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First Shot Fundamentals for Pistol

Revised May 21, 2013

Firearms Nomenclature and Safe Gun Handling Rules

ALWAYS KEEP THE MUZZLE POINTED IN A SAFE DIRECTION

(Discuss safe direction)

ALWAYS KEEP THE ACTION OPEN AND UNLOADED

UNTIL YOU ARE READY TO SHOOT

ALWAYS KEEP YOUR FINGER OFF THE TRIGGER

UNTIL YOU ARE READY TO SHOOT

M----MAT

A--Action

T-Trigger

- A. ACTION** - The parts that load, fire, and unload the gun
1. **Bolt** - loads pellet into chamber and seals the chamber when closed
 2. **Chamber** - Rear portion of the barrel that holds the pellet or cartridge.
 3. **Safety** - Mechanical device that can fail.
 4. **Charging lever** - Puts the air charge in the pistol
 5. **TRIGGER** - Part of the action that releases the firing mechanism
- A. BARREL**
1. Muzzle -Front of the barrel
 2. Front Sight
 3. Breach - Rear of the barrel
 4. Rear Sight
- C. FRAME** - Holds all the parts of the gun together
1. Trigger guard - Protects the trigger from accidental bumps
 2. Grip (or grip panels) - Aids in holding the pistol
- D. Eye Dominance-
- E. Sight Alignment
- F. TWO HAND GRIP**
1. **Shooting hand** - Grip high to help alignment of arm and pistol, to reduce distance to the trigger and to help reduce muzzle flip. Use a firm grip, but no white knuckles.
 2. **Support hand** - overlaps strong hand with fingers on fingers, thumb on thumb.
 3. **Push** forward with strong hand and **pull** back with weak hand to reduce wobble.

4. Trigger finger on frame until you are ready to shoot.
 5. **Align sights** - Top of front sight level with top of rear sight, front sight centered in rear sight.
 6. First pad of trigger finger on trigger (when ready to shoot).
 7. Gently add pressure to trigger until the pistol fires
- G. SUPPORTED SEATED POSITION USED FOR BEGINNING SHOOTERS
- H. SAFETY GLASSES ALWAYS REQUIRED – Both eyes open (Eye dominance not as critical as with archery, rifle, or shotgun if both eyes open)
- I. HEARING PROTECTION REQUIRED WHEN SHOOTING RIMFIRE OR CENTER-FIRE FIREARMS

Range Commands and Step-by-Step Shooting Procedure

SHOOTERS TO THE LINE

or

RELAY NUMBER ## TO THE LINE

VERIFY USE OF SAFETY GLASSES (AND HEARING PROTECTION IF NEEDED)

* **Preparation period begins now** This command is used in competition shooting. Specify the duration of the preparation period. This is the time to get equipment ready, adjust sights, etc.

* **Preparation period is over**

IS THE LINE READY?

Respond by firing point number.

THE LINE IS (NOT) READY

Resolve any problems and make sure the line is ready.

COMMENCE FIRING

Verbally give the following pistol shooting procedure commands for the first two or three shooting sessions to help new shooters learn the correct procedure.

1. PICK UP YOUR PISTOL
2. SAFETY ON
3. BOLT Open
4. CHARGE the pistol
5. LOAD the pellet
6. CLOSE the bolt
7. ASSUME YOUR SHOOTING POSITION
8. AIM Align sights, eyes focused on front sight, raise to target
9. SAFETY OFF Verify sight alignment / sight picture
10. FIRE
11. SAFETY ON
12. BOLT OPEN (Repeat Steps 4 through 12 until all rounds are fired)

CEASE FIRING

Anyone may call "Cease Fire" if a safety issue is present. All shooting must stop immediately. Safeties ON, bolts OPEN, pistols on the bench pointed downrange.

MAKE YOUR PISTOL SAFE Safety ON and Bolt OPEN, remove ammunition (not air pistols).

GROUND YOUR PISTOL

Safety ON, Bolt Open, lay pistol on the bench with the bolt handle UP and insert Open Bolt Indicator

STEP BACK FROM THE FIRING LINE

Range Officer verifies the line is SAFE

THE LINE IS SAFE, YOU MAY GO DOWN RANGE AND INSPECT YOUR TARGETS

PRACTICE SHOOTING

Practice dry firing and shooting at target backs until the students can shoot good groups.

