

## Running this workshop

This curriculum was developed with the primary focus of providing information for beef and dairy producers. Some adaptations for chickens and pigs are contained within the training design and workbook. A separate workbook for horses is available.

### A. Planning

1. Select a site and date(s)
  - a. Enough room for tables to spread materials out on and chair for each participant
  - b. Session runs for seven (7) hours (including approximately one (1) hour of breaks)
    - 1) For a one-day workshop, 9 a.m. to 4 p.m. seems best accepted choice for time
    - 2) For a series of workshops, the best breakdown seems to be 5 sessions, two hours in length.
      - (a) Introduction and sections 1 and 2
      - (b) Sections 3, 4, 5, and 6
      - (c) Sections 7 and 8
      - (d) Sections 9, 10, 11, and 12
      - (e) Sections 13, 14, 15, and conclusion
2. Enlist trainers and facilitator
  - a. For a workshop of this length, a variety of trainers is very useful in maintaining pace and interest, and allows you to call in experts in a variety of fields to enhance overall credibility of the session. In each section, we have suggested which types of specialists from your area would be a good trainer for that section.
  - b. Facilitator should conduct introduction, and make sure that objectives are all covered in each unit or prompt trainer to cover them, and then conduct closing
3. Plan publicity. Templates for brochures and press releases are included in the CD. In addition, we have included a PowerPoint presentation you can provide for publicity at meetings and other gatherings. Please send a copy of your brochure or press release to: Colorado State University  
Extension Soil and Crop Sciences  
Fort Collins, CO 80523-1170
4. Require pre-registration so you can arrange to

- a. Provide lunch for the all-day event, either sponsored or by charging participants.
  - b. Print out and collate notebook in a 2-inch, 3-ring binder with 15-tab dividers for each participant.
  - c. Have closest NRCS office provide soil survey and water source information
5. The costs associated with running this workshop include refreshments and lunches, notebook (printing, index, and binder), equipment rental as necessary, and publicity including printing and mailing costs. The grant which paid for the development of this curriculum and funded several workshops across the state is complete and the funds are no longer available.
- B. CD contains
1. Press release
  2. Brochure
  3. Sample "You're registered, bring these items" letter for one-day session
  4. Sample "You're registered, bring these items" postcards for multiple meeting session
  5. PowerPoint presentation to publicize workshop
  6. Transparencies to print
  7. Evaluation instruments
    - a. Pre-quiz
    - b. Post-quiz
    - c. Evaluation form
    - d. Training Team evaluation forms
  8. Fact Sheets
  9. Workbook contents, cover, and index
  10. BMP for Manure Utilization
- C. Other on-site needs
1. Overhead projector (works better for large groups and rooms than flip chart)
  2. Projection screen
  3. Overhead markers
  4. Flip chart (can replace or supplement overhead projector when group is small)
  5. Flip chart markers

6. Computer with PowerPoint
7. Digital projector
8. Amplifier, speakers, and microphone for large groups or rooms
9. Pointer (laser is best for power point)
10. Blank transparencies for overhead
11. Calculators
12. Complete notebook (print-out, 15-tab index, and 2-inch, 3-ring binder) for each participant
13. Three-hole punch
14. Soil, water, and manure sampling equipment
15. A few copies of each worksheet for participants to take
16. Pre-quiz for each participant
17. Post-quiz per participant
18. Evaluation per participant
19. Training Team evaluation

## Workshop Overview

### On-site registration

- Sign-in
- Get workbook
- Get pre-quiz, complete, and turn in
- Get soil inventory packets if available ??? should this be in pre-workshop stuff???

### Conduct designed training

### Post-workshop

- Return complete evaluation tools to CSU
  - Evaluation by participants
  - Pre-quiz
  - Post-quiz
  - Trainer Evaluations
- You'll get a printed summary

Follow up with phone evaluations to 3-5 participants at 6 months.

