Date: _____ Teacher Name: _____

One-day Lesson Plan Outline

Lesson Title: _____

Grade level = _Middle or High_*High_ Amount of time for this lesson = __5 days, 90__ minutes (Each Day)*

1. Standards and Safety and Materials:

A. Standards - (Both Wyoming and NGSS. Number and write it out)	HS-ETS1-1: Analyze a major global challenge to specify qualitative and quantitative criteria and constraints for solutions that account for societal needs and wants.
B. Safety Concerns: If none – "minimal safety concerns with regular class activity"	Minimal safety concerns with regular class activity
C. Materials (List of all materials needed for class including **technology** – like probes, tools, computer use, etc…)	• Access to DataCorral Website • Access to scientific journals or some sort of Primary or Secondary sources relating to microbes and foodborne illnesses • Computers/laptops • Lecture materials on foodborne illnesses including student worksheets

2. Objectives: (List them and make sure all are measurable! **Bold** the verbs. Three different levels!) Students will be able to…

A. SWBAT… ***use*** *a measurable verb*	SWBAT **Identify** the source problems of foodborne illnesses
B. SWBAT…	SWBAT **list** the microbes involved in foodborne illnesses
C. SWBAT…	SWBAT **develop** a plan for reduction of foodborne illnesses in a community and
D. SWBAT	SWBAT **support** their conclusions with articles, journals, or other evidence from the scientific community.

3. Connections, Misconceptions, and Crosscutting Concepts:

A. Real world connections: (List them; e.g. Careers, Societal issues, etc…)	People in agriculture have to be aware of the possibilities of foodborne illnesses in their products, as well as follow carefully the guidelines of governmental agencies. There are definitely careers associated with the detection of problems and the development of solutions to these problems to help keep the community's food sources safe.
B. Student connections: (List them; With what do they connect? Music, food, etc…)	Students may have had food poisoning before and know how awful it is. They may be from families who are farmers or ranchers and have heard about what measures are taken to make sure the food is safe.
C. Misconceptions: (List those AAAS misconceptions related to your content)	
D. Crosscutting Concepts: (List them and explain how they are used – e.g. patterns, cause/effect, scale/proportion/quantity, systems/system models, energy/matter, structure/function, and/or stability/change)	Structure/Function: The structure and function of microbes affects why the microbe would infect a food source and why they would be dangerous to humans who then consume that infected food. Patterns: Patterns can be looked at to see how foodborne illnesses start and how the microbes seem to enter the food source.
E. Academic Language: [List the words/prefixes/suffixes that are addressed (focus on science vocabulary as well as instructions such as analyze, compare/contrast, etc…). *What* will the teacher do? *How* does the teacher address the words/prefixes/suffixes? *How* does the teacher get students to use those words, prefixes, and/or suffixes?]	Primary, Secondary, and Tertiary Sources Scholarly Journals Research Databases E-coli Shiga Toxin Foodborne illness

4. Catch/*Engagement*: (Hook them quickly – use all 5 senses at different times – should be no longer than 5 minutes.)

Hook: How to get student/class attention	Have a picture of one of the microbes involved in foodborne illnesses shown up on the board to start without telling the students what it is. Tell them that they will soon be making the acquaintance of that creature/learning how to fight it.

5. Pre-test: (Same as post-test and short – to the point… **Bold** the objectives you are using – same as above!)

Date: _____ Teacher Name: _____

Pre-test and Post-test question(s) Put the pre-test at the end of this day's lesson plan (along with PowerPoint etc…)!	Pre-test: Have the students Pair and Share on these two questions. 1) What is a foodborne illness and what cases it. 2) What do you think could be done to reduce food-borne illnesses? Post-test: Students will answer these questions in the form of a written plan for reduction of foodborne illnesses which they will hand in at the beginning of the class period on day 5.

6. Activity/*Exploration*: (**Bold** the verbs that match the objectives. Can have as many parts as needed – step by step directions.
(Remember: Include at least 1 science writing activity and probe activity for the unit!)