SIGHT PICTURE

The relationship between proper sight alignment and the target.

1. **Center of Mass** - Discuss what it is and the problem of black sights in black targets.
2. **Six O'clock** - Discuss what it is and the problem of black sights touching black targets.
3. **Sub-Six O'clock** - Discuss what it is and why top-level shooters use it.

PRACTICE SHOOTING AT TARGET FACES – Adjust sights as necessary



Iowa State 4-H Youth Development – Targeting Life Skills Model
 Reprinted by Permission Iowa State University

Introduction to the Pistol

William F. Stevens, John Kvasnicka, Ronald A. Howard Jr. and Marilyn Bergum*

Objectives

Participating youth and adults will:

1. Understand the fundamentals of safety.
2. Recognize and identify the parts of pistols and their functions.
3. Understand proper sight alignment.
4. Understand and practice trigger control.
5. Understand range commands.
6. Understand basic shooting procedures.
7. Have fun while learning.

Roles for Teen and Junior Leaders

- Demonstrate or review equipment and functions.
- Present parts of the lesson.
- Tutor participants having difficulty with parts of the lesson.
- Assist with sight alignment exercise.
- Assist with trigger control exercise.
- Lead discussions summarizing the lesson.

Parental Involvement

- See Roles for Teen and Junior Leaders.
- Arrange for or coordinate transportation to meeting place.
- Arrange for or coordinate refreshments.
- Act as assistant instructors for the lesson.
- Supervise activities of teen and junior leaders.

1. Introduction/Ice Breaker 10-15 min
2. Pairing of participants 3-5 min.
3. Firing the first shot 30-40 min.
4. De-brief 10-15 min
Questions and answers and review
What do you expect from this training?

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Best Time to Teach

Any time of year, but before any live firing with pistols is attempted

Best Location

Classroom or range

Time Required

About 1 hour

Materials/Equipment

- flip chart or chalkboard with writing materials
- sight blocks
- cardboard cutouts of front and rear sights
- paper towel tubes
- sights attached with Velcro strips to PVC pipe
- pistols
- targets
- backstop
- eye and ear protection

References

The Basics of Pistol Shooting.

National Rifle Association,
Washington, DC. 1991.

Shooting FUNdamentally.

Training Video. Consult your
state shooting sports coordinator or Daisy
Manufacturing.

Colorado State University .S.T.E.M.

Item # SC8332 1-877-692-9358.

Teaching Outline

| Presentation | Application |
|--|---|
| I. Introduction | |
| A. Introduce facility and rules | ORIENT participants to facility and ESTABLISH ground rules for using it. BE SURE that everyone understands that discipline on range will be strictly enforced and what penalties for failure to comply will be. |
| 1. Food and drink (5 min) | |
| 2. Time schedule | |
| 3. Discipline and courtesy | |
| 4. Safety | Show possible locations and reasoning. |
| • Eye protection (Z 87+) | Emergency Plan and Risk Management |
| • Ear protection | |
| • Common sense | |
| • Responsibility | |
| 5. Range etiquette | |
| • teach Thank you and you're welcome when accepting firearm | |
| 6. Firing line | |
| B. Review basic safety rules (10-15 min.) | |
| 1. Muzzle control | ASK participants to state rules of safe firearms handling they feel are most important. LIST their suggestions on pad or chalkboard. SUMMARIZE to these three vital rules and state REASONS. |
| 2. Action open | |
| 3. Finger off trigger | |
| II. Orientation to pistol Essential First Shots | |
| A. Basic parts | USE visual aids, models or an unloaded pistol with action open to POINT OUT parts. |
| 1. Stock or grip | |
| 2. Action | |
| 3. Barrel | |
| B. Stock or grip | |
| 1. Handle | |
| • support | |
| • control | |
| C. Action | POINT OUT action of pistols being used or demonstrated. SHOW each part clearly as it is DISCUSSED. |
| 1. Operating parts of pistol | |
| 2. Bolt or breechblock | DISCUSS each part and its function |
| • holds projectile in place | |
| • may cock action | |
| • ejects spent cartridge | |
| 3. Trigger | DEMONSTRATE function of trigger using a mouse-trap pistol. RELATE trigger control to self-control. STRESS that fired shot is controlled by laws of physics. IT cannot be recalled |
| • releases mechanical parts of action causing pistol to fire | |
| • firing pin or hammer | |
| • air charge | |

4. Safety mechanism
 - mechanical device to block operation of action
 - trigger only
 - firing pin block
 - hammer blocks
 - potential for failure
 - shooter ultimately responsible for safety
 - muzzle pointed in safe direction
 - personally, check safety of any shot before firing

DEMONSTRATE operation of safety mechanism on pistols being used. EMPHASIZE that they can fail and are only an AID to otherwise safe gun-handling practices.

