



# Lesson Plan

## MUZZLELOADER



Wildlife Education Division

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**Audience:** Advanced Hunter Education students who have as prerequisite graduated from a Basic Hunter Education course

**Concept:** To familiarize the Advanced Hunter Education student with the history of black powder and various configurations of muzzleloaders. To introduce the instructor to the practical aspects of loading, firing, and cleaning a black powder muzzleloader.

**Objectives:** At the end of this course, the student will be able to achieve the following objectives in accordance with information received during the instructional period: 4-6 Hours

- 1.) Give a brief history of the discovery and use of black powder
- 2.) Name the four basic types of muzzleloaders and describe their methods of operation
- 3.) Describe different types of powders and ammunition that can be used in a muzzleloader and safety steps when using these materials

- 4.) Name the basic parts of a muzzleloader and the equipment associated with it
- 5.) Properly load and fire a muzzleloader
- 6.) Demonstrate the proper cleaning techniques used in the care of a muzzleloader

**Method:** Lecture/ Demonstration/ Practical Exercise

**Materials: Black powder firearms to include percussion, in-line, flintlock (if available)**

- Black powder / black powder equivalent, percussion caps
- Accessories to include bullet starter, capper, jag, powder measurer
- Projectiles-round balls, lead bullets, jacketed sabots
- Targets
- Cleaning supplies

**Background:** Understanding and knowing the history of the black powder firearm and how it has advanced through time to become one of the most used tools in hunting. The development of black powder is also important for without it there would not have been a firearm. The invention of the percussion cap which ultimately led to the creation of modern ammunition greatly increased the effectiveness of the modern firearm. This knowledge and familiarity with the nomenclature and equipment will instruct the student to safely load, fire, and clean muzzleloader firearms.

**Procedure:** The instructor will use the prescribed lecture /

demonstration/ practical exercise methods with black powder firearms and associated equipment (2-4 hours classroom instruction) (1-2 hours live fire range demonstration)

# **ADVANCED HUNTER EDUCATION MUZZLELOADER LESSON PLAN**

## **UNIT 1: INTRODUCING MUZZLELOADER SHOOTING**

### **TOPIC 1:**

#### **FIREARM SAFETY RULES**

Muzzleloading firearms have evolved over many years. In the 19th century, the survival of settlers depended on their expertise with muzzleloaders.

Technological advances eventually made these firearms obsolete. Early in the 20th century, an interest in antique firearms expanded from a curiosity into numerous specialized sports, including muzzleloader shooting.

Recently, in-line muzzleloaders have gained in popularity and use. While the basics of loading and firing a muzzleloader remain unchanged, these improvements in modern muzzleloaders can make for a more satisfying shooting experience:

- Convenient loading components, such as black powder substitute pellets
- More modern look and feel
- Removable breech plug that simplifies cleaning
- Modern sights
- Mechanical safeties

Today, muzzleloading firearm enthusiasts include antique collectors, historical re-enactors, and hunters just like yourself.

### **TOPIC 2:**

#### **DEFINING “MUZZLELOADER”**

- The term “muzzleloader” encompasses a variety of firearms that are loaded through the muzzle of the barrel, from revolvers and single shot pistols to rifles and shotguns.
- When the shooter fires a muzzleloader, the propellant is ignited and expanding gases force a projectile out of the barrel. This is controlled by the ignition system, which is known as the lock.

Locks used in muzzleloaders were replaced by actions on modern conventional firearms.

- The earliest muzzleloaders, the matchlock and wheel lock, are generally considered collectibles rather than practical firearms for shoots or hunting. Three of the most popular muzzleloading firearms in use are the in-line, percussion lock (or caplock), and flintlock rifles.
- Muzzleloaders used for shooting are usually rifles. However, there are also smooth-bored muzzleloaders—shotguns, known historically as fowlers or muskets.
  - Shotgun muzzleloaders can have either a single barrel or double barrels joined side-by-side.
  - When loading the double-barreled muzzleloader, be sure to avoid putting two loads down the same barrel. Double-barreled guns usually have two locks, one for each barrel. This allows the shooter to fire each barrel separately before the gun is reloaded. Most double-barreled guns are designed with two triggers.
- Muzzleloading handguns come as both pistols and revolvers. Pistols are mainly single shot. Revolvers contain multiple-shot chambers. Chain firing muzzleloading revolvers can be dangerous. When the chamber round is fired, it produces sparks that could accidentally ignite loads in other cylinders. Protect each load in a cylinder with a coating of grease to prevent sparks from entering the open end of the other cylinders.
- Black powder and approved black powder synthetic substitutes, such as Pyrodex® and Triple Seven®, can be used in muzzleloaders. Unless specifically designed to use smokeless powders, **don't use smokeless powders in muzzleloading firearms**. Smokeless powders create extremely high pressures, can cause severe damage to muzzleloading firearms, and can injure the shooter seriously.

