UF | IFAS Extension
UNIVERSITY of FLORIDA

4-H Archery Leader Guide

Basic and Advanced Levels, Ages 8–18 Years

Julia S. Kelly, Matt Benge, and Glenn Israel

Table of Contents

Introduction

The purpose of this guide is to provide a resource for archery leaders that includes reflection, application and evaluation with the activities.

THE PRIMARY OBJECTIVES ARE:

- To improve accuracy by performing proper shooting form
- To practice safety in all aspects of archery
- To develop life skills while learning archery

This guide was developed to address a need of archery leaders to plan activities that purposely incorporate life skills while teaching the youth about archery. The concepts and principles originate in the National 4-H Shooting Sports Committee Instructor's Manual II. This guide is designed to be used only by Level I Certified Archery Instructors, the training required to be a 4-H archery leader, because the concepts included are covered in depth in the training.

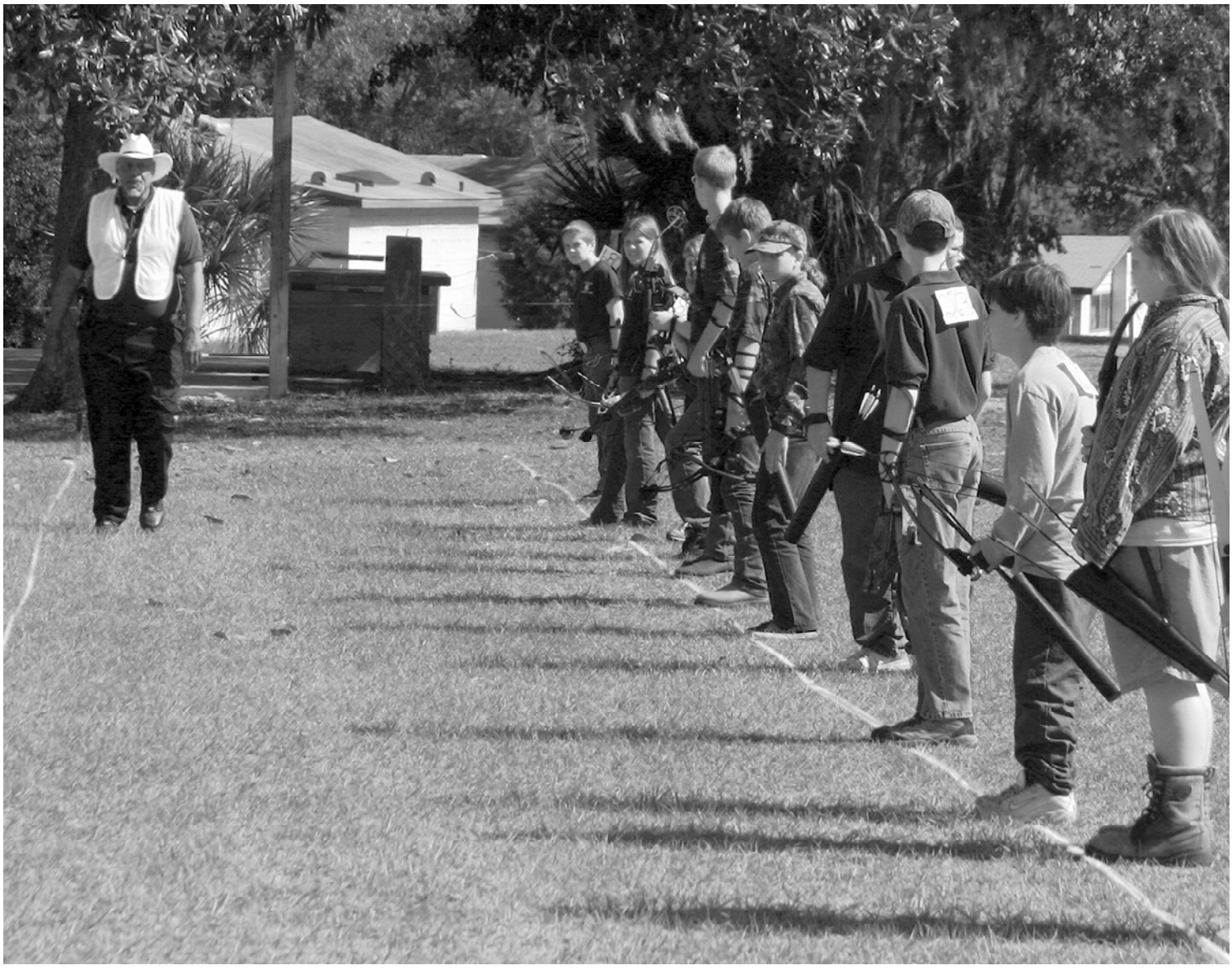
There are 13 lessons. Six are in the Basic Section and seven are in the Advanced Section. The sections are divided up by both skill level and age. All beginning archers, regardless of age, should be learning the lessons

from the Basic Section, especially 1–3. The Advanced Section is for more experienced archers (those who have shot for at least a year) who have mastered the lessons in the Basic Section and are age 11 or above.

In the Basic Section, the evaluation in each lesson should be satisfactorily completed before moving to the next lesson. Some material takes more than one meeting to master so an understanding of the material may be sufficient for advancement. The Personal Safety life skill is featured in all six lessons. This lowers the risk of injury when the safety protocols included in the lessons are followed. Safety is a consideration whenever archery equipment is being handled, whether the archer is shooting or not. Many of the lessons in this section can be taught by older Advanced Level archers with the supervision of a Level I 4-H Archery Instructor.

The Advanced Section includes lessons that are critical for fun recreational shooting. The purpose of these lessons is not to teach the archer how to shoot; they are intended to develop the life skills of Marketable Skills and Personal Safety. These lessons also focus on Problem Solving and Decision Making. Proficiency in a lesson is not a requirement to learn the following lesson. However, while not required, it is recommended that Lessons 1 and 2 be completed sequentially.

Throughout the book, there are references to the 4-H Instructor Manual. It is recommended that you read the fact sheets included in the manual for in-depth information. In the Appendices are fact sheets, diagrams, and printed copies of the slide shows.



Basic Lesson 1:

Eye Dominance

Skill Level

Basic

Time Needed

10 minutes

Learning Objectives

Project Skills

- Youth will be able to identify their dominant eye.

Skills for Life

- Teamwork
- Critical Thinking
- Personal Safety

Materials Needed

- Clipboard
- List of archers
- Pen/pencil

Setting

On the range

Lead-In Questions

- How do you know what your dominant eye is?
- How is your dominant eye related to your dominant hand?
- Why is it important in archery to identify your dominant eye?

Introduction

Almost everyone has a dominant eye. The image one sees lines up with the dominant eye. Very few people have indeterminate eye dominance, but a large minority is cross-dominant; their dominant eye is opposite their dominant hand. Archers with eyedness and handedness on the same side have an easier time learning archery than cross-dominant archers. However, if a cross-dominant person switches to the dominant hand side, they will have an even more difficult time mastering the sport. Even with the difficulties of being cross-dominant, in the long run, by following the eyedness, they will be better archers.

Background Information

Most people have a dominant eye, just as they have a dominant hand or foot. When a person looks at an object with both eyes, the dominant eye aligns directly with the object unless an obstruction interferes with a clear line of sight. Under normal conditions, when a finger is pointed at an object, or two or more objects are aligned visually, the dominant eye determines the alignment. Just as some people are truly ambidextrous, a very small number of people have indeterminate eye dominance. The majority, however, have a dominant eye. In most cases, eye dominance and hand dominance are on the same side, but many people are cross-dominant. That is, their handedness and eyedness are on opposite sides (Howard & Peter, 2012). For more information, see the fact sheet “Determining Eye Dominance” in the Florida 4-H Archery Discipline Instructor Manual.

Hand and Eye Dominance Activity

Pair archers and have them stand facing each other 6 feet apart. Start with one archer in each pair doing the following: Have them place one thumb over the other and cross their fingers over the fingers of the other hand, leaving a small triangle. Raise both hands together, keeping both eyes open and their arms straight toward their partner. They will look at their partner's nose through the opening. The partner should note which eye can be seen through the opening. Now keeping the nose in the opening, they will bring their hands slowly back to their face. The partner should watch for any "cheating" where the hands seem to wander from eye to eye. The eye that their hands return to is their dominant eye. Now switch roles and try it again. Do not be concerned if the handedness and eyedness are different. A significant minority of the people in the world is cross-dominant. For this first shoot, give them a bow as indicated by their dominant eye. If they are against using a bow based on eyedness, encourage them to try it, with the option to switch to the dominant hand later.

Photo credit: **www.pewpewtactical.com**

- Extend arms forward and form opening between the hands
- Look at distant object through opening
- Bring hands to face while looking at object—opening will be aligned with the dominant eye
- Chart the dominant eye

Activity adapted from:

Howard, R. A. (2014). Basic archery lesson 1: Archery equipment, safety and range commands. *4-H archery instructor manual—Level II*. National 4-H Shooting Sports Committee.

Howard Jr., R. A., & Peter Jr., J. (2012). Fact sheet 3: Eye dominance. *4-H archery instructor manual—Level II*. National 4-H Shooting Sports Committee.

Reflect:

- What could an image, like the target, look like if you were looking at it with your nondominant eye?
- What happens when you try to look out your nondominant eye without closing your dominant eye?
- Why is it easier for an archer with eyedness and handedness on the same side to learn archery?

Apply:

- What is another activity where knowing your dominant eye would make it easier to do?
- Now that you know your dominant eye, is there any other activity you might do differently?

Evaluation:

The youth understands the concept if he or she selects a left-handed or right-handed bow according to his or her dominant eye and shoots using the bow. The youth does not select a bow based on handedness and instead begins shooting according to eyedness.

Basic Lesson 2:

Shooting Safety

Skill Level

Basic

Time Needed

20 minutes

Learning Objectives

Project Skills

- Youth will respond correctly to range commands.
- Youth will be able to distinguish between the different areas on the range.
- Youth will be able to explain the safety reminders and range rules.

Skills for Life

- Decision Making
- Self-Responsibility
- Personal Safety

Materials Needed

- Whistle
- Range Rules Sheet

Setting

Archery range with lines and perimeter marked but not identified.

Lead-In Questions

- Why is it important to have the same safety rules for all archery ranges?
- Do you know where to stand when you are on the range?
- Do you know what the three lines on the range are for?

Introduction

Before we begin shooting, there are several safety practices that you need to know. Archery is a sport in which the tools can be dangerous if used incorrectly. Knowing the range layout and whistle commands will help to keep everyone on the range safe. The safety protocol must be strictly followed so that a fun and safe shoot takes place.

Background Information

In archery there are standard rules. It is important to make youth aware of the risks involved in archery and how to decrease the likelihood of an accident. A list of rules can be found with this lesson. Feel free to add to it, but don't subtract any. It is helpful to give this list to all participants at the first meeting and post a copy on the range.

However, there are two other safety protocol that apply to all archery ranges, inside and outside of 4-H. They are the range layout for outdoor FITA ranges and whistle commands. To follow risk management practices, the range should be laid out according to the Instructor's Manual, and whistle commands should be used every time the youth shoot. For the first several shoots, the range officer should say the range commands after they blow the whistle. See the Appendix A for a diagram of range layout.

Activity

Have the group standing in the waiting area while you teach. Stand in between the waiting line and the shooting line. Before you begin shooting, you need to know range rules, whistle commands, and the layout of the range. Let's start with the range layout. Pointing to the waiting line, ask if anyone knows what it is called. If no one answers, give them a hint:

> *"Right now, you are **waiting** behind the line. What do you think it's called?"*

Once they identify the waiting line, move to behind the shooting line and point at it.

> *"This is the line you stand on to **shoot**. What do you think it's called?"*

Once they answer that correctly, move to the target line or speed bump. Again, ask if they know what the line is. If no one answers, give them a hint:

> *"This line is near the **target** and it is where people wait to pull their arrows out of the target."*

Once they answer correctly, move to the edge of the range.

> *"This is the area reserved for **safety**. No one should be in this area when archers are shooting. What do you think it is called?"*

Move to the back of the range.

> *"This area is also reserved for **safety** because no one should be in this area when archers are shooting. What is this area called?"*

Walk to the front of the range and stand outside the waiting area.

> *"This area is where the spectators may stand, or it may be left empty. What do you think it's called?"*

Once they have answered that correctly, gather everyone in the waiting area.

> *"Now you are ready to learn whistle commands. Whistle commands are used to tell the archers what to do next. You should never take an action until you hear the whistle command that it is all right to move. The person in charge of the range is the range safety officer. They are the person who blows the whistle and gives commands. They determine when it is safe or unsafe to shoot. The first whistle command I want you to know is the command for you to retrieve your bow and move from the waiting area to the shooting line. When I blow the whistle twice, move to the shooting line."*

Blow twice. Everyone should move to the shooting line.

> *"Now that you're on the shooting line, should you begin shooting?"*

Wait for an answer. If no one answers, remind them they are to wait for a whistle command to tell them what to do. Tell them that one whistle blow indicates it is all right to shoot. However, until they hear the whistle, they should not take an arrow out of their quiver. Blow the whistle once. Tell them to raise their arm as if they are going to shoot. Explain that once they are done shooting, they should put their bow back and go back to the waiting area. This way, the range safety officer knows when everyone is done shooting and the range is cold or safe. Explain that when you blow the whistle three times, the archers move to the target line. Blow the whistle three times. Everyone moves to the target line. Tell them that one person at a time can pull their arrows and that everyone who has not pulled their arrows waits on the target line. After they pull an arrow, it should go into the quiver. Once an archer has pulled all their arrows, they should return to the waiting area.

When everyone is in the waiting area, it is safe to start the process over again. Go through the whistle commands again, having the archers move according to the whistle commands. Once they have done this correctly, move them back to the waiting area.

Explain what to do in an emergency or dangerous situation. Tell them that when they hear the whistle blow four times, it means "cease fire." Give some examples of dangerous situations: someone is behind the targets, an arrow is dropped on the range, an animal is on the range, etc. Ask them to identify the whistle blows as you make them.

Review procedures for dropping an arrow, retrieving an arrow, pulling an arrow, losing an arrow, and carrying arrows. Remind them to always keep arrows pointed downrange and only shoot the target in front of them.

Review the range rules. As you read a rule, discuss what the rule means to them and how it is applied to behavior on the range. Ask if there are any rules that should be added.

Reflection:

- How does having the rules written out help keep the range safe?
- Why are the range rules standard for all archery ranges?
- Why is it important to wait for a whistle command to move?
- What do you do when you hear four whistle blasts?
- Who oversees the range and blowing the whistle?
- Why aren't spectators allowed on the range?

Application:

- What is another example of rules that keep you safe?
- Why is it important to know your surroundings?
- When does knowing your surroundings keep you safe?
- How do you know you are in an unsafe area?

Evaluation:

- Youth respond to whistle commands without verbal direction. This assesses their knowledge of whistle commands and the range layout.
- Youth describe at least three range rules.
- Youth follow range rules.

Reference

Howard, R. A. (2014). Basic archery lesson 1: Archery equipment, safety and range commands. *4-H archery instructor manual—Level II*. National 4-H Shooting Sports Committee.

Archery Range Rules

1. Always be absolutely sure that the path to the target and beyond is clear.
2. Never point a drawn arrow at anything you do not intend to shoot.
3. Always be absolutely certain that the target is clearly visible, safe to shoot and appropriate.
4. Always be aware of the danger areas at the ends of the arrow and the tips of the limbs.
5. Place an arrow only on the string when you are told it is safe to shoot.
6. Never fool around with your archery tackle. Respect it.
7. Never use archery equipment while your mental ability is impaired by fatigue, distractions or the influence of any drug.
8. Always exercise caution when retrieving arrows or removing them from a target.
9. Always be sure that all archery tackle is in perfect working condition and free from damage before it is used.
10. Always abide by the strictest codes of behavior and ethics applied to the archery sport in which you are participating. This includes specific range rules.

Reference

National 4-H Shooting Sports Committee. (2014). Archery range rules. *4-H archery instructor manual—Level II*.

Basic Lesson 3:

Shooting Form

Skill Level

Basic

Time Needed

45–60 minutes depending on size of group.
Have no more than 10 youth per instructor.

Learning Objectives

Project Skills

- Youth will be able to perform the Eleven Steps to the 10-Ring method.
- Youth will demonstrate the Eleven Steps method to a partner.

Skills for Life

- Critical Thinking
- Self-Motivation
- Personal Safety

Materials Needed

- Bows and archery tackle for the participants and the instructor
- Eleven Steps to the 10-Ring sheet
- Eleven Steps to the 10-Ring video
- Projector
- Laptop
- Screen

Setting

- Classroom
- On the range

Lead-In Questions

- What are the four whistle commands?
- Where is the waiting line, the shooting line and the target line?
- What do you do after you have finished shooting an end?
- What does it mean to shoot with consistently proper form?

Introduction

No matter what kind of bow you are shooting, the basic form is the same. The method you are going to learn today can be used with compound or recurve bows. The reason a standard method was developed is because the key to consistent accuracy is consistently proper form. By learning and using this method every time you shoot, there will be a greater likelihood that your shooting will improve over time and your shooting will become more consistent. The Eleven Steps to the 10-Ring method starts the minute you move to the shooting line and ends after the arrow hits the target.

Background Information

The Eleven Steps to the 10-Ring (a.k.a. 11-Steps) is a proven method for teaching beginning archers proper form and correcting experienced archers' inconsistent shooting. While this lesson begins with direct instruction, most of this lesson is experiential. Identifying the person demonstrating the steps prior to the meeting is important as is learning the steps and their description prior to conducting this lesson. You and your demonstrator are encouraged to watch the Eleven Steps to the 10-Ring video to refresh your memory of the proper execution of the steps. After going through the

steps with the demonstrator several times, you will be ready to conduct the direct instruction with the youth. For further information on the 11 steps, see the *National Shooting Sports Committee's 4-H Archery Instructor Manual—Level II*.

Activity

Hand out the Eleven Steps to the 10-Ring reference sheet. Watch the Eleven Steps to the 10-Ring video and discuss the form in each of the steps. Next, go to the range.

Pair everyone up. Hand out the Eleven Steps to the 10-Ring sheet to each archer. Have a co-instructor or experienced archer work as your assistant. Point out the parts of the bow and arrow necessary for the first shot. With the assistant, demonstrate the 11-Steps method.

Point out that steps 6–10 (draw-anchor-aim-release-follow through) happen very quickly, so it can be difficult to see them. If you have a video of the eleven steps, you can more easily see all eleven.

After the archers have selected their bows, they will shoot one end (series of shots fired before the arrows are scored or retrieved) of three arrows using the 11-Steps method and pull their arrows. Before they shoot, the instructor will load their first arrow and watch their technique. The nonshooting partner offers feedback on the archer's form. During the second end, the process repeats for the other partner. After both have shot, bring the group together for a question-and-answer session. Using whistle commands, get the partners back to the shooting line. This time, only the youth will give each other feedback. Repeat this as long as you would like.

Reflection:

- Why would your arrows be all over the target?
- Which step is the most important?
- What happens if you shoot with consistently bad form?
- What could happen if you skip a step?
- As you become a better archer, is it still necessary to do the eleven steps?

Application:

- Why is it important to follow the directions to do something?
- What happens if you change the steps or ingredients in a recipe?
- If you are learning how to fly a plane, should you be taught by an expert? How about riding a bicycle?
- What is the difference between expert and experienced?

Evaluation:

- Youth shoot using the Eleven Steps to the 10-Ring.
- Youth coach their partner using the Eleven Steps to the 10-Ring.
- Youth can recognize when they are missing steps as they shoot.

The Eleven Steps to the 10-Ring

1. **Stance & Posture**
   - **a.** Place one foot on each side of the shooting line.
   - **b.** Find a comfortable balance stance with feet shoulder width apart.
   - **c.** Stand straight, keeping ribs and chest down, and bottom tucked under.
   - **d.** Keep shoulders down and relaxed.
2. **Nock Arrow**
   - **a.** Place arrow on arrow rest, holding arrow close to nock.
   - **b.** Keep index fletching pointing away from the bow.
   - **c.** Snap nock of arrow onto bowstring under nock locator.
3. **Set Hook**
   - **a.** Set first groove of first three fingers around the bowstring with one finger above the nock and two below creating a hook.
   - **b.** Keep back of drawing hand flat and relaxed.
   - **c.** The thumb and pinky should be tucked away.

