

Students please affix one of your self-adhesive identification labels to this space. Do not obscure other parts of this page with the label. If you do not have a self-adhesive identification label, please complete the following information. Write your name as it appears on your badge.

Your Name: _____

Participation Number:

Two letter state abbreviation. →

State code (0301, 0302, to 0350) ↑

Team member number (01, 02, 03, or 04) ↑

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Students please do not write or mark within this box.

Judges, after this skill sheet has been scored and double checked, write the total score for this activity in the blank below.

Skill Activity Score: _____

Judges Initials: _____

2019 National Agricultural Technology & Mechanical Systems Career Development Event Environmental and Natural Resources Skill

Situation: A farmer is looking to add a waterway to one of his fields. He has hired a consultant to survey the land and calculate the peak runoff so that the farmer can properly size his waterway. You are to help by taking surveying measurements and answering the questions below.

Directions: You are to complete the two tasks below. You will be split into three groups. Group 1 will begin with task 1, group 2 and 3 will begin with task 2. Each person will have 5 minutes to complete task 1 and the rest of time to complete task 2. Your tasks are listed below.

1. Using the dumpy level, determine the distance between two points and the difference in elevation. Then from that find the percent slope of the field.
2. Use the *Science and Technology Guide* and the peak runoff equation to find the peak runoff of for the respective field.

Task 1: Determine the slope of the land using the dumpy levels provided and answering the following questions. Assume your dumpy level is directly in line with point "A" and point "B."

1. Bubble in the letter of the dumpy level you used on line 1 of your scan sheet. (0 points)
2. Using the stadia hairs of the dumpy level, determine the distance in feet from the dumpy level to point "A." Write this number on line 2 of your scan sheet. (1 point)
3. Using the crosshairs of the dumpy level, determine the backsight reading in feet of point "A." Write this number on line 3 of your scan sheet. (1 point)
4. Using the stadia hairs of the dumpy level, determine the distance in feet from the dumpy level to point "B." Write this number on line 4 of your scan sheet. (1 point)
5. Using the crosshairs of the dumpy level, determine the foresight in feet of point "B." Write this number on line 5 of your scan sheet. (1 point)
6. Calculate the distance from point "A" to point "B." Write this distance on line 6 of your scan sheet. (2 points)
7. Calculate the change in elevation in feet from point "A" to point "B." Write this change in elevation on line 7 of your scan sheet. (2 points)
8. Using the distances and elevations calculated above. Calculate the percent slope from points "A" to "B." Write this number on line 8 of your scan sheet. (2 points)

Task 2 questions:

Use the Science and Technology guide and the given peak runoff equation to answer the following questions. Use the given information below to find the proper inputs for each category of the peak runoff equation.

$$Q = Q_t \times L \times I \times T \times S \times V \times C \times P \times F \times Q$$

Q = Peak runoff rate in cubic feet per second

Do not write on the Science and Technology Guide.

9. Size of watershed100 Acres $Q_t =$ _____ (2 points)

Write this number on line 9 of your scan sheet.

10. Location McDonald County, MO $L =$ _____ (2 points)

Write this number on line 10 of your scan sheet.

11. Infiltration.....Below average $I =$ _____ (2 points)

Write this number on line 11 of your scan sheet.

12. Slope (Use findings from task 1) $T =$ _____ (1 point)

Write this number on line 12 of your scan sheet.

13. Length of watershed 3800 feet $S =$ _____ (2 points)

Write this number on line 13 of your scan sheet.

14. Vegetation Good quality small grain $V =$ _____ (2 points)

Write this number on line 14 of your scan sheet.

15. Contouring..... none $C =$ _____ (2 points)

Write this number on line 15 of your scan sheet.

16. Terraces none $P =$ _____ (2 points)

Write this number on line 16 of your scan sheet.

17. Frequency 25 year $F =$ _____ (2 points)

Write this number on line 17 of your scan sheet.

18. Calculate the Peak Runoff Rate $Q =$ _____ (3 points)

Write this number on line 18 of your scan sheet.

Safety: Two points will be taken off for each infraction of safety.