## TOPIC 3:

### THE DEVELOPMENT OF MUZZLELOADERS

The Chinese are believed to be the first to use gunpowder, now called “black powder.” The first firearms were tubes closed at one end, usually made of brass or cast iron. They were loaded by pouring black powder and shoving a projectile into the tube from the muzzle end, and then igniting the powder using a lighted wick or match. The powder burned, creating pressure that launched metal objects or arrows. These firearms are now called “muzzleloaders” to distinguish them from more modern guns.

Advances in ignition systems were the major changes that brought about modern firearms:

- **Matchlock ignition** was developed in the early 1400s, enabling portable firearms. When the trigger is pulled, a lighted wick is lowered into a priming pan located next to a vent hole drilled into the closed end of the barrel. When the priming powder ignites, it lights the main charge.
- The faster and more reliable **wheel lock ignition** replaced the matchlock in the 1500s. When the trigger is pulled, a coiled spring forces the rough-edged steel wheel to spin against a piece of iron pyrite, creating sparks to ignite the powder in the priming pan.
- The **flintlock ignition**, still more reliable, appeared in the late 1600s. When the trigger is pulled, the hammer, holding a piece of flint, falls against a steel cover (the frizzen) sitting over the priming pan. The hammer knocks the cover out of the way, and the striking of flint and steel causes sparks that ignite the powder in the priming pan.
- The **percussion lock** (also called “caplock”) replaced the flintlock in the early 1800s. Early percussion locks used priming compounds inside a metallic foil cap placed over the vent hole. When the hammer strikes the cap, the resulting spark ignites the main charge. The percussion lock was more simply and inexpensively built, and easier to clean.
- The next advance, in 1835, was to arrange a series of percussion locks and barrels on a

rotating wheel (cylinder) to allow a rapid succession of shots (Paterson revolver). With a single hammer and trigger, multiple shots can be fired without reloading—a **repeating firearm**. The percussion cap revolvers are the forerunners of modern revolvers.

- The **percussion cap** also paved the way to the self-contained ammunition we have today—cartridges and shotshells. In the mid-1800s, gunpowder, the projectile, and the primer were put together into a single housing that could be loaded quickly.
- In 1985, the first modern **in-line** muzzleloader was produced. In this muzzleloader, the ignition system and nipple are located behind, and directly in line with, the powder charge. The result is a firearm that looks more like a modern rifle.

## **TOPIC 4:**

### **THE DAMASCUS BARELL**

Damascus or “Damascus twist” barrels are older shotgun barrels that typically were made before 1900. Iron and steel ribbons were twisted and welded together. Damascus barrels are weaker than modern barrels and are not designed for the high gas pressures created by modern ammunition. Damascus barrels have a distinctive, irregular pattern of short, streak-like marks around the barrel.

If you have a Damascus barrel gun, don’t shoot it. The barrel may burst slightly ahead of the chamber, crippling the shooter’s hand or forearm. If you have an older firearm and are not sure if it has a Damascus barrel, go to a qualified gunsmith to identify its make before shooting it.

## **TOPIC 5:**

### **KEEPING MUZZLELOADER SHOOTING SAFE**

#### **MUZZLELOADER SAFETY**

Muzzleloader shooting is a safe activity only when all safety rules are observed.

Three factors play a role in the majority of firearm incidents:

- Safety violations
- Hunter judgment mistakes
- Lack of skill

Almost all hunting incidents are caused by poor judgment, carelessness, or lack of safety training with a firearm—and almost all are preventable.

- Most firearm incidents occur in the home.
  - Store ammunition in a separate location.
  - Keep firearms secure.
  - Handle firearms safely at all times—not just on the hunt.
- Most incidents involving muzzleloaders are self-inflicted.
- The average hunter involved in a fatal accident is 32 years old.
- For hunters older than 18, most fatal hunting accidents occur for one of two reasons.