Use National Curriculum 717 or 747 parts sheet. Do A Quiz

D. Barrel

1. Primary function-launching tube for projectile
2. Chamber
 - holds cartridge or pellet in firing position
 - its specific cartridges or pellets only
3. Muzzle
 - where the projectile exits
 - points toward impact site
4. Bore
 - cylindrical hole between the chamber and muzzle
 - contains and guides projectile
 - diameter specific to caliber
5. Rifling
 - spiral lands (ridges) and grooves
 - rotating projectile on its long axis
 - stabilizing flight path
6. Sights
 - reference points
 - align eye to barrel
 - aligning barrel with intended point of impact
 - types of sights
 - laser sight
 - patridge sights
 - telescopic sights
 - electronic sight

Use paper towel tube to ILLUSTRATE a pistol barrel. PASS AROUND section of pistol barrel or use illustration to show various parts and their functions. STRESS importance of matching ammunition to chambering.

STRESS muzzle control again here.

DESCRIBE rifling using a barrel or illustrations. RELATE spin on bullet to throwing a football with a spiral to keep it going straight

DEMONSTRATE sight function using sights on a tube and altering alignment.

ILLUSTRATE or DEMONSTRATE any types of sights available

III. Eye dominance (2-3 min)

- A. Determine eye dominance
- B. Importance to good shooting
 - 1. Use dominant eye
 - reduced eye fatigue
 - reduced tension
 - quicker target acquisition
 - 2. Both eyes open
 - reduced eye fatigue
 - better depth perception
- C. Coping with cross-dominance
 - 1. Eye dominance and hand
 - 2. Learn to shoot from dominant-eye side
 - Reduced strain on eyes
 - Manual dexterity easier to teach
 - May require one-eyed shooting (rarely)
 - blinders
 - spot on shooting glasses

HAVE participants pair up and determine their eye dominance (*see Fact Sheet 3: Determining Eye Dominance*).

DISCUSS reasons for learning to shoot with the dominant eye even if it means relearning.

Reference fact sheet 3 section 4.

Reference fact sheet page 11 and III-5.

IV. Sight alignment (3-5 min)

- A. Sights as reference points
 - 1. Aligning the eye with the bore
 - 2. Aligning the bore with the intended point of impact
- B. Achieving sight alignment
 - 1. Focus on front sight
 - 2. Center front sight in rear sight notch
 - 3. Align top of front sight
 - 4. Maintain front sight focus

Reference page 12(CREATE 8.5x11 sight alignment sheet from NRA)

Life Skills Critical Thinking, Problem Solving

REVIEW functions of sights. ALTER sight locations on tube that is fixed in place to demonstrate need for proper alignment.

Have students PRACTICE proper sight alignment using blocks, cut-outs of sights or a sighting device.

V. Trigger control (5-7 min)

- A. Pressing the trigger without changing sight alignment
- B. Pressure straight back on trigger with trigger finger
 - 1. Pressing with trigger finger only
 - 2. Adjust finger position to apply pressure straight back
 - 3. Sight alignment remains constant

DEMONSTRATE proper trigger control using an empty pistol. Have participants PRACTICE trigger control using an eyedropper or similar device.

Life Wheel : Managing feelings, self responsibility, goal setting, team work Reference Fact Sheet 14.

VI. Introduction to shooting Range (5-10 min)

- A. Basic range procedures
1. Range officer in charge always
 2. Safety first
 - Personal responsibility
 - Eye and ear protection
 - No nonsense, disruptive or abusive behavior on or near the range
 - Any special circumstances
- B. Basics of pistol safety on the range
1. Muzzles pointed down range
 2. Actions open and empty except when firing
 3. Finger off the trigger except when firing
 4. Procedure if a problem occurs
 - Cease fire if necessary
 - Keep pistol pointed down range
 - Raise hand for help
- C. Range commands
1. Shooters to the line
 2. Is the line ready? Respond by firing point number
 3. The line is ready
 4. Pick up your pistols (or make ready)
 5. Fire when ready
 6. Cease fire
 7. Make your pistols safe
 8. Ground your pistols

EXPLAIN basic range rules and DISCUSS reasons for them.