4. **Set Bow-Hand Grip**
   a. Position the bow hand on the bow grip by making a Y with the fingers and thumb.
   b. The knuckles of the fingers should be positioned at a 45-degree angle and the thumb pointed towards the target.
5. **Raise & Extend Bow**
   a. Raise the bow arm and string hand together towards the target, while keeping shoulder down and aligning chest perpendicular to target.
   b. Drawing arm should be near level of nose.
   c. Bow arm should be rotated so it is straight up and down.
6. **Draw**
   a. Draw the string back in a straight line from raising and extending the bow (step 5) to the side of the face anchor point.
   b. Set drawing arm shoulder back and down until elbow is directly behind or a bit higher than arrow.
7. **Anchor**
   a. Draw string to side of face placing tip of first finger on corner of mouth.
   b. Keep hand snug against face folding thumb down and little finger towards palm.
8. **Aim**
   a. Look at target or through sight, keeping focus on form.
   b. Focus on the point of aim if not using a sight.
   c. If using a sight, then focus on the point you want to hit.
   d. Keep string lined up with center of bow.
9. **Release**
   a. Release all tension in fingers and drawing hand, all at once, while continuing to draw bowstring back without stopping.
   b. Continue bow arm towards target.
   c. Continue focusing on target.
10. **Follow Through**
    a. The drawing hand should continue back beside neck with fingers relaxed and ending up behind the ear.
    b. Keep bow arm up.
    c. Maintain follow-through until arrow hits the target.
11. **Relax & Evaluate**
    a. Relax after each shot.
    b. Evaluate the feeling of each shot to determine if you accomplished the goal you were trying to achieve.
    c. If not, you should refocus your efforts on the feeling of the proper shot and try again.

Reference

National 4-H Shooting Sports Committee. (2014). The eleven steps to the 10-ring. *4-H archery instructor manual—Level II*.

Basic Lesson 4:

Archery Equipment

Skill Level

Basic

Time Needed

40 minutes

Learning Objectives

Project Skills

- Youth will be able to differentiate between compound and recurve bows.
- Youth will identify the parts of a recurve bow, a compound bow, and arrows.
- Youth will be able to use safety equipment.

Skills for Life

- Marketable Skills
- Critical Thinking
- Personal Safety

Setting

Classroom with tables and chairs.

Lead-In Questions

- Can any type of full-size (not toy) bow be used for hunting? Is one type better than another?
- Does it matter what an arrow is made of?

Materials Needed

- Compound bow with sights
- Recurve bow with or without sights
- Arrows with feathers*
- Arrow with vanes*
- Armguards for everyone
- Finger tabs
- Gloves
- Quivers
- Target or Field points and Broadhead points
- Poster with parts of a bow & Poster with parts of an arrow OR
- Slideshow of equipment
- Diagram with parts of a bow for each learner
- Diagram with parts of an arrow for each learner
- Projector (if using the PowerPoint)
- Laptop (if using the PowerPoint)
- Screen (if using the projector)

*Both arrows should have a crest.

Introduction

The sport of archery requires specific equipment based on how and why you will be shooting. While all bows can be used for hunting and target shooting, some are better than others for different purposes. By knowing the parts of a bow and arrow, you can evaluate the equipment for safety. In another lesson, you will learn about the characteristics of equipment you should look for when selecting equipment for yourself. Today we are simply learning the parts and uses of equipment.

The definition of a tool is an implement or machine used to do work or perform a task. Do you think that bow and safety equipment could also be called tools?

Background Information

While compound bows and recurve bows are both used in archery, they are very different tools. While both can be used for hunting and competition, compounds are more common for hunting. Recurves and long bows are used more often in competition than hunting, although some do hunt using traditional methods. Recurve bows are also used in Olympic archery. Compound bows are used in target archery but are not used in Olympic archery. There are several types of recurve and compound bows, each designed with features suited to its purpose. However, within each style, the basic parts remain the same.

Activity

Have all the equipment spread out on tables in the front of the room. Hang posters with bow and arrow diagrams on the wall behind you or put the slides on the screen.

Start by describing the parts of each bow. Use equipment to show the parts. The poster/slide is up to reinforce what you are saying. Explain a very brief history of the recurve, the fact that it can be shot instinctively (without sights) or with sights and that it is the type of bow used in the Olympics. Go through the same information about the compound bow. Explain how long it has been around and what it is best for (hunting) and why. Stress that it may be shot competitively but not in the Olympics.

Next describe the parts of the arrow using an arrow with a crest and the different types of quivers (hip, back, ground, and bow). Explain the difference between feathers and vanes and what type of bow each are designed to be used in. Describe the different materials used for arrow shafts. Talk briefly about the spine. In the lesson on making arrows, the spine and weight are discussed in depth. The point of this lesson is to get them familiar with the equipment.

As you show the safety tackle, demonstrate how to use it. If you have enough for the group to each have a set (finger tab or glove, and arm guard), ask them to put it on or have pairs share them and take turns trying them on.

Reflection:

- What are the three most common types of bows?
- What are the two most important pieces of safety equipment?
- What are the parts of a bow and arrow?
- If you get to be an accomplished archer, do you still need to wear an armguard and finger tab?
- Why do arrows with vanes work better in compound bows?
- What could you do to make your arrows identifiable?
- Why should you check your equipment every time you shoot?
- Is it safe to use someone else's equipment?

Application:

- What is the benefit of knowing the parts of a tool you are using?
- What can happen if you use a tool for something other than what it was designed for?
- What is an example of a tool with multiple uses?

Tell them to keep reviewing the diagrams because they will need to know the parts of a bow and arrow for another activity later.

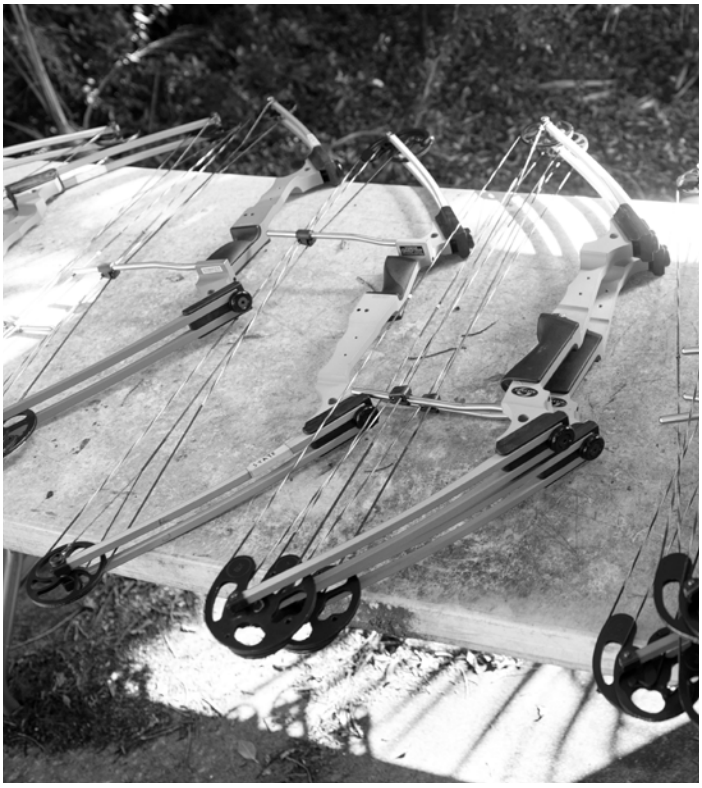
Evaluation:

Using the Archery Equipment Worksheet, youth will be able to identify at least 80% of the parts of a bow and arrow.

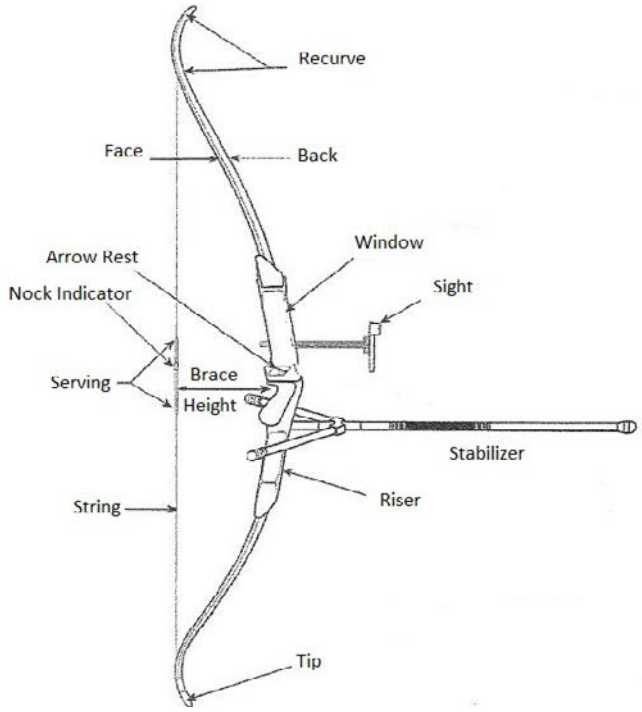
References

National Shooting Sports Committee. (2014). Archery tackle drawings—basic archery lesson 7: Bow tuning. *4-H archery instructor manual—Level II*.

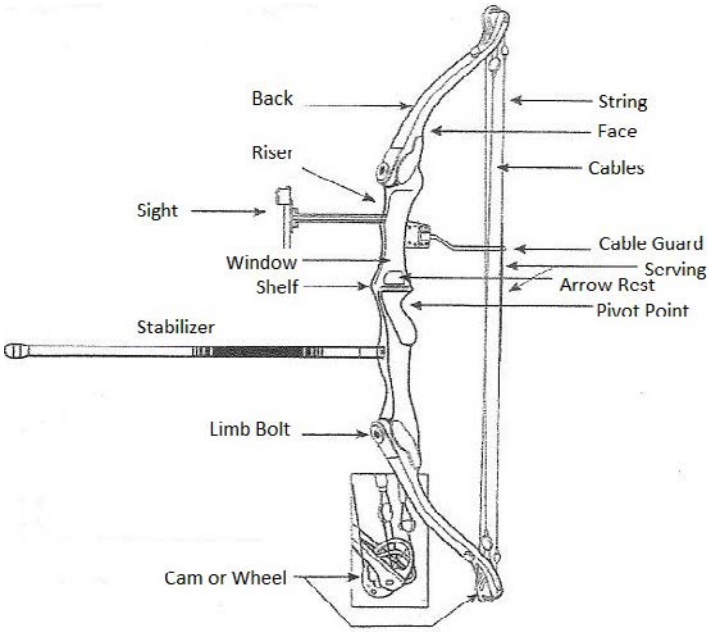
Bow and Arrow Drawings: Florida 4-H Archery Instructor Final Exam. (2015).



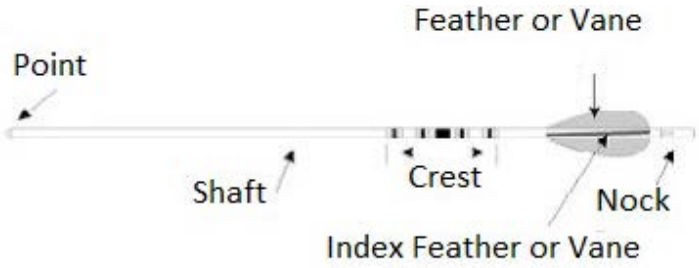
Recurve Bow



Compound Bow

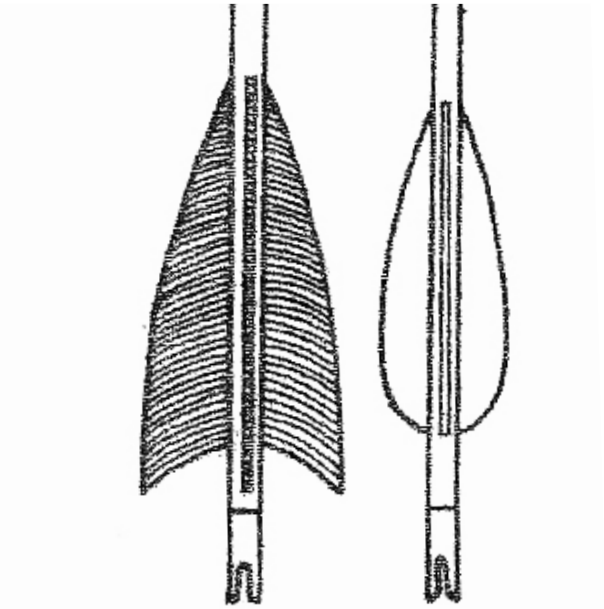


Arrow



Finger Tab

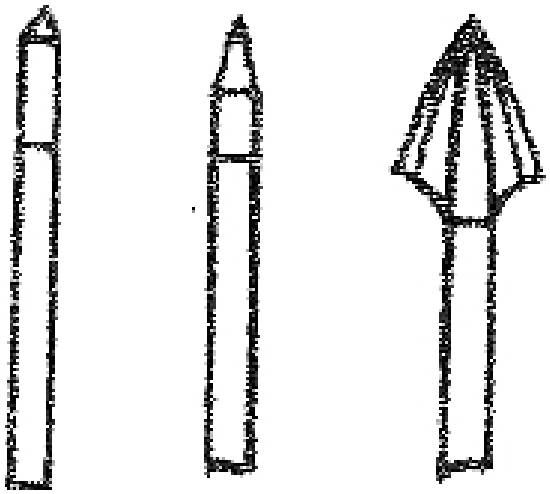
Fletching/Vanes



Fletching (feathers) *Vanes*

Glove

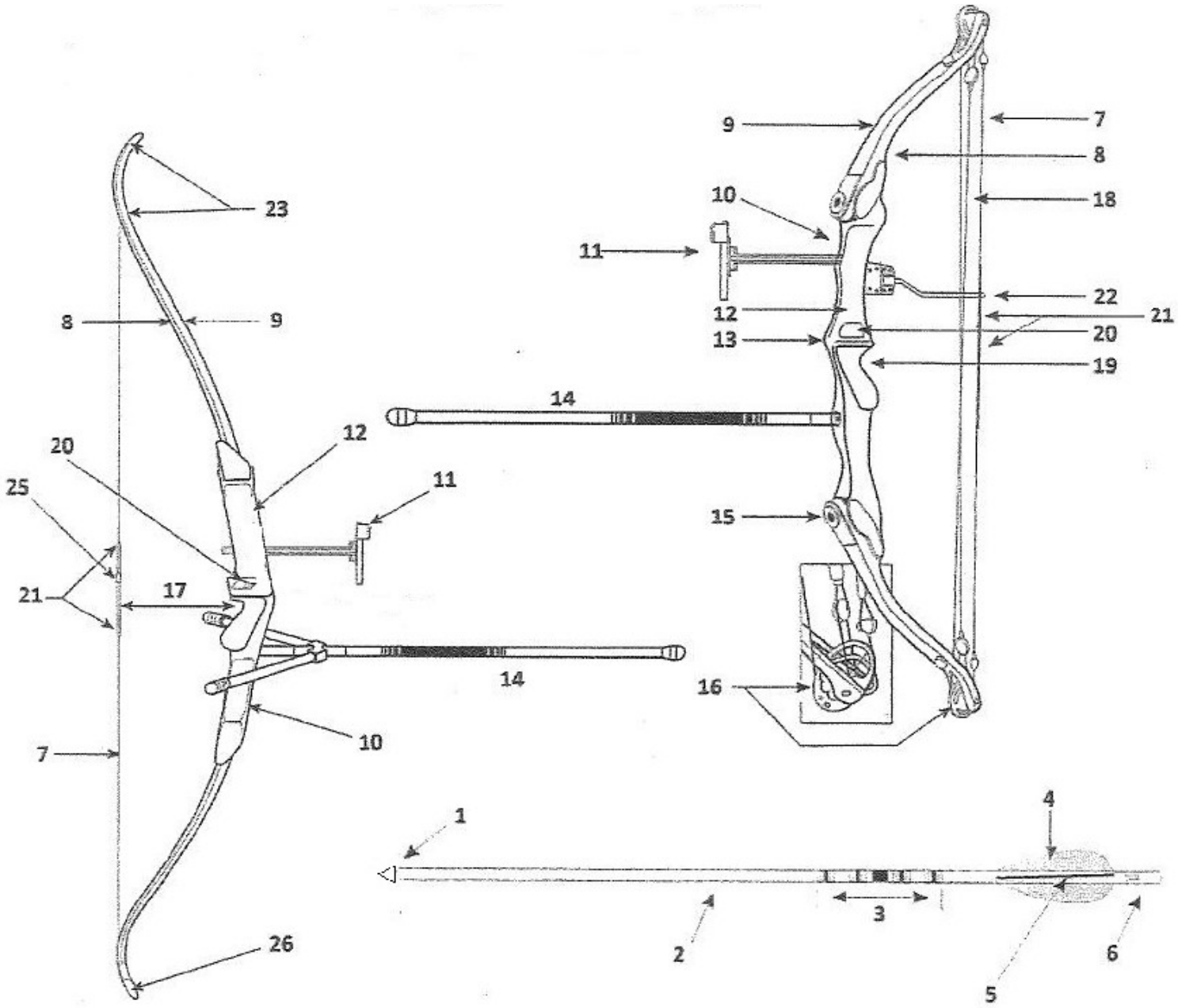
Points



Target *Field* *Broadhead*

EQUIPMENT IDENTIFICATION WORKSHEET

____Arrow Rest
____Back
____Crest
____Face
____Fletch or Vane
____Nock Locator
____Brace Height
____Cam or Wheel
____Pivot Point
____Riser
____Window
____String
____Point
____Shelf
____Cables
____Tip
____Nock
____Cable Guard
____Index Fletch or Vane
____Sight
____Serving
____Recurve
____Shaft
____Limb Bolt
____Stabilizer

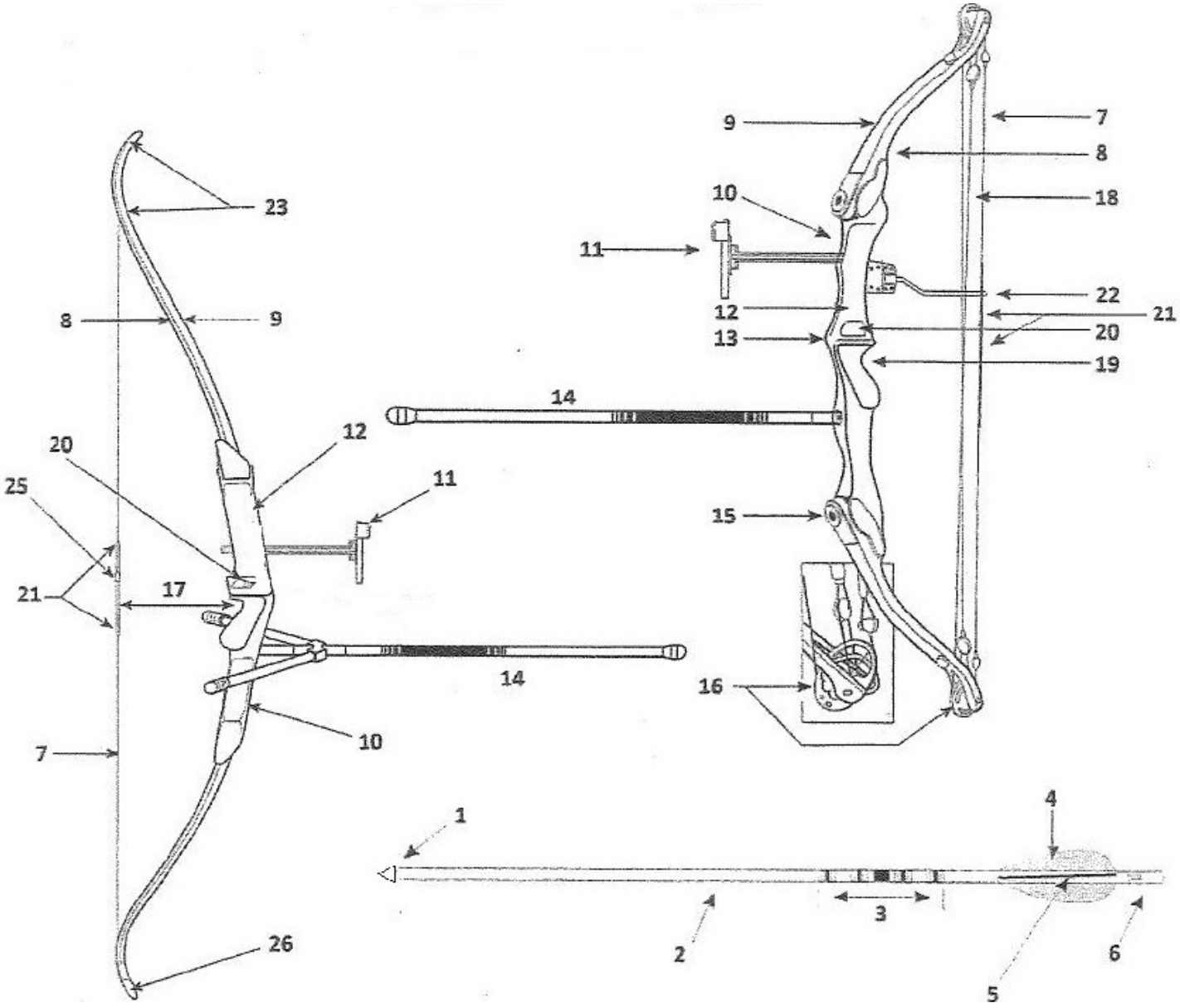


EQUIPMENT IDENTIFICATION WORKSHEET KEY

Diagram Number	Part Name
20	Arrow Rest
9	Back
3	Crest
8	Face
4	Fletch or Vane
25	Nock Locator
17	Brace Height
16	Cam or Wheel
19	Pivot Point

Diagram Number	Part Name
10	Riser
12	Window
7	String
1	Point
13	Shelf
18	Cables
26	Tip
6	Nock
22	Cable Guard

Diagram Number	Part Name
5	Index Fletch or Vane
11	Sight
21	Serving
23	Recurve
2	Shaft
15	Limb Bolt
14	Stabilizer



Basic Lesson 5:

Instinctive Shooting

Skill Level

Basic

Time Needed

30 minutes

Learning Objectives

Project Skills

- Youth will be able to explain how to shoot instinctively.
- Youth will be able to perform instinctive shooting.