### TO DO

Design trainer's evaluation  
Questions for followup

An Sci Consultants list  
Engineering consultant's list  
Post An Sci and Engineering lists to web

## Section: Introduction

- A. By the end of this workshop, the participant should be able to:
  - 1. List the basic components of a comprehensive nutrient management plan (CNMP).
  - 2. Begin the process of constructing a CNMP for his/her operation.
  - 3. Know where to place permanent records into workbook to document CNMP.
  
- B. Contents of Workbook Section - None
  
- C. Methods and tips:
  - 1. Collect pre-workshop quiz.
  - 2. Welcome participants.
  - 3. Show cartoon.
  - 4. Establish non-threatening tone.  
Producers are leery of nutrient management plans as a topic.. Assurances that we are here to provide information and help them and NOT here to collect information for regulatory investigations is important.
  - 5. Go over the goals for the workshop.
  - 6. Introduce trainers and facilitator.
  - 7. Introduce the concept of manure management as a way to minimize hazards and maximize benefits of manure as an agricultural by-product. Elicit problems or challenges caused by manure, and then list the benefits of manure or ways to use manure to your benefit. The goal in this segment is to inform the audience of the purpose of the workshop, and to involve them in that process. For that reason, when you generate the list of benefits and hazards, it is important to get the participants to contribute their ideas. The list of hazards and benefits is included for you as a means of stimulating conversation. If no one volunteers, you could present one of these items.
  
- D. Who can or should train this session:
  - 1. Facilitator who is known and respected by audience
  
- E. Pre-training resources:
  - 1. list of hazards and benefits of manure to stimulate discussion

- F. On-site resources required:
1. Overhead projector and screen, or flip chart (overhead works best for big crowds)
  2. Markers
  3. Pointer
  4. Relevant cartoon, story, news item for attention getter

## Section I. Regulatory Requirements

- A. By the end of this session, participants should be able to:
  - 1. Determine whether his/her operation is an animal feeding operation (AFO) or a concentrated animal feeding operation (CAFO)
  - 2. Learn the basic requirements for operation a AFO or CAFO
- B. Content of workbook:
  - 1.1 Regulatory Requirements
- C. Methods and tips:
  - 1. The purpose of this segment is to introduce the regulations. A credible "speaker" should explain the current regulations and then answer questions.
  - 2. At the end of the segment, the facilitator should make sure folks know if they run an AFO or CAFO, and that they understand worksheets.
- D. Who can/should train this session:
  - 1. Ron Jepson of Colorado Department of Public Health and Environment
  - 2. Local health department staff person
- E. Pre-training resources:
  - 1. Ron Jepson's PowerPoint presentation and speaking notes.
  - 2. FAQs
  - 3. Website addresses containing pertinent information
  - 4. Video of Jepson presentation
- F. On-site resources required:
  - 1. television and VCR
  - 2. computer with PowerPoint
  - 3. digital projector
  - 4. projection screen
  - 5. overhead projector
  - 6. laser pointer

## II Section 2: Soil and Water Inventory

- A. By the end of this session, participants should be able to:
1. Generate an inventory of pertinent soil properties for his/her land.
  2. Generate an inventory of water resources on and below her/his land.
  3. Evaluate the impact of the water and soil inventory on management choices.
- B. Contents of workbook
- 2.1 Soil Inventory (2 copies)
  - 2.3 Groundwater Inventory
  - 2.4 Surface Water Inventory (ponds, creek, canals, etc.)
- C. Methods and tips:
1. If you have soil surveys for the area, help producers complete the soil inventory worksheets. If soil data have been provided, explain them.
  2. If NRCS has made copies of the pertinent maps, distribute to producers for their notebooks.
  3. Walk producers through completion of their water inventory.
  4. Discuss the relationship between soil and water, and how that impacts management choices.
- D. Who can/should train this session
1. NRCS agronomist
- E. Pre-training resources
1. NRCS soil surveys or equivalent information
  2. Sometimes NRCS completes the tables for the producers if they have the legal descriptions of the land.
- F. On-site resources required:
1. transparencies of each worksheet
  2. overhead projector
  3. projection screen
  4. markers
  5. pointer

## Section 3: Feed Management

- A. By the end of this session, participants should be able to:
  - 1. Identify and evaluate current feed management strategies in light of nutrient excretion.
  