STRESS importance of personal responsibility, protecting sight and hearing and orderly behavior. DISCUSS how disruption can cause dangerous reactions. REVIEW responses to improper behavior. COVER any special rules or safety considerations.

REVIEW and DEMONSTRATE basic pistol handling on range.

DEMONSTRATE how to handle a problem, like a hang-fire.

DEMONSTRATE and DISCUSS range commands and appropriate responses by shooters. MODIFY these commands to fit your range procedure (for example, “the range is hot” or “fire when ready”).

USE expanded range commands while shooters are learning to ensure complete safety on range. See *Fact Sheet 16: Rifle and Pistol Range Commands and Procedures*.
NOTE: Define before using

VII. Basic pistol shooting procedure (2-3 min per shot)

- A. Pick up your pistol
1. Muzzle remains pointed down range
 - Shooter responsibility
 - Coach reinforcement
 2. Safety on
 - location of safety
 - explain “safe” or “on”
 - explain “fire” or “off”

Have adult volunteers or teen leaders DEMONSTRATE procedure with pistols being used. Follow up by having shooters PRACTICE same procedures. See Fact Sheet 4.

3. Action open
4. Finger off trigger
- B. Loading or unloading firearm
 1. Loading process
 - Open chamber
 - Place projectile in chamber
 - Close action
 2. Reverse process to unload
 3. Control of ammunition
 - ensure correct caliber
 - all live ammunition under control
 - coach or instructor distributes ammunition
 4. Charging air pistols
 5. Use of dummy ammunition
- C. Assume shooting position
 1. Take proper grip
 2. Arms extended
 3. Muzzle resting on bench or table
- D. Safety off
- E. Align sights
 1. Pistol resting on bench
 2. Obtain sight alignment
- F. Raise pistol
 1. Maintain sight alignment
 2. Raise arms and pistol as unit
- G. Fire when ready
 1. Maintain sight alignment
 2. Press trigger
 3. Follow through
- H. Cease fire
 1. Immediate response necessary
 2. Finger off trigger
- I. Make pistol safe
 1. Open action
 2. Remove all ammunition
- J. Ground pistol
 1. Pistol on bench
 2. Action open and exposed

EXPLAIN use of dummy ammunition in rim fire or center fire handguns during dry-firing sessions.

Reference shooting positions for pistol

Have assistants or teen leaders GUIDE each shooter through shooting process using empty pistols and “shooting” at backstop.

VIII. Coach/pupil method

- A. Shooters learning together
 1. Reinforcing proper technique
 2. Learning by doing
 3. Backed up by range staff

3-5 min

DEMONSTRATE coach-pupil method with teen leader pairs / assistants. Reference Fact Sheet 4.

- B. Roles of coach
 - 1. Watch all safety procedures
 - 2. Watch muzzle control
 - 3. Assist with pistol grip
 - 4. Control ammunition
 - Loads pistol in beginning
 - Assist with loading later
- C. Adult or teen leader at every firing point as a backup.

IX. Summary

- A. Facility
- B. Safety
- C. Pistol parts and their functions
- D. Sight alignment
- E. Trigger control
- F. Range procedure
- G. Shooting procedure
- H. Dry firing

Dry firing DISCUSS benefits and REVIEW responsibilities of coaches and range assistants.

PAIR coach/pupil teams and ASSIGN adult or teen leader to each pair.

REVIEW main points of lesson by asking participants questions designed to bring those points to mind.

PREPARE them for next session with a brief preview of what will be taught.

Lesson Narrative

Instructor note: Since every facility is a little different from all the others, you will need to customize the introduction to that facility. Note locations of bathrooms and rules or regulations that are specific to the site. While we must establish clear ground rules for participation, we must not project an atmosphere of domination, fear or unfriendliness. Please remember that young people are here to learn from a qualified, caring and concerned leader. Anything other than that image will decrease your ability to communicate with the kids and assist them in learning. Personal introductions and introductions of sponsors, club or range leaders, etc., are both appropriate and appreciated. Try to create an atmosphere of trust and mutual respect that will minimize problems throughout the instructional process and provide the foundation for strong intergenerational friendships.

