



Boating Session Outline For the Outdoor Skills Program

- I. Welcome students and ask group what they remember or learned in the last session.

- II. Boating Lessons
 - A. Activity: Engineering a Boat
 - B. Activity: Life Jacket Safety
 - C. Activity: Paddling

- III. Review: Ask the students what they enjoyed most about today's session and what they enjoyed the least. (Another way to ask is "what was your high today, and what was your low? As the weeks progress this can be called "Time for Highs & Lows".)

The Outdoor Skills program is a partnership with Nebraska Games & Parks and the UNL Extension/4-H Youth Development Program to provide hands-on lessons for youth during their afterschool time and school days off. It provides the opportunity to master skills in the areas of hunting, fishing, and exploring the outdoors. This educational program is part of the 20 year plan to recruit, develop and retain hunters, anglers, and outdoor enthusiasts in Nebraska.

Inventory

Activity: Boating

Kit Materials & Equipment

- Aluminum foil
- Straws
- (4) Pitchers
- (50) Marbles
- (6) Rulers
- (5) PFDs (Life jackets)
- Life jacket laminated poster
- Life jacket label poster
- (15) Nebraska Game and Parks
- Skateboard
- Painter's tape
- (4) Safety cone
- Masking tape
- Toothpicks

Supplies Instructor Provides

- Scotch Tape
- Water
- Stapler
- Stop Watch

Commission Boaters Guide

- Rope
- Canoe paddle
- Kayak paddle

Materials to be Restocked-After Each Use

- (15) Nebraska Game and Parks Commission Boaters Guide

Session: Tip A Canoe and Kayak Too

Activity: Engineering a Boat

Objectives: Participants will examine the differences in kayak and canoe design.

Test: Youth will engineer a boat to create a balance of buoyance and gravity in a kayak design and a canoe design.

Method: Youth will design a kayak and canoe from aluminum foil and test it for load limits.

Materials Contained in Kit:

Aluminum Foil	Masking Tape
Straws	50 Marbles
Pitcher (for water)	6 Rulers
Toothpicks	

All stored in a clear rectangle container to be filled with water to test boats.

Materials Needed to Conduct Activity:

Water	Stapler
Scotch Tape	

Duration: 60 - 90 minutes

Group Size: 12 students

Setting: Indoors or outdoors

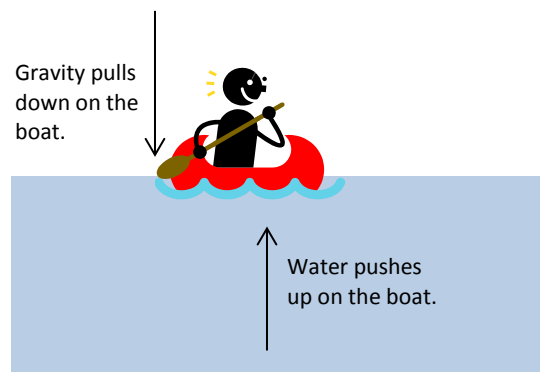
Key Terms: Buoyancy, Gravity, Load Limits, Bow, Stern, Single vs. Tandem

SET Abilities: Design/Draw, Collaboration,

Fair Project: Boats with charts of experiment

Background Information:

When an object is immersed in a liquid, it experiences an upward force on it called the buoyant force. Gravity pulls a boat down to the Earth, however, the density and surface area of an object determine if the object will sink or float.



This ability to fight gravity and float is known as buoyancy.

The larger a surface touching the water molecules, the more room the water can push up on the boat surface. This is why a freight liner go float on water but a skyscraper can't, there just isn't enough surface to hold up the volume.

Reminder: Volume measures how much space something takes up and mass measures how much matter it has.

(This is information was adapted from *The Science of Boat Design*).

Canoes are better than Kayaks

Canoes have more room for gear.

Canoes are more stable.

It is easier to adjust seating positions in canoes.

Canoes can be more comfortable.

You can stand up in a canoe -carefully.

Canoes keep you dryer when there is water in the boat.

You have a better view from a canoe.

Canoes are easier to get in and out of.

It's more natural to have two people in a canoe than in a tandem kayak.

It's an art to paddle with one blade and

water doesn't run down the shaft into your lap.

Kayaks are better than Canoes

Kayaks are easier to paddle solo for beginners.

Kayaks are more maneuverable.

Kayaks can keep gear dryer.

Kayaks are faster- 2 blades are better than one!

Kayaks can handle rougher conditions.

Kayaks won't take on water when waves come over the bow.

