Unit Plan Format

Bret Loucks

Unit Topic: Animal Utilization/ Resource

Essential Question: How do cultural traditions of Athabaskan people, with regard to resources, enable successful subsistence living?

ALASKA CONTENT STANDARDS ADDRESSED:

Math:

E: A student should be able to apply mathematical concepts and processes to situations within and outside of school: 1) explore problems and describe results using graphical, numerical, physical, algebraic, and verbal mathematical models or representations.; 3) use mathematics in other curriculum areas.

Science:

B: A student should possess and understand the skills of scientific inquiry: 1) use the processes of science; these processes include observing, classifying measuring, interpreting data, inferring, communication, controlling variables, developing models and theories, hypothesizing, prediction, and experimenting; 2) design and conduct scientific investigations using appropriate instruments.

Technology:

D: A student should be able to use technology to express ideas and exchange information: 1) convey ideas to a variety of audiences using publishing, multimedia, and communications tools.

STANDARD FOR CULTURALLY RESPONSIVE SCHOOLS ADDRESSED:

A: A culturally-responsive curriculum reinforces the integrity of the cultural knowledge that students bring with them: 1) recognizes that all knowledge is imbedded in a larger system of cultural beliefs, values and practices, each with its own integrity and interconnectedness; 5) provides opportunities for students to study all subjects starting from a base in the local knowledge system.

MAIN PURPOSE OF UNIT: The main purpose of this unit is to introduce students to the importance of utilizing resources as fully as possible. They will gain an understanding of the nutritional characteristics of traditional foods; learn analysis techniques; identify the characteristics of other materials that an animal provides, and how these characteristics are exploited for traditional uses.

OBJECTIVES:

The student will be able to:

- experimentally determine the caloric content of a food sample.
- experimentally determine the percent fat in meat.
- explain the importance of fat in the diet.
- describe the change in proteins which occurs during cooking.
- demonstrate the use of a triple beam balance, to measure mass and determine density.
- demonstrate the use of a thermometer to measure temperature.
- demonstrate the use of a graduated cylinder to measure the volume of a liquid.
- demonstrate the ability to calculate change in heat using the equation $\Delta H = m \times \Delta t$
- demonstrate the ability to use a graph of a standard curve to determine the value of an unknown (or alternatively use the algebraic equation for the standard curve).
- observe and compare evidence of digestion.
- recognize certain animals as an important food resource.
- design an experiment to compare the density of bone in several animals.
- compare bone density results with predictions.
- identify uses of other animal parts such as, skin, organs, etc.
- Identify uses for plants.

CONTENT OUTLINE AND DAILY BENCHMARKS:

A. Day 1: Measurement - Weighing Technique

Reading a Thermometer

Reading a Graduated Cylinder (40 min)

B. Day 2: Favorite food get to know you activity (45 min)

What is food?

Why do we eat? (10 min)

How much do we have to eat? Fish Portion Activity (30 min) cut & weigh - compare to your weight.

Calorie Lab 1(60 min)

[related Cultural activities…..]

C. Day 2: Field Experience

Protein Lab (45 min) (cooking)

[related cultural activities - traditional cooking & rendering fat???]

Gathering plant materials

Fat Lab 1 - simple qual test (10 min)

D. Day 3: Where do calories come from?

Fat Lab 2 (density method) (45 min)

Enzyme/protein Lab part 1 (20 min) Students design? 40 min

[related cultural activities]

E. Day 4: Bone Density lab (students design) (90 min)

Enzyme/protein Lab part 2 (5 min)

[related cultural activities- Tool making from bone?]

F. Day 5 Basic food testing / Nutrients

{Carbohydrate Lab}?

Vitamin C Lab.

[cultural activities]

G. Day 6 Prepare Project Presentations

Project Presentations

Additional Activities:

skin testing (students design lab?)

ELEMENTS AND PROCEDURES:

⟨ journals ⟨ field trip ⟨ experimentation ⟨ charting ⟨ measurement

⟨ analysis ⟨ experimental design

INSTRUCTIONAL AIDS OR RESOURCES:

working on this!