Skills for Life

- Teamwork
- Critical Thinking
- Personal Safety

Materials Needed

- Balls or beanbags for tossing
- Archery equipment to shoot

Setting

On the range

Lead-In Questions

- What does shooting instinctively mean?
- When did people begin shooting instinctively?
- Do you need special equipment to shoot instinctively?

Introduction

Instinctive shooting is using a bow without sights. This type of shooting is the oldest form of shooting. Shooting instinctively means focusing on the target instead of a sight. As you practice this way, you will learn how your form affects your shooting. As your shooting improves and you shoot at increasingly greater distances, take note of where your arrow hits the target. For example, if the arrows land higher than you aimed for, lower your bow. After shooting at a particular distance, you should be able to adjust your aim to achieve accuracy.

Shooting instinctively is more difficult than shooting with sights, so it takes more practice to become consistently accurate. However, if you master instinctive shooting, you will be able to hit the target regardless of whether you have sights. Archers who learn with sights may find it more difficult, sometimes impossible, to be as accurate without sights.

Background Information

Instinctive shooting simply means shooting without sights. Archers who learn to shoot instinctively before using sights become more confident archers than those relying solely on sights. Shooting instinctively is no different from tossing a ball. How do you know where to throw the ball? Do you line up a finger or close one eye? If you answered no to both of those questions, then you understand instinctive shooting. In archery, you aim the bow down range using “instinct” to know how to aim it. You get an “instinct” about where to aim the bow through a great deal of practice. The more you practice, especially at different distances, the better you will be able to adjust your aim to different situations. Learning to shoot instinctively is challenging, so be patient. However, it is like riding a bike. The more you practice shooting a bow without sights, the better you will shoot instinctively.

Activity

Pair up archers and have them stand six feet apart. Give one person in each pair a ball/beanbag. Instruct the partners to throw the projectile back and forth. Do this for less than 10 seconds. Have them move 12 feet apart and repeat. Have them move 10 more feet apart and repeat until the distance is too far to comfortably throw accurately.

Reflect:

- How did you know where to throw the ball/beanbag?
- What did you aim at?
- What did you change as you moved farther apart?
- Is there something you could use to make it easier to hit your target?

Apply:

- How is throwing a ball like shooting a bow?
- What is different about shooting a bow than throwing a ball?
- How do you know where to aim your bow?
- What can you learn from seeing where the arrow hit?

Activity

Shoot three arrows instinctively at the bullseye on the target. Using the worksheet, after every shot, record where the arrow hit the target. Describe how you adjusted your aim after every shot.

Reflect:

- Where did the first arrow hit the target?
- What did you adjust to improve accuracy?
- How was the third shot different from the first shot?
- Why is evaluating your shot important?
- What are other activities you can do instinctively?
- What are some activities where extra equipment is used to increase accuracy?

Apply:

- How will evaluating each shot affect the next shot?
- Do you see evaluating each shot as necessary for accuracy?
- How can you improve your ability to shoot instinctively?

Evaluation:

- Youth will explain what instinctive shooting means.
- Youth will shoot instinctively with increasing accuracy.

Basic Lesson 6:

Archery Disciplines

Skill Level

Basic

Time Needed

35–40 minutes

Learning Objectives

Project Skills

- Youth will be able to distinguish between FITA, Field and 3D archery.
- Youth will be able to correctly score all three types of targets.
- Youth will be able to describe the three range environments.

Skills for Life

- Problem Solving
- Teamwork
- Personal Safety

Setting

Classroom with tables and chairs where group work can be done.

Lead-In Questions

- How many of you have shot competitively?
- Which archery disciplines did you compete in?
- What are the three archery disciplines 4-H uses in competition?

Materials Needed

- Photos of target types with scoring
- Discipline rules
- Poster board or easel paper
- Archery Disciplines Description handout for each participant
- Target Scoring color worksheet, one for each group
- Target Examples in color, one set for each group
- Quiz Bowl questions, cut
- Archery Disciplines PowerPoint
- Projector
- Screen
- Quiz buzzers
- Something for prizes

Introduction

There are several disciplines in archery. Some involve shooting outside, while others are shot indoors. Some competitions, like the State Archery Match, involve multiple disciplines, while others have only one discipline. The Olympics only shoots one discipline, which you will hear about in a moment.

Background Information

Florida 4-H Shooting Sports uses the National 4-H Shooting Sports standards for club and competitive shooting. The information here is from those standards. Scoring can be even more challenging than shooting. The youth can be in a hurry, and there is a lot riding on their numbers being accurate. Review the handout and practice scoring the worksheet yourself so that you can understand the challenges the youth might face trying to complete it.

Activity

Evenly divide the participants into groups. Have youth of multiple ages in each group. Keep advanced archers in a group to be given roles in the later portion of the activity.

Give each participant an *Archery Disciplines Descriptions* handout.

Have advanced participants read portions of each of the descriptions. Use the descriptions to describe the picture of the target. Pass around the Target Examples so the group can examine them.

Now that you have heard a description of the different archery disciplines and seen the targets, it's time to score an archery match. Collect the *Target Examples*. Pass out the *Target Scoring* worksheets, one per group. On the worksheets are the three types of targets. Each target has purple, pink and green dots on it that represent arrow hits by three archers. As a group, write down what type of target it is and calculate the score for each color (archer). Write the answers on the lines next to the targets. You will have 10 minutes to work as a group on this worksheet. Wait 10 minutes or until everyone is finished.

Now let's have some fun. We are going to play *Quiz Bowl*. There will be two types of questions to answer. For one I will show you a target from the worksheet and the group will have to identify it and tell the score. The second type of question is about the characteristics of each discipline. The first group to buzz in will get a chance to answer. Each question is worth five points. You can buzz in as soon as the target is shown. If the team that buzzes in gets it wrong, the question can still be answered for points. Let's begin. An advanced archer will read the questions, one will keep score, and another will operate the buzzer. Tally the scores and hand out the prizes to the winning team.

Reflection:

- Which archery discipline would be the most challenging for you and why? There is no right answer.
- Why is it important to score the targets the same way, no matter where the range is located?
- How would the target's environment affect shooting?
- What might a 3D range look like in our area? Think about terrain and vegetation.

Application:

- Where else could you use the skills you needed to score the targets?
- What are some other activities when having the right environment (terrain, weather, and space) is important?

Evaluation:

- Using the worksheet, youth will identify FITA, field and 3D targets.
- Using the worksheet, youth will correctly score 80% of the targets.
- Youth draw the environment for one of the three disciplines.

4-H Archery Disciplines

FITA

FITA stands for the French Federation Internationale de Tir a l'Arc, now known as the World Archery Federation. It is the governing body of the sport of archery. FITA is also known as Target Archery.

- Target size: 40–122 cm, depending on the distance shot.
- Shot at an indoor or outdoor range.
- Scoring: 10X, 10, 9, 8, 7, 6, 5, 4, 3, 2, 1 point from center outward:
  Gold = 9-10-10X points (10X awarded for smaller X ring)
  Red = 7–8-point rings
  Blue = 5–6-point rings
  Black = 3–4-point rings
  White = 1–2-point rings

*Pass through or bounce out: any shaft that fails to remain in the target may be scored by the mark on the target face.

- 3 shots per end (series of shots fired before the arrows scoring), 6 ends at each distance.
- Olympic archery shoots FITA (target) archery.
- Ties are broken with the number of "X's" shot.
- There are 11 rings including the x-ring.

FIELD

This discipline is shot outside in a natural setting. There may be trees surrounding the range (but not in the shooting lane), the course may be set in a hilly area, or if there are no trees or hills, it may also be shot in an open field. The course is usually along a trail.

- Target size: 20 cm, 50 cm, and 65 cm
- Scoring: Center ring with X= 5X points
  Two center black rings = 5 points
  Next 2 white rings = 4 points
  Last 2 black rings = 3 points
- Targets may be individual or in groups of up to four on a target mat.
- Depending on the targets, archers may have to shoot from multiple spots. They may also have to select which target in a group they will shoot or shoot the targets in a specified order.
- Four arrows per lane.
- Known distances between 10–60 yards depending on age division.

3D

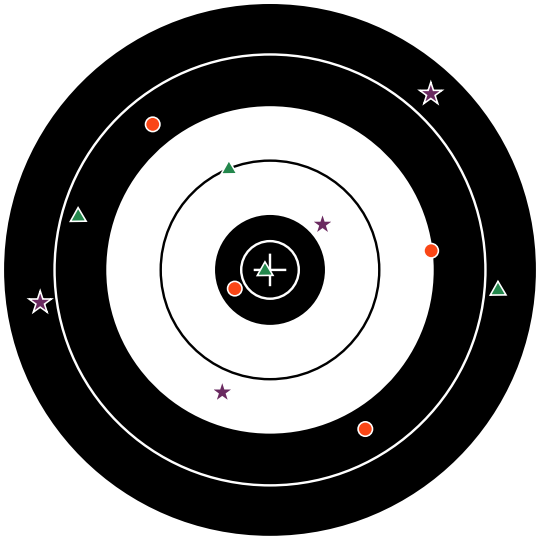
3D stands for 3-dimensional targets.

- These are foam targets in the shape of game animals (animals that can be legally hunted). Examples include deer, turkey, wild boar, bear and squirrel. Dinosaurs can also be used even though they are extinct.
- Scoring: Center vital zone ring = 11 points
  Second vital zone ring = 10 points
  Third vital zone ring = 8 points
  Any other body shot except the foot = 5 points
- Distances may or may not be known depending on age division.
- Course is outdoors in a natural setting. It may be an open or wooded area.
- Archers only shoot one arrow per target.
- Humanoid (people, zombies, aliens, etc.) targets cannot be used in 4-H archery.

Other information:

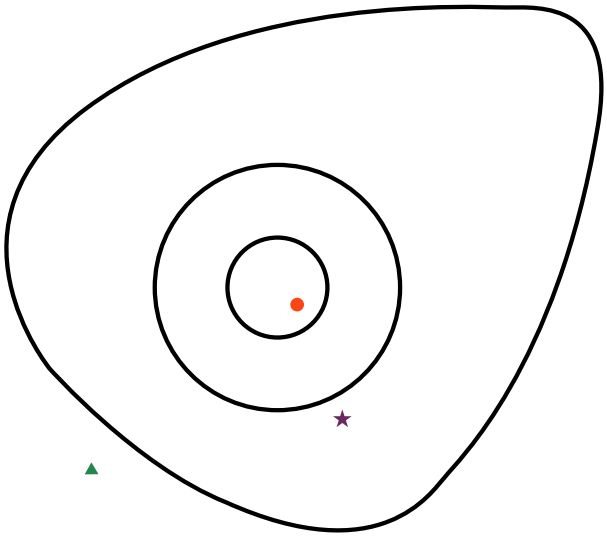
- In scoring a shot that lands between two areas on the line, the higher score is used.
- Arrows are not pulled until everyone has scored.
- Once arrows are pulled, the holes should be marked.

TARGET SCORING



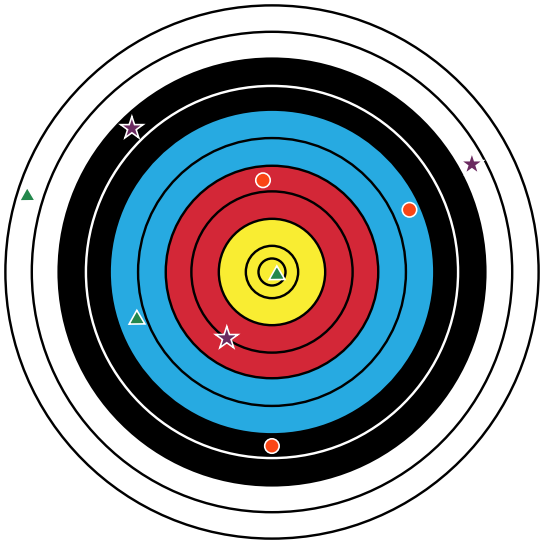
Archer	Arrow 1	Arrow 2	Arrow 3	Arrow 4	Lane Total
●					
▲					
★					

Target: _____



Archer	Arrow 1	Lane Total
●		
▲		
★		

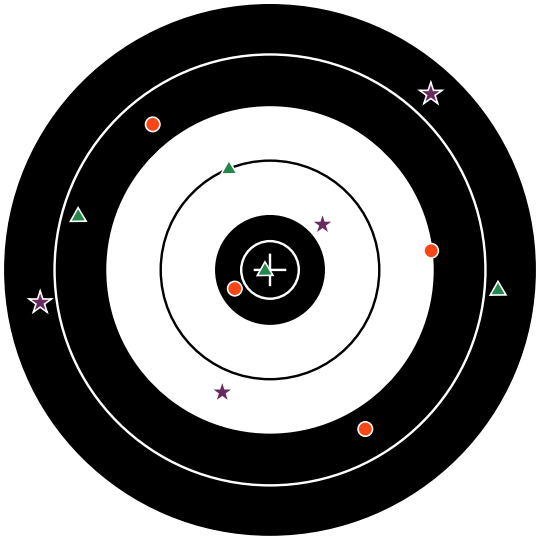
Target: _____



Archer	Arrow 1	Arrow 2	Arrow 3	Lane Total
●				
▲				
★				

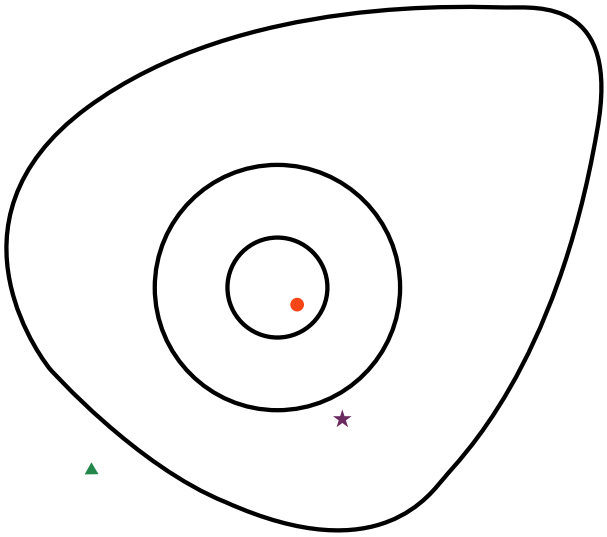
Target: _____

TARGET SCORING KEY



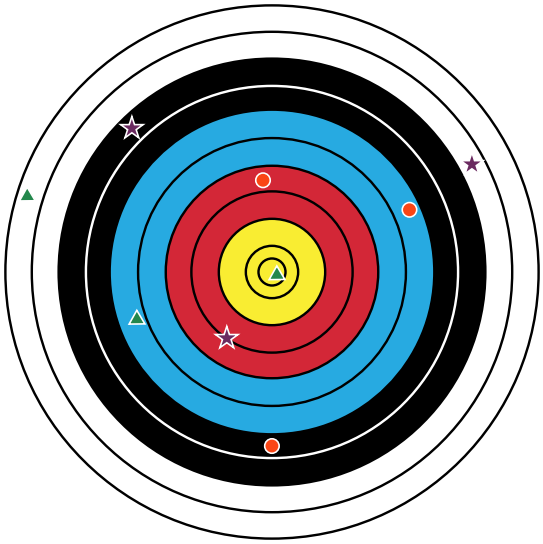
Archer	Arrow 1	Arrow 2	Arrow 3	Arrow 4	Lane Total
●	3	3	4	5	15
▲	3	3	4	5x	15x
★	3	3	4	4	14

Target: Field



Archer	Arrow 1	Lane Total
●	11	11
▲	5	5
★	8	8

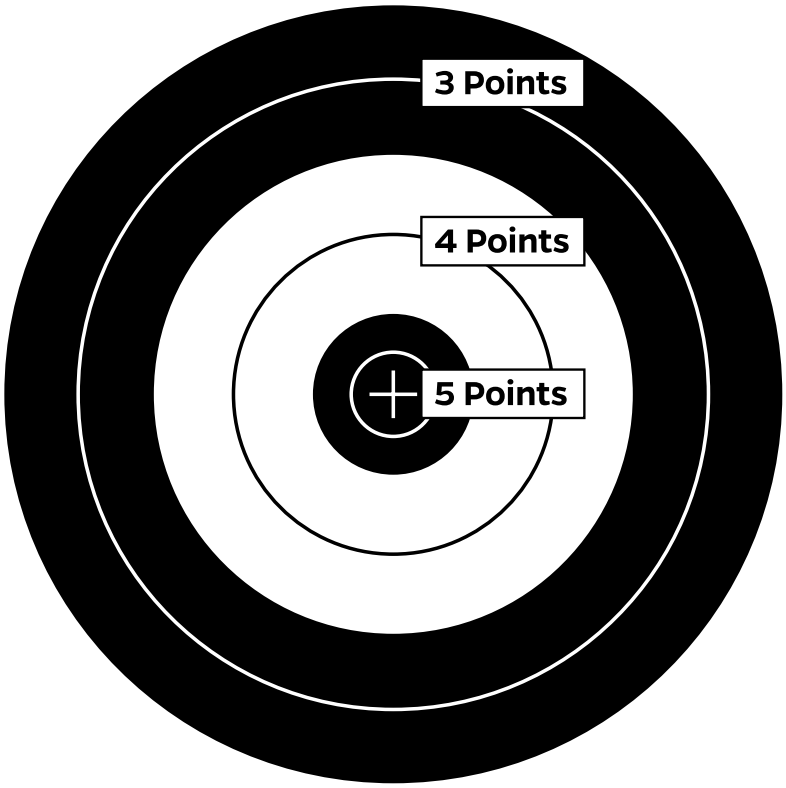
Target: 3D



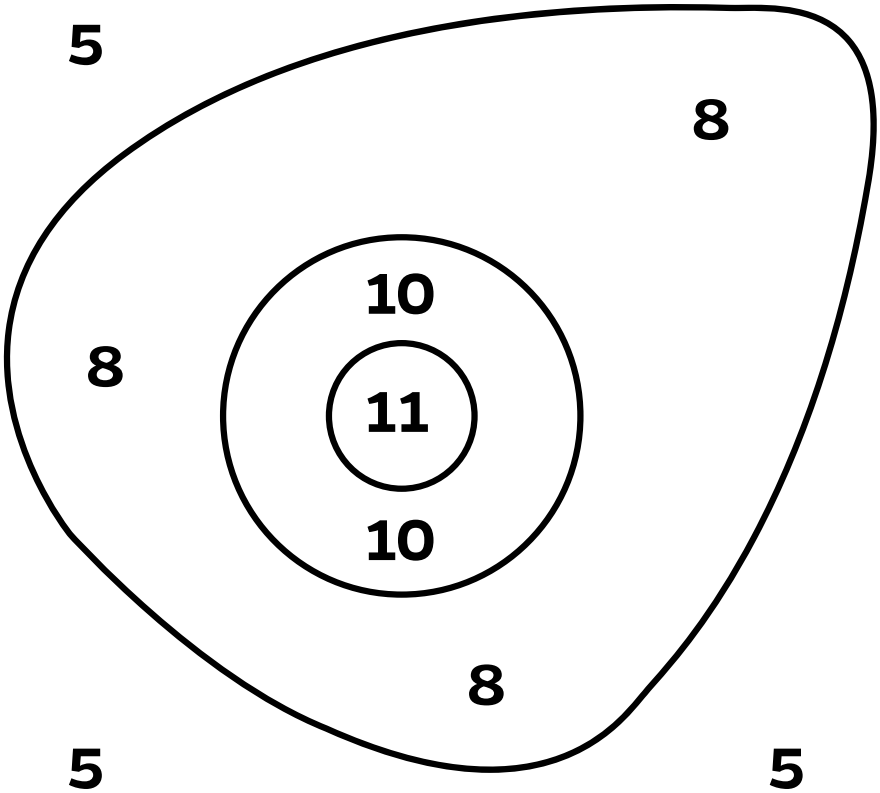
Archer	Arrow 1	Arrow 2	Arrow 3	Lane Total
●	4	5	7	16
▲	1	5	10x	16x
★	3	2	8	13

