

## MECHANICAL SCIENCES

Division 200  
Department 220

### Small Engines

#### Small Engines Unit 1 — Crank it Up

149. Completed Small Engines manual and e-record presented in a sturdy binder including appropriate sections in the manual completed and other items such as diagrams, drawings, photographs or attachments related to activities in the manual.
150. A display board (4 ft X 3 ft) on any topic from the Small Engines manual. Display may include an additional item related to the topic, such as tools, spark plugs, safety gear or a lubricant or fuel sample. You may use diagrams, drawings and photographs. Label and use captions to make your display as educational as possible.

#### CLASSES

1. Junior  
A. Intermediate  
9. Senior

#### Small Engines Unit 2 — Warm it Up

161. Completed Small Engines manual and e-record presented in a sturdy binder including appropriate sections in the manual completed and other items such as diagrams, drawings, photographs or attachments related to activities in the manual.
162. A display board (4 ft X 3 ft) on any topic from the Small Engines manual. Display may include an additional item related to the topic, such as classification of engines, identification of engine parts, and a calculations sample. You may use diagrams, drawings and photographs. Label and use captions to make your display as educational as possible.

#### CLASSES

181. Junior  
25. Intermediate  
29. Senior

#### Small Engines Unit 3 — Tune it Up

- A. Completed Small Engines manual and e-record presented in a sturdy binder including appropriate sections in the manual completed and other items such as diagrams, drawings, photographs or attachments related to activities in the manual.
- B. A display board (4 ft X 3 ft) on any topic from the Small Engines manual. You may use pictures or any records you kept to provide evidence of your accomplishments and what you have learned. Display may include an additional item related to the topic, such as the air and fuel systems, the electrical system, a diagram of the engine block, or a diagram of how to reassemble the air and fuel system or the electrical system. Label and use captions to make your display as educational as possible.

#### CLASSES

5. Junior  
A. Intermediate  
49. Senior

#### Advanced Small Engines — Unit 4

29. A completed e-record with emphasis on your accomplishments in your story presented in a sturdy binder. (self-determined). Include Morgan County small engines – Unit 4 report sheet.
30. A display board (4 ft X 3 ft) on any topic related to Small Engines. You may use diagrams, drawings, charts and photographs. Label and use captions to make your display as educational as possible.
31. This unit can use any type engine (tractor, car, etc.)

#### CLASSES

- A. Junior  
41. Intermediate  
69. Senior

## Bicycle

### Bicycles

All exhibits in Units 1, 2, and 3 will consist of the following:

- A. Completed project manual and e-record presented in a sturdy binder.
- B. A display board (4 ft X 3 ft) illustrating a topic investigated during the project year.

### Bicycles Unit 1 — **Bicycling for Fun**

#### CLASSES

- 73. Junior
- 77. Intermediate
- 81. Senior

### Bicycles Unit 2 — **Wheels in Motion**

#### CLASSES

- 85. Junior
- 89. Intermediate
- 1. Senior

### Bicycles Unit 3 — **Self-Determined**

#### CLASSES

- 97. Intermediate
- 101. Senior

## Electricity

### Electricity Unit 1 — **Magic of Electricity**

- A. Completed 4-H Electric project book and e-record in a sturdy binder.
- B. One article or display board (4 ft X 3 ft) which you have made as part of this study unit. (Example: homemade flashlight, simple switch, circuit with two batteries and one light bulb, compass, electromagnet, galvanometer, electric motor, etc.)

#### CLASSES

- 105. Junior
- 109. Intermediate
- 113. Senior

### Electricity Unit 2 — **Investigating Electricity**

- 81. Completed 4-H Electric project book and e-record in a sturdy binder.
- A. One article or display board (4 ft X 3 ft) which you have made as part of this study unit. (Example: circuit diagrams with explanation, series circuit, parallel circuit, momentary switch, three-way switch, soldered connection, rocket launcher, burglar alarm, etc.)

#### CLASSES

- 117. Junior
- 121. Intermediate
- 125. Senior

### Electricity Unit 3 — **Wired for Power**

- 93. Completed 4-H Electric project book and e-record in a sturdy binder.
- A. One article or display board (4 ft X 3 ft) which you have made as part of this study unit. (Example: electrical tool and supply kit, display of symbols on wires and cables and their meanings, display of light bulbs and the jobs they do best, display board on how to read an appliance name tag, chart showing the electrical usage of appliances, display board on how to replace a switch, etc.)

#### CLASSES

- 129. Junior
- 133. Intermediate
- 137. Senior

### Electricity Unit 4 — **Entering Electronics (Sr Advanced)**

- 1. Completed 4-H Electric project book and e-record in a sturdy binder.
- 2. One article or display board (4 ft X 3 ft) which you have made as part of this study unit. (Example: display of electronic parts, diode, transistor, light emitting diode (LED), LED flasher photocell alarm, light meter, silicon controlled rectifier (SCR) intruder alarm, 6-8 watt amplifier with integrated circuit, etc.)

