

Jerky Lab

Today you will be doing a food science lab. The lab will be mostly student-lead. All instructions you need are written out in the lab packet. Be sure to READ carefully and answer all questions within the packet. If you have questions at any time please ask Mrs. Propson or Ms. Koepfel.

Any lack of respect or misuse toward lab equipment, class time or peers will not be tolerated and may result in the zero on the lab.

Part A: Clean

Choose one person in your group to perform the experiment. They will be the **volunteer**, the other one/two people will serve as a **recorder(s)**.

1. Obtain the cooking spray from the materials counter and carefully spray it on the volunteer's hands. Be careful to not spray it on the ground, spray over the tables if need be and get close to the volunteer's hands to decrease excess spray.
2. Return the cooking spray and obtain approximately one tablespoon of cinnamon from the supply table and sprinkle it over the volunteer's hands.
3. Using the sink in the animal lab or headhouse the volunteer should perform the following tasks IN ORDER. The recorder should record observations the group sees at each step.
 - i. Wash your hands ONLY using COLD water (10 seconds)
 - ii. Wash your hands with COLD water and SOAP (10 seconds)
 - iii. Wash your hands with ONLY WARM water (20 seconds)
 - iv. Wash your hands with WARM water and SOAP (20 seconds)

Name(s) _____

4. Reflection Questions:

a. Fill out your observations in the graph:

Step	Time (s)	Temp	Observations
i			
ii			
iii			
iv			

b. This experiment uses two supplies: cinnamon and cooking spray. What do you think these supplies represent?

c. What conclusions can we draw from this experiment on the importance of hand washing? (Use 2-3 complete sentences to explain yourself).

Part B: History/Background

Jerky is a lean meat that can be made from a variety of different meats that have been trimmed of their fat. Jerky can be cut into strips from a whole cut of meat or can be made from mixed meats such as hamburgers. Jerky is then dried to prevent spoilage.

1. Why is spoilage something we want to prevent? What can happen if spoiled foods are consumed?
2. Hypothesize where the term jerky may originate? Who came up with it? Why is it called that?

The word jerky is actually a corruption of the Spanish word “charqui” which roughly translated means to burn meat. Really burnt meat is jerky in its most simple form. All you need to make jerky is a low temperature drying method and salt to inhibit (hinder) bacteria growth. This can be done with many types of meat.

3. List different types of meat that may be used to create jerky (ex: beef hamburger)

Part C: Recipe

Jerky is often marinated in a sauce or liquid to add flavor. Instead of marinating meat can also be ground/mixed with seasonings and salt to add extra flavor. Meat without flavoring tastes very bland (plain) to the modern palate (taste buds). This unflavored meat was extremely popular with our ancestors who considered jerky to be a special treat! MANY recipes exist for how to make jerky with various meats, spices, and marinades. Premade spice packets can also be purchased.

Mission:

Today your group will have one half pound of lean ground beef to create jerky from. Your group will be in charge of creating a recipe to follow for creating this jerky. I have provided a recipe below for you to use as an example.

Rules to creating your recipe:

- You may not use more than 2 Tablespoons of any one ingredient.
- You must include salt in your recipe for preservation.
- You may use any ingredients/supplies on the supply counter.
- Remember this is something we all want to EAT and find delicious! The group with the most votes in our taste tests will receive 2 extra credit points.
- Once you are satisfied with your recipe answer the questions below to get your meat/supplies from Mrs. Propson or Ms. Koeppel.

Example recipe:

1 pound extra lean [ground beef](#)

1/2 teaspoon onion powder

1/2 teaspoon garlic powder

1/8 teaspoon hot pepper sauce, or to taste

2 Tablespoons [Worcestershire sauce](#)

2 Tablespoons [soy sauce](#)

1 Tablespoon [ketchup](#)

1 teaspoon kosher salt

Name(s) _____

Questions:

1. The recipe example is for one pound of hamburger. Half the recipe below using your awesome math skills.

Example: $\frac{1}{2}$ pound beef

2. It is now your chance to act on your MISSION. Using the RULES above create your own jerky recipe. What are the ingredients in your recipe? List the name and amount of each ingredient.

1 pound lean hamburger

Name(s) _____

3. Why did you decide to modify your recipe from the example? How did you decide what to change? (Respond in 2-3 complete sentences)

4. Food scientists constantly work to modify food and make it better (more delicious, different taste, new flavor, different color/look). Do you expect your classmates to like your modifications to the jerky recipe? Why or Why not?