ASSESSMENT:

journals, dialogue, teacher observation, student participation, peer assessment, student products

Cultural????

Possible Cultural connections:

making traditional toys using animal parts?

traditional meals/preparation?

LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Pre-Assessment and Measurement

LESSON OBJECTIVE:

1. Determine the student's level of proficiency in using a triple beam balance to measure mass.
2. Determine the student's level of proficiency in using a graduated cylinder to measure volume.
3. Determine the student's level of proficiency in using a thermometer to measure temperature.
4. The student will use a triple beam balance to correctly measure mass.
5. The student will use a graduated cylinder to correctly measure volume.
6. The student will use a thermometer to correctly measure temperature.

RELATED STANDARD(S):

Science:

B-1. Use the processes of science...measuring.

Math:

A-1. Understand numeration, including ..(A) numbers... and decimals.

A-2. Select and use the appropriate units and tools of measurement.

B-1. Use computational methods and appropriate technology as problem solving tools.

E-3. Use mathematics in other curriculum areas.

BENCHMARK(S):

- Demonstration of appropriate use of tools.
- Ability to obtain accurate measurements, directly and indirectly.

LESSON OUTLINE:

I. Introduction: Informal dialogue/questioning.
   A. Have you seen these tools before?
   B. What is it, what does it measure?
   C. Can you measure the (mass, volume, temperature) of these things?

II. Process: Demonstration and Practice
   A. Demonstrate use of tools as necessary.
   B. Student practices measuring and recording data.

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. none

REQUIRED MATERIALS / SUPPORT:

- Triple beam balances 7 ea.
- Thermometers -10o - 110 o C 7 ea.
- Graduated cylinders 100 ml 7 ea.
- Styrofoam cups 500 ml 25 ea.
- Ice cubes (small amount) --
- Hot plate 1 ea.

- Beakers 250 ml 7 ea.
- Handouts 15 ea.
- Teacher record sheet 15 ea.
- Writing materials 15 ea.
- Water container 2 qt. 1 ea.
- Various objects to mass --

Unit Pre-Assessment Session #: _____

Camper Name: _____ From: _____

How do you usually spend your summers? _____

_____

What is your favorite food? _____

Tools:

For Mass:

Name: _____ Measures: _____ Units: _____

Familiar with? Y N Can Use? Y N Accurate Use? Y N

For Vol:

Name: _____ Measures: _____ Units: _____

Familiar with? Y N Can Use? Y N Accurate Use? Y N

For Temp:

Name: _____ Measures: _____ Units: _____

Familiar with? Y N Can Use? Y N Accurate Use? Y N

Comments:

Measure This!

Name_____

Session # _____

Finding Mass:

Object: Mass: Object: Mass:

_____ _____ _____ _____

_____ _____ _____ _____

Volume: Temperature:

Cup #: Volume: Cup #: Volume:

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

Measure This!

Name_____

Session # _____

Finding Mass:

Object: Mass: Object: Mass:

_____ _____ _____ _____

_____ _____ _____ _____

Volume: Temperature:

Cup #: Volume: Cup #: Volume:

_____ _____ _____ _____

_____ _____ _____ _____

_____ _____ _____ _____

LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Getting to know you activity

LESSON OBJECTIVE:

1. The student will learn about other students they will be working with.
2. The student will measure accurately.
3. The student will identify patterns in data, and draw reasonable conclusions.
4. The student will understand the intelligence in traditional ways of knowing.

RELATED STANDARD(S):

Standards for Culturally Responsive Schools:

E-8. Identify and appreciate who they are and their place in the world.

E-4. Determine how ideas and concepts from one knowledge system relate to those derived from another knowledge system.

Math:

A-1. Understand numeration, including ..(A) numbers... and decimals.

A-2. Select and use the appropriate units and tools of measurement.

E-3. Use mathematics in other curriculum areas.

E-4. Represent, analyze...using methods such as...graphs.

Science:

B-1. Use the processes of science: observing, measuring, interpreting data, communicating.

C-4. Understand that some personal and societal beliefs accept nonscientific methods for validating

knowledge.

