult that I have ever participated in and it has taught me dedication and how to work hard to achieve my goals. The contest has also helped me with my future career goals in life to go to college and earn a degree in electrical engineering.

Brandon Pritchett
2005 EMC/FFA State CDE Winner
Chapter Treasurer 2004-05
Wayne County FFA

The EMC/FFA CDE is a wonderful opportunity that is made available to students all across the state. I was able to participate in this event for three years and gained many skills that I can use for a lifetime. The scholarship money that is provided by Georgia EMC is very helpful in my education. Many thanks to Georgia's EMCs and all those involved for what I believe is a most influential CDE.

Britt Shiver
2002-2004 EMC/FFA Area V Winner and State CDE participant
Colquitt County FFA

The EMC contest gave me direction in selecting a career as an electrician and the skills that I learned helped me to get my current job. The wiring skills, problem solving, and speaking skills that I learned helped to prepare me for technical college and dealing with customers. It was a great experience and has had a tremendous impact on my life. I would like to thank all of the individuals that worked to make this opportunity available to me and to other youth in Georgia.

Kelvin Kitchens
2003 EMC/FFA State CDE Winner
Washington-Wilkes FFA Chapter

Participating in the State EMC/FFA electrification contest was one of the greatest learning experiences I've ever had. The contest opens windows of opportunity for all who participate. Being such a prestigious contest, anyone who participates should feel honored. Through the contest I've been able to explore new fields, and make decisions for the future.

John Bramblett
American FFA Degree 2002
Georgia FFA North Region Vice President 2001-2002
2000 EMC/FFA State CDE Winner
Jefferson City FFA Chapter

I would like to thank Georgia EMC for sponsoring the electrical wiring CDE. Your assistance and sponsorship of this contest is what makes it the most exciting and prestigious CDE in the state. It is always exciting for me to see one of my students continue on into the electrical field because of the experience, knowledge, and financial assistance that they have received in this CDE.

Scott Wheatley
Banks County FFA Advisor

The EMC/FFA Electrification Career Development Event combines knowledge of the National Electric Code, wiring skills, and leadership into one noteworthy activity. The vital information and speaking skills that are obtained serve as life long influences on any person's life, male or female. The basic principles are useful to an individual of any background and any future career goal.

Personally, the event gave me the perseverance and dedication needed to complete a physical task with the determination and hard work needed to learn electrical standards. It will truly serve as a meaningful part of my life skills education.

Carol Spruill
Georgia FFA President 1997-1998
1997 EMC/FFA State CDE Winner

I find it truly amazing that one contest, such as the EMC/FFA CDE, can harness the most dynamic, dedicated, and personable youth in one event. It brings together students from all backgrounds regardless of color or gender. All participants in this event are truly winners.

Bobby Ferris
Georgia FFA Vice President 1991-1992
Southern Rivers Energy, Barnesville, GA

I know from first-hand experience how beneficial the (EMC/FFA) CDE can be. I was fortunate to win the 1973 State Electrical Wiring CDE. The scholarship money I won paid for my first two years of college at Gainesville Junior College. If not for that money, my college education would have been postponed.

During my years of teaching, I have seen this CDE help many students "blossom" into a level of confidence they did not realize they could reach. Many of these students have also gone on to pursue work or a career related to the electrical industry.

Tony Embrick
Honorary American FFA Degree 2002
Agriculture Teacher, Jackson County High School (retired)

HISTORY OF THE EMC/FFA ELECTRIFICATION CAREER DEVELOPMENT EVENT

"The enthusiasm and spirit the FFA members show each year in the EMC/FFA Electrification Career Development Event overwhelms us. This has been, and we hope it will continue to be, our most successful endeavor. Each year the Career Development event has been an improvement over the year before." These remarks, from Jerry L. Dover, 1973-1974 Electrification Career Development Event Committee Chairman, present a common sentiment of those associated with the EMC/FFA Career Development Event.

The EMC/FFA Career Development Event began at Carroll EMC in the early 1960s. Skip Yow, a Carroll EMC employee, developed plans for an electrical wiring Career Development Event.

In 1966, five North Georgia EMCs cooperated in an "area" CDE that featured a team format. The first place individual winner received a $500 college scholarship.

The first statewide EMC/FFA CDE was held at Flint EMC's Reynolds, Georgia office in March 1968. Eliminations took place in six district CDEs held that February. The two top CDE contestants in each district were eligible to compete in the state CDE. Nearly 350 students from 116 FFA chapters participated on the district level.

The state CDE that year had four parts. First was an oral presentation on rural electrification. Second was the submission of a record of electrical projects completed by the student. Third, a true-false examination on wiring and rural electrification was given. Fourth, an actual wiring problem was given to the student to solve. Larry Stallings of the Heard County FFA Chapter was the first state CDE winner.

Since the first state meet, the CDE has been improved many times. The CDE was divided into individual and chapter competitions. The record of wiring projects was eliminated from the individual CDE; this component was merged into the chapter competition. Wiring teams were eliminated.

Additional improvements included the change of the examination from a true-false format to multiple choice questioning. Since this time, the written test has been changed again, this time to a problem-solving exercise. Hands-on problems are displayed and CDE contestants are required to use practical knowledge to arrive at the best solution for each problem.

The oral or "speech" element of the CDE has also been revised. Currently in lieu of a three to four minute speech, the CDE contestant gives a demonstration of some skill needed in wiring and electrification. Actual wiring materials are used to make the demonstrations more "life-like."

The location of the state CDE also changed from the Reynolds location and is now held each year at the State FFA-FHA Camp near Covington, GA.

Agricultural educators and EMC representatives still look for ways to improve an already good CDE. For example, the use of power hand tools for the wiring problems has been implemented.

And what has happened to those young people who participated in the EMC/FFA CE of years past? Those students are now electricians, farmers, home builders, veterinarians, heating and air contractors, agricultural educators, engineers, EMC employees - - *you name it.*

No matter what occupation these winners chose, all of them have one thing in common - - friendship and fond memories of the FFA program, their EMC and the EMC/FFA Career Development Event.

HISTORY OF EMCS IN GEORGIA

It was a hot summer in 1924 when Franklin D. Roosevelt took his first vacation at his cottage in Warm Springs, Georgia, to recoup his failing health. One evening while sitting on his front porch looking out over the valley, he noticed no lights and this puzzled him.

Upon receiving his first month's electric bill, be discovered why.

