



DNR



SOUTH CAROLINA

INTRODUCTORY

CROSSBOW

TEACHER'S MANUAL

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Introduction

Our vision for South Carolina is an enhanced quality of life for present and future generations through improved understanding, wise use and safe enjoyment of healthy, diverse, sustainable and accessible natural resources. The South Carolina Crossbow Program is a healthy activity for students to participate in and enjoy the outdoors.

The South Carolina Crossbow Program Manual is designed to provide teachers with the fundamentals of crossbows. This manual, classroom instruction, videos and your crossbow owner's manual provide a platform of information for you to present to your students. The program is recommended for 5th grade through 12th grade.

Due to its versatility, we will use the introductory crossbow in this program. It is light weight, ambidextrous, has no recoil or noise and one size fits all.

Instructional Timeline

Day 1 (classroom)

Lesson One - History of the Crossbow (Crossbow 101 video)

Lesson Two - Nomenclature of the Crossbow and Arrow

Lesson Three - Dominant Eye or Master Eye

Day 2 (Range)

Lesson Four - Range Rules and Set-up

Lesson Five - Pre-Shooting Drill

Lesson Six - Shooting Drill

Day 3 (Range)

Lesson Seven - Shooting Exercises

Day 4 (Range)

Lesson Seven, continued - Shooting Exercises

Day 5 (Classroom/Range)

Written Test

Practical Test

MATERIALS NEEDED:

South Carolina Crossbow Manual

5 Crossbows

20 Arrows

5 Targets

Crossbow 101 video from www.crossbowed.com

Recommended Crossbow and Arrow Specifications:

Note: "Crossbows and arrows should meet the North American Crossbow Federation's Introductory Crossbow Archery Project standards or equivalent."

Bow specs:

Poundage	Less than 30 pounds
Mass Weight	7 pounds or less
Power Stroke	13" or less
Safety	Auto engage safety that engages the safety when the bow is cocked
Sight System	Peep & Pin or single red dot
Dry-fire Test	No failure with 25 continuous dry-fires
Foot Pounds	18 foot pounds or less

Arrow specs:

Material	Aluminum
Weight	280 grain minimum
Length	14" minimum
Diameter	22/64" +/- 1/64" & as specified by manufacturer by model
Fletch	3 fletch/approx. 2" – approx. 4" length – 1/2" approx. height. Index fletching/ vane to be different color from hen vanes.

Lesson One: History of the Crossbow

OBJECTIVES: Describe the difference between a target and a hunting crossbow.

Crossbow 101 video from www.crossbowed.com

Part I Introduction

Part II History

Part III Today's Bows

Archery can take many forms. The National Crossbowmen of the USA, Inc. (TNC www.crossbowusa.com) and the North American Crossbow Federation (NACF www.northamericancrossbowfederation.com) are two organizations that provide the history of the crossbow and enhance its use as a sporting instrument for target shooting as well as for hunting.

In archery competitions crossbowmen sometimes shoot non-competitively with other archers. TNC hosts annual U.S. Indoor and Outdoor National Championship tournaments in which its members may compete for rotating championship awards. The National Archery Association of the United States (NAA), National Field Archery Association (NFAA) and the International Bowhunting Organization (IBO) support crossbow competition and each has a crossbow division in their competition classes.

Target Crossbows operate the same way as hunting crossbows. They typically have lower draw weight and arrow speeds are slower. Hunting crossbows may be used for target shooting, but target crossbows are built strictly for target shooting.



Target Crossbow.



Hunting Crossbow.

Hunting Crossbows are of the same design as target crossbows, but have higher draw weight and the arrow speed is much faster.

Lesson Two: Nomenclature of the Crossbow and Arrow

OBJECTIVES:

Define “crossbow.”

Identify the basic parts of a crossbow.

Describe safety check areas of the crossbow.

Name five basic parts of an arrow.