Target: FITA/Target Archery

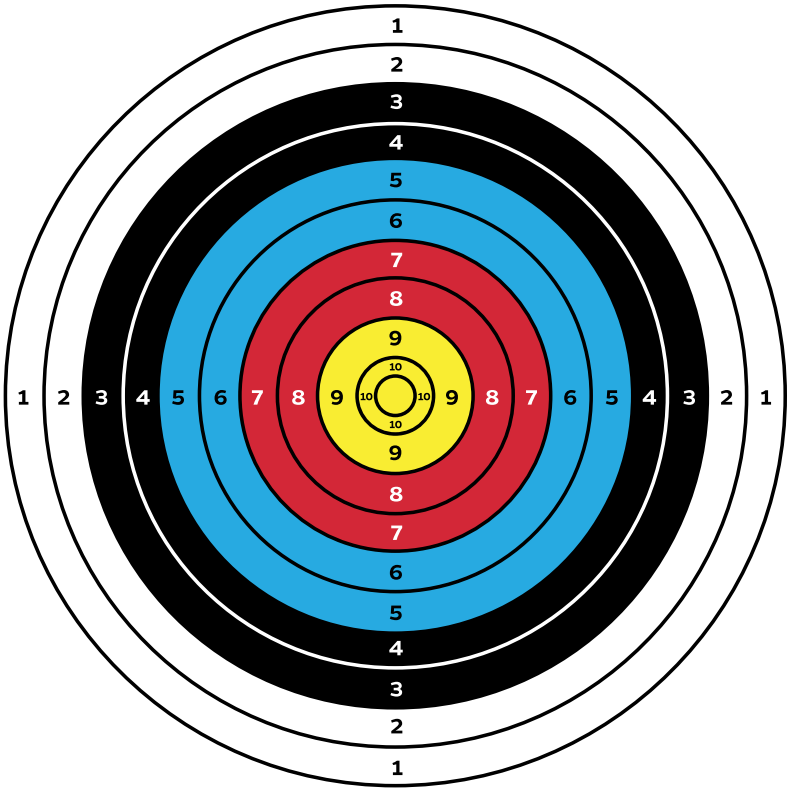
Field Target



3D Target



FITA Target



Quiz Bowl Questions

How many rings are on a FITA target? *11*	**Name two game animals that could be 3D targets.** *Any two animals that could be hunted, no humanoids.*	**In which type of archery could you shoot from different positions at the same target?** *Field*
What type of archery is shot at the Olympics? *FITA (Target)*	**What is the farthest distance in 4-H on a FITA range?** *60 meters*	**How many rings worth 7 points are on a field target?** *0*
Name three archery disciplines. *FITA (Target), Field, 3D*	**How do you know the target distance is on a 3D range?** *The distances may be known or unknown depending on the age division.*	**How many points do you get if you hit outside the vitals on a 3D target if you hit hair?** *5*
What are 3D targets shaped like? *3-dimensional animals*	**What is another name for FITA archery?** *Target Archery*	**How is a tie score broken?** *By the number of X's*
What does the environment on the field course look like? *Targets of different sizes set in natural terrain in a geographic region.*	**What is the maximum score for an end on the FITA target?** *30*	**Which type of archery shoots the most ends at a match?** *FITA*
What color or colors are on a FITA target? *White, Black, Red, Blue, Yellow*	**What is the maximum score for an end on the field target?** *20*	**Which type of archery can have multiple targets on one mat?** *Field*
What are the five numbers on a 3D target? *5, 8, 10, 11*	**What is the maximum score for an end on the 3D target?** *11*	**What is the governing body for archery?** *World Archery Federation*
How many arrows do you shoot at a single field target or group of targets in one end? *4*	**Which type of target has 11 rings?** *FITA*	**How large can a FITA target face be?** *122 centimeters*


State
Championship

Basic Archery Assessment

Name:_____ Date:_____

1. On the range, what should you do when you hear the whistle blow once?
- ☐ Move to the shooting line.
- ☐ Nock an arrow.
- ☐ It is safe to go down range and retrieve arrows.
- ☐ Cease fire! Stop shooting and put your bow down.

2. What line does the archer shoot from?
- ☐ Target line
- ☐ Waiting line
- ☐ Shooting line

3. If you draw but don't pause before you release, what steps are you missing?
- ☐ Anchor, Aim
- ☐ Nock an Arrow, Aim
- ☐ Anchor, Follow Through
- ☐ Follow Through, Relax & Evaluate

4. Why is knowing your dominant eye important in archery?

5. What should an archer do with their feet when they are on the shooting line?
- ☐ Keep both feet behind the line.
- ☐ Straddle the line.
- ☐ Stand with both feet in front of the line.

6. Describe something you could do to let other archers know which arrows belong to you.

7. On the range, what should you do when you hear the whistle blow twice?
- ☐ Move to the shooting line.
- ☐ Nock an arrow.
- ☐ It is safe to go down range and retrieve arrows.
- ☐ Cease fire! Stop shooting and put your bow down.

8. Where should spectators stand on the range?
- ☐ In the waiting area.
- ☐ Behind the shooting line.
- ☐ Behind the waiting area.

9. Check the three types of bows.
- ☐ Compound bow
- ☐ Recurve bow
- ☐ Long bow
- ☐ Square bow

10. Why should you check your equipment every time you shoot?

11. On the range, what should you do when you hear the whistle blow three times?
- ☐ Move to the shooting line.
- ☐ Nock an arrow.
- ☐ It is safe to go down range and retrieve arrows.
- ☐ Cease fire! Stop shooting and put your bow down.

12. An archer who has been shooting a bow for 15 years doesn't need to wear an armguard and finger protection.
- ☐ True
- ☐ False

13. Which type of fletchings are better to use with a compound bow?
- ☐ Feathers
- ☐ Vanes
- ☐ Bristles

14. What is the eleventh and last step in a shot?
- ☐ Release
- ☐ Follow Through
- ☐ Relax & Evaluate
- ☐ Aim

15. What is the most important thing to do when you are learning to shoot instinctively?
- ☐ Close one eye.
- ☐ Lean forward.
- ☐ Practice shooting at different distances.

16. Mark **ALL** the following things to consider when shooting outdoors.
- ☐ Wind
- ☐ Temperature
- ☐ Obstacles
- ☐ Rain or snow

17. Why is it important to score a FITA target the same way every time?

18. If you increase the distance to the target, how should you adjust your aim?
- ☐ Lower the bow.
- ☐ Keep the bow at the same level.
- ☐ Raise the bow.

19. What type of archery uses foam animal targets?
- ☐ FITA
- ☐ Field
- ☐ 3D

20. Why do the limbs need to flex on a recurve bow?
- ☐ To distribute energy.
- ☐ Because it looks cool.
- ☐ To keep the string in place.

21. Name three (3) range rules.

22. On the range, what should you do when you hear the whistle blow four times?
- ☐ Move to the shooting line.
- ☐ Nock an arrow.
- ☐ It is safe to go down range and retrieve arrows.
- ☐ Cease fire! Stop shooting and put your bow down.

23. Which is **NOT** a reason to have an arrow rest on a bow?
- ☐ Limit friction on the arrow.
- ☐ Protect the riser.
- ☐ Keep the arrow straight.
- ☐ Helps the archer see where to aim.

24. What is the step called when the archer clicks the arrow on the string?
- ☐ Load the bow.
- ☐ Put the arrow on the shelf.
- ☐ Nock the arrow.

25. What is the step after release?
- ☐ Relax & Evaluate
- ☐ Follow Through
- ☐ Raise and Extend the Bow
- ☐ Draw

26. Check all the following items that are archery safety equipment.
- ☐ Armguard
- ☐ Elbow shield
- ☐ Finger tab
- ☐ Glove

27. Which type of archery is the most difficult for you, FITA, Field or 3D, and why?

28. How do you tell if a bow is meant to be shot instinctively?
- ☐ It is made of wood.
- ☐ It has sights.
- ☐ It doesn't have sights.
- ☐ It doesn't have an arrow rest.

29. When the string is too short on a recurve bow, it puts too much pressure on the limbs.
- ☐ True
- ☐ False

30. How many colors, including white, are on a FITA target?
- ☐ Two
- ☐ Four
- ☐ Five

BASIC ARCHERY ASSESSMENT KEY

Name:_____ Date:_____

1. On the range, what should you do when you hear the whistle blow once?
   - ☐ Move to the shooting line.
   - ■ Nock an arrow.
   - ☐ It is safe to go down range and retrieve arrows.
   - ☐ Cease fire! Stop shooting and put your bow down.

2. What line does the archer shoot from?
   - ☐ Target line
   - ☐ Waiting line
   - ■ Shooting line

3. If you draw but don't pause before you release, what steps are you missing?
   - ■ Anchor, Aim
   - ☐ Nock an Arrow, Aim
   - ☐ Anchor, Follow Through
   - ☐ Follow Through, Relax & Evaluate

4. Why is knowing your dominant eye important in archery?
   When a person looks at an object with both eyes, the dominant eye aligns with the object.

5. What should an archer do with their feet when they are on the shooting line?
   - ☐ Keep both feet behind the line.
   - ■ Straddle the line.
   - ☐ Stand with both feet in front of the line.

6. Describe something you could do to let other archers know which arrows belong to you.
   Write your initials on the shaft with a marker or nail polish.

7. On the range, what should you do when you hear the whistle blow twice?
   - ■ Move to the shooting line.
   - ☐ Nock an arrow.
   - ☐ It is safe to go down range and retrieve arrows.
   - ☐ Cease fire! Stop shooting and put your bow down.

8. Where should spectators stand on the range?
   - ☐ In the waiting area.
   - ☐ Behind the shooting line.
   - ■ Behind the waiting area.

9. Check the three types of bows.
   - ■ Compound bow
   - ■ Recurve bow
   - ■ Long bow
   - ☐ Square bow

10. Why should you check your equipment every time you shoot?
    Any reasonable answer.

11. On the range, what should you do when you hear the whistle blow three times?
    - ☐ Move to the shooting line.
    - ☐ Nock an arrow.
    - ■ It is safe to go down range and retrieve arrows.
    - ☐ Cease fire! Stop shooting and put your bow down.

12. An archer who has been shooting a bow for 15 years doesn't need to wear an armguard and finger protection.
    - ☐ True
    - ■ False

13. Which type of fletchings are better to use with a compound bow?
    - ☐ Feathers
    - ■ Vanes
    - ☐ Bristles

14. What is the eleventh and last step in a shot?
    - ☐ Release
    - ☐ Follow Through
    - ■ Relax & Evaluate
    - ☐ Aim

15. What is the most important thing to do when you are learning to shoot instinctively?

- ☐ Close one eye.
- ☐ Lean forward.
- ■ Practice shooting at different distances.

16. Mark **ALL** the following things to consider when shooting outdoors.

- ■ Wind
- ■ Temperature
- ■ Obstacles
- ■ Rain or snow

17. Why is it important to score a FITA target the same way every time?

They should be scored the same so that competitions are the same no matter where the match is being held.

18. If you increase the distance to the target, how should you adjust your aim?

- ☐ Lower the bow.
- ☐ Keep the bow at the same level.
- ■ Raise the bow.

19. What type of archery uses foam animal targets?

- ☐ FITA
- ☐ Field
- ■ 3D

20. Why do the limbs need to flex on a recurve bow?

- ■ To distribute energy.
- ☐ Because it looks cool.
- ☐ To keep the string in place.

21. Name three (3) range rules.

Any reasonable answers.

22. On the range, what should you do when you hear the whistle blow four times?

- ☐ Move to the shooting line.
- ☐ Nock an arrow.
- ☐ It is safe to go down range and retrieve arrows.
- ■ Cease fire! Stop shooting and put your bow down.

23. Which is **NOT** a reason to have an arrow rest on a bow?

- ☐ Limit friction on the arrow.
- ☐ Protect the riser.
- ☐ Keep the arrow straight.
- ■ Helps the archer see where to aim.

24. What is the step called when the archer clicks the arrow on the string?

- ☐ Load the bow.
- ☐ Put the arrow on the shelf.
- ■ Nock the arrow.

25. What is the step after release?

- ☐ Relax & Evaluate
- ■ Follow Through
- ☐ Raise and Extend the Bow
- ☐ Draw

26. Check all the following items that are archery safety equipment.

- ■ Armguard
- ☐ Elbow shield
- ■ Finger tab
- ■ Glove

27. Which type of archery is the most difficult for you, FITA, Field or 3D, and why?

Any answer is acceptable.

28. How do you tell if a bow is meant to be shot instinctively?

- ☐ It is made of wood.
- ☐ It has sights.
- ■ It doesn't have sights.
- ☐ It doesn't have an arrow rest.

29. When the string is too short on a recurve bow, it puts too much pressure on the limbs.

- ■ True
- ☐ False

30. How many colors, including white, are on a FITA target?

- ☐ Two
- ☐ Four
- ■ Five

Advanced Lesson 1:

Bow Selection

Skill Level

Advanced

Time Needed

60 minutes

Learning Objectives

Project Skills

- Youth will be able to recognize the parts of compound and recurve bows.
- Youth will be able to compare the advantages and disadvantages of compound and recurve bows.
- Youth will be able to select which bow is best for the archery activities they wish to engage in.

Skills for Life

- Marketable Skills
- Decision Making
- Personal Safety

Setting

In a classroom with tables

Materials Needed

- Compound bow
- Recurve bow
- Longbow
- Arrows for each type of bow
- Archery tackle
- *Types of Bows* worksheet for each participant
- Poster of compound and recurve bows with stick on labels

Lead-In Questions

- What are the three most common types of bows used in archery?
- Does each type have a different purpose? What are they?
- What are the parts of the bow?

Introduction

The parts of recurve and compound bows are very similar. Both have limbs, a riser, a handle or grip, an arrow shelf/rest, an arrow plate, a sight window and a string. The compound bow also has cable and eccentric wheels of some type to give a mechanical advantage. There are advantages and disadvantages to using both types of bows.

Background Information

All three types of bows will be introduced, but recurve and compound bows will be the focus. The worksheet with all types of bows is included in this lesson along with a key. Put the Parts of a Bow poster on a board in the front of the room.

Activity

Give each a participant a worksheet. Describe each part of the bow and ask them to tell the volunteer where the label should be placed on the poster. Go through all parts. Now go through the parts again, placing the correct labels on the parts. Ask them to use the poster to label the bows correctly on the worksheets.

As you can see, the parts on each bow are different. These differences contribute to the discipline they are best for. There are some advantages and disadvantages to each type of bow. As you go through the list, point to the parts of the bow that affect the characteristic.

Compound Bow	Recurve Bow
Relaxation at full draw. Once the arrow is drawn to the anchor point, the draw weight diminishes.	No let off at draw. The archer is holding the entire weight until release.
Ease of holding anchor.	Anchor must be held steady while holding full draw weight.
Because the string is pulled back farther due to being run through the wheels, it transfers a greater proportion of stored energy to the arrow.	The distance the string is drawn back is only the amount the string moves when drawn.
Reduced stress on the arrow permits the use of a lighter arrow with less spine.	There is a great deal of stress on the arrow because all the potential energy rests on the arrow and is not distributed to cams or wheels.
Compact size makes it more efficient for hunting.	Length of limbs can make hunting in the woods more difficult.
Minor errors in form may produce major changes in arrow flight.	While form is important, errors have less dramatic results.
Bow's mechanics cause more complicated tuning, and it is difficult to reduce noise.	Without mechanics of a compound bow, most adjustments can be made by the archer.
Extra moving parts and added stress on the limbs, cables, strings, and other bow parts increase the possibility of breakage during shooting.	The only stress on the limbs is the force of the string.
Increased weight of bow can lead to fatigue.	The weight of materials, limbs and riser makes bow easy to carry.
Additional parts require extra care and make the bow less durable.	The only parts to maintain are the riser, the limbs and the string.
Because of the complex mechanics, compound bows are more expensive than recurve bows.	Materials, not mechanics, are the reason for expense in recurve bows.

The advantages of the compound bow make it a better bow for hunting. Its compact size and ability to hold the draw for an extended time make it easier to set up a shot. However, its weight and complex parts make it difficult to carry long distances and prone to break down due to the elements.

Overall, the compound bow is easier to shoot. This fact puts the recurve archer at a disadvantage in competition with the compound. For this reason, compound bows and recurve bows are not scored together or ranked together. More people shoot compound than recurve.

You must consider the characteristics of each type of bow and decide which is right for you. In many cases, it comes down to personal preference.

Reflect:

- What are the extra parts on the compound bow and what do they do?
- Why can a compound archer hold an anchor longer than a recurve archer?
- How are compound bows able to shoot lighter arrows with less spine than recurve bows?
- Why are recurve bows easier to repair?

Apply:

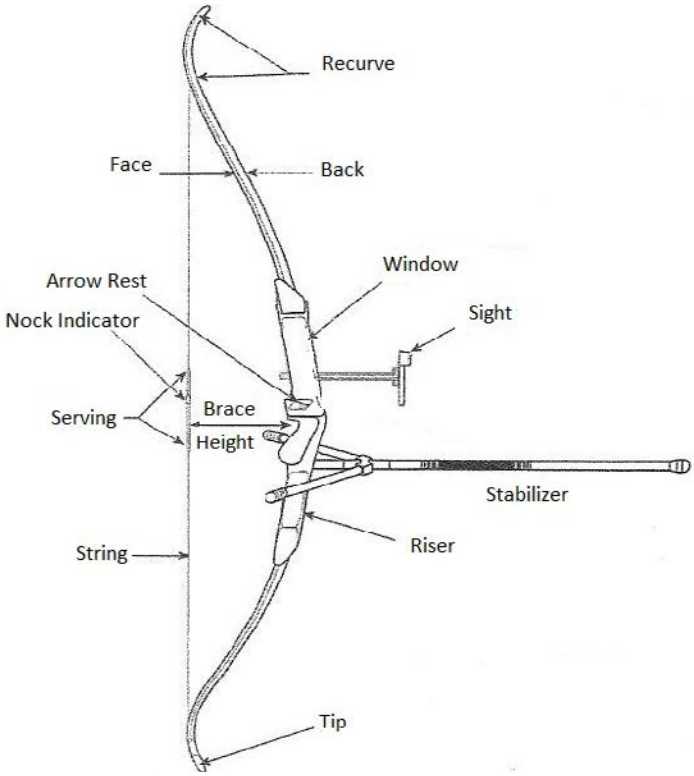
- What factors should you consider when choosing between a compound and recurve bow?
- If both bows have the same draw weight, which bow can shoot a farther distance and why?
- Why are compound bows more popular for hunting than recurve bows?
- How can learning archery using a recurve bow before a compound bow make a more skilled archer?

Evaluate:

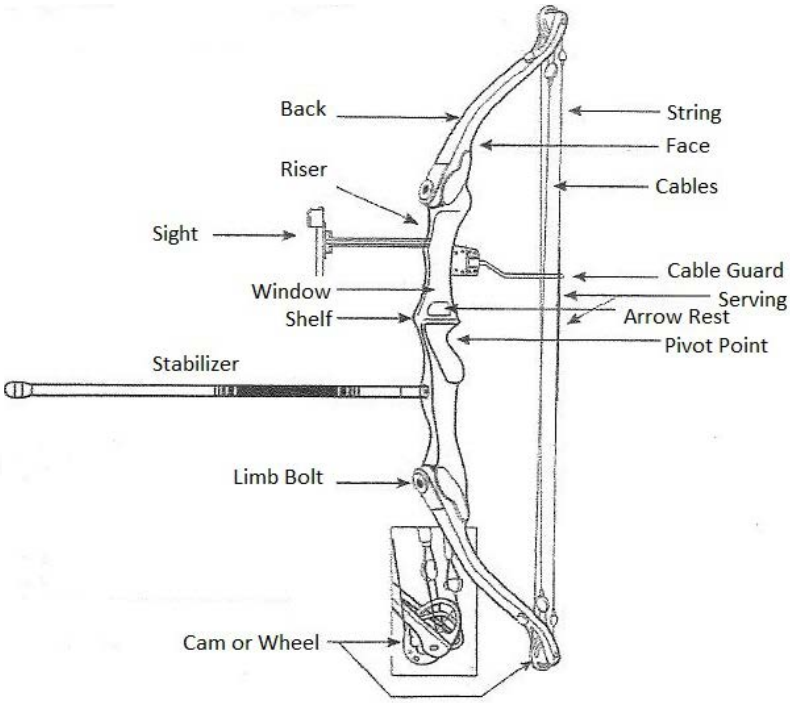
- Using diagrams of bows without labels, youth will be able to identify the parts of compound and recurve bows.
- Youth will be given scenarios of situations where an archer must select what type of bow they should choose. The youth will select the best bow for the scenario 80% of the time.
- After the youth list the archery activities in which they participate, they select the bow that is best for them.