". . . There was only one discordant note in that first stay of mine at Warm Springs. When the first-of-the-month bill came in for electric lights for my little cottage, I found that the charge was 18 cents a kilowatt hour – about four times what I pay at Hyde Park, New York," Roosevelt later said. "That started my long study of public utility charges for electricity into farm homes …. So it can be said that a little cottage at Warm Springs, Georgia, was the birthplace of the Rural Electrification Administration."

Eleven years later on May 11, 1935, he signed the executive order that made REA a reality. That summer discovery had been the catalyst which produced one of the largest, most successful consumer service projects ever undertaken by the United States government.

The REA, under the auspices of the New Deal administration, was designed as part of a general program to bring electric power out of the cities to the countryside in order to stimulate economic growth and relieve unemployment. It is important to remember that no rural electric cooperative is owned or operated by the Rural Electrification Administration, nor does REA generate, distribute, or sell electricity.

REA, now called the Rural Utilities Service or RUS is a federal agency in the U.S. Department of Agriculture, which provides loans and technical assistance to commercial, municipal and cooperative power companies provided they meet certain criteria. Most of the loans have been made to cooperatives to build distribution systems like your own local EMC.

America has had a love affair with electricity ever since Thomas A. Edison invented the light bulb and built the first central station electric system in lower Manhattan in 1882. Shortly afterward, cities all over the United States lit up. But, it was not until over 50 years later that the rural countryside surrounding the industrial cities started benefiting from the miracle of electricity.

At that time, nine out of ten families did without electric power. Today, 99% of the nation's farms have electric service.

How did it happen?

It began as early as 1923 when efforts were made to identify how electric power could be used on farms. The National Electric Light Association organized a committee that created and financed a rural electrification experiment near Red Wing, Minnesota with 20 farms.

Careful cost and production records were kept. The use of electricity dramatically increased, but production increased even more sharply. At the same time, overall operating expenses for the farmers dropped. They saw their lives were more productive and less tiring. The replacement of hand and animal labor by electric power worked better than expected. It looked as if the "miracle of electricity" would spread like wildfire throughout the countryside.

But it was not to be. At least, not yet.

Officials of the utility companies were not impressed. Service in the cities was their priority. Costs for bringing electric power to all outlying countryside were prohibitive. In a nutshell, though it was beneficial for the farmers, it was not seen to be profitable for the power companies.

The creation of the REA in 1935 was the necessary stimulus to spur power companies to an interest in rural electrification never displayed before. The primary function of the REA was to provide loans to power companies that would use the new funds to extend lines into rural America. Unfortunately, only a few companies applied for these funds.

In 1936, the Rural Electrification Act was signed. The Act made the REA the chief lending agency for 10 years, and made non-profit organizations such as cooperatives the main target of its funds. Thus was the customer-owned electric co-op born. And, though the coming world war was to create manpower and supply shortages, that first year of life for the new federal agency saw the number of farms connected for service increased by over 175%.

After the war, the enthusiasm for electrifying the countryside continued. The advent of new technology and the efforts of dedicated citizens throughout the United States enabled REA (now called the Rural Utility Service, or RUS) to demonstrate effectively and profitably how the job could be done. Today, there are almost 1,000 rural electric cooperatives nationwide, thanks to the support and financing of RUS. Each one has several characteristics, which differ from investor-owned utilities.

For example, a cooperative is an enterprise that is jointly owned and equally controlled by those who use its services. It is a form of business more interested in service to its members than in making profits. (Of course, it must make enough revenue to pay its own way.) In any cooperative, memberships are open to all that want to use its services, generally for a small membership fee. Co-ops also reflect true democratic control; each member has one vote, regardless of the size of investment or amount of use.

Throughout their long history, Georgia's EMCs have worked with the other utilities to strengthen their common ability to serve customers. The EMCs have done much of the leading along the way, including the building of distribution lines that now reach into 73 percent of Georgia's land area. In 1974, the EMCs formed Oglethorpe Power Corporation, a generation and transmission cooperative, to assure the delivery of electricity to parts of the State not served by Georgia Power.

In 1975, Georgia's EMCs came to the financial aid of Georgia Power with an infusion of $513 million. Demand for electricity was soaring and the cooperatives stepped in to help shoulder the burden of building new generating units. EMCs became involved in Plant Vogtle, a nuclear generating facility, when Georgia Power Company again found itself in financial difficulty, and again turned to the EMCs for assistance.

By 1987, the EMC investment in Plant Vogtle had grown to $2.9 billion. Without the financial help of the EMCs, Georgia Power would likely have been forced to shut down construction, leaving an expensive bill for its customers and shareholders to pay. Our action in coming to the aid of Georgia Power in the '70s and '80s enabled Georgia Power to realize lower interest costs in building Plant Vogtle. All utilities involved shared in the savings that resulted from the ability of the electric co-ops to borrow at low rates.

Overcoming all the obstacles encountered in building Plant Vogtle is an excellent example of how our electric utilities have always taken a "one Georgia" view of electricity supply, underscoring the EMC commitment to strengthen our communities and our state.

In Georgia, the 42 electric membership cooperatives serve 4.2 million residents – almost half of Georgia's population - and more than 75,000 commercial and industrial customers. As a result of more than seven decades of dedicated effort to improve the quality of life in rural America, many electric co-ops enjoy a value to their communities that goes beyond their ability to simply provide reliable light and heat. Communities depend on them for their economic development initiatives, their civic leadership, and their commitment to local job creation.

Although your local EMC is responsible for delivering power, it works closely with other cooperative businesses in accomplishing that task. Today, they can take credit for the formation of the nation's largest generation cooperative, Oglethorpe Power Corporation. Georgia Electric Membership Corporation (*www.georgiaemc.com*) is the statewide trade association for Georgia's EMCs. GEMC provides services in the areas of government relations, safety and training programs, economic development and communications, including publishing the state's largest circulation monthly publication, *GEORGIA Magazine (www.georgiamagazine.org).*

Looking towards the need for environmentally friendly and economically sensible power generation for our growing state, Georgia's EMCs formed a cooperative called Green Power EMC. An idea conceived in 2001 and operational by 2003, Green Power EMC is the first renewable energy program in Georgia and is one of the largest renewable energy programs in the southeastern United States. The members of the 37 participating EMCs are the first consumers in Georgia to be offered environmentally friendly electric power from their electric utilities. Green Power EMC represents more than 1.6 million homes, businesses, factories and farms in Georgia.

Green Power EMC is also educating middle and high school students about the benefits of solar energy. Through the Sun Power for Schools program, participating EMCs partner with schools to install a photo-voltaic system to harness energy from the sun and provide on-line data monitoring in the classroom. This is the first statewide academic program to evaluate the cost effectiveness of solar energy.

