



Drawing Conclusions

Middle School Food and Agricultural Literacy Curriculum

Precepts

- J. Mental Health
- J1. Think critically

National Standards

- CS.05.03.01.b. Interpret resource data in graphic format.
- CS.11.01.01.c. Demonstrate procedures and a conceptual understanding of scientific investigation.
- NL-ENG.K-12.4 – Communication Skills
- NL-ENG.K-12.12 – Applying Language Skills
- NM-NUM.6-8.1 – Understand Numbers, Ways of Representing Numbers, Relationships among Numbers, and Number Systems
- NM-DATA.6-8.3 – Develop and Evaluate Inferences and Predictions that Are Based on Data
- NS-5-8.1 – Science as Inquiry
- NSS-G.K-12.6 – Uses of Geography

Student Learning Objectives

- As a result of this **unit** the students will...
- Discuss agricultural research.
- As a result of this **lesson** the students will ...
- Evaluate the results of an experiment.
- Form conclusions based on collected data.

Content Outline

- I. **Understand the last two steps of the scientific theory.**
 - A. **Data:** Individual facts, statistics, or information.
 - B. **Conclusion:** The formation of a theory based on observations and data.
- II. **Analyze data and draw conclusions**
 - A. Answer lab report questions based on National Agricultural Statistics Service data provided.

Time

Instruction time for this lesson: 45 minutes

Resources

2007 Census of Agriculture, Farm Numbers. (2007). Retrieved September 7, 2009, from The Census of Agriculture. Web site: http://www.agcensus.usda.gov/Publications/2007/Online_Highlights/Fact_Sheets/farm_numbers.pdf — Max Preps, Americas source for high school sports. (2009) Hermiston High School Baseball Spring. Retrieved September 7, 2009. Web Site: <http://www.maxpreps.com/high-schools/jlMI5QrJHkCIKZSjKwKYWQ/hermiston-bulldogs/baseball/stats.htm> — National FFA Organization. (2009). LifeKnowledge Online. Retrieved July 9, 2009, from <http://agedlearning.org> — National FFA Organization. (2003). LifeKnowledge Precepts and Signs of Success.

Tools, Equipment, and Supplies

Overhead projector/transparencies
Poster Board
Markers
MS.AST.2.8.TM.A – one per teacher
MS.AST.2.8.TM.B – one per teacher
MS.AST.2.8.TM.C in color – one per teacher
MS.AST.2.8.AS.A – one per student
MS.AST.2.8.AS.A-KEY – one per teacher
MS.AST.2.8.ASSESS.A – one per student

Key Terms

Data

Conclusion

III. Form conclusions based on collected data.

- A. Create charts based on individual data.
- B. Discuss data and conclusions based on graphic representation.

Interest Approach

Greet students and introduce today's lesson by analyzing your school's latest sports statistics to draw their attention to analyzing data. Insert statistics from one or more sports within your school and surrounding areas or use **MS.AST.2.8.TM.A**.

Welcome to class. How many of us watched the game this week? Did you see (fill in your team's name and sport), the baseball team's impressive stats?



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Wow, those baseball players really did an amazing job on the field against (insert the opposing team), the Pendleton baseball team. Let's check out who made real impacts on last night's game.

Display **MS.AST.2.8.TM.A** for students to analyze and compare statistics of members on the team.

Use the Choral Response e-Moment® to encourage participation from every student in the room while analyzing the data on the overhead. Ask students to analyze the data for 25 seconds, and when you ask a question, they should all respond in a choral response answer – in unison.

When I say GO, critically analyze the baseball team's **data** and identify who lead the team in the most successes this past week. After we analyze, when a question is asked about the **data**, each of us will respond in unison with the answer. A little hint, the bigger number is better. We have 25 seconds to analyze the **data**. What questions do you have? GO!

Time's up! Remember to answer the following questions in unison. Who was the leader in Ground Plays?

Elicit student responses.

