

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: _____

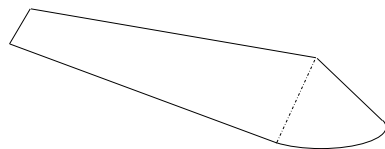
Judges Initials: _____

2016 National Agricultural Technology & Mechanical Systems Career Development Event

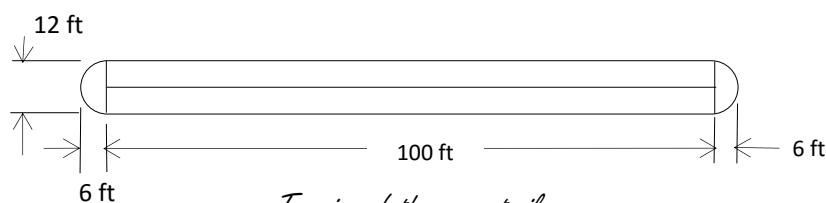
Animal Systems: Energy Systems Skill Activity

Materials Provided: Dumpy level, Philadelphia surveying rod, dry compost sample, moist compost sample, scale

Scenario: A livestock producer has a compost pile that is 112 feet long and 12 feet wide as illustrated below. The core of the pile is 100 feet long. Each end has a half-cone that has a radius of five feet. This producer wants to know how much nitrogen is available from the compost to spread on a field.



3-dimensional view of the compost pile.



Top view of the compost pile.

Given:

- Compost pile 112 feet long and 12 feet wide (you are to determine the depth)
- Moist compost weighs 35 pound per cubic foot
- Compost nitrogen content is 4 percent
- Land on which to apply the pile of compost equals 20 acres

Formulas:

- Volume of a triangular shaped pile: $\frac{1}{2} \text{ base} \times \text{height} \times \text{length}$
- Volume of a cone (used to calculate ends of pile): $\pi \times \text{radius}^2 \times (\text{height} \div 3)$
- Percent dry matter = weight of dry compost $\div$ weight of moist compost

Tasks you need to complete:

- Use the dumpy level and surveying rods to measure the simulated depth of the pile
- Calculate the volume of the core of the compost pile
- Calculate the volume of the cone-shaped ends of the compost pile
- Calculate the total weight of the compost pile
- Weight the moist compost and the dry compost to determine the percent dry matter of the compost
- Calculate the total weight of nitrogen in the compost pile
- Calculate the pounds of nitrogen applied to an acre



Figure 1. Example of compost piles

Record your answers here:

1. Reading at rod A (2 points) _____
2. Reading at rod B (2 points) _____
3. Reading at rod C (2 points) _____
4. Depth of compost pile (3 points) _____
5. Volume of 100-foot core of compost pile (2 points) _____
6. Volume of cone-shaped ends of compost pile (2 points) _____
7. Total volume of compost pile (3 points) _____
8. Weight of moist compost (2 points) _____
9. Weight of dry compost (2 points) _____
10. Percent of dry matter (3 points) _____
11. Weight of dry matter in compost pile (2 points) _____
12. Weight of nitrogen in compost pile (2 points) _____
13. Weight of nitrogen applied to each acre (3 points) _____

Scoring section: Students do not write below this line.

Item	Possible score	Individual's score
1. Reading at rod A	2	
2. Reading at rod B	2	
3. Reading at rod C	2	
4. Depth of compost pile	3	
5. Volume of 100-foot core of compost pile	2	
6. Volume of cone-shaped ends of compost pile	2	
7. Total volume of compost pile	3	
8. Weight of moist compost	2	
9. Weight of dry compost	2	
10. Percent of dry matter	3	
11. Weight of dry matter in compost pile	2	
12. Weight of nitrogen in compost pile	2	
13. Weight of nitrogen applied to each acre	3	
Safety (-1 point per infraction)		
Total points		