- B. Content of workbook section:
  - 3.1 Beef nutrition self-assessment
  - 3.2 Dairy nutrition self-assessment
  - 3.3 Pig nutrition self-assessment
  - 3.4 Horse nutrition self-assessment (we hope)
  
- C. Methods and tips:
  - 1. Walk the participants through the worksheets as appropriate depending on participants needs and background.
  - 2. Go through examples of managing diet to reduce phosphorus in manure.
  - 3. Explain managing amino acid for pigs if pig producers are present.
  
- D. Who can/should train this session:
  - 1. Extension livestock staff member
  - 2. Livestock nutrition consultant
  
- E. Pre-training resources:
  
- F. On-site resources required:
  - 7. transparencies of each worksheet
  - 8. overhead projector
  - 9. projection screen
  - 10. markers
  - 11. pointer

## Section 4: Manure Production

- G. By the end of this session, participants should be able to:
  - 1. Calculate annual manure production of herd.
  
- H. Contents of workbook section:
  - 4.1 Manure Production Calculation
  - 4.2 Solid Manure Production (as is)
  - 4.3 Manure Production Example
  - 4.4 Manure Production For My Operation
  - 4.5 Other Solid Wastes to Consider
  
- I. Methods and tips:
  - 1. Walk through formula and then worksheets to determine operations total annual manure production.
  - 2. For Table 4.2, the third column is "as applied" not "as excreted."
  - 3. Only discuss p. 4.5 if relevant to participants' operations.
  
- J. Who can/should train this session:
  - 1. Any non-math-impaired ag person
  
- E. Pre-training resources:
  - 1. Modified John Andrews PowerPoint presentation?
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer
  - 6. calculators

## Section 5: Mortality Management

- A. By the end of this session, participants should be able to:
  - 1. Estimate annual mortality production.
  - 2. Consider various disposal methods.
  - 3. Choose the best disposal method for her/his operation.
  - 4. Understand state regulations about leaving the carcass for predators to consume.
  
- B. Contents of workbook section:
  - 5.1 Mortality Management
  - 5.2 Estimating Your Mortality Production
  - 5.3 Choosing the Best Disposal Method for Your Operation
  
- C. Methods and tips:
  - 1. Do the sample calculation on page 5.2.
  - 2. Ask for comments or questions.
  - 3. Quickly review disposal methods.
  
- D. Who can/should train this session:
  - 1. Extension livestock agent
  
- E. Pre-training resources:
  - 1. Web addresses from 5.4
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer
  - 6. calculators

## Section 6: Land Base Requirements

- A. By the end of this session, participants should be able to:
  - 1. Work through N-based calculations and examples.
  - 2. Work through P-based calculations and examples and compare to N-based results.
  - 3. Determine how much land is needed to use all the manure produced by his/her operation.
  - 4. Consider options if land-base is inadequate to use all the manure produced by the operation.
  
- B. Content of workbook section:
  - 6.1 Land Base Requirement
  - 6.2 Land Base Calculation Example: N-based
  - 6.3 Land Base Calculation Example: P-based
  - 6.4 Land Base Calculation Example: N-based on two crops
  - 6.5 My Land Base Calculation (my copies)
  - 6.6 Table 1. Nutrient Content of the harvested part of selected Colorado crops
  - 6.8 Table 2. Nutrient content of solid manures in Colorado ( based on 1996 manure survey).
  
- C. Methods and tips:
  - 1. Walk participants through each worksheet.
  - 2. We assume 100% nutrition available to crops for this calculation because the land base requirement assumes repeated annual applications. We will include availability factors as we develop field by field requirements in section 13.
  
- D. Who can/should train this session
  - 1. Agronomist
  
- E. Pre-training resources:
  - 1. BMP for Manure Utilization, page 7.
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers

5. pointer
6. calculators

## Section 7: Manure and Runoff Handling

- A. By the end of this session, participants should be able to:
  - 1. List handling practices and document on worksheets.
  - 2. Consider alternative collection, treatment, and land application processes.
  