5. Food scientists sometimes have wonderful ideas in the lab that then go to consumer trials to see if the public will enjoy the product. Classic examples of new products include the Golden Oreo or the Code Red Mountain Dew. Sometimes these products fail at consumer trials, examples include Clear Pepsi or Purple Ketchup. Below, create a jerky recipe using ANY ingredients possible (do not have to be on the supply counter) that you think would go over well in consumer trials/consumer research.

Part D: Preparation

After getting your recipe checked by Mrs. Propson or Ms. Koeppel and finishing your “Part C Questions” you may prepare your beef jerky. Follow each step of the lab closely to ensure food quality, safety, and taste.

- A. Each group member - wash your hands using warm water and soap for 20 seconds.
- B. Obtain a bowl, dehydrator rack, piece of waxed paper (computer paper size) and mixing device from the supply counter.
- C. Using masking tape and permanent marker, label the outside of your rack with your names.
- D. Obtain the measuring spoons/devices you may need – you may need to share or wash the spoon.
- E. Add your meat to the mixing bowl. If you touch the uncooked meat with your hands be sure to wash them again after to avoid cross contamination.
- F. Obtain 1-2 of your other ingredients from the supply counter. Remember that we all need to share these ingredients so be respectful and only take one to two at a time. Work diligently to best use our time.
 - a. Please ensure we are not cross contaminating spices by NEVER putting a measuring device INTO the spice jar but pouring spice out of the jar into your measuring device.
- G. Add the ingredients to your bowl and mix thoroughly so that the seasoning is even. (if you need to mix with your hands instead of the mixing device – you may do so ONLY if you wash your hands BEFORE and AFTER doing so – bacteria loves to live under fingernails so be sure to thoroughly wash your hands!)
- H. Using your waxed paper and mixing device (or uncontaminated hands) move meat mixture over to the waxed paper to form a jerky strip (approx. 1 inch wide by 3 -4 inches long by 1/8 inch tall)
- I. After forming and packing the jerky on the waxed paper, carefully transfer it to your drying rack.
- J. Continue this process until your rack is full. You want the strips to be as close together as possible to fit the most jerky but not touching so air can come up and promote drying. Jerky is preserved through a slow drying process. Our jerky will be drying at a low setting of 145 degrees F for 8 hours. This low temperature will help the jerky avoid becoming over dry or brittle. Jerky that is over cooked will seem brittle and may “snap” apart easily. Jerky that is correctly cooked will seem “leathery” and somewhat pliable.

Part E: Clean up

Proper clean up will ensure food sanitation. Please make sure you do ALL steps of the cleanup process.

- A.** Return all ingredients to the ingredient table if you have not already.
- B.** Wash all dishes from the lab using hot soapy water. Dishes may be left to air dry in the headhouse.
- C.** With a wet paper towel, spot clean any large particles left on your workstation and dispose of them.
- D.** If your group is the first group done, prepare a 1 tablespoon bleach to 1 gallon hot water mix in the bucket provided. If there is already a solution made, share it as a class. Apply the solution to your workstations and allow it to stand for 2-3 minutes.
- E.** After 2-3 minutes, wipe down the workstation with clean water and allow it to air dry or dry it using paper toweling. Discard any used paper toweling.
- F.** If your workstation is clean but the classroom is not, you may also help in cleaning up the classroom as a whole, we will not be leaving today until the classroom is clean.

Part F: Reflection

Answer the following questions using complete sentences. Be detailed and complete in your answers to receive full credit. You may use your book to help you answer the questions if needed (pages 627 – 661)

1. Processing is defined as turning a raw agricultural process into an attractive/consumable food. Explain what your raw agricultural product(s) were and what your new processed food is.
2. Give two examples of other ways we could process hamburgers (other than making it into jerky).
3. Hamburgers are high in Vitamin B. What is the function of Vitamin B in our body? Why do we need it?
4. Moisture can be removed from foods by dehydrating like we did today, it can also be removed by freeze drying. Explain what freeze drying is.

5. The shelf-life of our jerky is 2 weeks or a month in the fridge or a year frozen. What is shelf life? Why is it important?

6. When harvesting cattle for human consumption. What part(s) of the animal does the ground beef (hamburger) come from?

7. Being that this is an agricultural hands on learning class we will always be working hands on and always be answering questions via written and oral communication. Tomorrow we will do "blind consumer taste tests" to test our jerky. Other than eating it right away or not answering questions, what suggestions do you have to make this lab even better in the future?

If you finish early: You may help clean up the classroom (tables/counters need to be washed down with bleach-water), check feed/water of the animals, log SAE hours, work on other homework, or read.