BOWS

Recurve

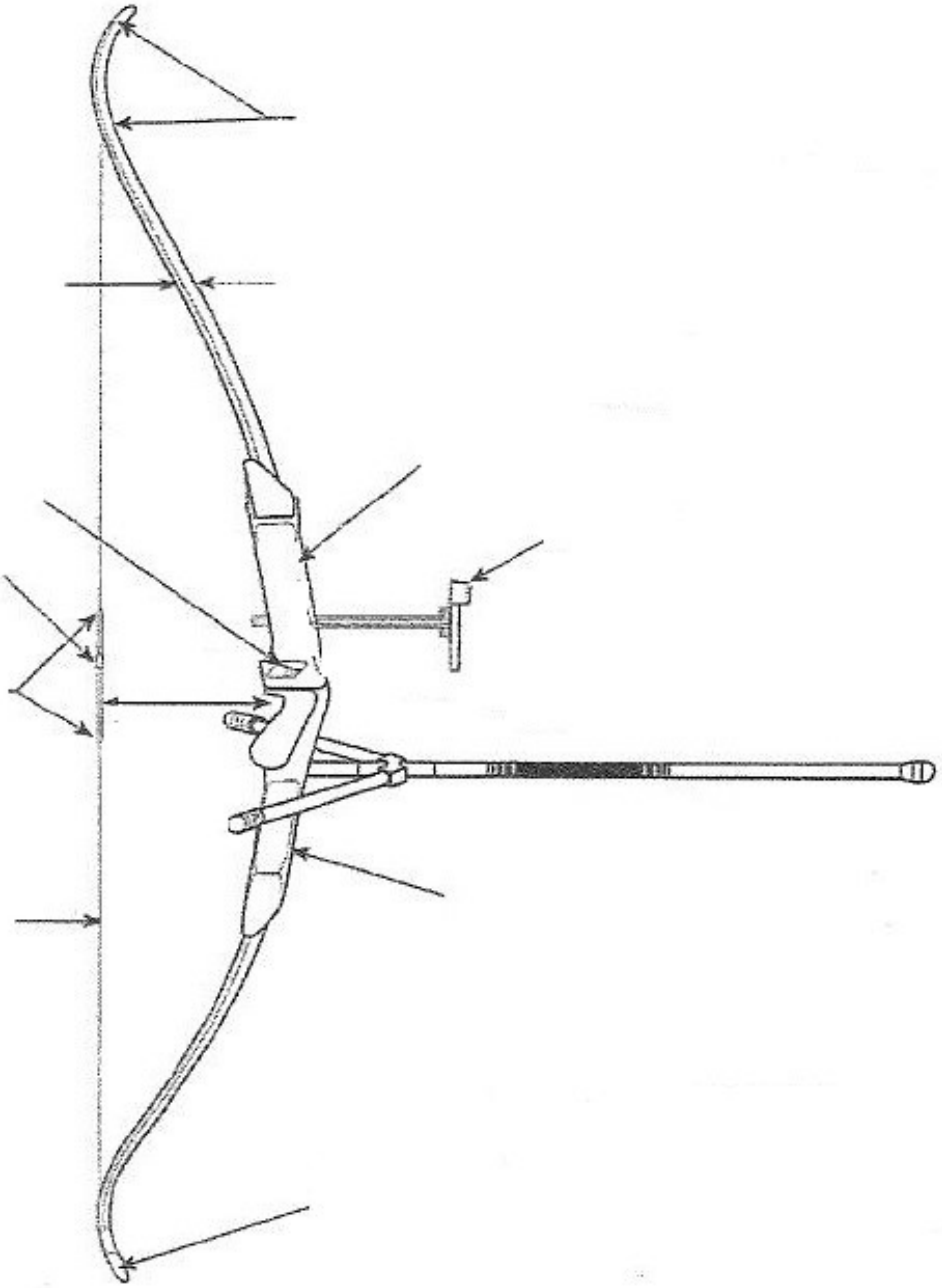


Compound



Graphics adapted from Florida 4-H Archery Level 1 Instructor Exam.

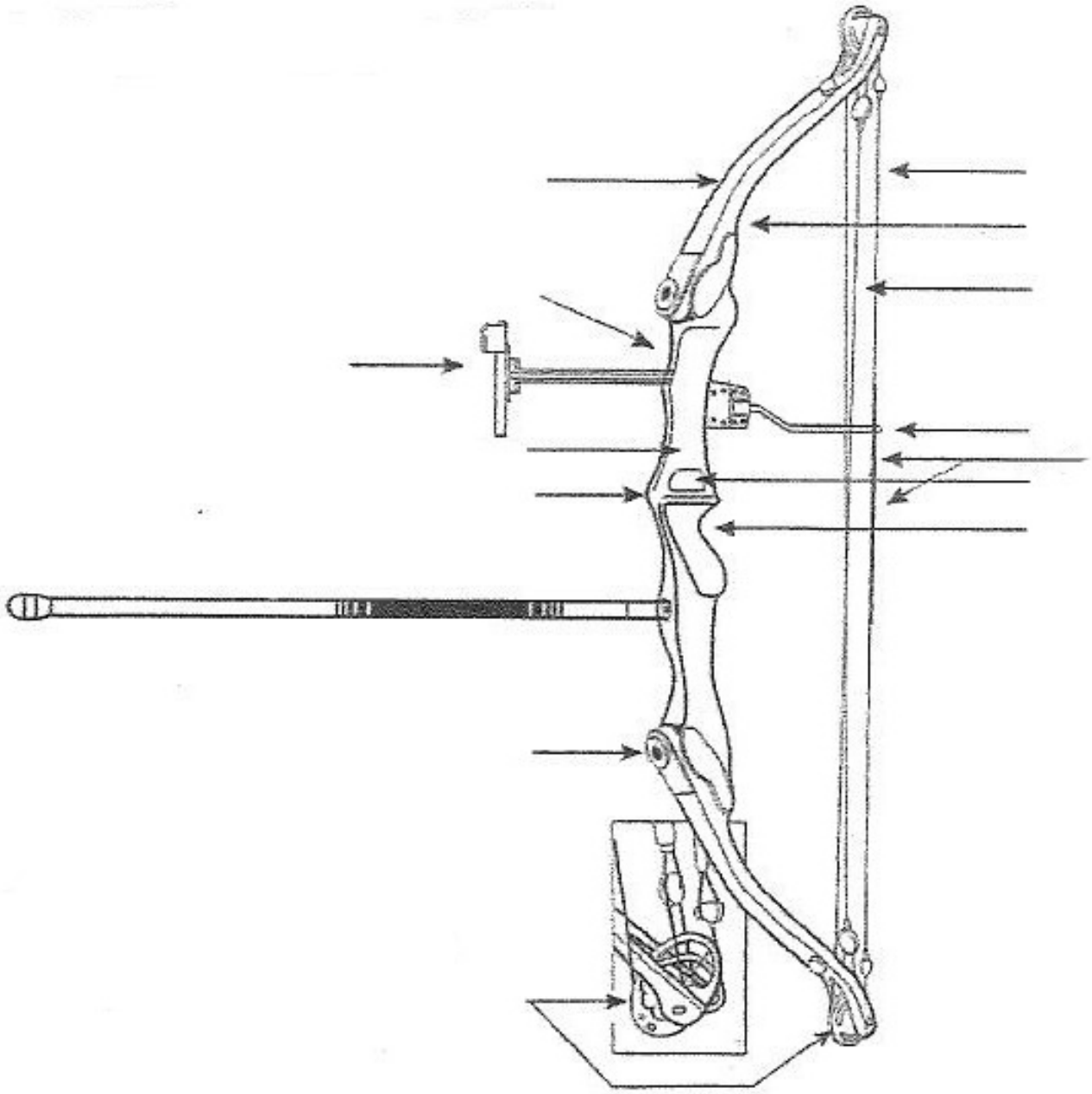
BOWS (POSTER)



BOW PARTS FOR POSTER

Arrow Rest	Sight	Shelf	String
Arrow Rest	Stabilizer	Cables	Pivot Point
Back	Stabilizer	Cam or Wheel	Window
Face	Limb Bolt	Sight	Window
Face	Recurve	Cable Guard	Riser
Back	Tip	Nock Locator	Riser
Serving	Serving	String/Brace Height	String

BOWS (POSTER)



BOW PARTS FOR POSTER

Arrow Rest	Sight	Shelf	String
Arrow Rest	Stabilizer	Cables	Pivot Point
Back	Stabilizer	Cam or Wheel	Window
Face	Limb Bolt	Sight	Window
Face	Recurve	Cable Guard	Riser
Back	Tip	Nock Locator	Riser
Serving	Serving	String/Brace Height	String


1
2
1

BOW SELECTION SCENARIOS

Name:_____

Often, a compound bow and a recurve bow can be used for the same purpose. However, sometimes one bow is better for the task than the other. Select the bow which is best for the described scenario.

1. Christian will be hunting deer from a ground blind.
- ☐ Compound
- ☐ Recurve

2. Anna will be training for Olympic archery.
- ☐ Compound
- ☐ Recurve

3. Juan lives 60 miles from the closest bow repair shop.
- ☐ Compound
- ☐ Recurve

4. Leesha wants to visit her brother across the country and shoot her bow with him.
- ☐ Compound
- ☐ Recurve

5. Devon wants to accurately hit a target at 60 yards, but he isn't very strong.
- ☐ Compound
- ☐ Recurve

6. Josiah wants to hunt, but the draw weight on his bow must be 40 pounds, which is very difficult for him to hold his anchor point on.
- ☐ Compound
- ☐ Recurve

7. Maliqua is learning archery and tends to make a lot of mistakes.
- ☐ Compound
- ☐ Recurve

8. Jackson is a junior who wants to shoot at a lot of competitions, so he must carry his bow a lot.
- ☐ Compound
- ☐ Recurve

9. Brooklyn can spend up to $130 on a new bow.
- ☐ Compound
- ☐ Recurve

10. Maria lives 10 miles from a bow repair shop.
- ☐ Compound
- ☐ Recurve

BOW SELECTION SCENARIOS KEY

Name:_____

Often, a compound bow and a recurve bow can be used for the same purpose. However, sometimes one bow is better for the task than the other. Select the bow which is best for the described scenario.

1. Christian will be hunting deer from a ground blind.
   - ■ Compound
   - ☐ Recurve
2. Anna will be training for Olympic archery.
   - ☐ Compound
   - ■ Recurve
3. Juan lives 60 miles from the closest bow repair shop.
   - ☐ Compound
   - ■ Recurve
4. Leesha wants to visit her brother across the country and shoot her bow with him.
   - ■ Compound
   - ■ Recurve
5. Devon wants to accurately hit a target at 60 yards, but he isn't very strong.
   - ■ Compound
   - ☐ Recurve
6. Josiah wants to hunt, but the draw weight on his bow must be 40 pounds, which is very difficult for him to hold his anchor point on.
   - ■ Compound
   - ☐ Recurve
7. Maliqua is learning archery and tends to make a lot of mistakes.
   - ☐ Compound
   - ■ Recurve
8. Jackson is a junior who wants to shoot at a lot of competitions, so he must carry his bow a lot.
   - ☐ Compound
   - ■ Recurve
9. Brooklyn can spend up to $130 on a new bow.
   - ☐ Compound
   - ■ Recurve
10. Maria lives 10 miles from a bow repair shop.
    - ☐ Compound
    - ■ Recurve

Advanced Lesson 2:

Choosing Equipment

Skill Level

Advanced

Time Needed

60 minutes

Learning Objectives

Project Skills

Youth will be able to select equipment based on use, price, fit, availability and personal preference.

Skills for Life

- Marketable Skills
- Decision Making
- Personal Safety

Setting

In a classroom with tables.

Lead-In Questions

- How did you choose your equipment?
- How do you know what the right equipment is for you?
- Does a higher price indicate a more useful product?

Materials Needed

- Score sheets
- Scenario descriptions
- Pencils
- Clipboards
- Equipment:
  - Recurve bows
  - Fiberglass bows
  - Compound bows
  - Finger tabs
  - Gloves
  - Arm guards (3 styles)
  - Hip quivers
  - Back quivers
  - Bow quivers
  - Arrows
  - Need price and specifications for each. You can use catalog photos or real items.

Introduction

Selecting the right equipment can be overwhelming, especially if you are a beginning archer. In this exercise, we are going to use what you already know, along with facts to make informed decisions about the right equipment for a situation.

Background Information

Families struggle with deciding on the archery equipment they need for their young archer. Usually, it is the leader or maybe a salesperson who guides the decision. The youth and their parents often don't even know what to ask for to begin a fruitful search.

By teaching the youth about the right equipment for the right reason, they can help their family select archery equipment that meets their needs and their family's requirements.

Read pages 72–73 in the *National Shooting Instructor's Manual*.

Activity

It is time to purchase your own equipment, but what do you select? There are several factors to take into consideration. The first piece of equipment you should select is your bow. The bow should fit you, your skill level, your strength, and your budget. The most expensive bow is not necessarily the best bow. There are lots of good bows for sale that are suitable for beginning archers or hobbyists. Let's start with how a bow should fit. We will look at a recurve bow.

BOW SELECTION

Bow size is determined by draw length. To identify draw length, stand with your arms stretched out to the sides as far as you can. Ask someone to measure the distance from fingertip to fingertip. Take that number and divide it by 2.5. That is your draw length.

A common misconception is that a person's height determines the bow length. That is not exactly true. The only way that height affects draw length is that a taller person probably has longer arms, and therefore they will have a longer draw length.

These numbers are for target shooting. There are different measurements for choosing a bow to hunt with.

Draw weight is determined by the archer's strength. The archer should be able to shoot for 45–60 minutes before feeling fatigue. A heavier draw weight is required for longer distances. It is best to try bows of different draw weights to find out what is comfortable for the archer.

Takedown recurve bows are recurve bows in which the limbs can be removed from the riser. This can be done to store the bow or transport it. It also allows the archer to change limbs to higher or lower poundage. Limbs must be made for the specific model bow. Generally, takedown bow risers have a draw weight limit. Some risers fit bows with a draw weight from 10 to 25 lb., and others are made for 30 lb. and above. The draw weight on compound bows can be adjusted using the limb bolts.

ARROW SELECTION

Next, you'll need to select your arrows, and there are several factors to consider. You'll need to consider length, weight and spine. The spine is the stiffness of the arrow, and it is the most important factor in arrow performance. The spine determines the archer's paradox. The archer's paradox means that an arrow must flex to fly straight. (If you have a video of an arrow in flight exhibiting the archer's paradox, this is the time to show it to the group. Point out the flex of the arrow as it leaves the bow.) A longer arrow is "softer" than a shorter arrow, so arrow length affects stiffness. (Pass around arrows with different spines and encourage the participants to slightly bend the arrow to compare the stiffness.) For target archery, the arrows should be the same length as the draw length. (Show the group a spine chart to highlight the relationship between length and stiffness.)

Arrow weight, and therefore speed and momentum, are influenced by shaft length, too. The longer arrow has greater mass and inertia. Although it may have greater momentum, it is more difficult to propel at the speed or velocity as a lighter shaft. It is also important to consider the weight of the point as part of the weight of the arrow. Thinner arrows are primarily for outdoors because they cut the wind better, while thicker arrows are made for indoors.

There are a lot of choices for fletchings. Look for fletching (either vanes or feathers) that fits the type of arrow rest on the bow and the bow itself. Vanes can be used on compound bows or recurve bows with arrow rests. Feathers should be used on recurve bows with hair rests or arrow rests. If the points are heavy, then a larger fletching is required. Target archers can use 2"–3" fletchings, while hunting and field archers may choose arrows with 5" fletchings to balance the heavier point. Fletchings with a helical shape (that is, the feathers are twisted to the left or right) help the arrow fly straighter.

ARCHERY TACKLE

Safety equipment is required for shooting a bow. The styles of equipment are often a matter of preference. There are three pieces of archery tackle every archer should use: quiver, armguard and finger protection.

- **Quiver.** For competitive archers and beginning archers, a hip quiver is the best. It is easy to slip the arrows into and stays in place. Back quivers are usually not allowed in competition. It is difficult to slip the arrow into the quiver, leading to possibly poking the person behind the archer and wasting time trying to find the quiver without looking. Bow quivers are also not normally used in competition and are made for hunting.
- **Armguard.** The armguard should be long enough to cover the bow arm from wrist to elbow crease. Some armguards also cover the top of the arm, which is also acceptable. There are many armguard styles and materials. In addition to size, think about the temperature outside and how much arm you want covered from side to side. Beginning archers may consider a wider armguard.
- **Finger protection.** This is usually a matter of preference. A finger tab is more flexible and allows the archer to feel the string. Some archers find it easier to hold the string without curling their fingers around the string and pinching the nock. It can be challenging to put on and does not stay in place when the archer isn't shooting. A finger tab can be made from leather or soft plastic. A finger tab can be made at home. A shooting glove provides finger protection with leather or fabric. It should fit snugly, reaching from the fingertip to the wrist. Some archers find it difficult to hold the string without wrapping their fingers around it and pinching the string. It is difficult to feel the string. It stays in place when the archer is waiting to shoot. These must be purchased and cannot be made at home.

Reflection:

- If a bow has a 30 lb. draw weight and the other bow has a 40 lb. draw weight, which bow shoots the heavier arrow?
- Mariah can shoot tight groups at the 30 m target. She wants to shoot at the 40 m and 50 m targets, but the arrows are falling short before they reach the target. What can she do?
- Zach grew taller over the summer and the distance between his fingertips has increased from 55 inches to 63 inches. What length bow does he need?
- Jake sweats under his armguard in the summer. What kind of armguard does he need?
- Keisha is wrapping her fingers around the string because she says she can't keep it on her fingers otherwise. What type of finger protection should she try?
- Kim loves the movie *The Hunger Games* and wants a quiver like Katniss. She plans to shoot in the state archery match. Which quiver should she get?

Apply:

Copy and enlarge photos from an archery catalog. Get photos of as many different weights, sizes, materials of each as possible. Get an opening price, a midrange price and a high-end price. Have at least three of each piece of equipment.

- Recurve bows
- Fiberglass bows
- Compound bows
- Finger tabs
- Gloves
- Armguards (3 styles)
- Hip quivers
- Back quivers
- Bow quivers
- Arrows

Explain how to use the score sheets to determine which piece of equipment is the best for the scenario. Equipment will be selected on use, price, fit, availability and personal preference.

Evaluate:

This lesson is evaluated by the results of the equipment choice exercise.

Example Scenarios. You can create your own scenarios that best fit the members of your club.

1. Antonio is 8 years old and a beginning archer. He has been using club equipment, and his parents are ready to buy him his own. He has been using a 10 lb. fiberglass bow with feathered arrows, a finger tab, an armguard and a hip quiver. The bow is very easy for him to shoot. His parents don't want to keep buying bows as he gets stronger. He needs a bow, 8 arrows, a quiver, finger protection, and an armguard. His budget is $300.00. Which bow should he purchase?

2. Isabella is 11 years old and has been in her 4-H archery club for 2 years. She has been shooting a 25-pound recurve with her club. Her father bowhunts and she would like to hunt with him. She has a 25 lb. recurve, feathered arrows, an armguard, hip quiver and glove of her own. Which bow package (all the equipment) should she purchase?
3. Jonathan is a senior who has been shooting a bow for eight years. He plans to compete at the state match with the intention of qualifying for nationals. After he graduates from high school, he will attend college on an archery scholarship. He has saved $1,000 to purchase a new bow and arrows before the state match. Which bow should he purchase?
4. Gina has been using club equipment and finally got her own bow, arrows and quiver for her birthday. She needs a new armguard and finger protection. She shoots with her 4-H club and at matches. She has been using finger gloves and prefers them over a finger tab. It is hot in Florida. Her budget is $40. Which glove should she purchase?
5. Shante has broken or lost several arrows and needs to purchase 12 new ones. She shoots outdoors most the time, her draw length is 28 lb., and she shoots a recurve bow with a hair rest. Her budget is $100. Which arrows should she purchase?

ARCHERY EQUIPMENT SCORE SHEET

Name:_____

Scenario Number	Score
Scenario 1	1
	2
	3
Scenario 2	1
	2
	3
Scenario 3	1
	2
	3
Scenario 4	1
	2
	3
Scenario 5	1
	2
	3
Scenario 6	1
	2
	3
Scenario 7	1
	2
	3
Scenario 8	1
	2
	3
Scenario 9	1
	2
	3
Scenario 10	1
	2
	3

Advanced Lesson 3:

Trajectory of an Arrow

Skill Level

Advanced

Time Needed

30 minutes

Learning Objectives

Project Skills

- Youth will be able to explain trajectory of an arrow.
- Youth will understand why knowing an arrow's trajectory is important.

Skills for Life

- Problem Solving
- Marketable Skills
- Personal Safety

Materials Needed

- Cotton swabs (one for each participant)
- Straws (one for each participant)
- Tape or string
- Trajectory worksheets
- Two different-colored crayons for everyone
- Trajectory PowerPoint presentation
- Screen
- Projector

Setting

Classroom with space for whole group to line up at a "starting line" and another line at 15 feet.