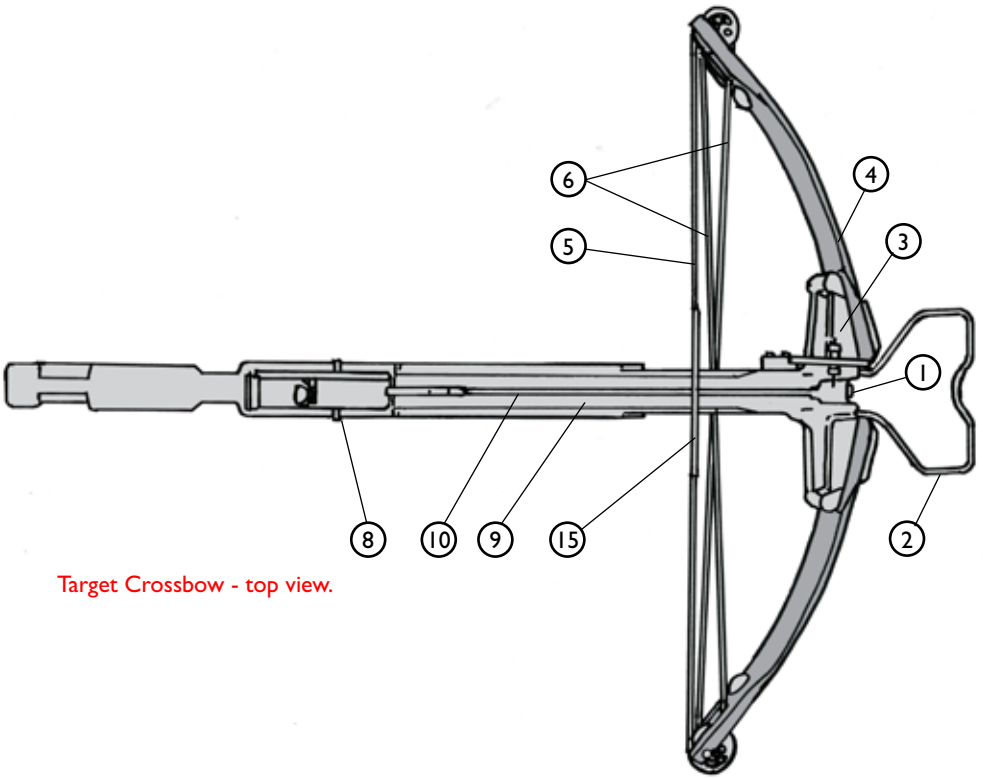
Describe at least three crossbow accessories.

Explain what a quiver does and list the three types.

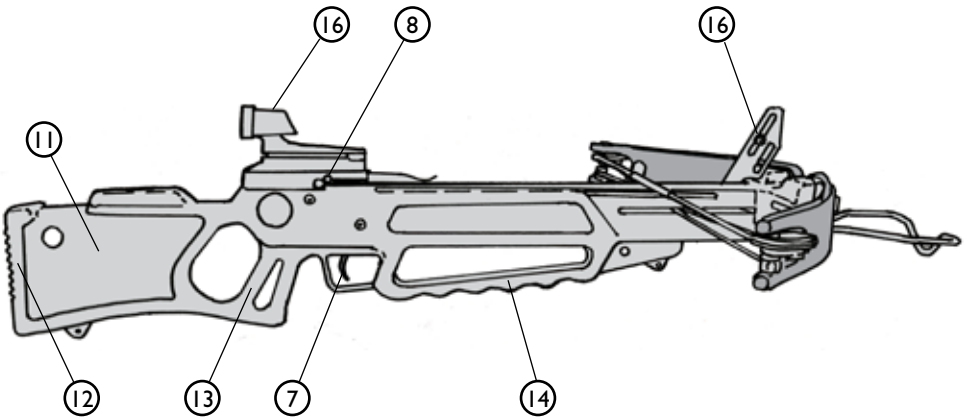
A crossbow is a bow with a rifle-like stock that shoots bolts or short arrows.