Technology: (Possibly)

A-1 Use a computer to enter and retrieve information.

A-2 Use technological tools for learning....and productivity.

C-1 Use technology to analyze, interpret and draw conclusions.

BENCHMARK(S):

- interviewing and gathering information about another student.
- Introducing and sharing information about another student.

LESSON OUTLINE:

I. Introduction: Game format

A. Each student is given a card that has a "favorite food" on one side and interview questions on the other.
B. Students must find the student whose favorite food is written on the card and interview them.
C. Each student introduces the person they interviewed, and tell us about this student.
D. Discussion: Why do we eat? (energy, nutrition, etc.)

I. Process: Data Gathering
   A. Tell story - How much fish do you need? (Traditionally, heel to tip of middle finger each day)
   B. Students measure this distance, their weight and height.
   C. Students place "sticky dots" on wall charts (graphs) that represent their data.

II. Conclusion: Data analysis
   A. Looking at each wall chart (Height vs. length of hand, Weight vs. length of hand), students look for pattern or trend.
   B. Is there a basic trend or pattern? Is it perfect? How did communities take into account individual differences (mothers make adjustments)? The traditional way of determining the food needed was an example of estimating and averaging.
   C. Students cut size of fish and dry it???

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. none

REQUIRED MATERIALS / SUPPORT:

- Index cards printed with interview questions and favorite foods.

(Bret and Bunny to generate interview questions) 15 ea.

- Writing materials 15 ea.
- Metric rulers 7 ea.
- Bathroom scale (preferably in kilograms) 1 ea.
- Metric tape measure 2 ea.
- Chart paper (Graph) 2 ea.
- Markers (1 each - red, blue, black) 3
- Sticky dots (self-adhesive) (20 each color - red, blue) 40
- Salmon for drying, knives, etc??

A Handful of Fish

Name: _____

Session: _____

I. Purpose:

Traditionally, on Kenai, the amount of fish needed for 1 day was equal to the length of your hand from the base of the palm to the tip of your longest finger. Was this a good way to estimate the amount of food you needed? Why or why not?

What questions do we need to answer to find out?

II. Procedure:

1. Measure the length of your hand as described above. Record this measurement.
2. Measure your height. Record this measurement.
3. Measure your weight. Record this measurement.

III. Data:

Length of Hand	Your Height	Your Weight

IV. Analysis:

1. Plot your hand length and height on the Height vs. Hand Length chart.
2. Plot your hand length and weight on the Weight vs. Hand Length chart.
3. What patterns do you see when you look at the chart of everyone's data?

4. How would you answer the questions written in Part I?

V. Conclusion:

LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Determining the Caloric Content of Food

LESSON OBJECTIVE:

1. The student will experimentally determine the Caloric content of a food sample.
2. The student will observe and demonstrate laboratory safety practices.
3. The student will demonstrate the appropriate use of laboratory equipment.
4. The student will measure accurately.

RELATED STANDARD(S):

Standards for Culturally Responsive Schools:

Math:

A-1. Understand numeration, including ..(A) numbers... and decimals.

A-2. Select and use the appropriate units and tools of measurement.

B-1. Use computational methods and appropriate technology as problem solving tools.

E-3. Use mathematics in other curriculum areas.

Science:

A-2 Understand the...chemical...changes and interactions that result in observable changes in the

properties of matter.

A-8 Understand the scientific principles and models that (A) describe the nature of...chemical...reactions.

B-1. Use the processes of science: observing, measuring, interpreting data, experimenting, communicating.

B-6. Employ strict adherence to safety procedures in conducting scientific investigations.

C-2. Understand that scientific knowledge is validated by repeated specific experiments that conclude

similar results.

BENCHMARK(S):

- Observations of student participation in laboratory activity.
- Sharing of results.
- Data sheets

LESSON OUTLINE:

I. Introduction: Informal dialogue/questioning.

A. Where do we get energy?
B. How is the energy in food measured?

I. Process: Demonstration and Experimentation
A. Demonstrate experimental set-up.
B. Demonstrate procedural steps, following hand-out.
C. Students carry-out experiment and record data.
D. Students calculate caloric content of food sample.