Lead-In Questions

- What is the trajectory of an arrow?
- How does knowing the trajectory affect your shooting?

Introduction

Trajectory is the path followed by a projectile flying or an object moving under the action of given forces. If you understand the trajectory of an arrow, you will know how to adjust your aim at varying distances. With enough practice at varying distances, you will come to know the trajectory for each distance and be able to adjust accordingly.

Background Information

Read Fact Sheet 5 in the *4-H Archery Instructor Manual—Level 1*.

Prepare the room by placing one piece of string long enough for all the participants to stand behind it. Place another piece of string the same length at 15 feet from the first. Queue up the PowerPoint presentation.

Activity

When everyone is seated, pass out the worksheet and two different-colored crayons. On this sheet you will see an archer and target. Draw a line from the archer to where the arrow will hit the target. (Give them time to think about this and complete the exercise.)

Now that you've got your arrow path, let's see if that arrow path is correct. Have everyone gather at the starting line and given them a straw and a cotton swab.

> *In a moment, but not yet, you will place the cotton swab into the end of the straw with the cotton sticking out the end. Then you will wrap your lips around the other end and blow as hard as you can to propel that straw to the finish line. The one that shoots the farthest is the straw-blowing champion. Archers, load your straw. I'm going to count down, and when I say blow, blow! Ready? 5-4-3-2-1 BLOW!*

When everyone has blown, announce the winner and have everyone note where their cotton swab landed. Have everyone return to their seat.

Based on what you saw with your cotton swab, using a different-colored crayon, draw where you think the arrow will hit. If you think it was right the first time, you don't have to draw anything.

Give them some time to think it over. Queue the PowerPoint while they are drawing. When they appear to be finished, go on.

Let's see where the path of the arrow is.

Play the PowerPoint.

The arrow is pointing up, so the arrow starts out going up, but what happens?

(Look for the answer that gravity pulls it down.)

That is trajectory. The arrow never travels in a straight line. Think about how many of your cotton swabs ended up on the ground before they hit the end.

Reflection:

- Why did some swabs make it to the end and others came up short?
- What did those archers do differently?
- Would blowing harder help?
- How could the straw be held to extend the trajectory?

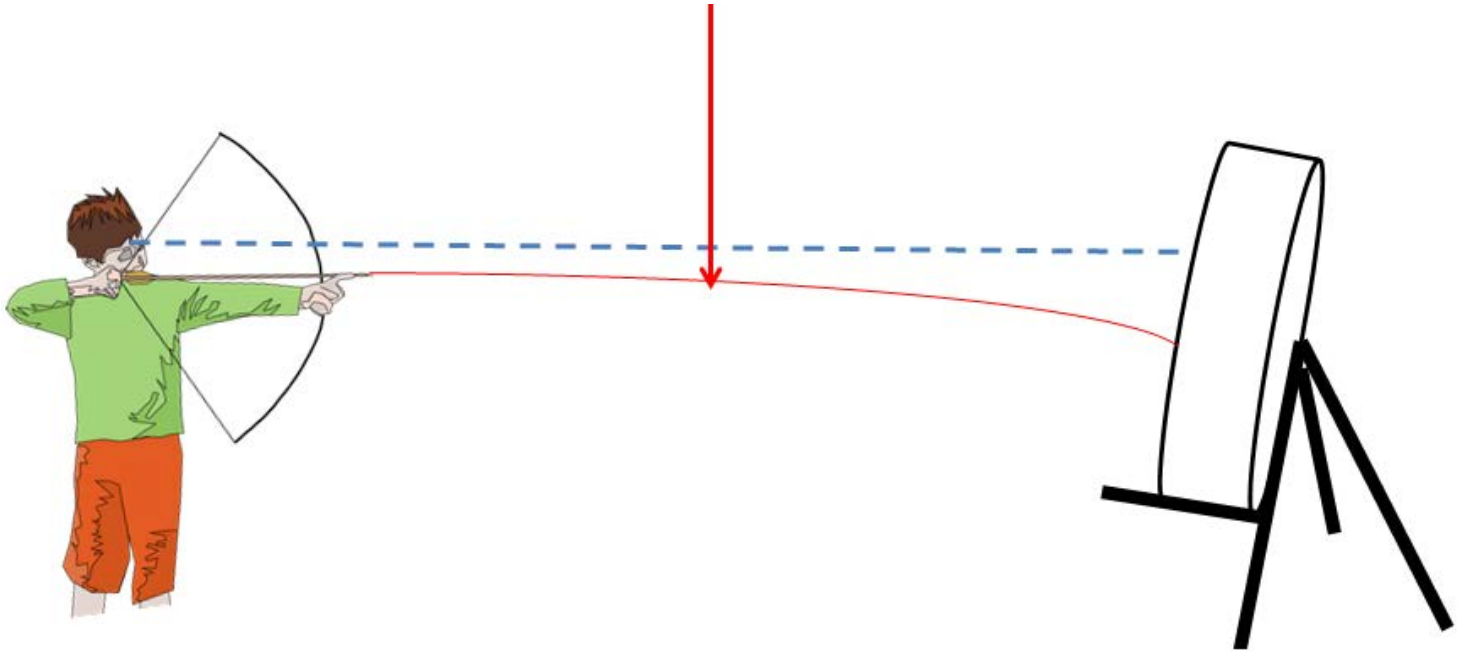
Apply:

- How will you know what the trajectory of your arrow is?
- How will you adjust your aim to compensate for trajectory?
- When is another time to adjust for trajectory?
- What is a way to diminish the effect of gravity on flight path?
- Why does a heavy arrow have a shorter trajectory than a light arrow?

Evaluate:

Youth will complete the following exercise: Youth will adjust aim by knowing the trajectory of the arrow at 10-yard intervals. If the arrow hits the same spot at each distance, they are adjusting their aim for trajectory. If the arrow hits in different spots at each distance, they are not considering trajectory when aiming.

Arrow Path



Trajectory: Path followed by a projectile flying or an object moving under the action of given forces.

Arrow Path

Line of Sight:

Trajectory:

Advanced Lesson 4:

Physiology of Archery

Skill Level

Advanced

Time Needed

45 minutes

Learning Objectives

Project Skills

- Youth will be able to recognize the parts of the body used in shooting.
- Youth will be able to demonstrate how form affects how the parts of the body are used.
- Youth will be able to explain how healthy bones, muscles and heart positively affect shooting.

Skills for Life

- Problem Solving
- Healthy Lifestyle Choices
- Marketable Skills

Materials Needed

- Bow that is easy to draw and hold
- Crayons
- Body diagram worksheet
- Body diagram PowerPoint or poster
- Screen
- Projector

Setting

In a classroom with tables

Lead-In Questions

- What parts of the body are used in archery?
- What is an instance when adjustments to equipment need to be made?
- How can you get injured from shooting a bow?

Introduction

In the sport of archery, there are more parts of the body than just the draw arm that are being used. It is important to know what they are so that the archer can be sure they are healthy enough to shoot. Injuries can happen if an archer shoots too long or with improper form or unsafe equipment. If you know what parts of the body are involved in shooting, you can take steps to get your body ready for shooting a bow safely and for an extended period such as during a competition.

Background Information

It is easy to see that the arms and the shoulders are used in archery, but there is more to it than that. Archers should know what parts of the arm and shoulder and the other parts of the body. This will allow the archer to stretch properly and engage in strength training to improve their skill and stamina.

Activity

Pair the archers up and give them one bow to share. They should each have a pencil and a worksheet.

> *Start by getting into the correct stance and going through the eleven steps up through anchor without an arrow. Pay attention to what muscles in your body are used as you go through the steps. Using the worksheet, color in the muscles you feel being used through the first seven steps (stance, nock arrow, set bow hand grip, raise and extend, draw, anchor). DO NOT release! Color in the muscles on the diagram you felt being used. Repeat with the next person.*

When everyone has completed the exercise, bring the group back together. Put the body diagram PowerPoint up. Describe the parts of the body that are used in archery.

Reflect:

- Which parts of the body did you miss?
- What part of the body that was used surprised you?
- How does form affect which muscles you use?
- Were more or fewer muscles used than you thought?
- Which joints moved the most?
- Which muscles worked hardest?

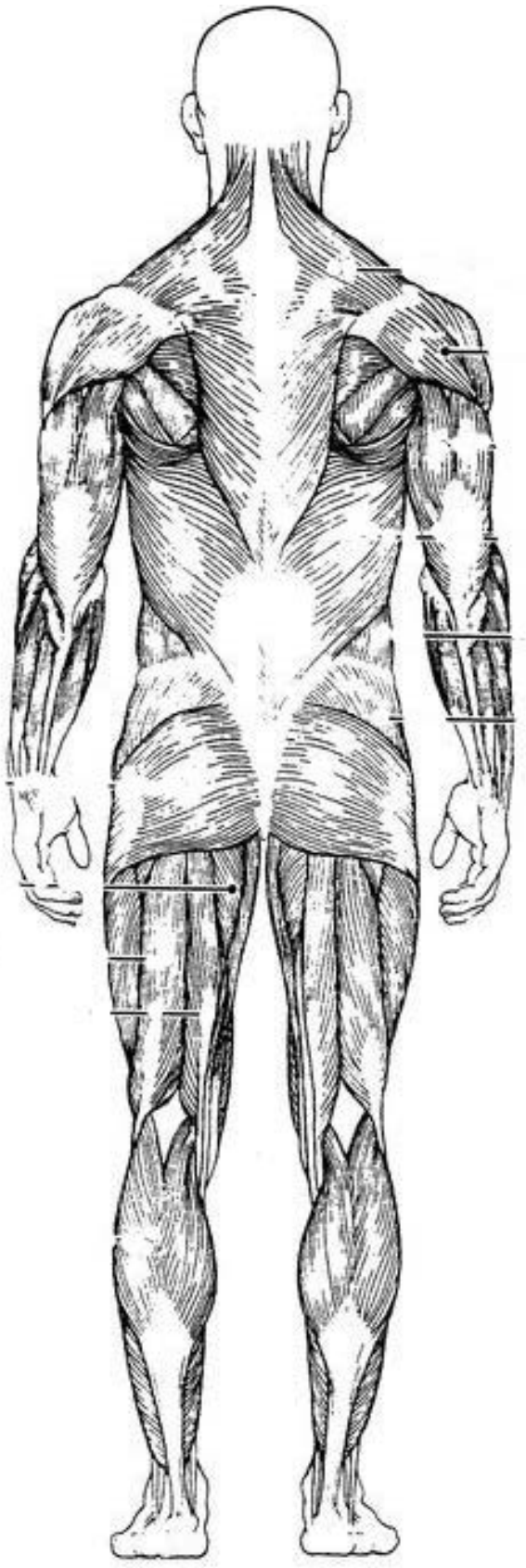
Apply:

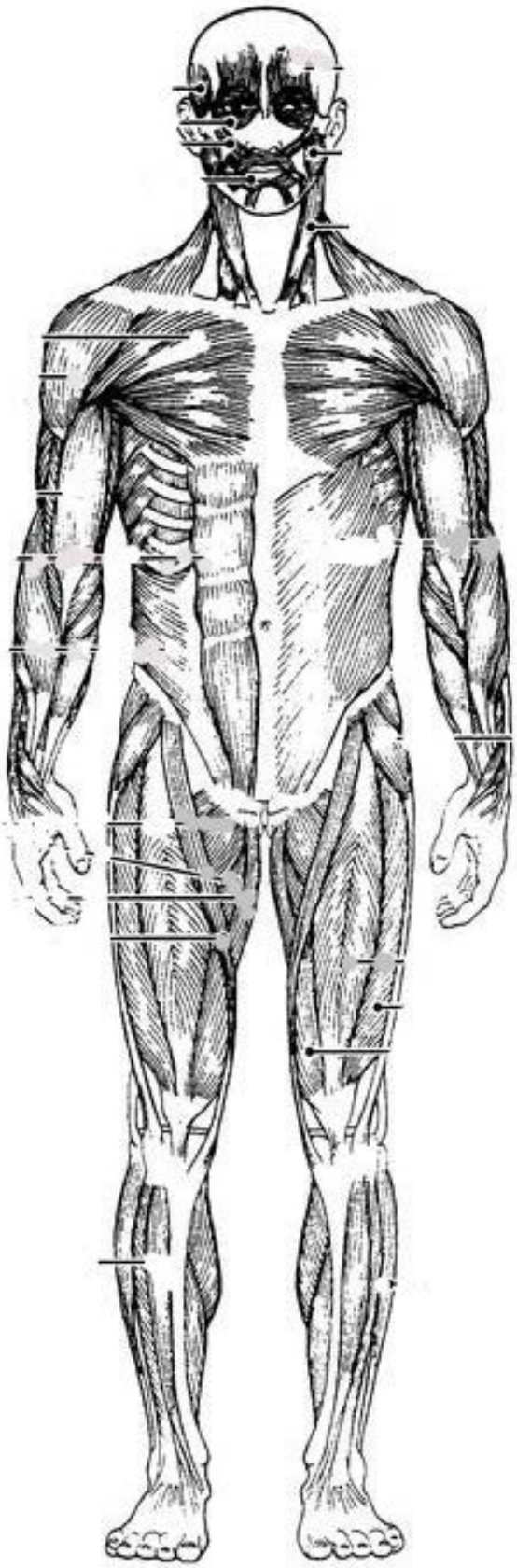
- What can you do to strengthen your body for archery?
- Where in your body do you need to strengthen?
- How is your form affecting how you are using your body?
- How long can you shoot before your body gets tired?
- What role does the heart play in shooting?

Evaluation:

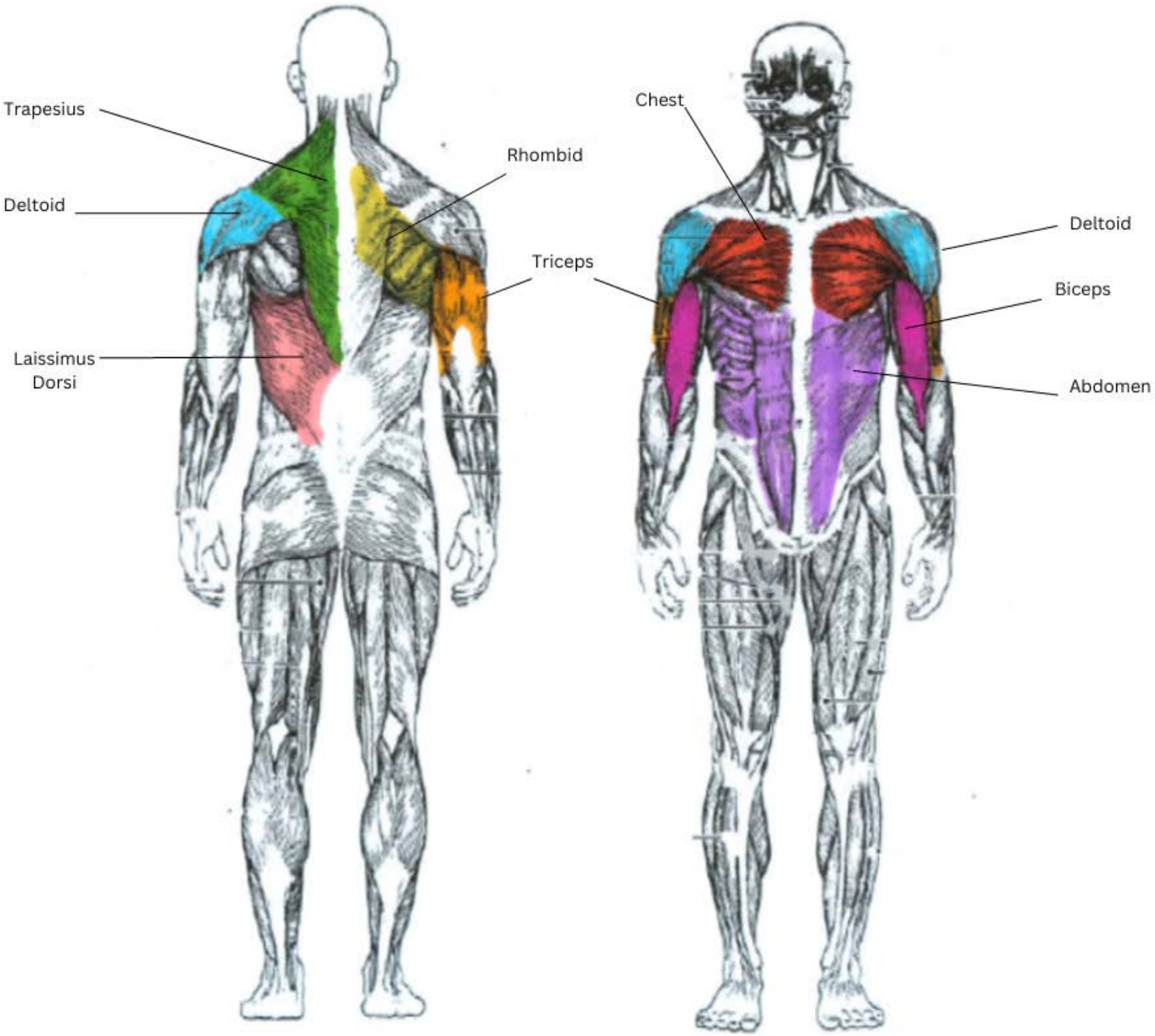
Youth research online and find two warm-up activities that prepare parts of the body identified in this lesson. They can use any reputable fitness site that has stretches that target the areas identified in this exercise. Youth will lead the group in one of the researched activities before they shoot.

MUSCLE GROUPS WORKSHEET





MUSCLE GROUPS WORKSHEET KEY



Graphic created using information from: Cole, D. (2017). *Archery muscles and exercises from Bowfit*. Bowhunting.net. Retrieved from **https://www.bowhunting.net/2017/02/archery-muscles-by-bowfit**

Advanced Lesson 5:

Setting Up a Bow

Skill Level

Advanced

Time Needed

60 minutes

Learning Objectives

Project Skills

- Youth will be able to recognize the parts of a recurve bow.
- Youth will be able to convert a bare bow to a safe, usable bow.
- You will be able to recognize a safely set up bow.

Skills for Life

- Personal Safety
- Marketable Skills
- Problem Solving

Setting

A classroom with tables. Get the participants close to the demonstration area, because some of the parts are small. Set all the bow parts and tools on a table where the participants can easily see them.

Materials Needed

- Completed recurve bow
- Recurve riser
- Limbs
- Served string
- Bow stringer
- Nock indicator
- Arrow rest or hair rest (can be the soft side of Velcro or a purchased hair rest)
- Arrow plate
- Bow tip protector (optional)
- Bow square
- Crimping tool
- String wax
- Steps to Setting Up a Recurve Bow reference sheet for each participant

Lead-In Questions

- What parts is a new recurve bow missing?
- When can a trained archer repair a bow, and when does a bow shop need to make the repair?
- What tools and supplies should be carried in an archery toolbox?

Introduction

Normally, new recurve bows come with a riser, served string, two limbs and sometimes a stick-on arrow rest and arrow plate. To fully understand how a bow works, it is important to know how each part affects shooting. Knowing this will help you determine if inaccurate shooting is because of improper form or a malfunctioning bow. Being able to repair your own bow will get you back to shooting faster and save money on having a shop make the repair for you. However, these procedures you will learn don't include the steps to repairing a damaged limb or riser. Those malfunctions must be handled by a professional because they may lead to replacing the limb or riser.

Background Information

Normally, new recurve bows come with a riser, served string, two limbs, and sometimes a stick-on arrow rest and arrow plate. A hair rest or another arrow rest can be substituted for the one that is included. In addition


MORRELL
OFFICIAL SIZE

to learning how to set up a bow from the beginning, another skill this lesson will teach is how to make simple repairs. This is especially helpful at archery matches. Situations such as a loose nock locator or a string at the incorrect brace height will need to be corrected before a bow passes inspection. Having all the parts on a bow assembled properly will aid the archer in making consistently accurate shots by allowing them to focus on their form.

Activity

We will be going over the steps to properly set up a bow. First, we will watch a YouTube video on what assembly looks like. Next you will get the chance to do it yourself.

YouTube video: **https://youtu.be/0bOcsWGf_HE**

You will also get a reference sheet with the steps and illustrations of each step (found in the Appendix). As I list the steps, read the description over. Watch what I am doing and take any notes which will help you remember the techniques. Relate the live demonstration to the illustration to help you recall what you saw today.

STEP 1: ASSEMBLE THE BOW

The limbs do not come attached to the riser. Identify the top and bottom limbs. The bottom limb has the draw weight on the face. Start by unscrewing the bolt on the bottom of the riser. Fit the limb into the space and screw the bolt back in. Screw it in tightly, but don't overtighten it or you may not be able to remove it at another time. The limb should be snugly in place without wiggling. Repeat with the top limb.

STEP 2: ADD THE STRING

The top of the string has a larger loop. Slip this end of the string over the tip and slide it down as far as it will go. Slip the bottom string on the other end. String the bow.