The forefathers of rural electrification were truly people with a purpose. The development of the rural electric program began in Georgia more than 70 years ago, and the dynamic growth hasn't slowed. Working together to attract new industry and build stronger communities, EMCs have contributed greatly to Georgia's growth.

Georgia's 42 Electric Membership Corporations

- Serve approximately 4.2 million residents – nearly half of Georgia's population.
- Georgia's co-ops serve more customers than any other state network of EMCs in the nation.
- Cover 73 percent of Georgia's land area, serving customers in 157 of Georgia's 159 counties.
- Average less than ten customers per mile of distribution line, compared with 35 customers per mile for investor-owned electric utilities and 47 customers per mile for municipal electric utilities.
- Employ almost 5,000 workers.
- Operate as not-for-profit cooperatives to offset cost of serving large land areas.
- Operate the largest distribution network in the state by far, with more than 177,000 miles of electric power lines.
- You can find out more about Georgia's EMCs by going to www.georgiaemc.com

STATE FFA-EMC ELECTRIFICATION CONTEST
RULES / INSTRUCTIONS

A. General:

1. Each contestant is responsible for providing his/her own tools. Any tool not specifically prohibited by the rules of this CDE as published will be considered proper tools unless deemed unsafe by the CDE superintendent.

** Tools that cannot be used:
- Razor cutting devices. (Utility knives, box cutters, etc)
- Corded Drills of any kind.
- Cordless Drills for any use other than mounting boxes and Service Entrance straps.
- Cordless screwdrivers over 4.0 volts.

2. No outside material or references will be allowed. Use only the references and materials provided to you for planning and completion of the assigned wiring problem.

3. All materials will be SURFACE MOUNTED on the wiring panel (simulated wall) following the accepted 1/3 rule with the 1 1/2" edge surface of the Top 2 X 4 (plate) representing the ceiling and the studs representing wall studs. (Lights in top 1/3-, switches in middle 1/3, and receptacles in bottom 1/3).

4. The overall allotted time for the wiring portion of this CDE will be two hours to include 30 minutes of planning, and 90 minutes of "work" time.

5. Safety Glasses must be worn during the wiring portion of the CDE.

6. In case of an accident, notify the judge immediately. We will stop your time, treat your injury, and then resume the contest.

B. Each contestant will have a maximum of 30 minutes to make plans and procure materials after the wiring problem given out. During this 30 minute period, the contestant will be allowed to:

1. From the floor plan, make a wiring Diagram drawing of the circuit on the paper provided. (Not to be graded.)

2. Using the Diagram as a guide, select the proper devices and materials needed to complete the wiring problem according to the 2005 National Electric Code and complete the Bill of Materials provided with the *exception of circuit wire, Service Entrance cable, and Grounding wire, which will be available free choice after wiring time has begun*. Economy of materials should be considered; you will be docked points for extra or excessive materials left over after completing the problem.

3. Present the completed Bill of Material to the "Storekeeper" who will assemble the requested materials.

4. After picking up your items from your Bill of Materials, take the "sack" of materials back to your station, lay out the materials and check for correctness of ordered materials but no "work" can begin. Work includes any assembling or disassembling of materials as received from the "store" as well as mounting of boxes and cutting of wire.
**If you ordered an incomplete Bill of Material, additional materials may be acquired by completing another Bill of Material form. Additional order forms may be acquired and filled, *ONLY AFTER THE 90 MINUTE WIRING TIME HAS BEGUN.* NO MATERIAL MAY BE RETURNED TO THE "STORE". If the Bill of Materials was not filled correctly, bring it to the attention of your "storekeeper" immediately.

5. Lay out and arrange TOOLS in anticipation of beginning the wiring problem.

C. Each contestant will be given a maximum of 90 minutes to complete the actual wiring of the problem to include 60 minutes of "work" time in which to wire the problem without loss of points for time, and 30 minutes to complete the problem after the allotted 60 minutes resulting in loss of points for time. All "work" will cease after the 90 minute wiring period and the contestant will leave the wiring area to complete the Problem Solving and speech Demonstration portions of the CDE.

After the signal has been given, the contestant may:

1. Select wire from the supply available (list below). Do not carry coils of wire to your work station.

2. Install the circuit on the short side of the wiring panel (simulated wall) with the 1 1/2" edge surface of the Top 2 X 4 (plate) representing the ceiling and the studs representing studs.

3. Connect devices and lights with hooks at terminals only, DO NOT BACKWIRE! **Exception is the GFCI outlet, which is designed to be backwired but does use the screw terminal in the process.

4. Since no weatherhead is installed, ground the Service Entrance Panel to an assumed "driven" ground.

5. Upon completion of the assigned problem, signal the time keeper. No further work can be done after "TIME" is called.

6. Problems will be mounted on the wiring panel as described on the floor plan. No points will be given for workability if installation is not the ASSIGNED PROBLEM.

7. All points gained for completing the problem within the 60 to 90 minute "work" period will be forfeited if the problem is deemed "Incomplete."

** An incomplete wiring problem is the result of a contestant calling "Time" before the 90 minute cut-off in order to receive time credit. Even though the problem may work correctly as assigned, the contestant has not met the following criteria for a complete problem:

1. Secured branch circuit cables to the frame with a minimum of five (5) staples.
2. Attached all devices to boxes.
3. Installed all cover plates.
4. Installed the Service Entrance cable into the Service Entrance Panel through the cable connector.

** Light bulbs do not have to be installed to be a "complete* problem and are not listed on the Bill of Material.

8. The wiring problem, ALL RELATED WORK SHEETS AND REFERENCES, and extra materials ordered from the "store" and not used, MUST BE LEFT AT THE WORK STATION after completing the problem for the contestant to be scored.

