**Exploring Biotechnology – Middle Grades CDE**

**Purpose**

The Middle Grades Exploring Biotechnology CDE is designed to test middle grades FFA members’ knowledge of biotechnology tools, processes, and practices. Members are tested on their ability to identify biotechnology tools, performance on a written test, and their ability to perform a lab practicum as a team.

**Sponsor**

This event is sponsored by The North Carolina FFA Association.

**State Event Superintendent**

The superintendent for this is Mr. Jason Davis, State FFA Coordinator, Department of Agricultural and Extension Education, NCSU, Campus Box 7654, Raleigh, NC 27695-7654. Phone: 919.515.4206 Fax: 919.513.3201  
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**Eligibility**

This event is open to all Middle Grades FFA chapters (6th – 8th grade) and Middle Grades FFA members in good standing. Members winning a previous state event in this area are ineligible.

**Teams shall consist of three or four members. Four scores will count towards the team total (A three-member team will earn a zero for the 4th score).**No alternates are allowed in state events. Any alternate found participating in a state event will result in team disqualification.

The use or possession of cellular phones, Personal Digital Assistants (PDA’s) or any other mobile electronic communication device is prohibited during any state-level career development event. Any violation of this rule will result in total disqualification.

Any member found cheating in any state-level career development event will result in total disqualification for that event.

At the North Carolina Middle Grades FFA State Competition, members may participate in only one career development event with the exceptions of Middle Grades Parliamentary Procedure, Middle Grades Prepared Public Speaking and Middle Grades Parliamentary Procedure.

**Dress Code**

Participants are required to follow the North Carolina FFA Career Development Event Dress Code. A ten percent reduction in the total team score will be taken if a participant violates the dress code. Participants are allowed to wear long pants, an appropriate shirt with a collar or an appropriate high school or FFA t-shirt.

**Procedures for Administering the Event**

The event coordinator shall be responsible for setting up the event, choosing event officials, and developing materials according to the criteria listed below.

**The Tools and Materials Identification Phase (40 points)**

1. Twenty (20) tools will be selected from the attached official list.
2. Each tool used in the event shall be identified by a number. Participants may examine tools.
3. Participants will place the identification number of the tool in the space to the left of that tool name on the official list.
4. When two sets of tools are used, they shall include the same tools.
5. No tool will be used more than once in the identification portion of the event.
6. Each participant will be assigned a tool to begin identification.
7. Each participant will remain at each tool for one minute and then progress to the next tool. 20 minutes total will be given for the identification round.
8. No participant will be permitted to return to a tool for a second time.
9. Grading will be done by giving two (2) points for each tool correctly identified.
10. If it is observed that a participant uses the same number on his or her paper for more than one identification, neither number will be counted as correct thus resulting in a penalty for using the same number twice.
11. When teachers are involved in the grading of papers, they shall not grade any papers of their own team members.

**The Tools and Materials Knowledge Test Phase (40 points)**

1. A written (matching) test designed to test the knowledge of the participants regarding the proper use(s) of 20 randomly selected tools will be developed by the coordinator selecting 20 tools and 25 uses from the attached tool identification listing.
2. Participants will place the letter of the correct use in the space to the left of each tool.
3. Each participant will be given 20 minutes to complete the test. Two (2) points will be given for each tool with the correct use.
4. When teachers are involved in the grading of papers, they shall not grade papers of their own team members.

**Lab Practicum (40 points)**

1. Students will be evaluated on completing activities at a liquid measuring station and a weighing station.
2. Students will be given ten (10) minutes at each station, 20 minutes total to complete.
3. Students will be evaluated on using proper safety techniques, accuracy, and following instructions.
4. Grading will be done by giving twenty (20) points for each station.
5. Teams will not be permitted to return to a previous station.
6. All activities at each station will be completed as a team.
7. Equipment and supplies will be provided at each station. All equipment will require manual measurements.

**Scoring**

*Maximum Score 120*

Tool Identification 40

Knowledge Test 40

Lab practicum 40

The top three scores of participants from a team will be counted to determine team rankings.

In the case of a team tie, the fourth team member’s score will be used to determine team ranking. If the event remains tied co-winners will be awarded.

In the case of an individual tie, the tie will be broken by comparing individual scores in the Tool Knowledge portion of the event. If the individuals remained tied compare the Tool Identification portion. If the scores remain tied co-winners will be awarded

**State Awards**

The following awards will be presented annually at the state FFA convention provided sponsorship is available:

State Winning Team

*First place plaque & team pins*

Second Place Team

*Second place plaque & team pins*

Third Place Team

*Third place plaque & team pins*

**Bibliography**

Exploring Biotechnology Curriculum Guide (latest edition), available on Moodle.

**Exploring Biotechnology Tools and Materials Identification List**

**Instructions**: Tools/Materials will be numbered 1-20. The contestant is to write appropriate number in the space to the left of the tool/material.