- B. Content of workbook section
  - 7.1 Waste Management Components Worksheet
  - 7.2 Manure Management Flow Chart: Collection Process
  - 7.3 Manure Management Flow Chart: Storage and Treatment Process
  - 7.4 Manure Management Flow Chart: Land Application Process
  - 7.5 On-Site Feedlot Evaluation: Manure and Runoff Handling
  
- C. Methods and tips:

Concentrate on the systems and options that are relevant to the audience. For example, most don't have liquid manure, so don't spend time on it.
  
- D. Who can/should train this session:
  - 1. NRCS engineers
  - 2. Consulting engineers
  
- E. Pre-training resources:
  - 1. Fact Sheets 1.220 and 1.221
  - 2. John Andrews PowerPoint presentation and speaking notes.
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer

## Section 8: Wastewater Storage Pond Design

NOTE: Skip this section unless you have CAFOs represented.

- A. By the end of this session, participants should be able to:
  - 1. Generate rough size for waste pond.
  - 2. Gather all the information necessary to have an engineer help reduce the size of the pond.
  - 3. Understand that NRCS engineers can help with the pond size and design.
  
- B. Content of workbook:
  - 8.1 Waste Storage Pond Volume Determination Worksheet
  - 8.2.1 Table 1. Colorado Climate Data for Waste Management System Design
  - 8.3 RAINFALL vs. RUNOFF for Single Storms on Paved & Unpaved Feedlots
  - 8.4.1 Table 3. Volume of Rectangular Ponds for given width, length, and depth
  - 8.4.2 Table 3. Volume of Rectangular Ponds for given width, length, and depth
  - 8.5 Waste Storage Pond Volume Determination Worksheet
  
- C. Methods and tips:
  - 1. Need the information on areas which are paved and not paved, and what is under roof, as well as the location of the land for rainfall map.
  - 2. Walk them through the worksheets.
  - 3. Explain that this helps you get started, and engineer can help you finish up.
  
- D. Who can/should train this session:
  - 1. NRCS engineer
  
- E. Pre-training resources:
  - 1. NRCS Field Guide for Animal Waste website at <http://www.ftw.nres.usda.gov/awmfh.html>
  - 2. PowerPoint presentation and spreadsheet.
  
- F. On-site resources required:

1. transparencies of each worksheet
2. overhead projector
3. projection screen
4. markers
5. pointer
6. calculator

## Section 9: Soil Test Results

- A. By the end of this session, participants should be able to:
  - 1. Explain how soil tests help manage nutrients.
  - 2. Collect an adequate soil sample.
  - 3. Interpret soil test results
  - 4. File test results for his/her operation in book.
  
- B. Content of workbook:
  - 9.1 Soil Test Reports
  - 9.2 Sample soil test report
  
- C. Methods and tips:
  - 1. Encourage participants to use soil test results as the basis for nutrient management.
  - 2. Explain how to collect a good sample. Analysis is only as good as the sample.
  - 3. Display and explain how to use soil sampling equipment if possible.
  - 4. Talk about choosing a laboratory.
    - a. Numbers may be similar, but recommendations will vary.
    - b. Find a philosophy you can live with.
      - 1) Feed the crop sufficient nutrients to develop.
      - 2) Feed the soil to build up nutrient levels.
      - 3) Feed the pocket book of the fertilizer dealer.
    - c. Some tests work better on acid soil.
  - 5. Go over sample soil test results and explain them.
  - 6. Remind them to file their results here to maintain records.
  
- D. Who can/should train this session:
  - 1. Agronomist
  - 2. Lab manager
  
- E. [Pre-training resources:](#)
  - 1. [Fact sheets on soil sampling, testing, interpretation](#)
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen

4. markers
5. sampling equipment
6. pointers

## Section 10: Manure, Runoff, and Water Analysis

- A. By the end of this session, participants should be able to:
  - 1. List reasons for testing manure and water.
  - 2. Collect adequate manure and water samples.
  - 3. Interpret manure and water test results
  - 4. File test results for his/her operation in book.
  