Welcome to the first session of the series on pistol shooting. Introduce yourself, any assistants, teen or junior leaders who are helping you and any sponsors or members of the club or facility. If time and numbers permit, have the kids (and parents) introduce themselves. In any event, plan on using name tents so you can personalize the discussions.

In this session we will learn about the facility and review a few of the rules and regulations for safety. We will begin learning the parts of a pistol and how they operate, what sight alignment is and why it is important and how to control the trigger. These things are vital if you are going to shoot a pistol safely and well. We will be meeting for about an hour today. We are guests of the people here, and we are all expected to behave as guests.

We want to keep the sessions as informal as possible, so please feel free to ask questions if you do not understand something.

A Few Rules of the Road

Shooting is a safe and wholesome sport. In order to keep it that way, all shooters must abide by some basic rules of behavior. You must pay attention and behave in an adult manner on the shooting line, in the classroom and at all other times you are involved in meetings. Unsafe, abusive or distractive behavior cannot and will not be tolerated. Should you choose to behave in such a fashion, the instructors will ask you to leave. If you repeat the offense, they may bar you from the program for the day or the rest of the year. These rules may seem harsh, but they are necessary if we all want to keep shooting safe, fun and fair. In most cases, self-discipline and courtesy can be related to safety. Shooting demands concentration. When shooters are learning, they can be distracted easily. If that results in a poor score or a missed shot it is unfortunate. If it results in an accident, it could be fatal. Safety starts with common sense. It also involves taking personal responsibility for your actions on and off the firing line. Bullets or pellets cannot be recalled, and their flight paths cannot be changed. You must control them

before they leave the muzzle. Some of the procedures may seem odd or uncomfortable at first but they are designed to make you a safe and accurate shooter. We will all practice using them.

For personal safety, the use of shooting glasses is required any time live firing is taking place. You only have one set of eyes issued to you, and they must last for your entire life. Investing in a pair of shooting glasses and developing the habit of wearing them, when you shoot can protect your eyes from accidents.

Any time that you are using firearms other than air guns, you must use either earmuffs or earplugs. There are many styles ranging in price from a few cents (disposable foam plugs) to a few dollars (custom fitted plugs and some muffs). On the high end of the spectrum are electronic muffs that amplify sound until the high frequency sound of a shot being fired shuts off the microphones. You do not need to go to that extreme, but you must wear ear protection at every shoot. Remember that damage to your hearing is cumulative and it cannot be repaired. Wear your hearing protection to prevent the damage.

We will learn several range commands during the course. Range commands are to be obeyed immediately and without question. Every shooter must watch for any unsafe condition. Call "Cease fire" if you see one. The authority of the range officer is absolute. Everyone on the range and in the observation, area must comply with his or her commands.

Only shooters and their coaches will be permitted on the firing line. No horseplay or foolishness will be tolerated. Firearms on the firing line must be handled only as directed by the range officer and they must be kept safe (empty with the actions open and lying on the mats) until the range is declared ready for live firing. All muzzles must be kept pointed down range and in a safe direction always.

The Basic Rules of Firearms Safety

A firearm should NEVER be pointed at anything you do not want to shoot.

Firearms safety should be stressed always. It is based on self-control and muzzle control. We will reinforce the three basic rules of safety throughout the project. You need to learn them, understand them and practice them always.

First, since the muzzle indicates the direction a projectile will travel, the muzzle must be controlled always. A firearm should NEVER be pointed at anything you do not want to shoot. In other words, the muzzle should always be pointed in a safe direction.

There are many stories of "unloaded" guns going off and injuring or killing someone. Unless the firearm falls on someone, that is impossible. Firearms that are assumed to be unloaded, however, can be extremely dangerous. All firearms should be considered loaded until you have seen for yourself that they are completely empty. In order

to ease all tensions on the range, all actions will be kept open with the loading port exposed to view except during live firing. Make a habit of keeping the action open and the firearm unloaded except when preparing to fire a shot.

Finally, keep your finger off the trigger except when you are in the act of shooting. Develop the habit of resting your trigger finger on the frame above the trigger guard.