D. Judges will answer questions concerning DEFECTIVE MATERIALS, but not questions concerning the wiring problem.

The following sizes and types of wire will be available for the contestants to choose from:

SEU	#1	3 conductor aluminum	No. 4 soft drawn bare copper
SEU	#2	3 conductor aluminum	No. 6 soft drawn bare copper
SEU	#4	3 conductor aluminum	No. 8 soft drawn bare copper
N.M. Cable		14/2 w/ground	N.M. Cable 12/2 w/ground
N.M. Cable		14/3 w/ground	N.M. Cable 12/3 w/ground

STATE BILL OF MATERIALS
EMC/FFA CONTEST

Contestant Number_____

_____ Box, 4" X 1 1/2" round or octagonal w/o clamps, 1/2" knockouts
_____ Box, 4" X 2 1/8" round or octagonal w/o clamps, 1/2" knockouts
_____ Box, 4" X 1 1/2" square, 1/2" knockouts
_____ Box, 4" X 2 1/8" square, 1/2" knockouts
_____ Box, 4" X 2 1/8" X 1 7/8" device, handy, w/o clamps, 1/2" knockouts
_____ Box, 4" X 2 1/8" X 2 1/8" device, handy, w/o clamps, 1/2" knockouts
_____ Box connector, 1/2" non-watertight
_____ Box connector, 1" non-watertight
_____ Box connector, 1 1/4" non-watertight
_____ Oval service cable strap, #1 - 3 conductor
_____ Oval service cable strap, #2 - 3 conductor
_____ Oval service cable strap, #4 - 3 conductor
_____ Circuit breaker, 15 amp, 120v., single pole
_____ Circuit breaker, 20 amp, 120v., single pole
_____ Coverplate, metal, duplex receptacle, handy box
_____ Coverplate, metal, GFCI duplex receptacle, handy box
_____ Coverplate, metal, toggle switch, handy box
_____ Coverplate, metal, single duplex receptacle, for 4" square box
_____ Coverplate, metal, GFCI duplex receptacle, for 4" square box
_____ Coverplate, metal, double duplex receptacles, for 4" square box
_____ Coverplate, metal, single switch, for 4" square box
_____ Coverplate, metal, double switch, for 4" square box
_____ Coverplate, metal, comb. switch & duplex receptacle, for 4" sq. box
_____ Lampholder, keyless
_____ Receptacle, duplex outlet, grounding
_____ Receptacle, duplex outlet, ground-fault circuit-interrupter type
_____ Screws, #10 X 3/4" hex head
_____ Switch, single pole toggle
_____ Switch, three-way toggle
_____ Switch, four-way toggle
_____ Clip, grounding box
_____ Grounding pigtail with grounding screw
_____ Grounding pigtail without screw
_____ Staple, NM cable
_____ Connector, yellow, solderless
_____ Connector, red, solderless
_____ Connector, green grounding
_____ Electrical Tape - Black
_____ Electrical Tape – Red
_____ Electrical Tape - White

Revised 7/1/04

FFA/EMC ELECTRIFICATION
CAREER DEVELOPMENT EVENT APPLICATION

THIS APPLICATION IS TO BE FILLED OUT COMPLETELY BY THE INDIVIDUAL SELECTED TO REPRESENT THE CHAPTER IN THE _____ (REGION/AREA) CAREER DEVELOPMENT EVENT, AND MAILED OR FAXED TO THE RESPECTIVE REGION COORDINATOR BY _____.

CONTESTANT'S NAME_____

ADDRESS_____CITY_____ZIP_____

PARENTS_____

CHAPTER_____SCHOOL_____

SCHOOL ADDRESS_____CITY_____ZIP_____

CHAPTER ADVISOR(S)_____

ADVISOR'S ADDRESS_____CITY_____ZIP_____

CHAPTER ADVISOR(S)_____

ADVISOR'S ADDRESS_____CITY_____ZIP_____

NAME OF ALTERNATE_____

ADDRESS_____CITY_____ZIP_____

PARENTS_____

MAIL TO or FAX TO: (Region Coordinator)_____

(Address)_____

_____

FFA/EMC ELECTRIFICATION CDE
DEMONSTRATION/PRESENTATION ACTIVITY SCORE SHEET

CONTESTANT NO._____ **SCORE**_____

KNOWLEDGE

FACTS/ ACCURACY OF STATEMENT	**(25 POINTS)** _____
CONFIDENCE	**(5 POINTS)** _____
UNDERSTANDABLE	**(10 POINTS)** _____
SUBTOTAL	***(40 POINTS)*** _____

UTILIZATION OF MATERIALS PROVIDED

EFFECTIVE USE OF MATERIALS	**(15 POINTS)** _____
ORGANIZATION OF MATERIALS	**(10 POINTS)** _____
SUBTOTAL	***(25 POINTS)*** _____

PRESENTATION

GESTURES	**(5 POINTS)** _____
POSTURE	**(5 POINTS)** _____
EYE CONTACT	**(5 POINTS)** _____
VOICE PROJECTION	**(10 POINTS)** _____
SUBTOTAL	***(25 POINTS)*** _____

APPEARANCE

(10 POINTS) _____

SUBTOTAL ***(10 POINTS)*** _____

TIME LIMIT

OKAY ☐

OVER ☐	**(6 MINUTES, DEDUCT 5 POINTS)** _____
	(7 MINUTES, DEDUCT 10 POINTS) _____
	(8 MINUTES, DEDUCT 15 POINTS) _____
	(9 MINUTES, DEDUCT 20 POINTS) _____
	(10 MINUTES, DEDUCT 25 POINTS) _____
	(WILL BE STOPPED AT 10 MINUTES) _____
UNDER ☐	**(4 MINUTES, DEDUCT 5 POINTS)** _____
SUBTOTAL	***(MINUS 25 POINTS MAXIMUM)*** _____

SUBTOTALS

KNOWLEDGE	**(40 POINTS)** _____
UTILIZATION OF MATERIALS PROVIDED	**(25 POINTS)** _____
PRESENTATION	**(25 POINTS)** _____
APPEARANCE	**(10 POINTS)** _____
TIME LIMIT	**(-5 POINTS)** _____

TOTAL

(100 POINTS) _____

EMC/FFA Career Development Event Revision 7/1/04

NOTE: NO WRITTEN SPEECHES WILL BE ALLOWED AT ROSTRUM
ONLY 3X5 OUTLINE CARDS ARE PERMITTED

EMC/FFA CAREER DEVELOPMENT EVENT
EXAMPLE PROBLEM SOLVING QUESTIONS

1. **Using the 120/240 Volts, 3-Wire, Single Phase Dwelling Services – Conductor Types & Sizes Table in Article 310, Notes to Ampacity Tables of 0 to 2000 Volts, determine what size service can be installed using the USE cable of the size displayed at this station.**

2. **Using the wire gauge provided, determine the AWG size of the conductor sample at this station.**

3. **Using Table 370-16(a), determine if the box at this station is big enough for the number of conductors and devices installed in it and indicate your answer with a YES or NO on the appropriate line on the answer sheet. If you determine that the box is NOT big enough, recommend the correct size.**

4. **Based on the conductor count rules in Article 370-16a(1) of the NEC, how many allowances must be made to determine if the box is the correct size?**