Kayaks keep the paddler protected from the elements.

Kayaks are lighter to carry and easier to load on a roof rack.

Kayaks have rudders to compensate for wind and currents.

Kayaks allow the paddler to be closer to the water which is a great feeling.



Student Notebook

- 1) In your student notebook draw a design for your kayak, and the other team member draws the canoe. Encourage the use of measurements.
- 2) Using a piece of foil, engineer a boat according the drawing.
- 3) Make a hypothesis based off of buoyancy which will hold more weight.
- 4) Then take the two boats to the “lake” and place marbles- one at a time- in each where a person would sit, and how they would sit. Encourage the use of scotch tape to hold the marbles together, basically make a seat in each boat.
- 5) Record the results in your journal of what the load limits of each boat.

	Canoe	Kayak
# of marbles		

Career Focus

Fisheries Biologist (Sturgeon on the Missouri)

Activity

Before the activity

Take all the supplies out of the rectangle container, and put out on table for participants. Then, fill the container with water.

Hang up the posters: Canoe and Kayaks.

Procedure

Youth will build a canoe and kayak in teams. Go over the design differences in the posters between the two boats. Challenge the students using the exact same materials to build a canoe and a kayak.

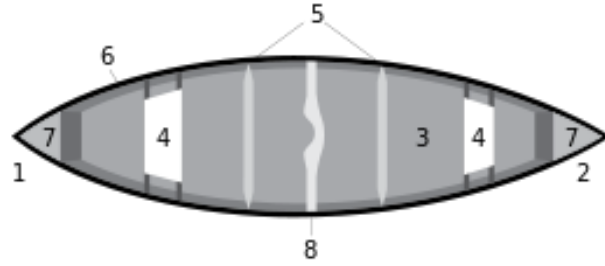
Wrap Up

Which has a higher load limit – kayak or canoe? Why?

If you were an engineer for a boat company, how would you test for load limits?

Why are most kayaks single versus tandem? Why are canoes usually for two people? If you wanted to make a five person boat, how would you have to engineer it differently for the extra mass (based off what you have learned about buoyant force)?

CANOE DESIGN



A canoe is an open, flat-bottomed boat with raised seats for the paddler. It has a wide body that curves upward at both ends, like a slight “U.”

- 1- Bow (the forward part of the boat)
- 2- Stern (the rear part of the boat)
- 3- Hull (the body of the boat. It touches the water)
- 4- Seats (this is where the person sits. It is suspended in a canoe)
- 5- Thwarts (braces that connect the left side to the right side of the boat)
- 6- Gunwale (the top edge of the boat that reinforces the bracing of the thwarts)
- 7- Deck (A covering over the hull of a ship to keep it sturdy. In a canoe it is over both the bow and stern).
- 8- Yoke (a bar going across the boat to use when carrying and transporting the boat. This should be solid and not bend when you move the boat).

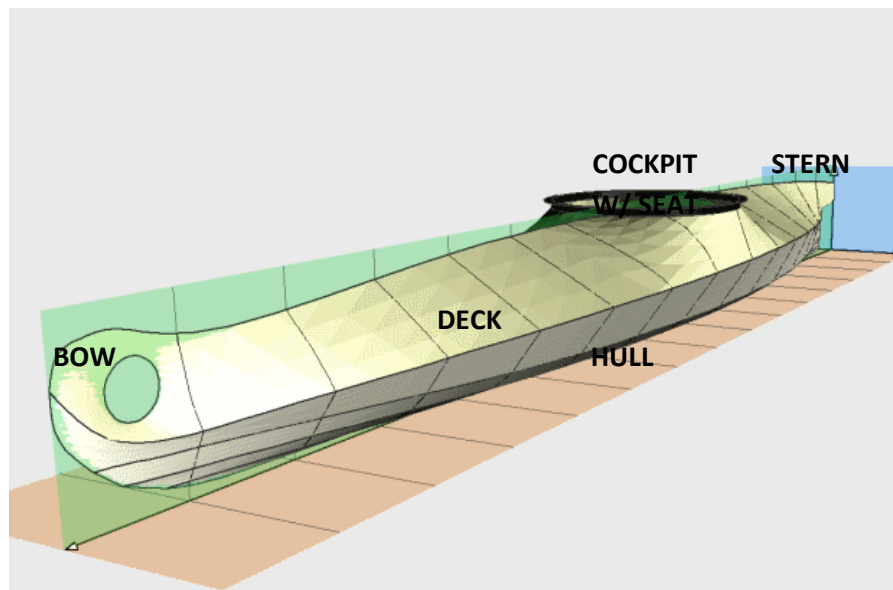


Design your canoe in the space below. Label the supplies you are going to use for each part of the boat. . EX: Hull (foil), Measure where appropriate so someone else could build your boat by your plans. Canoes are typically 17 feet in length.