Correct! Louie Frank. Who had the most RBI's or Runs Batted In?

Elicit student responses.

Correct! Louie Frank again. Who had the most runs?

Elicit student responses.

Yes! Jose Demark. Lastly, who had the best overall average?

Elicit student responses.

Louie Frank. Very good.

Every experiment provides some sort of **data**. This **data** leads us to a conclusion. Although the **data** we just analyzed was not the result of an experiment, it can be analyzed to form a **conclusion**. What **conclusion** could we draw from the baseball team's statistics?

Elicit student responses. Responses may include who was the best player, who has the most potential, who is the most improved, etc....

Excellent. **Data** is very helpful and useful in making decisions and inventing new ideas and products. As we analyze **data** today, keep an open mind to all the possibilities that the **data** may lead us to.

Collecting **data** and forming a **conclusion** are the last two steps in the scientific method. Let's define these steps before we move on.

A. Data: Individual facts, statistics, or information.

Data is essential towards making an educated decision. Analyzing and interpreting **data** leads us to a conclusion.

B. Conclusion: The formation of a theory based on observations and data.

Summary of Content and Teaching Strategies

Objective 1. Evaluate the results of an experiment.

Hand out lab reports, **MS.AST.2.8.AS.A**, and display **MS.AST.2.8.TM.B** for students to see.

Let's look at another set of results, analyze the **data** and form a **conclusion**. When I say FOCUS, analyze the **data** in the chart on the overhead and answer the questions on your lab reports. Take five minutes to complete this lab. What questions do you have? FOCUS.

After five minutes, get the class's attention and review the data and questions on the worksheet.

Time's up. Let's review the **data** and identify the **conclusions** that each of us made.

Review the conclusions students made.



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Objective 2. Form conclusions based on collected data.

Before class, lay out poster board and markers for students to create their own chart. Students will create a data chart by working in a group and making up their own data. Provide students with examples if they struggle to think of their own. At the end of the activity, have each group share their data chart with the class.

Data received from an experiment is analyzed through the creation of a **data** chart. When I say ANALYZE, create a **data** chart using **data** about a topic that you will choose. Examples may include how many games a sports team won versus how many they've lost or the amount of days you go out to lunch versus how many you eat at the school cafeteria. Create a line graph or bar graph and develop a **conclusion** about your **data** from the chart and be prepared to present it to the class. In groups of four, utilize the poster board and markers that are provided on the supply table. You may choose your own groups and have 15 minutes to complete this task. What questions do you have? ANALYZE!

After 15 minutes, conclude group work and have groups present to the class. Be sure to ask students how they came to their conclusions of their data charts.

Great job! Let's share our charts. Who will go first?

Today has required us to analyze **data**, make decisions reflecting a conclusion, and be creative. This entire time we have been doing what we call "thinking critically." Thinking critically means that we take into account many factors and observations before we make any decisions. Every day before I come to school, I think critically about what I am going to teach and why I am going to teach it. Is it because I enjoy it? Am I teaching it because it's what you're supposed to learn? Am I doing it for a paycheck? The answer I always end up with is that the material I have chosen to teach is important for you to learn.

What things do you think critically about in your life?

Elicit students' responses. Answers may include hard decisions such as drinking, doing drugs, etc.

If you didn't think critically about some of the decisions in your life, what might happen?

Elicit student responses. Answers may include messy, problematic, undesirable, etc.

Don't forget to think critically about the important decisions in life. Choosing between Pepsi and Coke is easy, but making a life-changing choice about underage drinking is one that needs critical thinking to ensure the right decision is made.

Review/Summary

Utilize the Fred Astaire e-Moment@.

To review today's lesson, we will be creating two motions that will help us remember the last two steps of the scientific method, analyzing **data** and forming a **conclusion**. Both motions must be done with our body and may include sound. Groups are designated by whoever is sitting at your table. We have five minutes to create our motions. At the end of five minutes we will share your motions with the class. What questions do you have? GO.