Safety is no accident. In fact, safety is something that all of us must work to maintain all the time. Complying with these three simple rules will make the firing line and learning to shoot a safe and positive experience. Remember MAT (Muzzle, Action, Trigger)

1. Keep the muzzle pointed in a safe direction always.
2. Keep the action open and exposed so other shooters can see it is open.
3. Keep finger off the trigger until you are in the act of shooting.

Orientation to the Pistol

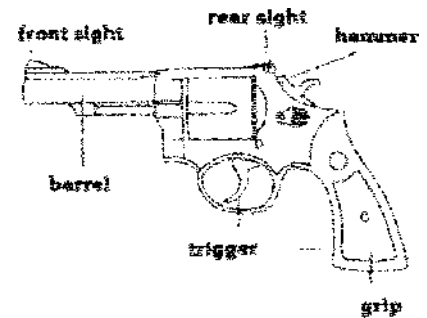
Like most firearms, pistols are composed of three major components. The **grip** of a pistol is equivalent to the stock on most firearms (although a few pistols have a forearm, too). Pistols also have an **action** and a **barrel**. Each part performs an important function. The stock or grip serves as a handle to hold or control the pistol. This ensures muzzle will remain pointed in the intended direction.

The action of the pistol includes those parts that load, cock and fire the arm. In other words, the action is the mechanical part of the pistol. The **bolt** or **breechblock** seals the rear of the chamber and holds the projectile in place for firing. In bolt-action pistols, the bolt may also cock the **trigger mechanism**. The trigger mechanism releases the **firing pin**, **hammer** or **air charge**. On some revolvers and semi-automatic pistols (double actions) the trigger may cock the hammer, too. Until the trigger is pulled, the firearm is under the conscious control of the shooter. Once it is pulled, the mechanical, chemical and physical forces take over very rapidly to deliver the projectile to its target.

The **safety** mechanism is a device that aids the shooter in keeping the firearm from firing until he or she intends to do so. Like other mechanical devices, safeties do not always function properly. They are subject to failure at any time. As a result, do not depend upon them to prevent accidental firing. Instead, the shooter should be the ultimate safety by keeping the muzzle of firearm under control. The safety should be used as a supplement to proper firearm handling.

Make a habit of keeping the action open and the firearm unloaded except when preparing to fire a shot.

Develop the habit of resting your trigger finger on the frame above the trigger guard.

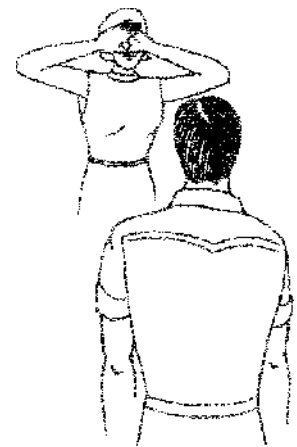


The **barrel** is a launching tube for the firearm. The rear of the barrel is designed to fit a cartridge or pellet. Here the projectile and/or cartridge are held in place inside the chamber. When a round is in the chamber, the pistol is loaded. The opposite end of the barrel is the muzzle, which points in the direction that the projectile will go when the pistol is fired. When both front and rear sights are present, the **rear sight** is normally near the chamber and the **front sight** is usually very close to the muzzle. The primary function of the sights is to serve as reference points that permit the eye to be aligned with the bore of the pistol. Once the eye, the sights and the bore of the pistol are aligned as a unit, the shooter can control the sight picture to direct the projectile to its target. The sights help the eye and the bore to be directed at the same point.

The inside of the barrel is bored to a specific diameter or **caliber**. Almost all pistols have rifled barrels. The **rifling** is a spiral set of ridges (or lands) and grooves. Rifling causes the bullet to rotate around its long axis, making it more stable in flight. The rotating bullet, like the spinning of a football in flight, tends to fly true to its course.

Eye Dominance

Learning to shoot well is much easier when the shooter uses the dominant eye for sighting. Nearly everyone has a dominant eye, just as they have a dominant hand and a dominant foot. Select a partner and stand squarely facing that partner two to three arm-lengths apart. One member of each pair needs to be an observer. The other member will be the "shooter." Shooters should extend their arms forward with the hands in front of the waist and place the thumb on top of the other one. Keeping the thumbs in place, cross the fingers of the top hand over the fingers of the bottom hand to form a small triangle. Now, with both eyes open, extend the arms to eye height and look at the observer's nose through the opening. The observer should note which eye they see looking back through the triangular opening. Then, keeping the nose centered in the opening, the shooter should slowly bring the hands back to his or her face. The opening will come to the dominant eye. The observer should watch for switching between the eyes as the hands move toward the face. The shooter should stand square to the observer without leaning, canting the head or squinting one eye. Try it a couple times to confirm your observation, then switch roles and repeat the process.