KAYAK DESIGN

A kayak is a narrower, closed boat in which the paddler sits on the boat's bottom.

Design a kayak in the space below. Label the supplies you are going to use for each part of the boat. Measure where appropriate so someone else could build your boat by your plans. Kayaks are typically 8-16 feet.



Session: Tip A Canoe and Kayak Too

Activity: Got a Life Jacket?

Objectives: Participants will

1. List and define boating options.
2. Identify the importance of wearing a life jacket.
3. Demonstrate how to properly select and wear a life jacket.

Materials Contained in Kit:

- 5 Life Jackets (different sizes, condition and types)
- Life Jacket Label Poster
- Life Jacket Poster
- Current Nebraska Boating Guide (one per student)
- Rope

Materials Needed to Conduct Activity:

- Chairs or some type of seat
- Stop Watch

Field Day Activity: Students will demonstrate how to select and properly wear a life jacket prior to kayaking and/or canoeing. Students will be asked questions on proper life jacket use.

Duration: 1 hour

Group Size: any

Setting: Indoors or outdoors

Key Terms: PFD, Vessel

SET Abilities:

Fair Project: Life Jacket Promotional Poster

Background Information:

Motorboats to kayaks; boating is a fun way to enjoy Nebraska's scenic waters. There are a number of water recreation vessel opportunities.

Terms to know:

- **Vessel** – Every description of watercraft, used as a means of transportation on water.
- **PFD** – Personal Flotation Device. Also known as a life Jacket.

Safety First:

Anyone operating a motorboat or personal water craft (uses a motor or engine for power) in Nebraska, born after December 31, 1985 must be at least 14 years of age and they must have successfully completed the Nebraska boating safety course and are in possession of a valid certificate card. It is a good idea to take the class even if you just plan on canoeing or kayaking to learn all water safety requirements.

Whether you are using a paddle, motor or sail you should always wear a life jacket.

Flotation Device Requirements:

- Life Jackets are to be US Coast Guard Approved (USCG).
- Person less than 13 years of age must wear a USCG-approved PDF.
- All life jackets must be in good condition – not fading or tearing. Zipper or buckles must fasten correctly.
- Life jackets must be of proper size for the intended wearer. Sizing life jackets is based on body weight and chest size.

Other Safety Tips:

- Wear a safety whistle to call for safety.
- Stay hydrated.
- Check weather prior to departure.
- Properly care for vessels.

Careers

- Coast Guard Officer
- Boating Law Enforcement

Activity

Before the activity

1. Ensure there are enough chairs/seats for every student. If outside, using anything to have student sit on.
2. The “Life jacket Drill” will require you to create a boat using masking tape or rope large enough to fit the number of chairs/seats for each student.
3. Review Nebraska’s law regarding life jacket use.

Procedure

1. Got a Life Jacket?

Place life jackets on the chair. As the students enter the room, ask the students to sit down in the boat. Explain that they are traveling in a motorboat down the river. Suddenly you are hit a large rock. The boat begins to sink and you are 50 yards from shore. Yell... “Quickly, grab your PFDs”. Students will quickly learn that there are not enough flotation devices for everyone. Also the life jackets available may be too small or big.

Ask the listed questions followed by discussion:

- *What is a PFD?* – Personal Flotation Device. (AKA – Life Jacket)
- *How many life jackets should be in the boat?* Indicate there is to be one life jacket per person in each vessel. The life jacket must also fit each person properly. Express the importance of knowing before

getting on a boat that there are enough life jackets for everyone.

- *What type of boat do you need to wear life jackets?* Express that a lifejacket are to be worn in all boats no matter how deep the water.
- *Who should wear a lifejacket?* Person less than 13 years old is required by law. All ages should wear a lifejacket for safety.
- *Have you or anyone you know had any scary experiences around water? Were PFDs worn by everyone?*
- Have the students refer to the Nebraska Boater Guide looking up the life jacket use state requirements.