5. **Using Table 310-16, determine what size copper conductor should be protected with a 30 Amp circuit breaker if type THHN wire is used.**

6. **Using tables 10 through 39 in the Agricultural Wiring Handbook, determine the size aluminum conductors which should be used when installing 2-500 Watt security lights to operate on 120 volts. The installation is to be made underground 175 feet from the Service Entrance panel and should not have more than 4% voltage drop.**

7. **Using the attached Table VIII, determine the type and size wire and the circuit breaker rating for installing a <u>Freezer</u>.**

   A. 10 – 2 30 – 40 A-2P
   B. 10 – 3 30A-2P
   C. 12 – 2 20A-1P
   D. 6 – 3 50A-2P

8. The first electric cooperatives were organized because:

A. Schools, churches, and hospitals were receiving electricity before farmers.
B. Labor unions caused electric rates to be unusually high.
C. Early electric farm machinery was designed for use with 230-volt systems.
D. Power companies found it too expensive to supply rural areas with electric energy.

9. How many receptacles on this circuit are GFCI protected?

10. Using the attached Table VI, determine the proper size over current protection if a circuit is installed with wire the size of the sample displayed at this station.

A. 15 Amp
B. 20 Amp
C. 30 Amp
D. 40 Amp

11. A branch circuit supplying a single motor should have an ampacity rating of not less than _____% of the motor full current rating.

A. 80%
B. 125%
C. 100%
D. 110%

NEC, Article 430-22

12. What does the UL stamp on this receptacle assure you of?

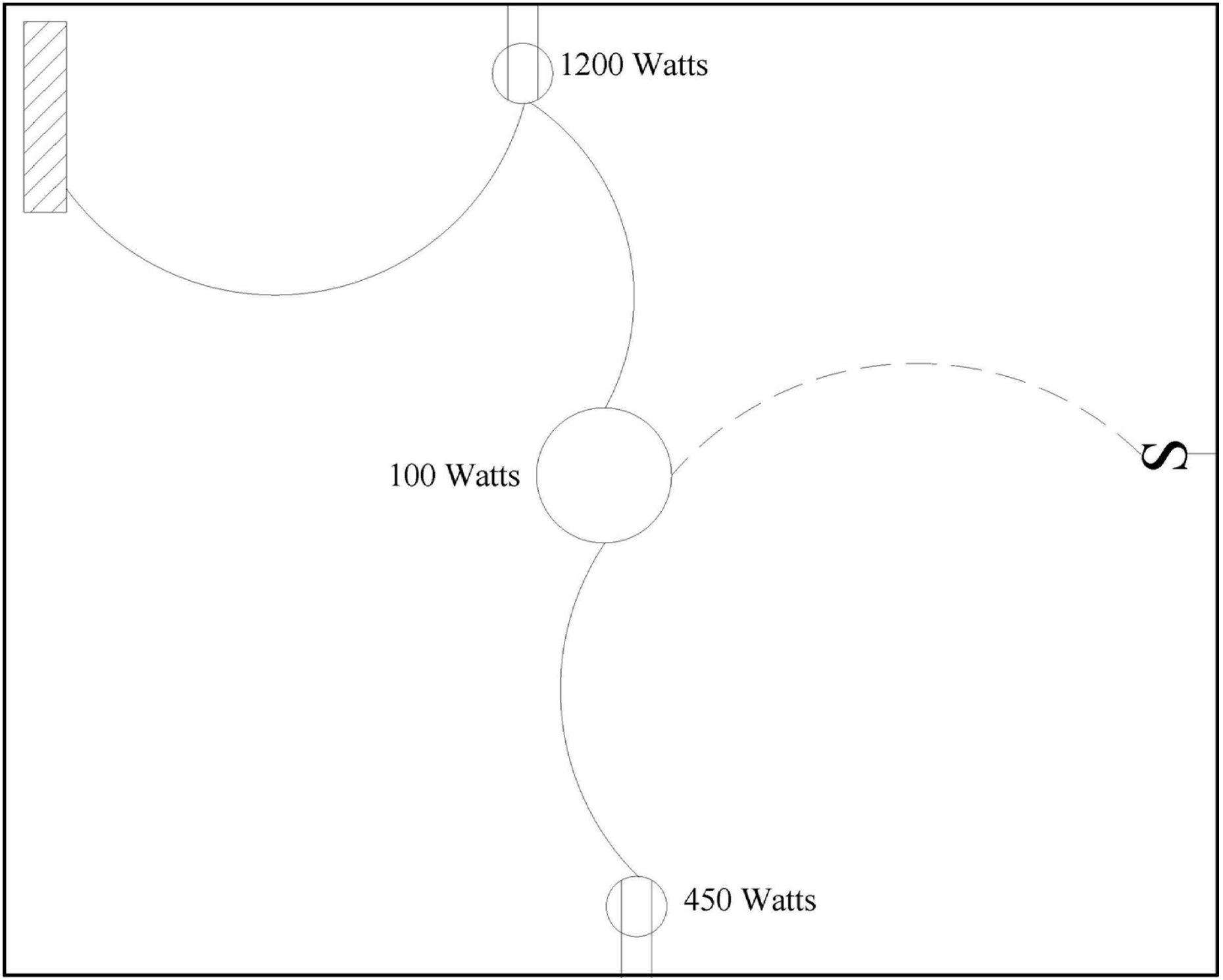
A. The receptacle can be used in wet locations.
B. This is a grounding type receptacle.
C. This product meets minimum safety requirements.
D. This product is of a standard quality.