- The hunter fails to identify his target and what lies beyond it.
- The firearm is discharged in a boat, motor vehicle, or off-road vehicle.
- No single factor has reduced hunting incidents as much as wearing hunter orange.
  - The color is not found in nature, so it is easily seen by other hunters.
  - Most game animals are not alerted because they may see the color differently from humans.
  - Many states require that you wear hunter orange while hunting. Be sure to check your local regulations.

## FOCUSING ON SAFETY

When handling or shooting your firearm, always follow the safety recommendations of your firearm manufacturer.

**Using Personal Safety Equipment:** Always protect your vision and hearing when shooting.

- **Eye protection:** Unburned powder, sparks, hot gases, and metal fragments from the cap can escape when firing a muzzleloader. Shooting glasses with high-impact lenses protect your eyes from these hazards as well as from falling shot, clay target chips, tree branches, and particles in the air. Tinted lenses help reduce glare and prevent tiredness of the eyes.
- **Ear protection:** Shooting will progressively damage a shooter's hearing unless ear protection is worn. Standard earplugs or earmuffs reduce sound to a harmless level. Electronic earmuffs allow normal or even enhanced hearing but block damaging levels of sound.

## Observing the Four Rules of Firearm Safety With Your Muzzleloader

1. **Always control the muzzle of your firearm.**
  - Always point the muzzle of your firearm in a safe direction.
  - Never point at a person, or where a person might be found, such as a building, vehicle, or even the next room.
2. **Keep your finger off the trigger until ready to fire.**
3. **Assume the gun is loaded.**
  - Make it a habit to immediately check any gun you hold and make certain it isn't loaded—even if you've been told it isn't.
  - Checking a muzzleloader requires a different procedure, described in Chapter Two.
  - Don't prime or cap a muzzleloader until you're ready to fire.
4. **Know your target and what is beyond it.**
  - Be absolutely sure of your target before shooting.
  - Never shoot at a "skylined" animal.
  - Bullets from a muzzleloading rifle can travel long distances and fall with enough force to kill a person.

## Other Shooting Precautions

- Only one hunter should aim at a target.
- Don't shoot unless you know what's beyond the target. Never shoot at a "skylined" animal.
- Don't shoot if someone is in your zone-of-fire.

## Handling Muzzleloaders

In addition to the four rules of firearm safety, you must know and follow safety rules specific to muzzleloading firearms.

- Have an experienced gunsmith examine any used firearm you acquire.
- Never handle a firearm you're unfamiliar with using.
- Never use any firearm without getting training on its operation from a qualified instructor.
- As a rule, avoid using a gun that does not have a mechanical safety. A half-cock hammer position is not a safety.
- If you use one-piece wads in your shotgun, be sure the bore is clear of plastic fouling after you fire.
- Use only appropriate wad materials in your shotgun. Never put newspaper, or other material that does not belong, into the bore.
- Use the granulation of powder recommended in your owner's manual.
- Always keep propellants covered and away from the firing area.
- Always keep percussion caps on the firing line and away from the loading station.
- Load by volume only, using a powder measure.
- Don't overload a muzzleloader. This is dangerous and wasteful and can result in an explosion. Overloading rarely improves accuracy or velocity.
- Focus closely on the tasks while following the steps to load a muzzleloader.
  - Do not lean over, stand in front of, or blow down the muzzle.
  - Don't swing your head or arms over the barrel as you reach for items on the loading bench.
- Keep guns unloaded until you're ready to shoot. Never prime the pan of a muzzleloader or cap the nipple until you're ready to fire.
- After you fire a double-barreled shotgun, be sure the other load remains in place. Loads may move and cause gaps between the powder charge and shot charge.
- Never place any loaded firearm in a vehicle, boat, off-road vehicle, or airplane.
- Do not display firearms in window gun racks.

### **Important**

Never use smokeless powder in a muzzleloader.

## **UNIT 2: KNOWING YOUR MUZZLELOADER FIREARM**

### **TOPIC 1:**

#### **UNDERSTANDING THE BLACKPOWDER LOAD**

Conventional firearms fire a cartridge, which simplifies loading and shooting considerably. In the muzzleloader, however, the projectile is loaded along with an easy-to-light, slow-burning black powder or its approved substitute. When the muzzleloader is fired, the propellant is ignited and the expanding gases force the projectile from the gun.