Contestant Number: \_\_\_\_\_\_\_\_\_\_\_\_\_\_ Contestant Name: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

1. Agar
2. Apron
3. Balance
4. Beaker
5. Beaker brush
6. Bunsen Burner
7. Buret
8. Centrifuge
9. Concave microscope slide
10. Crucible
11. Disposable boots
12. Distilled water
13. Dust mask
14. Face shield
15. Fire extinguisher
16. First aid Kit
17. Flask
18. Forceps
19. Funnel
20. Graduated cylinder
21. Grafting tool
22. Hedge shears
23. Hot plate
24. Hot water bath
25. Implant gun
26. Incubator
27. Lab coat
28. Liter container
29. Medicine dropper
30. Microscope cover slip
31. Monocular Microscope
32. Mortar
33. Pestle
34. Petri dish
35. pH meter
36. Pint Container
37. Pipette Pump
38. Pipette, Disposal
39. Planting bar
40. Pruning shears
41. Quart container
42. Respirator
43. Rubber Gloves
44. Rubbing alcohol
45. Ruler
46. Safety Glasses
47. Safety Goggles
48. Scalpel
49. Soil auger
50. Soil thermometer
51. Stain, methylene blue
52. Stirring rod
53. Syringe
54. Test tube
55. Test tube brush
56. Test tube rack
57. Thermometer

### Exploring Biotechnology Tools and Materials Career Development Event

#### Name Proper Use of Tools, Equipment or Materials

Agar Gelatinous extractive of a red alga used especially in culture media

Apron A garment made of cloth, plastic, or other protective materials wrapped around the waist.

Balance An instrument for weighing

Beaker A deep wide mouthed thin-walled vessel usually with a lip for pouring that is used especially in science laboratories

Beaker brush An instrument used to clean the inside of beakers

Bunsen burner A gas burner consisting typically of a straight tube with small holes at the bottom where air enters and mixes with the gas to produce an intensely hot blue flame

Burette A graduated glass tube with a small aperture and stopcock for delivering measured quantities of liquid

Centrifuge A machine used for separating substances of different densities

Concave microscope slide A cupped device to hold a small specimen

Crucible A vessel used for melting a substance that requires a high degree of heat

Disposable boots Safety device used to keep feet and shoes clean

Distilled water Purified water

Dust mask Protects the respiratory system from airborne particles

Face shield A protective device to cover the eyes, nose and mouth

Fire extinguisher A safety device used to put out fires.

First aid Kit A collection of materials to treat injury

Flask A container often somewhat narrowed toward the outlet and often fitted with a closure

Forceps An instrument for grasping, holding firmly, or exerting traction upon objects especially for delicate operations

Funnel A utensil that is usually a hollow cone with a tube extending from the smaller end and that is designed to catch and direct a downward flow

Graduated cylinder A cylinder that has been divided into increments for measuring

Grafting tool Preparing woody parts for grafting

Hedge shears Trimming and shaping hedge

Hot plate A simple portable appliance for heating or for cooking in limited spaces

Hot water bath A container filled with liquid used to raise the temperature of materials

Implant gun Injects growth hormone into animals

Incubator An apparatus with a chamber used to provide controlled environmental conditions especially for the cultivation of microorganisms

Lab coat A protective garment worn over the clothes

Liter container Any container that holds 1000 milliliters

Medicine dropper A short glass tube fitted with a rubber bulb and used to measure liquids by drops

Microscope cover slip Thin material used to mount specimens

Monocular microscope An instrument using radiations other than light or using vibrations for making enlarged images of minute objects

Mortar A strong vessel in which material is pounded or rubbed with a pestle

Pestle A usually club-shaped implement for pounding or grinding substances in a mortar

Petri dish Small shallow dish of thin glass or plastic with a loose cover used especially for cultures in bacteriology

pH meter An instrument used to measure the acidity and alkalinity

Pint container Any container that holds 16 ounces

Pipette pump Device used to accurately dispense small amount of fluids

Pipette, disposable A small piece of apparatus which typically consists of a narrow tube into which fluid is drawn by suction (as for dispensing or measurement) and retained by closing the upper end

Planting bar Setting out tree seedlings

Pruning shears Cutting and shaping shrubbery

Quart container Any container holding 32 ounces

Respirator A device worn over the mouth or nose for protecting the respiratory tract

Rubber gloves Protective device used to protect hands and fingers

Rubbing alcohol A colorless flammable liquid that is used as a solvent

Ruler A smooth-edged strip (as of wood or metal) that is usually marked off in units (as inches) and is used as a straightedge or for measuring

Safety glasses To protect the eyes from impact of foreign objects

Safety goggles To protect eyes from the liquids and vapors

Scalpel A small straight thin-bladed knife used especially in surgery

Soil auger Boring into soil to get samples

Soil thermometer Determining soil temperature

Stain, methylene blue A standard dye

Stirring rod Instrument used to mix liquids

Syringe A device used to inject fluids into or withdraw them from something

Test tube A plain or lipped tube usually of thin glass closed at one end and used especially in chemistry and biology

Test tube brush An instrument used to clean the inside of test tubes.

Test tube rack A device used to hold test tubes

Thermometer An instrument for determining temperature