STEP 3: ATTACH REST AND ARROW PLATE

- Stick-On Rest
  - Can only be used with feathered arrows or vanes.
  - If a stick-on rest is being used, remove adhesive and attach on the side and in the center of the sight window. Take care that it is on straight and that the rest isn't sitting on the shelf.
- Hair Rest
  - Can only be used with feathered arrows. The vanes will be torn off.
  - If a hair rest is being used, cut the fabric to fit on the shelf. Take care not to have any material going up the side of the sight window or hanging off. Remove adhesive and attach to shelf.
  - Attach the arrow plate on the center side of the sight window. It should touch the hair rest but not go below it.

STEP 4: INSTALL THE NOCK LOCATOR

Attach the two-prong end of the bow square to the string so that the perpendicular pieces sit on the arrow rest. It should be able to swing free with a little resistance. Measure approximately ¼" up from where the bow square is attached to the string using the ruler on the square. This is where you will attach the locator. Use the larger hole on the crimping tool to crimp the nock locator on the string. Once it will stay in place, use the small hole on the crimper to tighten the nock locator on the string. When the arrow is nocked, it should be touching the arrow rest, but lightly.

STEP 5 *(optional)*

- Install a tip protector on the bottom tip of your bow. Pull it over the end and make sure it fits snugly.
- Your bow is ready to shoot.

Review the tools to be included in an archery tool kit.

Bow Equipment and Supplies:

- Bow square
- Nock indicators
- String wax
- Served string
- Crimping tool
- Extra arrow rest or extra hair rest

Arrow Equipment and Supplies:

- Feathers or vanes
- Glue
- Jig
- Nocks
- Points
- Inserts
- Permanent marker or bright nail polish (to identify arrows)

Reflect:

- Why is the brace height important?
- How do you know where to put the nock indicator?
- What is the difference between a stick-on rest and a hair rest?
- How do you remove a nock indicator?
- What should you do if the laminate comes off a limb?
- What should you do if the riser cracks?
- How long would it take you to set up a bow?
- Where can you make a bow repair?
- How does a missing nock indicator affect safety?
- What happens if an arrow rest falls off?
- When should you replace a hair rest?

Apply:

- What is the importance of having all the tools needed for a job whenever the job is being done?
- What is an example of a situation where having the right tools or equipment could help someone who is injured?
- How will considering all the possible outcomes of an activity help you prepare for it?

Evaluate:

- Youth will set up a bow by completing Steps 1–5.
- (If no bow is available to set up) Youth will list and describe Steps 1–5.

Advanced Lesson 6:

Fletching an Arrow

Skill Level

Advanced

Time Needed

60 minutes, depending on how many jigs are available.

Learning Objectives

Project Skills

- Youth will be able to select materials to fletch an arrow.
- Youth will be able to fletch an arrow.
- Youth will describe the difference between their personal arrows and the arrow they fletched.

Skills for Life

- Critical Thinking

Setting

Ventilated classroom with tables. Cover tables with newspaper to protect them from glue.

Materials Needed

- Carbon fiber arrow shafts with inserts, points and nocks already installed (one for each participant)
- Fletching jig (one single for every two participants or multiple arrow jigs)
- Fletching glue
- Different-colored feathers or vanes (three for each participant)
- Fletching tape
- Permanent markers (fine point)
- Rubbing alcohol
- Cotton balls
- Assembled arrow from materials to be used

Lead-In Questions

- What are the parts of an arrow?
- What is the difference between fletchings and vanes?
- Which type of bows use fletchings? Which type of bows use vanes?

Introduction

Arrows can be purchased in several stages of readiness. Shafts come alone without fletching, inserts or points. Shafts with inserts and points are also available, and some arrows come completely assembled. The price varies based on how much the arrow has been assembled. Today you will be fletching your own arrow using feathers or vanes. Once the fletching has dried you will have an arrow that you can shoot from your bow.

Arrows with feathers offer more control than arrows with vanes. Feathers flex and fold as the arrow passes over the shelf. They also fold as the arrow passes the back of the bow and arcs because of the archer's paradox. The flexing of the feathers keeps the arrow flying in the direction it is being shot without interference shifting its direction. However, feathers may hiss in flight, slow the arrow's speed and be affected by wet weather. Feathers are the time-honored fletching substance. Arrows with vanes, the plastic fletchings, are best for high-speed arrow flight and work well on lighter shafts. However, because they don't flex like feathers, they provide less room for error. Vanes work best on compound bows or recurves with an arrow rest instead of a shelf rest. Vanes cannot be used on bows with shelf rests because the friction will tear the vane.

Background Information

Fletchings can come loose or come off while being shot. If an archer learns how to fletch an arrow and has the right equipment, they can repair their arrows without the expense or inconvenience of taking them to a shop. As the archer progresses in skill, they may come to find that changing the fletching makes a difference in how their arrow flies. This could lead them to shooting arrows custom-made for their shooting style.

Make an arrow before the lesson to familiarize yourself with how the equipment and supplies will work. Be ready to demonstrate making another arrow for the group. You will be demonstrating making another arrow as they do as a guide. Some of the steps they will be doing may be difficult to understand without a demonstration.

Because of the time it takes for the fletching glue to dry, you can finish the lesson at a subsequent meeting where they shoot and evaluate their arrows against the arrows they normally use.

Set up the jig using the directions it came with.

Activity

Describe the supplies and equipment to be used to fletch the arrows. Holding up a completed arrow, review the parts of an arrow.

Instruct the participants to select three feathers or vanes of at least two colors. Once they have chosen their feathers or vanes, begin the explanation of the fletching.

Demonstrate the instructions as they are given. Before fletching the arrow, the shaft must be cleaned so that the adhesive will stick to it. Wet a cotton ball with alcohol and rub it at the end of the shaft where the feathers will be attached. Let it dry and don't touch the area with your fingers. That would leave grease on the shaft.

Place the cleaned shaft in the assembled jig. Place a feather or vane in the clamp. Next, run a thin glue bead down the length of the fletching. Place the clamp on the jig, applying slight pressure to seat the fletching against the shaft. Let the glue dry 3–4 minutes and repeat the process with the remaining feathers or vanes. Remove the clamp. Rotate the nock receiver to bring a new area of the shaft into position. Repeat the process until all the fletchings have been applied.

Reference

Adapted from Einsmann, Scott. (2018). *Step by step: How to fletch arrows*. Retrieved from **https://www.archery360.com/2018/01/31/step-step-fletch-arrows**

Reflection after Fletching:

- What is the advantage of using feathered arrows in a recurve bow?
- What is a reason being able to fletch your own arrows is important?
- Why did you choose the feathers you did?
- What surprised you most about fletching the arrow?

Applying after Fletching:

- How will knowing how to fletch an arrow help your shooting?
- Who else could benefit from knowing how to fletch an arrow?
- What parts of the arrow that you made are different from the arrows you normally use?

Evaluation after Fletching:

- Youth will fletch one functional arrow with materials provided.

If time is an issue, conduct this activity at a subsequent meeting.

Activity

- The archer shoots one of their personal arrows and notes where it hit.
- Next, the archer shoots the arrow that was just fletched.

Reflection after Shooting:

- If the arrow you made flew differently than the one you normally use, why might that be?

Applying after Shooting:

- How could you improve on the arrow you fletched?
- Would you choose the same fletching materials used in the arrow you fletched for your next arrows?
- How will this exercise impact your next arrows?

Evaluation after Shooting:

- Youth will explain why their arrow shoots the same or differently than the arrow they fletched. This can be done by asking each person in the group or having each youth write their answers out.

Advanced Lesson 7:

Building and Using Sights

Skill Level

Advanced

Time Needed

45 minutes

Learning Objectives

Project Skills

- Youth will be able to shoot using a homemade sight.
- Youth will be able to adjust the sight for their personal use.

Skills for Life

- Marketable Skills
- Problem Solving
- Personal Safety

Materials Needed

- Weather-stripping foam
- Dressmaker pins with enamel heads
- Scissors
- Bows without sights

Setting

On the range with tables to set materials to make the sights on.

Lead-In Questions

- What is the purpose of a sight on a bow?
- On what types of bows can sights be used?
- How is a sight adjusted for shooting?

Introduction

Sights can be used on bows to direct the archer where to hold the bow to hit the target. There are several types of sights: fixed-pin sights, multi-pin sights and recurve sights. Fixed-pin and multi-pin sights are designed for compound bows and recurve sights are designed for recurve bows. Pin sights can be mounted on recurve bows, but it is not recommended.

Background Information

When teaching archery, it is important to teach beginning archers the instinctive method of shooting. If an archer can shoot instinctively, then the transition to a sighted bow will be relatively easy. They will also have a reference point for how well or how poorly their performance changes when they switch to a sighted bow. Not all instinctive shooters want to add a sight to their bow. Some prefer the challenge of instinctive shooting, although it will take significantly more practice to make them competitive with sighted bows.

It is rare that a compound bow is shot instinctively. The biggest challenge archers, especially recurve archers, have shooting with sights from the beginning is that they are often unable to function without a sight, making them dependent on this equipment. Compound bows are the most common bows for hunting. Sights are important in hunting because accuracy is crucial for humanely killing an animal. If a shot is just a little bit off, the animal may be wounded and suffer a painful death.

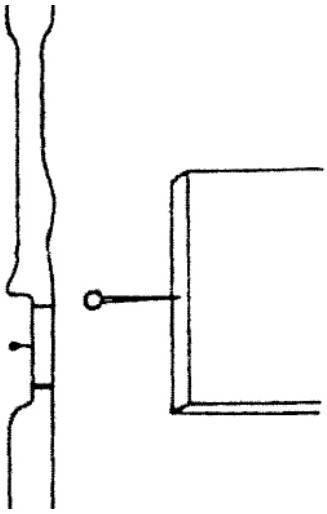
If you have a pin sight, a pendulum sight and a recurve sight, show them and explain their use. If not, use the identification sheet with this lesson.

Make a sight ahead of time so that you can show the group an example of what they will be making.

Activity

We are going to make a simple pin sight for your bow. It will even be adjustable. Stick a strip of foam on the back of the bow at the sight window. Stick the pin into the foam, leaving the enamel head in the sight window. A good starting point places the pin about the same distance above the arrow rest as the eye is above the anchor point. The head of the pin should stick out into the sight window about as far as the edge of the arrow is from the dominant eye, about 1.5 cm (3/4"). This arrangement should place the arrows close to the point of aim at close range (15 to 25 yards). The sights can be adjusted by trial and error to place the group center on the point of aim.

The sights will need to be adjusted. To do so, the archer must know where the arrows are hitting relative to the point of aim. That means that the ability to shoot tight groups is essential. A minimum of three arrows should be shot to establish the point of impact. Use the same sight setting, anchor point and point of aim. If the sight setting places the first arrow completely off the butt or target and your form was good, adjust the sight after that arrow to get on the target. Using the "chase the arrows with the pin" approach, move the sight to the left if the hits are to the left, upward if they are high and so on. With this type of sight, adjustments may need to be made by trial and error. Once the sights are set to your satisfaction, mark the pin and foam with the distance. Shoot using the sight at multiple distances to discover how distance affects sight adjustment.



Reflect:

- How did using a sight improve your accuracy?
- What did you do to adjust your sight after evaluating your shot?
- Why was evaluating your shot each time important when sighting in your bow?
- How did your shooting form change because of using a sight?

Apply:

- Why was it important to learn to shoot instinctively before learning to use a sight?
- After learning to use a sight, what will change about how you shoot instinctively?
- What is an example of shooting archery when accuracy is more important than shooting competitively and sight would be useful? Why?

Evaluate:

- Youth will shoot one end correctly using the sight they have made.
- Youth will adjust sight to improve accuracy on one end.

Reference

Howard Jr., R. A. (2014). Shooting with sights. *4-H archery instructor manual: Level 1*. National 4-H Shooting Sports Committee.

SIGHTS

Pin Sight

Photo credit: Miley Wilson

Pendulum Sight

Recurve Bow Sight

Photo credit: Morgan Paulsen

Advanced Archery Assessment

Name:_____

1. Why can a compound shooter hold an anchor point longer than a recurve archer?
- ☐ Compound bows have let off.
- ☐ Compound bows aren't made of wood.
- ☐ Compound bows use arrows with vanes.

2. Compound bows can shoot lighter arrows with less spine than recurve bows because the cams absorb more energy than the limbs on a recurve bow.
- ☐ True
- ☐ False

3. A bow with a 30-pound draw weight shoots a _____ arrow than a bow with a 40-pound draw weight.
- ☐ Heavier
- ☐ Lighter
- ☐ Same weight

4. Keisha saw an archer in a movie that used a back quiver, and she liked the way it looked. She is shooting in the state match next month. What type of quiver should she purchase?
- ☐ Back quiver
- ☐ Bow-mounted quiver
- ☐ Hip quiver

5. A 120-grain arrow has a shorter trajectory than a 110-grain arrow because the heavier the object, the greater the effect of gravity.
- ☐ True
- ☐ False

6. Caden can shoot tight groups at the 40-meter target. He's trying to hit the 50-meter target, but his arrows are falling to the ground before they reach the target. What should he do?
- ☐ Hold the anchor for a shorter time.
- ☐ Use lighter arrows.
- ☐ Use a bow with a higher draw weight.

7. How do you adjust your aim to compensate for the trajectory of the arrow?
- ☐ Point the arrow directly at the bullseye.
- ☐ Point the arrow slightly below the bullseye.
- ☐ Point the arrow slightly above the bullseye.

8. Select all the muscle groups that are used when shooting a bow.
- ☐ Shoulder muscles
- ☐ Facial muscles
- ☐ Abdominal muscles

9. Why should an archer have good cardiovascular function? Select the best answer.
- ☐ Because they must walk back and forth to the target.
- ☐ They must carry their equipment.
- ☐ They need stamina to shoot for long periods of time.

10. Describe an effective warm-up stretch for archery.

11. Select all the reasons that brace height is important.
- ☐ The nock indicator will line up with the arrow.
- ☐ The string is putting the correct amount of pressure on the limbs.
- ☐ The string will stay untangled.

12. What should you do if the laminate splits on a recurve bow?
- ☐ Glue the laminate back on and continue shooting.
- ☐ Nothing. The laminate is only for appearance.
- ☐ Stop using the bow and buy new limbs.

13. Which of the following can happen if the nock indicator is missing?

- ☐ The arrow won't click on the string.
- ☐ The arrow will not line up with the rest.
- ☐ The arrow won't come off the bow.

14. Mark all the following which may happen if the arrow rest falls off.

- ☐ The arrow won't stay on the bow.
- ☐ The arrow won't line up with the nock indicator.
- ☐ The brace height will be wrong.

15. Which is **NOT** a reason to learn to fletch your own arrows?

- ☐ You can save money by making the repairs yourself.
- ☐ You can customize the vanes or feathers you want.
- ☐ You can change the spine of the arrow.
- ☐ You can repair an arrow immediately.

16. Why is it important to learn to shoot instinctively before learning to use a sight?

ADVANCED ARCHERY ASSESSMENT KEY

Name:_____

1. Why can a compound shooter hold an anchor point longer than a recurve archer?
   - [x] Compound bows have let off.
   - [ ] Compound bows aren't made of wood.
   - [ ] Compound bows use arrows with vanes.

2. Compound bows can shoot lighter arrows with less spine than recurve bows because the cams absorb more energy than the limbs on a recurve bow.
   - [x] True
   - [ ] False

3. A bow with a 30-pound draw weight shoots a _____ arrow than a bow with a 40-pound draw weight.
   - [ ] Heavier
   - [x] Lighter
   - [ ] Same weight

4. Keisha saw an archer in a movie that used a back quiver, and she liked the way it looked. She is shooting in the state match next month. What type of quiver should she purchase?
   - [ ] Back quiver
   - [ ] Bow-mounted quiver
   - [x] Hip quiver

5. A 120-grain arrow has a shorter trajectory than a 110-grain arrow because the heavier the object, the greater the effect of gravity.
   - [x] True
   - [ ] False

6. Caden can shoot tight groups at the 40-meter target. He's trying to hit the 50-meter target, but his arrows are falling to the ground before they reach the target. What should he do?
   - [ ] Hold the anchor for a shorter time.
   - [ ] Use lighter arrows.
   - [x] Use a bow with a higher draw weight.

7. How do you adjust your aim to compensate for the trajectory of the arrow?
   - [ ] Point the arrow directly at the bullseye.
   - [ ] Point the arrow slightly below the bullseye.
   - [x] Point the arrow slightly above the bullseye.

8. Select all the muscle groups that are used when shooting a bow.
   - [x] Shoulder muscles
   - [ ] Facial muscles
   - [x] Abdominal muscles

9. Why should an archer have good cardiovascular function? Select the best answer.
   - [ ] Because they must walk back and forth to the target.
   - [ ] They must carry their equipment.
   - [x] They need stamina to shoot for long periods of time.

10. Describe an effective warm-up stretch for archery.
    Any reasonable answer.

11. Select all the reasons that brace height is important.
    - [x] The nock indicator will line up with the arrow.
    - [x] The string is putting the correct amount of pressure on the limbs.
    - [ ] The string will stay untangled.

12. What should you do if the laminate splits on a recurve bow?
    - [ ] Glue the laminate back on and continue shooting.
    - [ ] Nothing. The laminate is only for appearance.
    - [x] Stop using the bow and buy new limbs.

13. Which of the following can happen if the nock indicator is missing?

- ☐ The arrow won't click on the string.
- ■ The arrow will not line up with the rest.
- ☐ The arrow won't come off the bow.

14. Mark all the following which may happen if the arrow rest falls off.

- ■ The arrow won't stay on the bow.
- ■ The arrow won't line up with the nock indicator.
- ☐ The brace height will be wrong.

15. Which is **NOT** a reason to learn to fletch your own arrows?

- ☐ You can save money by making the repairs yourself.
- ■ You can customize the vanes or feathers you want.
- ☐ You can change the spine of the arrow.
- ☐ You can repair an arrow immediately.

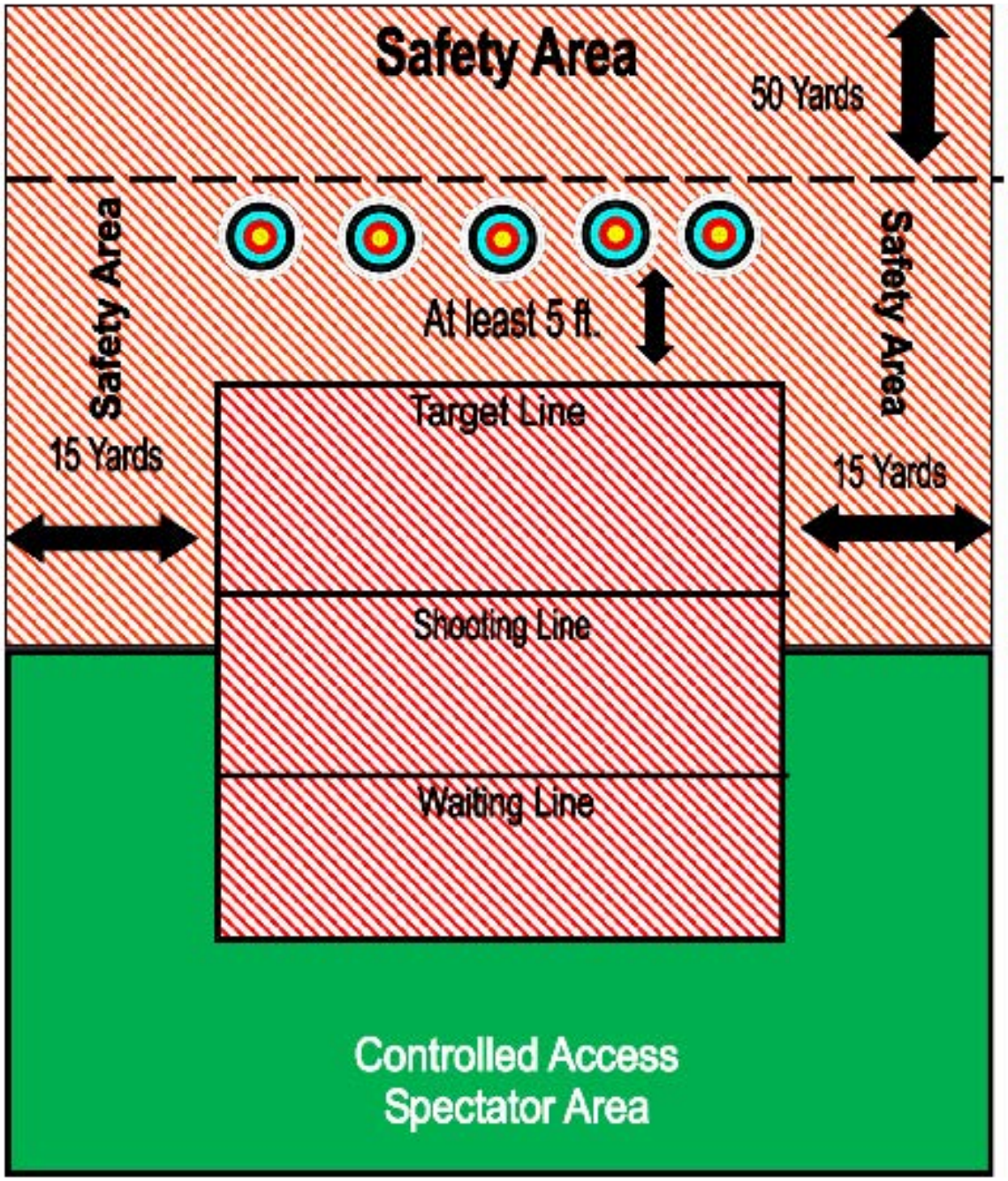
16. Why is it important to learn to shoot instinctively before learning to use a sight?