Student groups should work together to create motions that are completed in unison (within their groups) representing the final two steps of the scientific method.

Time's up. When I call your group, please share your motions with the class.

Fantastic job today. We identified how to analyze **data** and its importance. We created **data** and **data** tables, allowing us to form a **conclusion**. Don't forget: Always think critically when you evaluate **data** and make decisions, whether in life or science. Thanks for participating today. We did great!



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Application

Extended Classroom Activity:

Students conduct an experiment in a small group, analyze data creating their own chart, analyzing the data and writing out a conclusion. At the end of the experiment, they will present to the class.

FFA Activity:

Use data from the FFA Chapter to draw conclusions about membership trends, event participation, advertising, fundraisers, etc.

SAE Activity:

Students could pursue an exploratory SAE project or research SAE investigating an agriculture question and become involved in the FFA Agriscience Fair

Evaluation

MS.AST.2.8.ASSESS.A

Answers to Evaluation

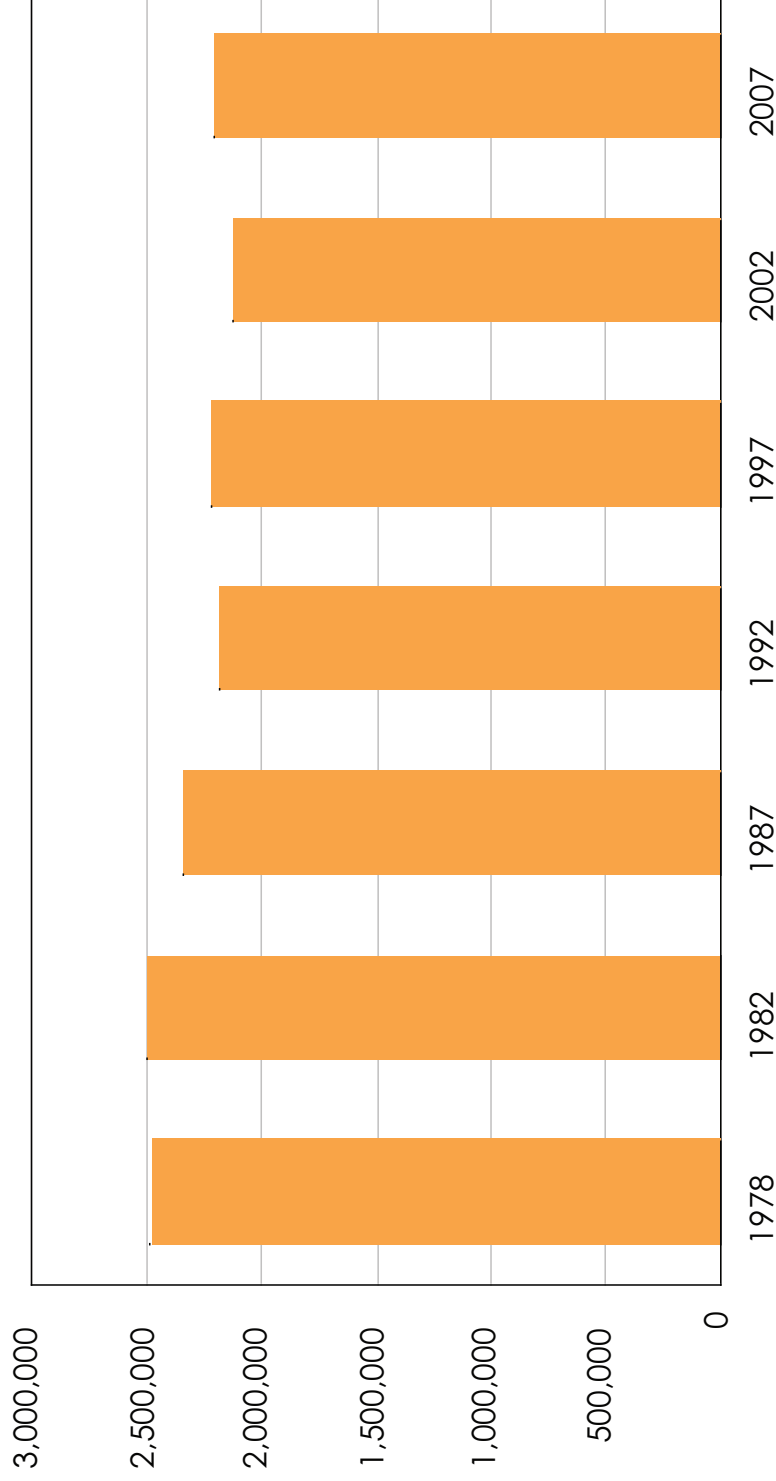
1. A
2. B
3. T
4. T
5. T



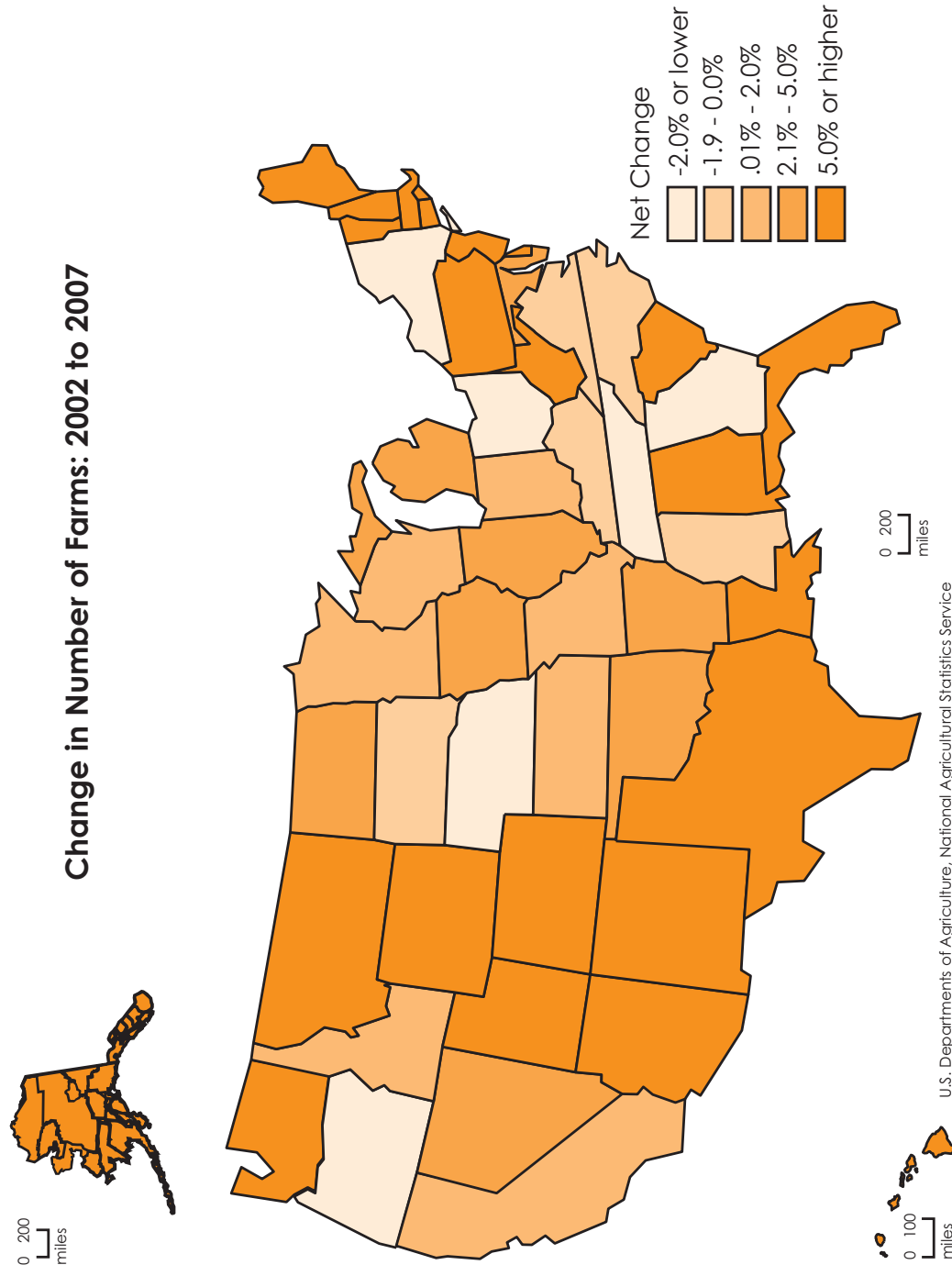
Boys Baseball Statistics					
Player Number	Name	Ground Plays	Average	Runs Batted IN (RBI)	Runs
2	Sam Thomas	24	.188	6	10
3	Louie Frank	27	.359	14	16
8	John Muhl	11	.273	0	2
6	Justin Turley	16	.282	3	7
1	Aaron Baker	10	.200	0	1
13	Mark Ships	26	.213	8	10
15	Rick Matter	5	.143	0	1
16	Jose Demark	24	.328	13	22