Crossbow parts:

1. Front End Bow Mounting Bolt
2. Cocking Stirrup
3. Riser
4. Limbs
5. String
6. Cable
7. Trigger
8. Safety
9. Rail
10. Rail Fletching Groove
11. Stock
12. Stock Butt
13. Grip
14. Forearm
15. Center Serving
16. Sights (Front & Back)



Target Crossbow - top view.



Target Crossbow - side view.

Crossbow safety checks:

Check the stock and limbs for cracks and damage. There is a great amount of pressure on the stock and limbs when the crossbow is being cocked and when it is at full draw for long periods of time. A damaged stock and limbs could fail and seriously injure the archer and others.

Check the rail for proper lubrication. A light coat of rail lube should be applied about every 25-30 shots.

Check the trigger and safety for proper function and damage. Make sure that you can engage and disengage the safety and make sure the trigger won't operate while the safety is engaged.

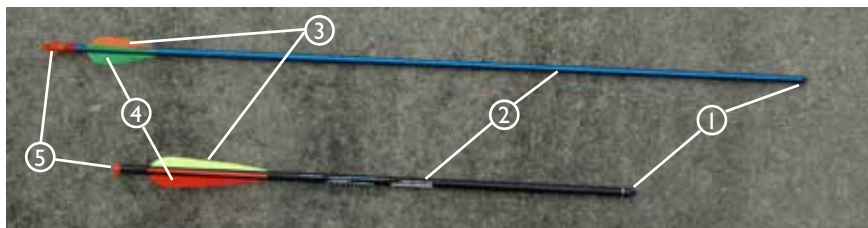
Check rail for damage and rough spots that could damage the string. The string moves along the rail at a great speed and a rough spot or burr on the rail or the top side of the rail edge could cause the string to break. This results in a dry fire and will damage the bow and possibly the archer and others.

Arrows

The crossbow manufacturer's suggestion should be used for crossbow arrows. The arrow spine and length must match the crossbow from which it is being shot.

Crossbow arrows are generally 20" in length and are typically 22/64th of an inch or 9mm outside diameter. Crossbow arrows are fletched with vanes or feathers and use a flat or crescent-shaped nock. The points for crossbow arrows are the same as those used in other arrows except that blunts and judo points may not be used if they don't allow the arrow to lie flat on the rail.

Most archery retailers sell stock length arrows for use in crossbows and they may be used with no further modification; but for higher accuracy, the arrows must be tuned to match the bow as they are with vertical bows.



Arrows.

Parts of an arrow:

1. Arrow head
2. Shaft
3. Index Fletching
4. Fletching
5. Nock

Check arrows for missing fletching, broken nocks, missing arrow head, dents, creases and breaks. Look at all arrows; if one is bent, discard it.

Accessories

Red Dot Scope uses an illuminated red dot in the scope which is used to aim. The archer sights the crossbow in at one distance and at that distance the Red Dot can be placed directly on the intended impact point. For closer or farther distances the Red Dot must be placed below or above the intended impact point.

Cross Hair or Reticule Scopes use two crossed lines, one vertical line and one horizontal line, which are used to aim. The point at which the lines cross is placed on the intended impact point when shooting at the distance at which the crossbow is sighted in.

Sights

Sights on a crossbow are usually made of adjustable horizontal pins on the front sight and a fixed peep or “V” rear sight. The front pin is centered in the middle of the rear peep sight, or if a rear “V” sight is being used the front sight pin is placed in the valley of the rear “V” sight. Align the rear sight and front sight with the intended impact point.

Front Single pin adjustment to obtain the correct point of impact is as follows:

Move the front sight pin

Up will cause the arrow to impact lower

Down will cause the arrow to impact higher

Left will cause the arrow to impact right

Right will cause the arrow to impact left

Moving the front pin $\frac{1}{4}$ " will change the point of impact approximately 6" to 9" at a distance of 20 yards.