2. Proper Life Jacket Fit and Selection

Put students in pairs and have each pair select a lifejacket. Each pair will have one person put on the lifejacket and both will stand together to talk about their lifejacket with the group. Going through each pair, the person wearing the lifejacket will show off the lifejackets he or she is wearing. Have each pair answer all or a few of the following questions:

- *How did you put it on?*
- *Does the life jacket fit?*
 - They need to fit snug. Chin and ears should not slip through the top. Demonstrate how a life jacket to large will float pull off over the head. Look at the weight requirements inside the jacket.
 - Adult-sized life jackets will not work for youth.
- *What makes this a good life jacket?*
 - Have the students look for the coast guard approved wording it the life jacket.
 - Is the life jacket fading, cracked or falling apart? Point out the jacket that is fading or cracked. This indicates the

floatation material may not be effective.

- Go over how to read a lifejacket label. Have students draw line from the label to the description on the worksheet in the journal.



FLOTATION AID – TYPE III PFD –

Coast Guard classification.

INTENDED USE – Statement as required by the Coast Guard. The designation “Sport Vest” is the manufacturer’s suggested uses that do not necessarily limit this life jacket to only those uses.

ADULT X-LARGE – Sizing by manufacturer. It is important to follow the body weight and chest size ratings that also are listed on the label.

MODEL & STYLE – Manufacturer uses a model number, which usually indicates the type and size of the life jacket. The model number, style and lot number are important to know when contacting the manufacture.

U.S. Coast Guard Approval NUMBER – First six-digits 160.064 indicates the Federal Regulation under which the Coast Guard approved this life jacket.

STRENGTH TESTED – “Underwriters’ Laboratory tests the structural integrity of the life jacket by placing it in a frame and dropping it into the water from a boat at six different angles. Often a buckle will explode or a zipper seam will peel like a banana. This appears because many people mistake the structural integrity test for an endorsement of high speed use. No life jacket should be used for waterskiing or similar use unless it has been tested at at least 50 mph.

UL – Coast Guard requires the manufacturer to contract testing.

Underwriters’ Laboratory performs extensive tests.

LOT NO – code the year and quarter of manufacture. A new lot must be started any time materials or production methods change. Important to have when contacting the manufacture or Coast Guard.

- *When would you wear this life jacket?*
 - Refer to the type of devices in the Boaters Guide.
 - Express that life jackets are to be worn all the time in a boat.

3. Life Jacket Relay Race

Divide the students into two equal teams. Have them form two lines. Place a life jacket at the feet of the first student in each line. At the signal to go, the first students in each line will pick up the life jacket, put it on properly, and run to the designated place were the adults are standing. The adult will quickly “inspect” the student’s life jacket, making sure the straps are tied and/or fastened and the life jacket fits snug.

Students return to the starting point, removes the life jacket and give it to the next person in line. The race is over when the first team to have each person complete the exercise is finished.

Wrap Up

Discussion: Talk about how difficult it is to put on a lifejacket when you are in a hurry. Point out that it is always easier to have the life jacket on to start with rather than putting it on in an emergency.



Student Notebook

CHEST SIZE: 40-44 IN.(102 TO 112 CM)

UPC 87306

**FLOTATION AID – TYPE III PFD
INTENDED USE: BOATING VEST
ADULT LARGE**

USER WEIGHT: **MORE THAN 90 LBS. (41KG)** CHEST SIZE: 40 - 44 IN.
MODEL: WAVE (102 TO 112 CM)

U.S. COAST GUARD APPROVAL NUMBER 160.064/4093/0

USCG Approved **wearable** device for uninspected
Commercial vessels **less than 40 feet (12m)** in length
Not carrying passengers for hire, and for recreational
Boats.

WARNING – TO REDUCE THE RISK OF DEATH BY DROWNING:

- **READ MANUFACTURER'S "THINK SAFE" PAMPHLET BEFORE USING THIS DEVICE AND PERFORM "THINK SAFE" CHECKS EACH SEASON**
- **CHOOSE THE RIGHT TYPE AND SIZE PFD AND WEAR IT – FASTEN ALL CLOSURES AND ADJUST FOR SNUG FIT**
- **FOLLOW MANUFACTURER'S USE AND CARE INSTRUCTIONS**
- **DO NOT CARRY HEAVY OBJECTS– HEAVY OBJECTS IMPAIR FLOTATION**

STRENGTH TESTED AT 50 MPH, NOT TESTED FOR PERSONAL PROTECTION FROM IMPACT.

THIS DEVICE IS NOT TO BE FASTENED TO THE BOAT.