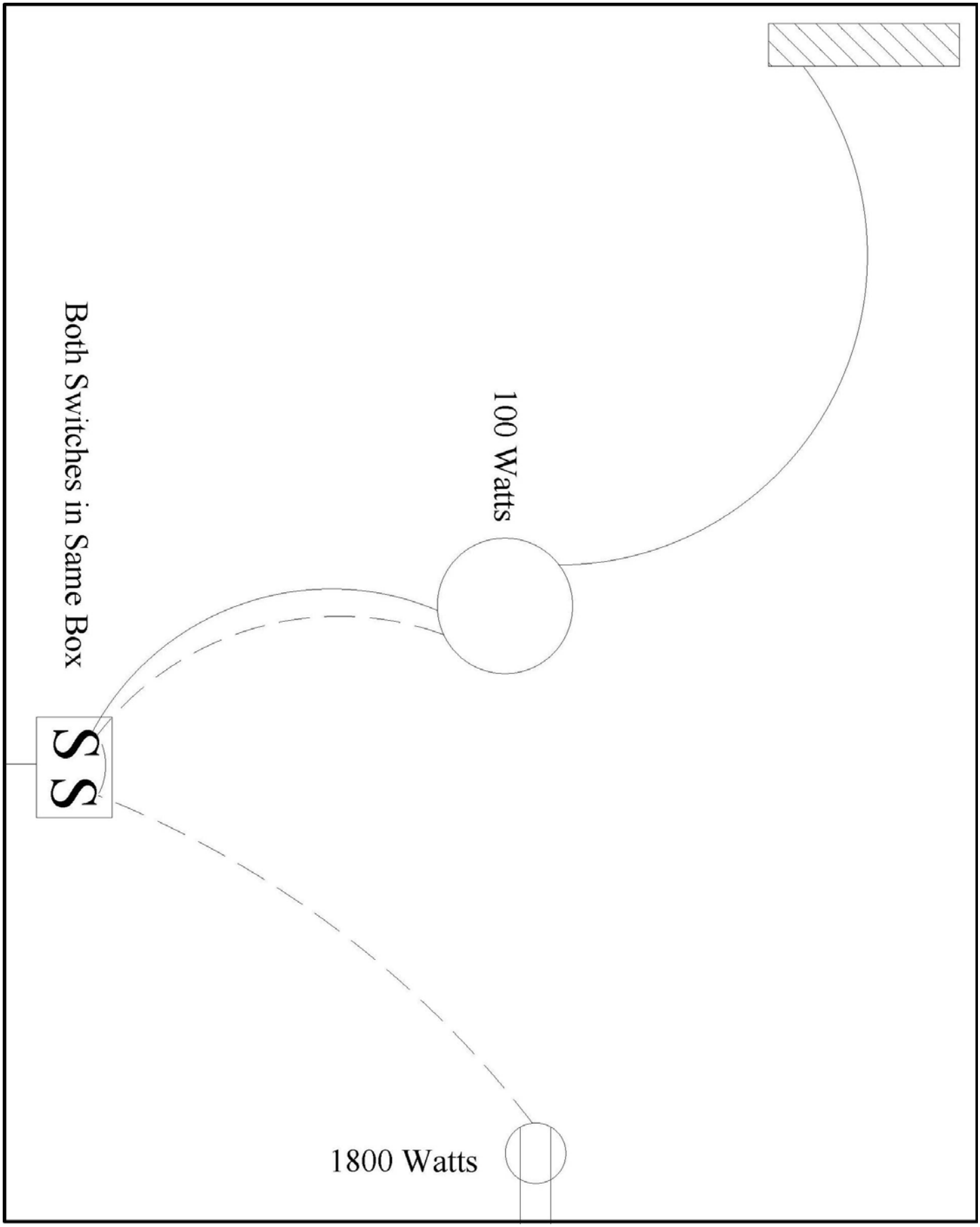
Electrical Wiring, Page 8

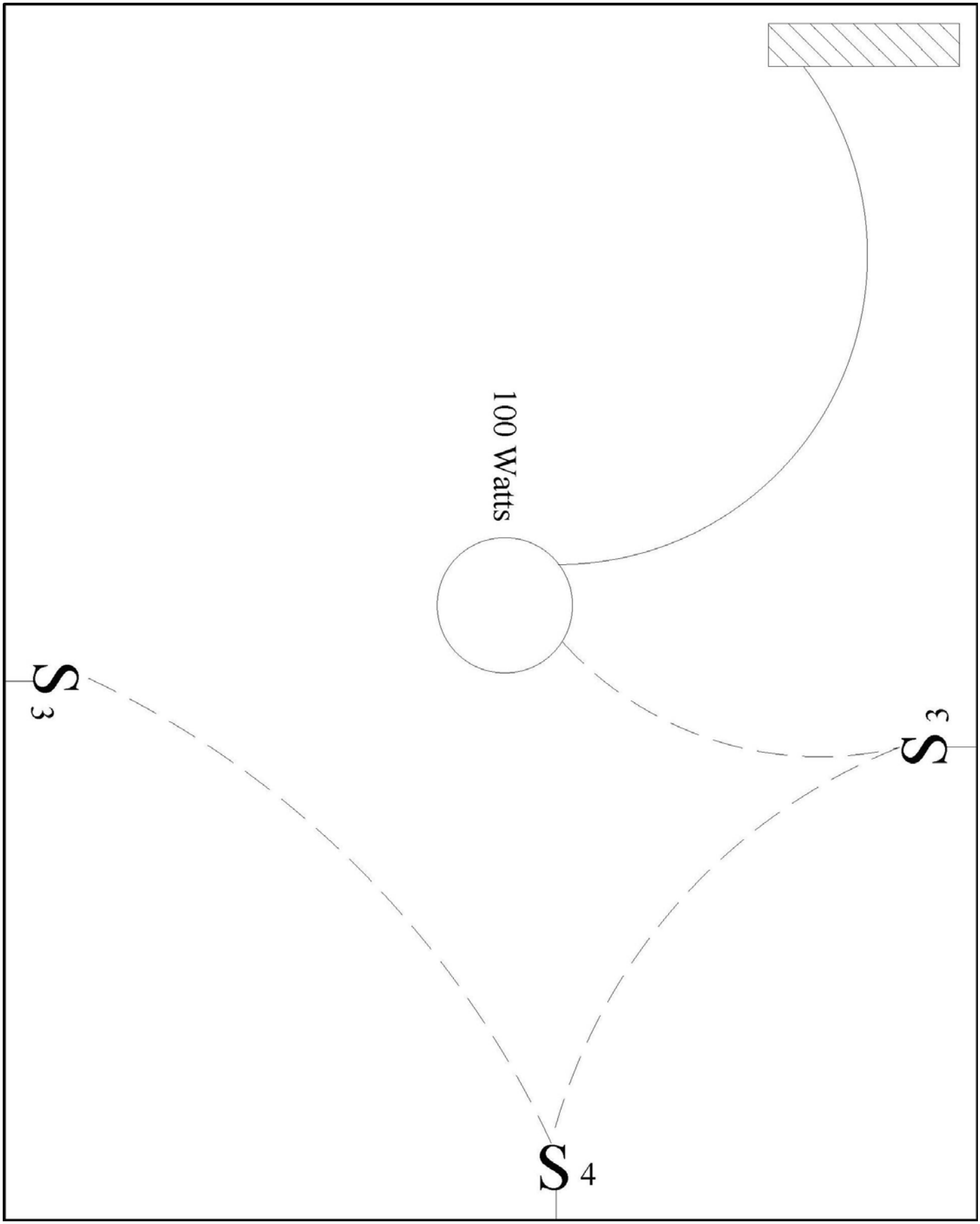
CONTESTANT NO. _____ STATE EMC/FFA WIRING PROBLEM SCORECARD TOTAL SCORE_____

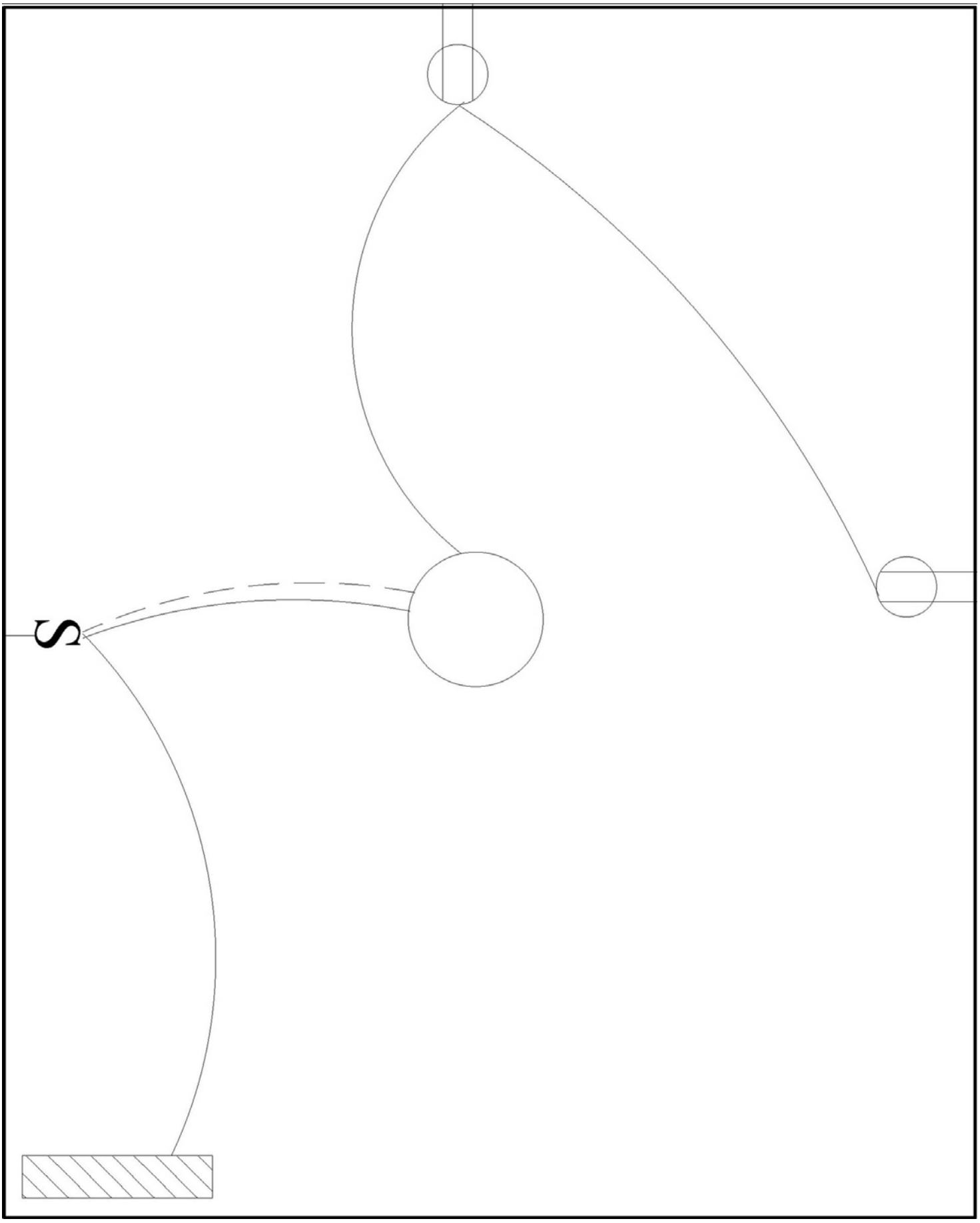
TIME	POINTS	SCORE
60 MIN - 60 PTS. 80 MIN - 20 PTS. 65 MIN - 50 PTS. 85 MIN - 10 PTS. 70 MIN - 40 PTS. 90 MIN - 0 PTS. 75 MIN - 30 PTS.	XXXXX	
TOTAL MINUTES _____ Incomplete problem will receive a "0" for time	60	
Workability of assigned problem	45	
Assigned problem wired correctly	20	
Efficient use of wire and other materials	20	
Wore safety glasses while completing assigned problem	10	
Appropriate tools	4	
Tools Used Properly	4	
SERVICE ENTRANCE		
1. Cable correct size	11	
2. Service Entrance cable straight, flat/parallel to surface	3	
3. Service Entrance cable strapped properly	4	
4. Service Entrance Cable-box connectors properly used (tight, nut on correctly, clamped correctly, cable properly fitted into connector)	3	
5. Insulation of cable properly removed (Service Entrance & Branch Circuit)	5	
6. Service Entrance cable conductors properly attached to the correct service entrance terminals	10	
7. Service Entrance cable proper length inside panel	5	
8. Ground wire correct size	13	
9. Ground wire stapled	5	
10. Bonding screw properly installed	10	
11. Branch Circuit cable correct size (for assigned problem)	10	