II. Conclusion:
A. Sharing of results
B. What factors may affect accuracy of our measurement?
C. How could this experiment be improved?

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. Differentiated instruction: support for students who need bridge for mathematics problem solving.

REQUIRED MATERIALS / SUPPORT:

- Triple beam balances 7 ea.
- Ring Stands 7 ea.
- Iron Ring 3 in. 7 ea.
- Thermometers, alcohol -10o - 110 o C 7 ea.
- Graduated cylinders 100 ml 7 ea.
- Metal cans 250 ml 7 ea.
- Ice cubes (small amount) --
- Matches 1 ea.
- Propane Torch 1 ea.
- Handouts 15 ea.
- Writing materials 15 ea.
- Water container 2 qt. 1 ea.
- Food samples (variety?)
- Calculators 7 ea.

The Energy Available in Food

Name_____

Session _____

I. Purpose:

The purpose of this activity is to find the amount of energy in a sample of food. Food energy is measured in Calories. One Calorie (dietary calorie) is the amount of heat needed to raise the temperature of one liter of water by 1 o Celcius. This the same as raising the temperature of 100ml of water by 10 o C.

II. Procedure:

Caution: Keep clothing and hair away from open flame. Do not touch hot equipment.

1. Set up the experiment as shown.
2. Measure 100ml (0.1 liter) of water and pour it into the can.
3. Measure the temperature of the water. **Record this temperature.**
4. Measure the mass of the food (including the container). **Record this mass.**
5. Place the food under the can of water and light it.
6. Adjust the ring stand so that the flame hits the bottom of the can.
7. Gently stir the water with the thermometer.
8. When the water has reached 30 o C, blow out the flame.

9. Continue to stir the water and watch the temperature as it rises.
10. When the temperature of the water has reached its maximum, **record this temperature**.
11. Weigh the remaining food as before. **Record this mass.**

III. Data:

Measurement Taken:	Mass of Food	Temperature of Water
Before Heating		
After Heating		

IV. Analysis:

1. What was the temperature change of the water?

2. How many Calories of Heat energy were released by the food?

Heat energy = Amount of water (liters) X Temperature change

4. How much food was burned?

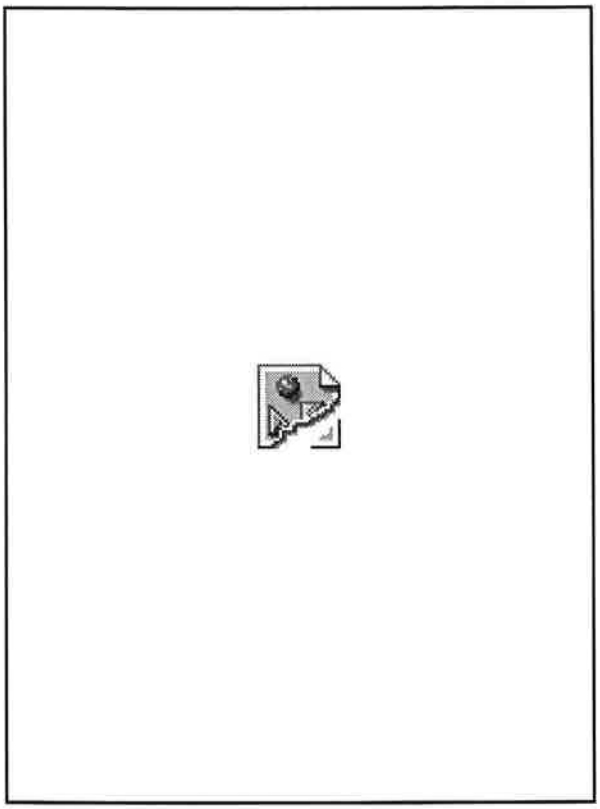
5. How many Calories are in one serving?

V. Conclusion:

1. What have you found out about the calories in this food?

2. What happens to the food you eat?

3. What factors might have affected the accuracy of our experiment? How could you improve it?



LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Field Experience

Elders.