**LISTED
FLOTATION AID
ISSUE NO. E – 740**

WELLINGTON LEISURE PRODUCTS INC., MADISON, GEORGIA

LOT NO. C- 82722102

Session: Tip A Canoe and Kayak Too

Activity: Paddling

Objectives: Participants will

1. Demonstrate how to paddle a kayak
2. Demonstrate how to paddle a canoe.

Test: Youth will be able to perform a forward stroke with a canoe paddle, and propel themselves forward. Youth will be able to perform all three phases of a kayak stroke.

Method: Youth will paddle one handed for canoeing and two handed for kayaking.

Materials Contained in Kit:

Canoe paddle	Kayak paddle
Skateboard	Painter's tape
Safety cones	

Materials Needed to Conduct

Activity: Stopwatch or Clock

Field Day Activity: Students will kayak and canoe.

Duration: 30 minutes

Group Size: 12 students

Setting: Indoors or outdoors

Key Terms: Kayak, Canoe, Stroke, Propulsion

SET Abilities:

Fair Project:

Background Information:

When the Missouri River flooded in Nebraska in 2011, scientists studying fish had to become very familiar with boating. The waters were much more dangerous than what they normally are. Understanding how to propulsion is important in flat water as well as raging river waters.

Canoe paddling is different from kayak paddling. Canoe paddling is more about digging into the water where kayak paddling is more about skimming the water.

Canoe Paddling

- 1) Raise the paddle out of the water and bring the top hand up high (at or above the head). The shaft of the canoe paddle should be near vertical to the water and not diagonal across the body.
- 2) Push the lower hand forward, reaching the paddle blade toward the front of the canoe. Be sure to sit up straight.
- 3) Place the paddle blade into the water ahead of your body. Keep the face of the blade perpendicular to the direction of the stroke.
- 4) Pull the paddle along the side of the canoe in a straight line. Allow the top hand to push forward and down while the bottom hand pulls back.
- 5) Use the torso and upper body rotation to aid in the stroke and give maximum power. You shouldn't be using your arms as much as you use the rotation of your body.
- 6) When the blade is past the canoeist's body, bring the blade out of the water and go back to step #1.

Tips: Switch sides frequently so that you don't put too much stress on one arm. It is most efficient to paddle on the left side of the canoe when the right hand is on top of the paddle. It is most efficient to paddle on the right side of the canoe when the left hand is on top of the paddle.

Kayak Paddling

1) **Rotate Your Body**

To take a stroke on the right side, rotate your torso counter-clockwise so that the right paddle blade is forward. Be sure to maintain the paddler's box. The key to it is the torso rotation not arm motion.

2) **Place the Paddle in the Water "Catch the water"**

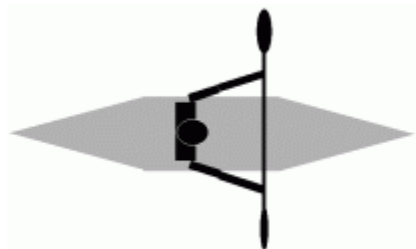
Place the forward paddle blade in the water near the feet and toward the "bow" of the kayak. The blade should be inserted into the water with little disturbance. The face of the blade should be perpendicular to the direction of pull.

3) **Take the Stroke:**

With the blade in the water, rotate the torso so as to pull the blade through the water alongside of the boat. Keep the top hand level throughout the rotation at about eye level. Again, the stroke is powered by the rotation of the torso and not by pulling and pushing with the arms. The forward stroke length is "tip to hip." The blade enters toward the tip/bow of the kayak and is only pulled as far back as your hip of the kayak.

4) **Repeat these steps on the opposite side of the boat.**

Tips: Keep your hands on the paddle at shoulder length apart. Make a "Paddler's box".



Career Focus

Fisheries Biologist (Studying sturgeon on the Missouri).

Activity

- 1) *Mark a starting line 6' wide with the painter's tape, and a 6' finish line approximately 20 feet away.*
- 2) *Place cones 6' apart about 7' down the "runway", and again at 15'. To keep the observing students off the runway.*

Procedure

- 1) Go over the background information on canoe and kayak paddling. Let the students try the canoe and kayak paddling while standing.
- 2) Students will now take the canoe position with sitting up straight on the skateboard. Students will sit on a skateboard, and practice their canoe paddle stroke on the runway.
- 3) Kayak Paddling – students will sit in the kayakers position (back up with legs in front and knees slightly bent), and practice staying in the paddler's box while paddling.
- 4) Now time each person going from the start line to the finish line using each type of paddle –PROPERLY.

Wrap Up

- Which paddle is more effective for going faster? What in the design allows for that?
- Which paddle is more effective for need strength, like in situations you are going against the wind?



Student Notebook!