- B. Content of workbook section:
  - 10.1 Manure and Water Test Analysis
  - 10.2 Sample Manure Test Analysis
  - 10.3 Sample Water Test Analysis
  
- C. Methods and tips:
  - 1. Encourage producers to sample manure so they can plan how to manage nutrients.
  - 2. Explain sampling techniques and processing of manure samples.
  - 3. Encourage producers to sample water so they can plan how to manage nutrients.
  - 4. Explain sampling techniques and process of water samples.
  
- D. Who can/should train this session:
  - 1. Agronomist
  - 2. Lab manager
  
- E. [Pre-training resources:](#)
  - 1. [Fact sheets on sampling](#)
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. sampling equipment
  - 6. pointer

## Section 11: Crop Rotation and Yield Goals

- A. By the end of this session, participants should be able to:
  - 1. Record previous crop and yield for every field.
  - 2. Record next years' crop and yield goal for every field.
  
- B. Content of workbook section
  - 11.1 Crop Rotations and Yield Goals
  - 11.1 Crop Rotations and Yield Goals
  
- C. Methods and tips:
  - 1. One way to calculate the yield goal is to average 5-years worth of yields and add 5% to 10% for good weather and improved genetics.
  
- D. Who can/should train this session:
  - 1. Agronomist
  
- E. Pre-training resources:
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer

## Section 12: Nutrient Basis for Manure Application Rates

NOTE: Skip this section or abbreviate if the audience is numb or time is short.

- A. By the end of this session, participants should be able to:
  - 1. Use Colorado Phosphorus Index (COPI) to evaluate potential for P movement on each field.
  - 2. Determine whether application should be N-based or P-based for each field.
  
- B. Content of workbook:
  - 12.1 Deciding Whether to Apply Manure Based on Nitrogen or Phosphorus Needs of the Crop
  - 12.1 Deciding Whether to Apply Manure Based on Nitrogen or Phosphorus Needs of the Crop
  - Page 1 of 4: Colorado Phosphorus Index Risk Assessment
  - Page 2 of 4: Procedures for Making an Assessment
  - Page 3 of 4: Table 3b. Approximate Nutrient Composition of Selected Types of Manure at Time of Application
  - Page 4 of 4: Colorado Phosphorus Index Risk Assessment
  
- C. Methods and tips:
  - 1. Explain P Index.
  - 2. Help participants fill out worksheet.
  
- D. Who can/should train this session:
  - 1. Agronomist from NRCS.
  
- E. Pre-training resources:
  - 1. Jim Sharkhoff's PowerPoint presentation and speaking notes.
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer

## Section 13: Recommended Manure Application Rates

- A. By the end of this session, participants should be able to:
1. Complete the worksheet to determine manure application rate for a every field.
- B. Content of workbook section:
- 13.1 Determination of Manure Application Rates for Field
  - 13.2 Nutrient Content, Availability , and Credits
  - 13.3 Table 13C. Crediting previous legume crops.
  - 13.4 Nutrient Recommendations for Colorado Crops
  - 13.5 Nutrient Recommendations for Grasses
  - 13.6 Nutrient Recommendations for Corn
  - 13.7 Table 13.08 Nitrogen recommendations for dryland corn grain (80 tons/A)
  - 13.8 Nutrient Recommendations for Sorghum
  - 13.9 Table 13.12. Nitrogen recommendations for dryland forage crops for silage ( 15 T/A)
  - 13.10 Table 13.14. Phosphorus recommendations for grain and forage sorghum, sorghum-sudan hybrids, and sudan
  - 13.11 Nutrient Recommendation for Spring -Seeded Small Grains
  - 13.12 Table 13.17 Nitrogen recommendations for dryland proso and pearl millet ( 40 bu/A).
  - 13.13 Nutrient Recommendations for Winter Wheat
  - 13.14 Table 13.22 Phosphorus recommendations for winter wheat
  - 13.15 Nutrient Recommendations for Sunflowers
  - 13.16 Nutrient Recommendations for Dry Beans
  - 13.17 Nutrient Recommendations for Vegetables
  - 13.18 Table 13.29 Nitrogen recommendations for potatoes.
  - 13.19 Nutrient Recommendations for Mountain Meadows
  - 13.20 Nutrient Recommendations for Revegetated Disturbed Lands
- C. Methods and tips:
1. Explain the resource tables and calculations.
  2. Get everyone to the worksheet.
  3. Ask someone to provide her/his own information as a sample a and lead group through the exercise. Be prepared with an example if no one volunteers.
  4. Calculate N-based and P-based rates based on example.
  5. Use experience and soil test results to complete a worksheet