A. Day One	Lecture: Teacher will go through the power-point provided. (If there has been a more recent food outbreak, you can most certainly focus on that and change the powerpoint to match current events). Slide 2: talk about a recent outbreak, tell what food, where the food came from, what infected the food, and the consequences for people who ate the food. Slide 3: Explain the bacteria responsible for the infection, what it does to people who consume or are exposed to it, and where it is found in nature. Slide 4: Question slide; give the students several open ended questions to think about how the contamination could have gotten into the food. Slide 5: Question slide; give the students some prompting questions about the possibility of reducing these outbreaks. Slide 6: Assignment: introduce the assignment and make groups. Slide 7: Introduce Data Corral and discuss how this website could be useful for researchers, scientists, the FDA and CDC, and lettuce farmers.
B. Day Two	Library Research Day: Coordinate with your Librarian to have a library research day. Ask him or her to give the students insight into where either in books or online they can find the sources they need to support (or develop) their plan. Have the librarian talk about the difference between primary, secondary, and tertiary sources. Today, the students will be in the library the whole time; give the librarian discretion on today's class period.
C. Day Three	Work Day: Students will be given the whole class period to work on their plans. Try to get laptops available to the students for today's class so they can look online (as the librarian will have helped them to know how to do) for scholarly articles and information which will support their work. If the students wish to go down to the library, coordinate with the librarian and see if this can be arranged. Conclusion: About ten minutes before class ends, get the whole group together again to give them options for presentations. Show them how to use prezi or other presentation methods, (video? Visually artistic project?). Have the groups tell you what materials they will need for their project (e.g. science fair board, art supplies, a camera, etc).
D. Day Four	Work Day: Student given whole class period to work on their written report and their presentation. Students will be encouraged to work together on the report, not just have one person write it all.
E. Day Five	Presentation Day: Students will turn in their Post-test (the written version of their plan), and give their presentation as a group. (Again, these presentations can be done as an extracurricular event open to parents, peers, etc.)

7. Review/Essential Questions/*Explanation*: (Should be closely related to pre/post tests!)

A. Low Level Questions – (Knowledge/Remembering and/or Comprehension/Understanding)	**Name** the microbe involved in this contamination outbreak.
B. Middle Level Questions – (Application/Applying and/or Analysis/Analyzing)	Identify one source problem which might contaminate lettuce with E-coli.
C. High Level Questions – (Synthesis/Evaluating and/or Evaluation/Creating)	Develop a plan for reduction of foodborne illness and support it with evidence from the scientific community and the datacorral website.

8. Assessments (Post-test)/*Evaluation*: (**Bold** the verbs that match the objectives and are in the activity.)

Date: _____ Teacher Name: _____

A. Formative: (Check for learning in class?) e.g. Oral questions?	Oral questions at the beginning of Day one of the lesson.
B. Post-test: ("Same as pre-test"; Compare w/pre-test to inform teaching!)	Oral Questions after day one of the lesson.
C. Summative: (Check for final learning/understanding) – e.g. Students turn in **constructed** project and **take** 20 question multiple choice test.	Student must present a plan for reducing these threats in the community. The students will work in groups. The plan must follow the following parameters: 1. Must be well-documented: contain at least two non-tertiary sources which support the plan 2. Must contain a clear outline of the steps that need to be taken in order to put the plan into action 3. Must contain at least one diagram or picture to support presentation 4. Must use data from the datacorral to support either the reason behind the plan or the plan itself. Students will then present their plan to the class in the form of a formal presentation (separate from their written plan; can be a powerpoint, science fair board, Prezi, or other presentation aid). (Having an event outside of class where peers, parents, and other school officials can attend is strongly recommended).
D. Explain how the data informs tomorrow's teaching. For example, "The class post-test average must be a 80% or the next class begins with a 10 minute review/discussion of today's material followed by another post-test of the same material."	Each of the days of this lesson will build on each other. The information assimilated in Day One will fuel the students' research days. The research days will ultimately lead them to the development of the two pieces they will turn in on the last day of the presentation.

9. Timeline for your lesson:

A. Catch 2 min B. Pre-test 3 min C. Activity – 4 parts 40 min D. Review and Post-test 8 min Add/change as needed	Each Day will Consist of 50 minutes. If your school has 90 minute class periods, it can be modified in the following way: Day One: Lecture and Work Day Day Two: Library Research Day/Work Day Day Three: Presentation Day (Or work day if presentations will be done extracurricular)

10. Enrichment/*Elaboration*: (Include one enrichment activity for students that might finish early)

What enrichment activities are offered for students in this lesson (beyond what is taught)?	Students might write up a condensed paragraph explanation of their plan to submit to the school newspaper, or a class science journal if you have one.

11. IEP Accommodations/Differentiation/Diversity: What accommodations will you use to support struggling learners?

What accommodations are used to support struggling learners?	Students will work in groups, so students who are struggling with the content will have a chance to work at their Zone of Proximal Development and thus learn at a higher level than they would if they were working alone. Students who need more time for the project can be given time either before or after school with help from the teacher to find sources that will support their group's plan.