#### **Black Powder**

Black powder's basic makeup has changed very little since it was first used around 1200 A.D. to charge cannons. Made of potassium nitrate (saltpeter), sulfur, and charcoal, black powder or its

approved substitute is extremely dangerous if mishandled. Use care when handling, storing, loading, or transporting black powder.

During combustion, about half of the powder is converted to gas and about half remains a solid residue in the bore of the firearm. The residue, known as **fouling**, will corrode a firearm. Always clean your muzzleloader at the end of the day.

## **Glossary**

### ***fouling***

Corrosive residue left on the internal surfaces of a muzzleloading firearm after firing

**\*\*Explain and demonstrate different blackpowder / equivalent granulation**

**\*\*Explain and demonstrate differences in blackpowder ammunition**

Pages 9-10

## **TOPIC 2:**

### **REVIEWING THE PARTS OF THE MUZZLELOADER**

#### **Chapter 2 / pages 11-17**

Lock

Flintlock Muzzleloader

Percussion Lock Muzzleloader

In-Line Muzzleloader

Stock

Barrel

Rifling in the Bore

Muzzleloader Rifle Calibers

Muzzleloader Shotgun Gauges

Set Trigger

Sights

Safety Mechanisms

## **TOPIC 3:**

### **LOADING THE MUZZLELOADER FIREARM PAGES 14-15**



Making Sure the Muzzleloader Is Empty

Safety While Loading

Steps for Loading a Muzzleloader

Loading a Muzzleloader, Part 1

Loading a Muzzleloader, Part 2

Loading a Muzzleloader, Part 3

Seating the Projectile

Loading and Cleaning Accessories / Disassembly for cleaning

## **UNIT 3: SHOOTING YOUR MUZZLOADER SAFELY AND ACCURATELY**

### **TOPIC 1:**

#### **BECOMING A RESPONSIBLE MUZZLELOADER HUNTER**

Comparing Muzzleloaders to Conventional Firearms

Understanding Maximum Point-Blank Range

Determining Velocity and Trajectory

Factors Affecting Maximum Point-Blank Range

Expanding Hunting Opportunities Using Muzzleloading Firearms

Hunting: A Tool For Wildlife Managers

Selecting a Firearm for Shooting and Hunting

Safe Hunting Habits

### **TOPIC 2:**

#### **LEARNING THE BASICS OF FIRING A MUZZLELOADER RIFLE**

Sight Alignment

Aligning an Open Sight

Identifying Your Master Eye

Sighting In Your Muzzleloading Rifle

Rifle-Firing Techniques: Shooting from a Rest

Rifle-Firing Techniques: Practicing the Five Fundamentals

Protecting Your Firearm for Dry-Firing Practice

Positioning Your Body for Accurate Rifle Shooting: Prone

Positioning Your Body for Accurate Rifle Shooting: Standing

Positioning Your Body for Accurate Rifle Shooting: Sitting

Positioning Your Body for Accurate Rifle Shooting: Kneeling

### **TOPIC 3:**

#### **LEARNING THE BASICS OF FIRING A MUZZLOADER SHOTGUN**

Using Correct Shotgun-Firing Techniques

Patterning Your Shotgun

Swing-Through Lead

Sustained Lead

Shotgun Choke and Shot String

### **TOPIC 4:**

#### **DETERMENING CORRECT LOADS**

Understanding the Importance of Loads in Accurate Shooting

Using Bench-Rest Testing

Setting Up for the Test

## Determining Loads with Bench-Rest Testing

### Steps for Testing Firearm Performance

## **TOPIC 5:**

### **IMPROVING MARKSMANSHIP**

#### Good Marksmanship

A fair amount of knowledge, skill, and experience is required to become a successful hunter. One of the essential skills is good marksmanship, which is accurately and consistently hitting the target where planned. When hunting, accuracy is critical for a clean kill.

Protect and make the most of your natural tools for hunting—your senses as well as your intelligence and knowledge. Build upon that knowledge to improve your skills.

- Schedule an examination to test your vision and the possibility of color-blindness. Color-blind hunters may have trouble identifying game and hunter orange and must take extra safety precautions.
- Always wear prescription glasses if you need them.
- Always wear protective shooting glasses with high-impact lenses to protect your eyes.
- Develop good “peripheral vision.” While hunting, move your eyes slowly from side to side. Not only will you see more game and locate other hunters, but your natural vision also will become more alert to the area just outside your direct line of vision. Tunnel vision, or focusing straight ahead, can be unsafe.
- Use proper hearing protection.
- Practice your marksmanship under conditions similar to hunting conditions.
  - Outfit yourself in your hunting clothing and gear.
  - Practice correct shooting positions.
  - Select a wooded area to condition yourself for the environment.
- Cultivate extra patience and self-control. Because of your gun’s shorter range, you need greater knowledge of the game and more patience while stalking and waiting calmly for that better shot.