12. Circuit Breaker correct size	24	
13. Branch Circuit wires properly connected (Black, white, bonding)	10	
14. Conductors fitted inside panel	5	
15. N.M. Cable properly attached to service entrance panel (by cable connector)	3	
16. Knockout holes properly plugged	5	
COLUMN TOTAL	289	

BRANCH CIRCUIT	POINTS	SCORE
1. Proper use of 2 or 3 wire cable	10	
2. Wire straight and parallel to surface	8	
3. Staples properly used	10	
4. Cable box connectors used properly	15	
5. No insulation cut outside/inside boxes	15	
6. Switch, outlet and light boxes properly located, mounted straight and tight	20	
7. Correct size of fixture boxes	25	
8. Correct coverplates	10	
9. Devices properly mounted in boxes	10	
10. Correct kind of switches	20	
11. Correct kind of receptacle	20	
12. Bond wire used properly	25	
13. Wire folded neatly inside boxes	8	
14. Six inches free conductor in switch, outlet and light boxes	15	
15. Insulation 1/2" or less inside boxes	5	
16. Identified terminals correctly used a. Switches _____ b. Receptacles c. Lamp _____ (Total 20 Points)	20	
17. Used white wire correctly (as identified conductor)	30	
18. Hooks made and used properly	15	
19. Splicing devices correct size, tight on wire and free from exposed bare wire	25	
20. Knockout holes properly plugged	5	
COLUMN TOTAL	311	