Science:

B-1. Use the processes of science: observing, inferring, interpreting data, communicating.

C-4. Understand that some personal and societal beliefs accept nonscientific methods for validating

knowledge.

BENCHMARK(S):

- Students will gather traditional craft materials
- Students will cook a meal in a traditional way.
- Students will use traditional methods for rendering animal fat.
- Students will utilize animal fat for traditional purposes.

LESSON OUTLINE:

I. Introduction: Introduce Elder.

II. Process: Elder guides students as they:

A. Prepare fire and meal materials. (find edible plant materials?)
B. Cook food in traditional way. (stew?)
C. Render fat in traditional way.
D. Utilize any storytelling opportunities.

I. Exploration:

A. With assistance of Elder, students collect plant materials for crafts. (and eating?)

BUNNY I NEED LOTS OF HELP WITH THIS ONE!!!

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. Appropriate adaptations for physical handicaps (accessibility issues)

REQUIRED MATERIALS / SUPPORT:

- **HELP BUNNY!!!!**

LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Determination of Percent Fat in Meat by Density

LESSON OBJECTIVE:

1. The student will accurately find the density of meat samples using the specific gravity method.
2. The student will compare meat density to a standard curve to determine the percent fat in the sample.
3. The student will explain density.

RELATED STANDARD(S):

Standards for Culturally Responsive Schools:

B-1. Acquire insights from other cultures without diminishing the integrity of their own.

B-2. Make effective use of the knowledge, skills and ways of knowing from their own cultural traditions to learn about the larger world in which they live.

Math:

A-2. Select and use the appropriate units and tools of measurement.

E-3. Use mathematics in other curriculum areas.

E-4. Represent, analyze...using methods such as...graphs.

Science:

B-1. Use the processes of science: observing, measuring, interpreting data, communicating.

Technology: (Possibly)

A-1 Use a computer to enter and retrieve information.

A-2 Use technological tools for learning....and productivity.

C-1 Use technology to analyze, interpret and draw conclusions.

BENCHMARK(S):

- Observation of student performance in laboratory activity.
- Student report of results.

LESSON OUTLINE:

I. Introduction: Remembering yesterday:

A. How did we render fat?(rendered fat floated on water).
B. Why did fat float?(discussion - density)

I. Process: Experimental determination of percent fat in meat.

A. Demonstrate experimental setup.
B. Determine density of meat samples (bear, moose, etc.).
C. Compare to standard curve to determine percent fat.

I. Conclusion:

A. What factors might affect accuracy of your results?
B. Does a low fat content in your sample mean that the animal's meat is lower in fat than the other animals tested? Why or why not?
C. Is lower fat necessarily more healthy?

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1)

REQUIRED MATERIALS / SUPPORT:

- Triple beam balances 7 ea.
- Ring stands 7 ea.
- Iron ring 3 in. 7 ea.
- Plastic cups 250 ml 7 ea.
- Safflower oil 2 qt.
- Dental floss 1 box
- Density stand 7 ea.
- Weights (books,etc) 7 ea.
- Handouts 15 ea.
- Standard curves
- Writing materials 15 ea.
- Meat samples (variety?) 15 ea.
- Calculators 7 ea.

How Much Fat in Meat

Name:_____

Session:_____

I. Purpose:

Use the density of meat to estimate the percent fat in the sample. You will weigh the fat, and then find it's weight when it is submerged in oil. The more fat in the sample, the less it will weigh in the oil. Why?

II. Procedure:

1. Weigh the wire sample holder and string. **Record the mass.**
2. Hang the meat from the holder and weigh the combined mass. **Record the mass.**
3. Submerge the meat in the safflower oil. **Record the mass.**
4. Repeat steps 1-3 with another sample.

III. Data:

Type of Meat	Sample Holder Mass	Sample Holder + Meat in Air	Sample Holder + Meat in Oil

IV. Analysis:

Type of Meat	Mass of Meat in Air	Mass of Meat in Oil	Meat Density Air mass/Oil mass

Percent Fat from Standard Curve:

Type of Meat % Fat

_____ ____

_____ ____

V. Conclusion:

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Digestion of Protein

LESSON OBJECTIVE:

1. The student will run a controlled experiment.
2. The student will observe and describe the effect of stomach acid and digestive enzymes on meat protein.