#### **Becoming a Responsible Muzzleloader Hunter: Four Steps**

1. Practice at the firing range until you know your firearm's capability. Know what size target you can hit reliably at various distances, your firearm's range, and how much your bullet drops.
2. Practice your range estimation skills on targets at known distances.
3. Practice marksmanship in all shooting positions.
4. Study game anatomy to excel at shot selection.

**Important**

Never fire beyond your effective range.

**UNIT 4: HUNTING RESPONSIBLY AND ETHICALLY**

**TOPIC 1:**

**HUNTING ETHICALLY**

**TOPIC 2:**

**TAKING VITAL SHOTS**

**TOPIC 3:**

**PERFORMING FIELD CARE OF GAME**

**References:**

Today's Muzzleloader Hunter: A guide to Hunting Responsibly and Safely With a Muzzleloader

Kalkomey Enterprises Inc Dallas, Texas: 2009

Hogg, Ivan V. The Illustrated Encyclopedia of Firearms. London, England: 1978

Blair, Claude. Pollard's History of Firearms. New York, New York: 1983

## **MUZZLELOADER EXAM**

### Questions

1. Muzzleloader development followed in the following order:
  - A. Flintlock, Percussion, Matchlock, Wheel lock
  - B. Matchlock, Flintlock, Wheel lock, Percussion
  - C. Matchlock, Wheel lock, Flintlock, Percussion
  - D. Percussion, Flintlock, Matchlock, Wheel lock
2. When Loading a muzzleloader what do you place in the barrel first?
  - A. Ball
  - B. Patch
  - C. Sabot
  - D. Powder
3. 4Fg powder should be used in which of the following?
  - A. Flintlock flash pans
  - B. Cannons
  - C. Shotguns of greater than 20 gauge
  - D. Rifles of .45 cal and less
4. Which of the following cannot be used in a Black powder muzzleloader?

- A. Pyrodex
- B. Black Powder
- C. Smokeless Powder
- D. Clean Shot

5. What is the most important thing to remember when dealing with muzzleloading firearms?
- A. Know if the gun is loaded.
  - B. Keep the muzzle pointed in a safe direction.
  - C. Use the correct percussion cap.
  - D. Keep the powder dry.

6. Black powder is classified as a:
- A. Oxidizing agent
  - B. Propellant
  - C. Catalyst
  - D. Explosive

7. Muzzleloaders do not require special cleaning procedures.  
T or F

8. Black powder handguns are legal hunting arms in North Carolina  
T or F

9. Sabots are typically modern handgun bullets encased in a plastic sleeve.  
T or F

10. The best method for handling a misfire is to inspect the charge by looking down the barrel.  
T or F

11. North Carolina has a special muzzleloading season.  
T or F

12. Muzzleloaders can only fire patch and round ball  
T or F

#### Skill Demonstrations

- 1. Name the key components of a muzzleloading firearm.
- 2. Correctly determine if the firearm is unloaded.
- 3. Identify needed materials for loading and prepare the muzzleloader for loading.
- 4. Properly load the muzzleloader.

5. Safely fire the muzzleloader.
6. Describe steps to take if a misfire or a hang fire should occur.
7. Describe the proper steps to deactivate a powder charge.
8. Properly disassemble and clean a muzzleloader. Reassemble and store the muzzleloader for travel.

#### MUZZLELOADER EXAM ANSWER KEY

##### Answer Key

1. C
2. D
3. A
4. C
5. B
6. D
7. F
8. F
9. T
10. F
11. T
12. F

**Adapting the course:** This lesson plan is designed to coincide with *“Today’s Muzzleloader Hunter”* (Kalkomey 2009)

NC Wildlife Resources Commission **DOES NOT** require a muzzleloader “certification” in order for hunters to legally hunt with a muzzleloader.

Only training “completion” documents should be issued to students at completion of the course. Instructors will enter the appropriate data on the Hunter Education **EVENT MANAGER** system for Hunter Education Coordinator activation and approval.

**Evaluation:** Course evaluation submitted by students at the end of the course

**Post Activities:** None