#### CLASSES

- 141. Senior

## Computers

### NOTE FOR ALL UNITS:

1. **4-H members may stay in a unit for more than one year. The exhibit has to be different each year.**
2. **DO NOT include computer disks or other media that may inadvertently be damaged or rendered inoperable due to the transport of the project or the display process.**

**Note: Not all judging locations will have computer or internet resources available. Display items must be self-contained and capable of being judged "as is" for example, Sample printouts of code developed, multimedia projects created or web pages/sites developed. Non three-dimensional displays will be accepted.**

### Computers Unit 1 - Newbie Know-How

- A. One study binder that contains the project manual or copy of page 5 – Achievement Program Requirements with explored areas completed (page 5 of manual) and completed e-record.
- B. A display board (4 ft X 3 ft) illustrating a topic from the Expand Your Memory in the manual.

#### CLASSES

- 151. Junior
- 155. Intermediate
- 159. Senior

### Computers Unit 2 – Inside the Box

- A. One study binder that contains the project manual or copy of page 5 – Achievement Program Requirements with explored areas completed (page 5 of manual) and completed e-record.
- B. A display board (4 ft X 3 ft) illustrating a topic from the Expand Your Memory in the manual.

#### CLASSES

- 163. Intermediate
- 167. Senior

### Computers Unit 3 – P2P – Peer to Peer

- A. One study binder that contains the project manual or copy of page 5 – Achievement Program Requirements with explored areas completed (page 5 of manual) and completed e-record.
- B. A display board (4 ft X 3 ft) illustrating a topic from the Expand Your Memory in the manual.

#### CLASSES

- 171. Intermediate
- 175. Senior

### Computers Unit 4 – Teens Teaching Tech

- A. One study binder and completed e-record.
- B. A display board (4 ft X 3 ft) illustrating a topic from the Expand Your Memory in the manual.

#### CLASSES

- 179. Senior

## Geospatial

Note: 4-H members can exhibit both as an individual and/or as part of a group. The exhibits need to be different – one exhibit for the individual and a different topic exhibit for the group.

### Geospatial Level 1 – Setting Out

5. Completed e-record presented in a sturdy notebook.
6. Using the `Take Me on a Tour' activity, create a display and map showing four to six tour sites, geo-tools used to create the map, positional data for the sites, and information about the selected sites

#### OR

49. Using information from the `What Are Geographical Tools?' activity, prepare an exhibit showing and describing ten mapping tools. Explain how the mapping tools are used and why maps are important.
50. Posters/Maps must be presented on display board (4 ft X 3 ft). Exhibitors are encouraged to laminate all posters/maps or cover them with clear plastic film.

#### CLASSES

- 183. Junior
- 187. Intermediate
- 191. Senior

## Geospatial Level 2 – On the Trail

- A. Completed e-record presented in a sturdy notebook.
- B. Using the table from the 'Take Me on a Tour' activity from Level 1, create a map showing recreational historical or public service sites in your community. Determine if there is a need for additional community resources. Make written suggestions for what resources should be added and where they should be located on your map.
- C. Posters/Maps must be presented on display board (4 ft X 3 ft). Exhibitors are encouraged to laminate all posters/maps or cover them with clear plastic film.

### CLASSES

- 195. Junior
- 199. Intermediate
- 203. Senior

## Geospatial Level 3 – Reaching Your Destination

- A. Completed e-record presented in a sturdy notebook.
- B. Create a computer-generated map with layered data that provides information on a community need. Explain how the need was identified; how you gathered information; and your recommendations on how to solve the need. Use the template from 'Take Me on a Tour' activity from Level 1, to gather data for the map.
- C. Posters/Maps must be presented on display board (4 ft X 3 ft). Exhibitors are encouraged to laminate all posters/maps or cover them with clear plastic film.

### CLASSES

- 207. Junior
- 211. Intermediate
- 215. Senior

## Groups Projects (Developed by two or more 4-H members)

- A. Completed e-record presented in a sturdy notebook.
- B. Create a computer-generated map with layered data that provides information on

a community need. Explain how the need was identified; how you gathered information; and your recommendations on how to solve the need. Use the template from 'Take Me on a Tour' activity from Level 1, to gather data for the map.

- C. Posters/Maps must be presented on display board (4 ft X 3 ft). Exhibitors are encouraged to laminate all posters/maps or cover them with clear plastic film.

### CLASSES

- 219. Junior
- 223. Intermediate
- 227. Senior

## JUNIOR GRAND CHAMPION MECHANICAL SCIENCES

Sponsor: Wayne and Marilyn Small, Brush

## SENIOR GRAND CHAMPION MECHANICAL SCIENCES

Sponsor: Spradley Barr Ford of Greeley