RELATED STANDARD(S):

Standards for Culturally Responsive Schools:

Science:

A-1. Understand the chemical....changes and interactions that result in observable changes in the properties of matter.

B-1. Use the processes of science: controlling variables, observing, measuring, interpreting data and communicating.

BENCHMARK(S):

- Observation of student performance in laboratory activity.
- Student discussion of observations and results.

LESSON OUTLINE:

I. Introduction: What we already know about protein:

A. What happened to the protein when we cooked the meat?(molecules uncoiled and meat became opaque).
B. How does your body break down these large molecules for you?(discussion - juices in stomach and intestine).

II. Process: Controlled experiment - Visible Stomach.
A. Show pop bottle "stomachs."
B. Introduce question - What happens to the food in your stomach? What do stomach juices do?
C. Show possible treatments - acid and enzyme.

D. As a group students help design an experiment to answer above questions.
E. Students write down hypothesis: What will happen in each treatment, and control?
F. Students experiment (experiment runs overnight).
G. Students make observations and discuss conclusions that can be drawn from experiment.

III.
IV. Conclusion:
    A. What do your results indicate?
    B. Which is more effective at digesting meat, acid or enzymes?
    C. What could be done to improve this experiment?

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. none

REQUIRED MATERIALS / SUPPORT:

- 24 oz. soda bottles 14 ea.
- Papaya enzyme 1 bottle
- Hydrochloric Acid (10%) 1 liter.
- Dental floss 1 box
- Meat samples (1 inch cubes) 30ea.
- magnifying lenses 7 ea.

LESSON PLAN FORMAT

UNIT OF STUDY: Utilization of Plants and Animals

LESSON: Bone Density Lab

LESSON OBJECTIVE:

1. Students will apply their knowledge and experience to design an experiment.

RELATED STANDARD(S):

Standards for Culturally Responsive Schools:

B-2. Make effective use of the knowledge, skills and ways of knowing from their own cultural traditions to learn about the larger world in which they live.

Math:

A-2. Select and use the appropriate units and tools of measurement.

E-3. Use mathematics in other curriculum areas.

E-4. Represent, analyze...using methods such as...graphs.

Science:

B-1. Use the processes of science: observing, measuring, interpreting data, communicating.

B-2. Design and conduct scientific investigations using appropriate instruments.

Technology:

A-1 Use a computer to enter and retrieve information.

A-2 Use technological tools for learning....and productivity.

C-1 Use technology to analyze, interpret and draw conclusions.

BENCHMARK(S):

- Assessment of student experimental design/
- Observation of student performance in laboratory activity.
- Assessment of student laboratory report.

LESSON OUTLINE:

I. Introduction: Putting it Together:
   A. What is density? How did we measure it?
   B. Why do animals need bones (skeleton)? How are bones of different animals different? Why would this be so?
   C. If we were to measure the density of the bones of (list different animals -one is a bird), what do you think we would find out? Why?

II. Process: Experimental Design - Bone Density.
   A. Design experiment with lab partner to measure bone density.
   B. Conduct experiment.

C. Compare and share results.

III. Conclusion:
   A. Were your results surprising?
   B. How did your results compare with the results of others? Why?
   C. Can you make any generalizations about the bone density of animals?

POTENTIAL MODIFICATIONS / ADAPTATIONS:

1. none

REQUIRED MATERIALS / SUPPORT:

- Triple beam balances 7 ea.
- Ring stands 7 ea.
- Iron ring 3 in. 7 ea.
- Plastic cups 250 ml 7 ea.
- Water 2 qt.
- Dental floss 1 box
- Density stand 7 ea.
- Weights (books,etc) 7 ea.
- Graph Paper 30 sheets
- Writing materials 15 ea.
- Bone samples (variety?) 15 ea.
- Calculators 7 ea.