1200 Watts
100 Watts
450 Watts
S


Both Switches in Same Box
S S
100 Watts
1800 Watts

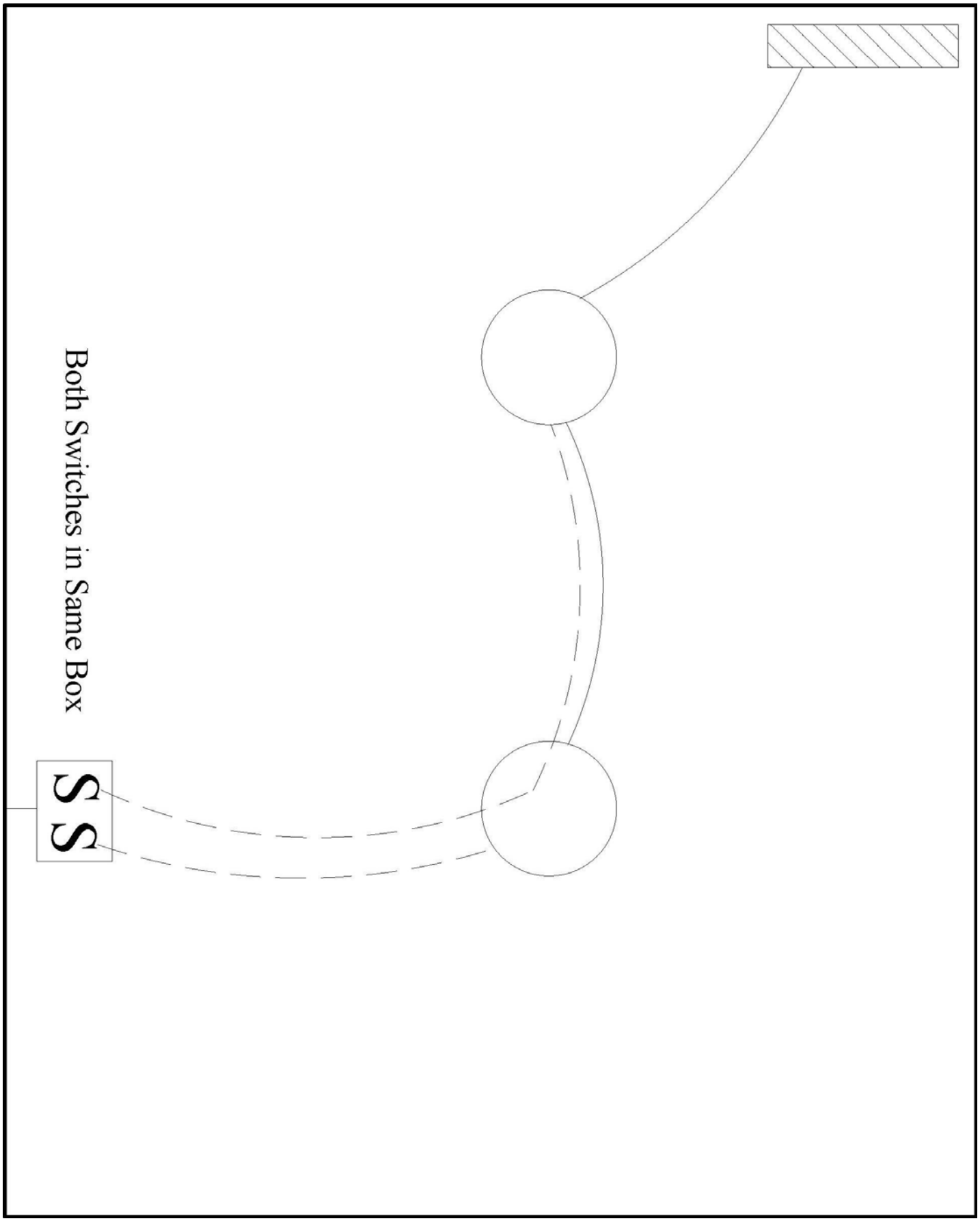

100 Watts
S 3
S 3
S 4



600 Watts
Both Switches in Same Box
SS
100 Watts

600 Watts
Both Switches in Same Box
S
S
100 Watts

S
S
100 Watts
400 Watts
100 Watts


Both Switches in Same Box
S
S

EMC/FFA CAREER DEVELOPMENT EVENT
GEORGIA EMC

AWARDS

Area Career Development Event

1st Place – Individual	$500.00 Scholarship & Plaque
2nd Place – Individual	$300.00 Scholarship & Plaque
3rd/4th/5th Place – Individual	Plaques
1st Place – Advisor	$50.00 & Plaque
1st Place – Chapter	Plaque
2nd Place – Chapter	Plaque

State Career Development Event

1st Place – Individual	$1,000.00 Scholarship & Plaque
2nd Place – Individual	$750.00 Scholarship & Plaque
3rd Place – Individual	$500.00 Scholarship & Plaque
4th – 12th Place – Individuals	State Finalist Plaques
1st Place – Advisor	$250.00 & Plaque

GEMC

Georgia Electric Membership Corporation

Congratulations on earning a scholarship in the area and/or state EMC/FFA Wiring Contest. Your scholarship is good at the college, university or vocational institution of your choice.

To receive your scholarship, Georgia Electric Membership Corporation (Georgia EMC) must receive verification of your enrollment from the registrar's office at your school. Georgia EMC then issues a check to your school, where the fund will be administered by the financial aid office.

Please mail or email verification of enrollment to:
Gale Cutler
Georgia EMC
PO Box 1707
Tucker, GA 30085-1707
gcutler@georgiaemc.com

Or fax to:
Gale Cutler, (770) 270-6995

The scholarship must be used by within five years or it is forfeited.

Georgia's electric cooperatives are pleased to sponsor this program to recognize and reward the outstanding achievements of our state's young people.

Agricultural Electrification (EMC) News Releases

Agricultural Electrification (EMC) news releases can be found on the Georgia Agricultural Education Curriculum Resource and Reference CD. Click on the FFA button, and then scroll down until you find the news release you need for the occasion.