Multiple pin sights work like single sight pins except that each pin may be adjusted individually to indicate a distance of the archer's choice. The front pin indicating the desired distance is aligned with the rear sight and used to aim at the target.



1. Hip quiver 2 Bow Quiver 3. Ground quiver

Quivers

Quivers must be used to carry arrows or to keep them together on the shooting line. Examples: Hip Quiver, Bow Quiver or Ground Quiver

Cocking Device

Most crossbow manufacturers make a cocking device that makes it much easier to cock the crossbow. The devices range from mechanical advantage pulley or lever systems to built-in or attachable mechanical cranking



Cocking.

systems that allow you to cock the crossbow without having to grasp the string. Cocking devices can make it much easier to cock the crossbow, but make sure that you check the device for compatibility and read and understand the instructions for use before trying to operate one. If used improperly, these devices can cause serious injury to the archer and others.

Carrying Slings

Carrying slings can make it much easier and less tiring to carry the crossbow for long distances. Carrying slings operate the same way as a rifle sling and allow the crossbow to be slung over the shoulder or across the back. They may also be used to steady the crossbow while aiming.



Bow Case.

Bow Cases

A bow case should be used for transporting and storing the crossbow. Cases protect the crossbow from damage and some states require that bows be cased while being transported in a vehicle. Like all bows, crossbows should not be stored inside vehicles during warm temperatures.

Lesson Three: Dominant Eye or Master Eye

OBJECTIVES: Demonstrate how to determine your master eye.

Just as you have a dominant hand, you also have a dominant eye. The crossbow is not configured to right-handed and left-handed models but you need to aim with the dominant or master eye for the most accurate shooting. Usually your dominant eye is the same as your dominant hand, but not always.

To determine your dominant eye;

1. Form a triangular opening with your thumbs and forefingers.
2. Stretch your arms out in front of you.
3. Focus on a distant object while looking through the triangular opening.
4. Bring your hands slowly to your face, keeping sight of the object through the opening; the opening will come to your dominant eye naturally.

If you are not sure, close one eye at a time. The weak eye will see the back of your hand; the strong one will be focused on the object in the triangle. (*Today's Hunter*, Kalkomey, 2006)



Master eye demonstration.

Lesson Four: Range Rules and Set-up

OBJECTIVES: List and explain the whistle commands used in the crossbow program.

Indoors

You will need about 20 yards by 12 yards

The range requires an arrow resistant net to be set up at one end of the gym.

Targets should be placed within 3 feet of the netting.

The shooting line is then placed 15 yards away from the targets.

A table should be set up just behind the shooting line. There should be no more than 5 students on the line at one time. Students that are not shooting must remain behind the table at all times during the shooting stage.

Two whistle blasts – students will pick up their crossbow , cock it and place the crossbow back on the table.

One whistle blast – students will load their crossbow with one arrow (index fletching down in the groove), after the shot place the crossbow back on the table.

Three whistle blasts – retrieve arrows from the targets

Five or more whistle blasts – signifies an emergency on the range

If there is a malfunction at any time archers should keep the crossbow pointed down range (toward the target) and raise their hand for assistance.

Outdoors

Same spacing and whistle commands.

The net is optional although recommended.



Arrow loaded.

Lesson Five: Pre-Shooting Drill

OBJECTIVES:

Demonstrate proper crossbow shooting stance and grips.
Explain the basic steps to shooting a crossbow.

Note: Crossbow is uncocked/unloaded

Stance

Start by standing with feet straddling the shooting line. This is a 1-2-3 drill to get archers into a slightly open stance.

1. Move foot closest to the target (if right-handed then left foot).
2. Move left foot toward target until feet are shoulder

width apart, keeping left toes even with the right instep.



Set Bow Hand.

Set Trigger Hand

Grasp the stock with the trigger hand in the grip of the stock and place the trigger finger behind the trigger or trigger guard.