Because it is more difficult to shoot instinctively, and if an archer can shoot instinctively, they can learn to shoot with sights relatively easily. However, if an archer learns with a sight first, it will be difficult for them to learn to shoot instinctively.

Appendix A:

Basic Lesson 2: Shooting Safety

Outdoor Archery Range Layout



Appendix B:

Basic Lesson 5: Setting Up a Bow

Steps to Setting Up a Recurve Bow

STEP 1: ASSEMBLE THE BOW.

The limbs do not come attached to the riser. Identify the top and bottom limbs. The bottom limb has the draw weight on the face. Start by unscrewing the bolt on the bottom of the riser. Fit the limb into the space and screw the bolt back in. Screw it in tightly, but don't overtighten it, or you may not be able to remove it at another time. The limb should be snugly in place without wiggling. Repeat with the top limb.

STEP 2: ADD THE STRING.

The top of the string has a larger loop. Slip this end of the string over the tip and slide it down as far as it will go. Slip the bottom string on the other end. String the bow.

STEP 3: ATTACH REST AND ARROW PLATE.

- **Stick-On Rest**
  - Can be used with feathered arrows or vanes.
  - If a stick-on rest is being used, remove adhesive and attach on the side and in the center of the sight window. Take care that it is on straight and that the rest isn't sitting on the shelf.
- **Hair Rest**
  - Can only be used with feathered arrows. The vanes will be torn off.
  - If a hair rest is being used, cut the fabric to fit on the shelf. Take care not to have any material going up the side of the sight window or hanging off. Remove adhesive and attach to shelf.
  - Attach the arrow plate on the center side of the sight window. It should touch the hair rest but not go below it.

STEP 4: INSTALL THE NOCK LOCATOR.

Attach the two-prong end of the bow square to the string so that the perpendicular pieces sit on the arrow rest. It should be able to swing free with a little resistance. Measure approximately ¼" up from where the bow square is attached to the string using the ruler on the square. This is where you will attach the locator. Use the larger hole on the crimping tool to crimp the nock locator on the string. Once it will stay in place, use the small hole on the crimper to tighten the nock locator on the string. When the arrow is nocked, it should be touching the arrow rest, but lightly.

STEP 5: TIP PROTECTOR (OPTIONAL)

Install a tip protector on the bottom tip of your bow. Pull it over the end and make sure it fits snugly.

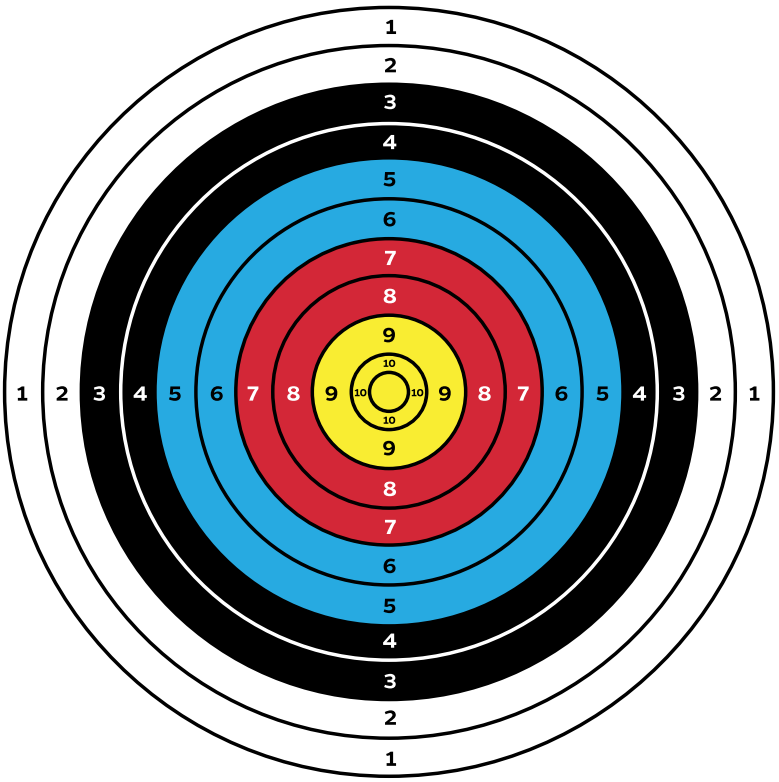
Your bow is ready to shoot.

You can find a video of set up at **https://youtu.be/0bOcsWGf_HE**.

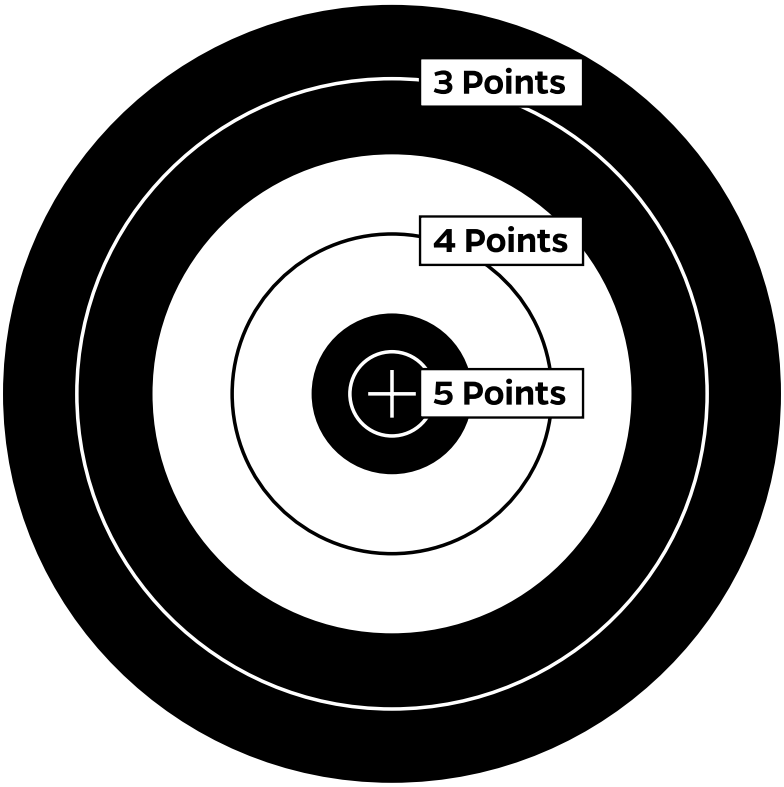
Appendix C:

Basic Lesson 6: Archery Disciplines

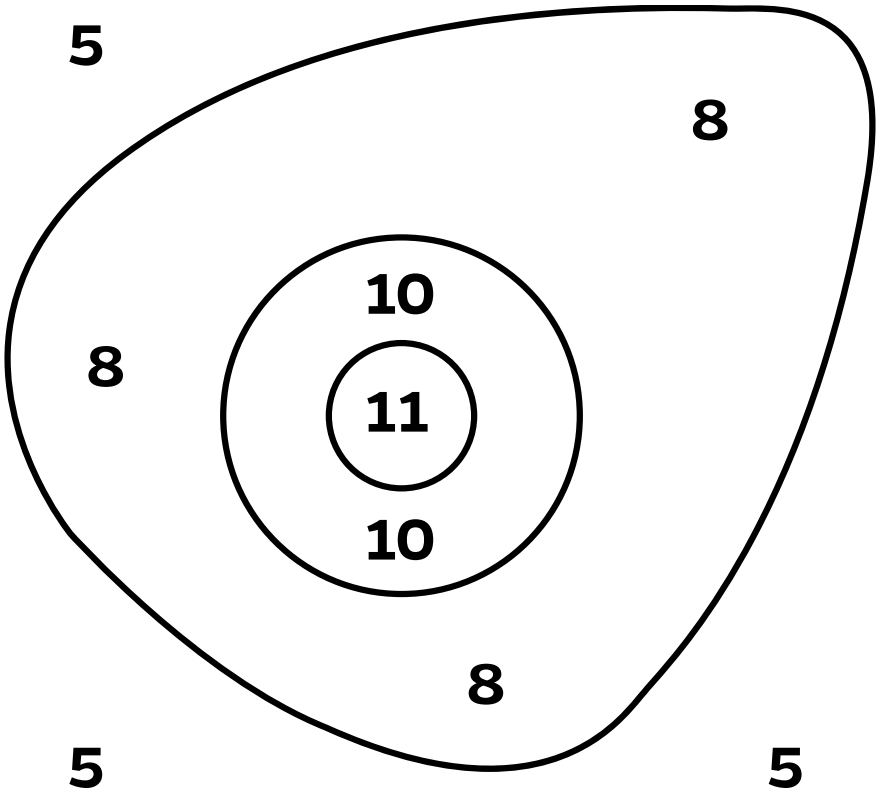
FITA Target



Field Target



3D Target



Appendix D:

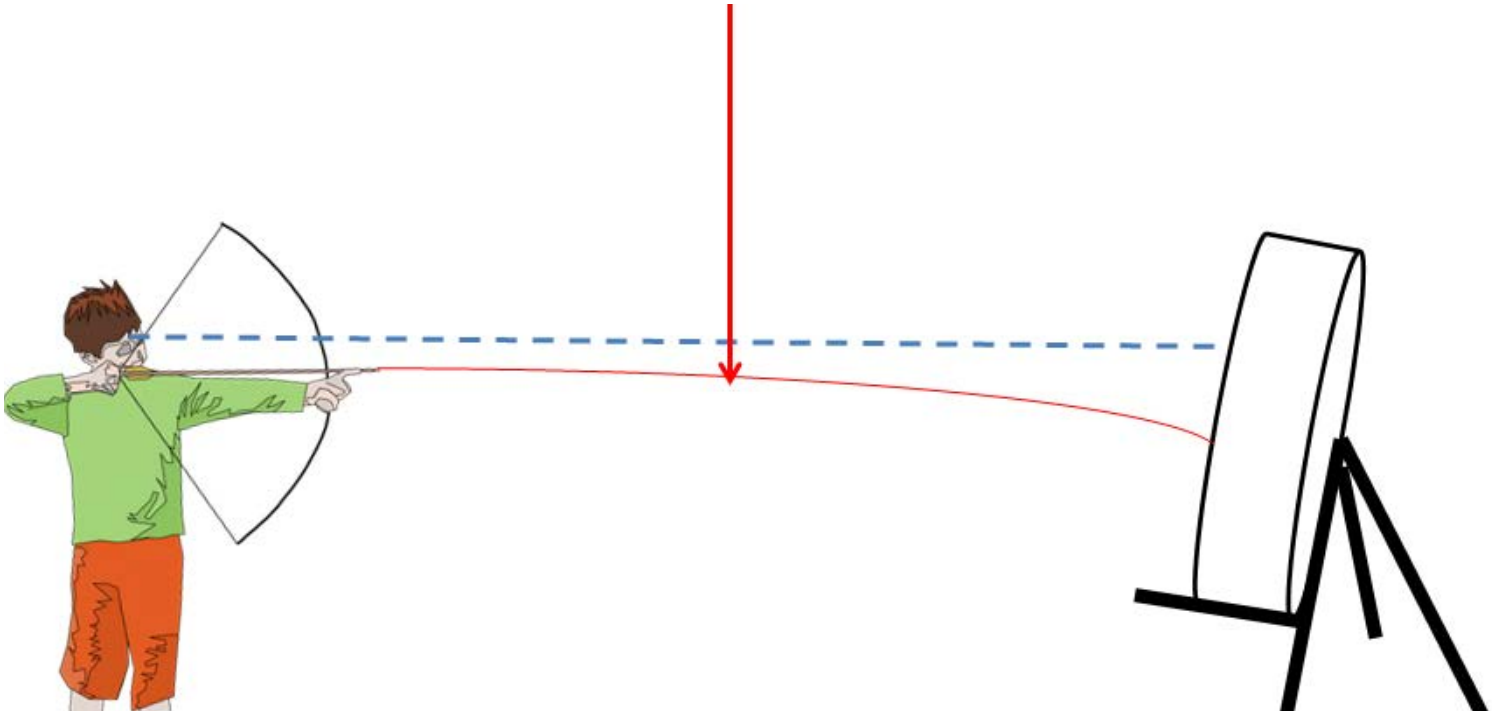
Advanced Lesson 3: Trajectory of an Arrow

Arrow Path

Line of Sight

Line of sight: Straight line between the shooter and the target.

Trajectory

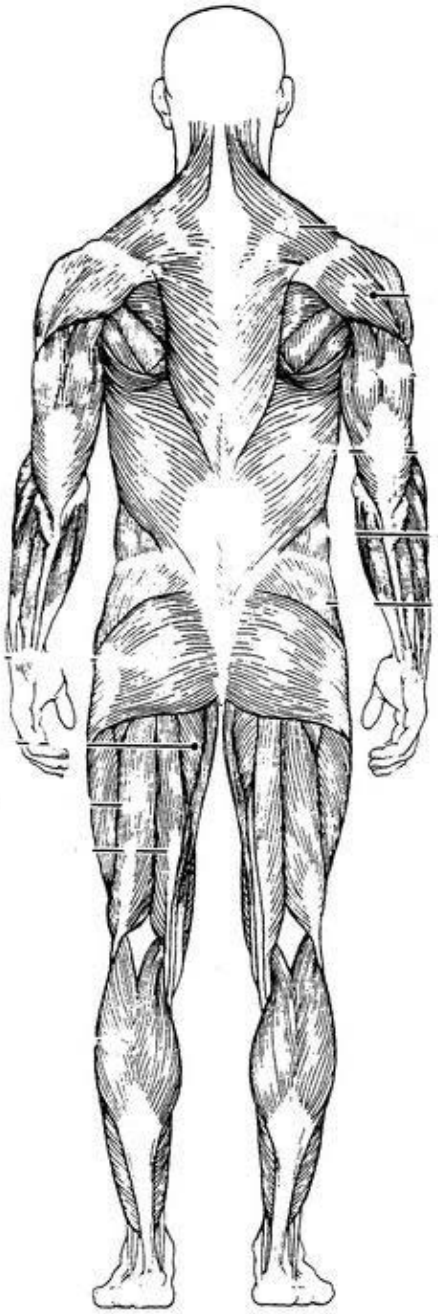


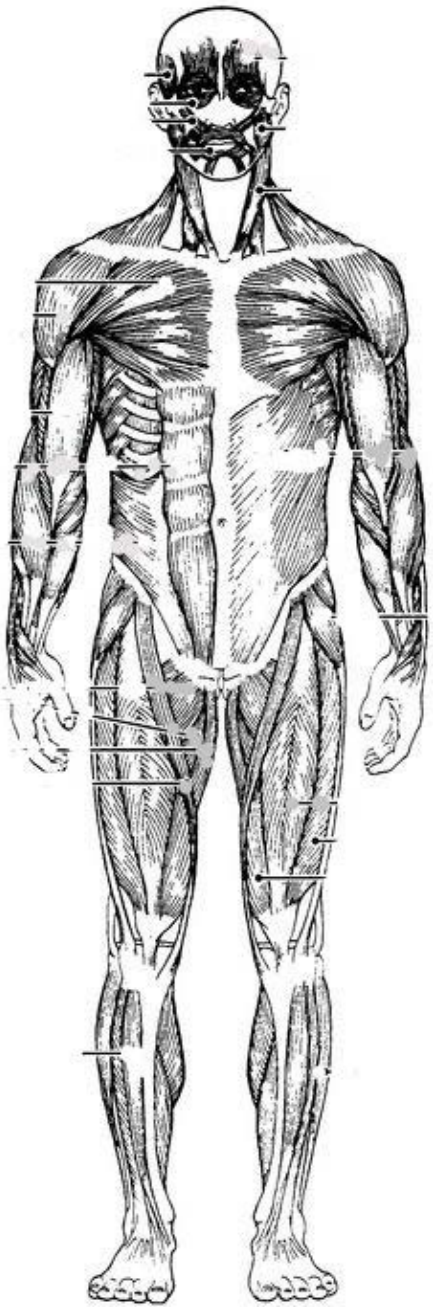
Trajectory: Path followed by a projectile flying or an object moving under the action of given forces.

Appendix E:

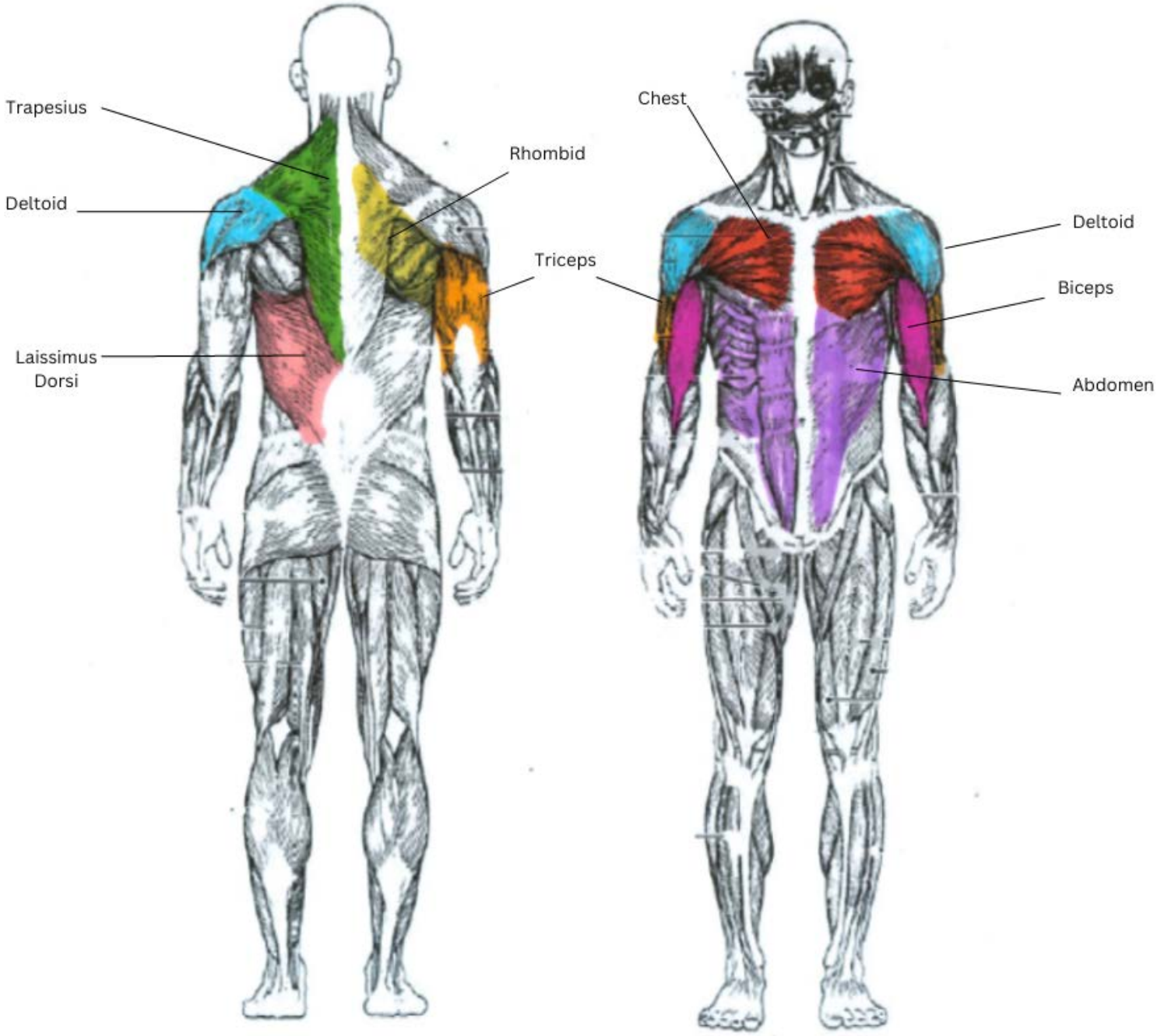
Advanced Lesson 4: Physiology of Archery

Archery Muscles





Archery Muscles



UF | IFAS Extension
UNIVERSITY of FLORIDA

Contact Info

UF/IFAS Extension
Florida 4-H Youth Development Program
2142 Shealy Drive
PO Box 110225
Gainesville, FL 32611
(352) 846-4444