Number of Farms, 1978 to 2007



2007 Census of Agriculture, Farm Numbers





Lab Report

Name: _____

Directions: Answer the following questions relating to the data above.

1. Has the number of farms declined or inclined from 1978 to 2007? _____
2. What year in history has had the least number of farms in the United States? _____
3. In 1982, there was the largest number of farms ever in the United States. How many were there? _____
4. How many states in the United States had 5.1% or greater numbers of farms from 2002 to 2007? _____
5. Name one state that had a percentage decline of -2.0% or lower. _____
6. Approximately how many farms are there currently according to the most recent data we have in the United States?

7. Approximately how many farms have we lost from 1978 to 2007? _____
8. Name one state that had a 0.1 to 2.0 % net change in farms. _____
9. How many states had 0.00% to -1.9% net change decline in farm numbers? _____
10. What percentage change of farm numbers was there in Oregon? _____



Lab Report

KEY _____

Directions: Answer the following questions relating to the data above.

1. Has the number of farms declined or inclined from 1978 to 2007? Declined
2. What year in history has had the smallest number of farms in the United States? 2002
3. In 1982, there was the largest number of farms ever in the United States. How many were there? 2,500,000
4. How many states in the United States had 5.1% or greater numbers of farms from 2002 to 2007? 20
5. Name one state that had a percentage decline of -2.0% or lower. New York, Ohio, Tennessee, Georgia, Oregon, Nebraska
6. Approximately how many farms are there currently according to the most recent data we have in the United States?
2,200,000
7. Approximately how many farms have we lost from 1978 to 2007? $2,500,000 - 2,200,000 = 300,000$
8. Name one state that had a 0.1 to 2.0 % net change in farms. California, Wisconsin, among others.
9. How many states had 0.00% to -1.9% net change decline in farm numbers? 5
10. What percentage change of farm numbers was there in Oregon? 2.0% or lower.



Multiple Choice

Name _____

Directions: Circle the right answer.

1. **The best definition for data is?**
 - a. Individual facts, statistics, or information
 - b. Information spoken
 - c. Group opinions and ideas
 - d. Second hand knowledge
2. **Formations of a theory based on data and observations is a what?**
 - a. End result
 - b. Conclusion
 - c. Big idea
 - d. Only option

True and False: Circle the right choice.

3. **True or False. Data can be analyzed in the form of charts, graphs, and observations.**
4. **True or False. The number of farms has declined from 1978 to 2007.**
5. **True or False. There are more states with an increase percentage of farms than those who have declined in numbers.**