Set Bow Hand

Grasp the forearm of the bow with the bow hand in a position that will allow the bow arm elbow to be bent at 90 degrees when

the bow is raised to shoulder level. Make sure that all fingers and the thumb of the bow hand are against the side of the forearm and below string level. Note: Be sure to keep fingers and thumb below the string line as it will cause injury.



Close pictures show the trigger and bow hand set as well as shouldering the bow.

Shouldering the Bow

Shoulder the crossbow by doing the following:

1. Point the bow toward the target, lift the bow smoothly to shoulder level with the butt of the stock about 3"-4" from your shoulder.
2. Pull the stock of the bow firmly into the pocket of your shoulder.
3. Place your cheek on the stock in a position so that your eye is in line with but not touching the rear sight of the bow.

Aiming

Look through the eyepiece to the pin (green tip). It may take a few seconds to get the sights on the target. Place the sight pin on the target where you want the arrow to strike.



Safety/fire picture.

Safety Release & Trigger Squeeze

1. Release safety with thumb or index finger as appropriate to the crossbow you are shooting.
2. Place the index finger on trigger so that trigger is aligned in the middle of the first joint of the index finger.
3. Squeeze the trigger by pulling straight back with the index finger so slowly that you can feel the trigger travel.

Have the student repeat these steps as you call them out aloud:
Stance...set trigger hand...set bow hand...shoulder the bow...aim...
safety release & trigger squeeze.

Note: Although the crossbow is designed to withstand several dry fires, we do encourage students to only shoot a crossbow when an arrow is loaded and the crossbow is pointed down range at the target.

Lesson Six: Shooting Drill

OBJECTIVES:

Demonstrate how to cock the crossbow.

Demonstrate how to load an arrow in the crossbow.

Cocking the Crossbow

The crossbow should be pointed down with the cocking stirrup on the ground and the butt of the stock held by your hands at stomach level.

1. Make sure the crossbow's safety is in the "fire position." Place your right or left foot into the cocking stirrup up to the instep. Bend forward at the waist while bending your knees and reach down with both hands, one on either side of the rail.
2. Grasp the string by pinching it between the thumbs and forefingers with the thumbs against sides of the rail to keep the string centered while cocking. Grip the string firmly with the remaining fingers of each hand.
3. Cock the crossbow by standing up by straightening your knees and back while pulling the string upward. Attempting to cock the crossbow by pulling with the arms instead of the back can cause injury to the archer. Keep the string centered on the rail and pull it upward until the safety engages, indicating that the string is in the proper position and the crossbow is cocked.
4. After the crossbow is cocked manually push the safety to the "safe" position to insure the safety is fully engaged. Check your stance, set your trigger hand, set your bow hand, and proceed to the arrow-loading phase.



Cocking.



Hen feather into groove.

Arrow Loading Drill

1. With the bow hand supporting the crossbow by the forearm, move an arrow from the quiver with the trigger hand.
2. Lift the arrow over the crossbow and place it on the rail with the index vane down and in the rail slot.
3. Slide the arrow back toward the stock until it stops. Push firmly to insure that the arrow is seated against the string latch.



Before the shot.

Shoulder the crossbow, aim, release the safety and squeeze the trigger.

Follow-through

Continue to aim the crossbow until the arrow hits the target. Lower the crossbow to the beginning stance position and repeat the shot sequence.

Retrieving Arrows

Students should retrieve arrows by placing one hand on the target and pulling the arrow with the other hand. When returning arrows to the quiver students should hold the arrows at the shaft with one hand and the arrow tips with the other hand.



Retrieving arrows.

Lesson Seven: Shooting Exercises

OBJECTIVES:

Demonstrate basic shooting positions.

- 1. Standing
- 2. Sitting
- 3. Kneeling
- 4. Prone (optional)



1. Standing



2. Sitting



3. Kneeling



4. Prone (optional)

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<http://www.northamericancrossbowfederation.com>



<http://www.excaliburcrossbow.com/>



<http://www.tenpointcrossbows.com/>



<http://www.parkerbows.com/pb/2007/>



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