- 6. for each field in operation.
- 6. Answer questions.
  
- D. Who can/should train this session:
  - 1. Agronomist
  
- E. Pre-training resources:
  - 1. [Fact sheets on fertilizing](#)
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer
  - 6. calculators

## Section 14: Manure Application and Calibration Records

- A. By the end of this session, participants should be able to:
  - 1. Complete the Whole Farm Nutrient Use Summary with information from section 13, and other information sources.
  - 2. Choose among calibration methods.
  - 3. Record calibration information on worksheet.
  
- A. Content of workbook section
  - 14.1 Whole Farm Nutrient Use Summary (2 copies)
  - 14.2 Calibration Records (2 copies)
  
- B. Methods and tips:
  - 1. Help participants fill in Whole Farm Nutrient Use Summary for sample.
  - 2. Evaluate whole farm nutrient balance by comparing manure utilization to production considerations.
  - 3. Be sure to mention that manure moved off-site or sold should be recorded here, so that total "use" for the year is approximately equal to the total production (from Section 4) for each year. All the manure should be accounted for.
  - 4. Discuss alternative uses for manure if necessary.
  - 5. Explain how to calibrate manure application by different methods (see Fact sheet).
  - 6. Discuss the advantages and disadvantages of each method.
  
- D. Who can/should train this session:
  - 1. Agronomist
  
- E. Pre-training resources:
  - 1. Fact sheet on calibrating manure spreaders.
  
- F. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer

## Section 15: Best Management Practices

- A. By the end of this session, participants should be able to:
  - 1. List the best management practices of his/her operation.
  - 2. Consider alternative practices.
  - 3. Project changes in practices for future.
  - 4. Indicate land management practices in effect for each field.
  - 5. Pick one thing to do differently because you are here today.
  
- A. Content of workbook:
  - 15.1 Conservation Practices for Animal Feeding Operations
  - 15.5 Summary of implemented conservation /best management practices: Land management
  
- B. Methods and tips:
  - 1. Lead participants through tables.
  - 2. Make sure they know these are options or alternatives, not requirements.
  - 3. Field questions.
  
- C. Who can/should train this session:
  - 1. Agronomist
  
- D. Pre-training resources:
  - Best Management Practices for Manure Utilization, CSU Coop Ext
  
- E. On-site resources required:
  - 1. transparencies of each worksheet
  - 2. overhead projector
  - 3. projection screen
  - 4. markers
  - 5. pointer

Section      Closing

- A. By the end of this session, participants should be able to:
  - 1. Hand in completed post-quiz
  - 2. Hand in completed evaluation
  - 3. Feel good about participating in workshop
  
- B. Content of the workbook section: none
  
- C. Methods and tips:
  - 1. Thank them for participating.
  - 2. Acknowledge that they got lots of “stuff” thrown at them, but congratulate them on having the beginnings of a CNMP for their operation. They are probably ahead of other producers in their area in this feat.
  - 3. Mention the two resource pages at the end as sources of more information.
  - 4. Mention EQIP funds, and availability of NRCS and extension help in completing their plans.
  - 5. Ask them to complete their quiz, and evaluation.
  
- D. Who can/should train this session:
  - 1. Any trainer or facilitator
  
- E. Pre-training resources:
  
- F. On-site resources required:
  - 1. post-quiz
  - 2. evaluations

Please collect send pre- and post- quizzes and evaluations to  
Colorado State University  
Extension Soil and Crop Sciences  
Fort Collins, CO 80523-1170