How many of you came to your left eye? Right eye? You should shoot with the dominant eye, regardless of whether it is on the same side as your dominant hand. Using the dominant eye reduces tension and eye fatigue and helps in seeing the target clearly and quickly. Keeping both eyes open increases depth perception as well. Those whose eye and hand dominance is on opposite sides are cross dominant. You should shoot from the dominant eye side, even though it feels clumsy and uncomfortable. Your hands and feet are much easier to train than your eyes. Even if you are

already shooting from the "off-eye" side, you will improve more rapidly by switching to the dominant side.

A few people are ambidextrous. A similar number are ambi-eyed, that is, their eyes switch dominance when an obstacle is placed in front of them. Shooters with this situation can use a shield, a spot on their shooting glasses or some similar barrier to assure the same eye is used every time they shoot. Even persons with a specific eye dominance may find a barrier device helpful. Be sure you remember which eye is your dominant one, so you can use that side in your shooting.

Sight Alignment



The basic function of the **sights** is to align the eye with the barrel. The sights must be consistently aligned with the eye before they can be adjusted to align properly with the barrel. We will be using **patridge-style sights**. They have a squared rear notch and a rectangular front sight. The front sight (where your eye should be focused) is centered in the rear notch. There should be the same amount of light showing through on either side of the front sight. The top of the front sight should be even with the top of the rear sight. If the front sight is above the top of the rear sight, the pistol will impact above the intended point. If the front sight drops into the square notch of the rear sight, the pistol will impact below the point of aim. Proper sight alignment is critical to consistency, sight adjustment and accuracy.



Trigger Control

Pulling a trigger seems to be a simple act. It can be, but proper trigger control means pressing the trigger to fire the shot without disturbing the sight alignment. To do that, the shooter must learn to control the trigger. The trigger finger must be positioned so that the pressure on the trigger comes straight back toward the center of the hand or hands holding the pistol. Apply pressure by flexing only the trigger finger. All other fingers maintain the same pressure and position on the grips of the pistol, so the barrel remains aligned with the target throughout the trigger pull. Practicing with a medicine dropper can be an effective way to learn trigger control, but we will use dry-firing techniques to do the job effectively.

Range Procedures

The range officer is in control of the range always. The primary task of a range officer is to maintain order and safe operation of the range. All shooters share that responsibility. If any unsafe or potentially dangerous situation is noted, the shooter detecting it has the responsibility to call a cease-fire immediately. Having a

designated range officer does not remove the personal responsibility for range safety. It only helps coordinate activity on the range and aids in avoiding accidents. Safe range procedures help make shooting safe for all participants.

Shooting is fun and among the safest of sports. The dedication to safety, concentration and responsibility of individual shooters keep it that way. Shooting responsibility must be taken seriously. We intend to demonstrate that responsibility on the range and in our personal shooting. We expect you to do the same. No foolishness or nonsense will be permitted on the range or in the observation areas. Minor infractions may bring a warning, or the range officer may eject the offender from that shooting session. Repeated safety, behavior or other violations of responsibility will be justification for ejection from the program. That may seem harsh. It is not. It merely underscores the importance shooters place on safety.

Safety on the Range

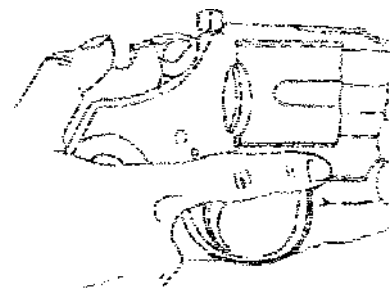
Safety on the range starts in the mind of the shooter. It requires an appropriate attitude as well as knowledge. The three basic rules of pistol safety were stressed earlier. Muzzle control action, open and empty, and finger off the trigger rules will be enforced at all times. Obedience to range commands and orderly behavior on and near the range will also be stressed. Most other procedures relate to management of the shooters and the range facility.

Malfunctions or other equipment problems may occur while on the line. In that event, keep the muzzle pointed down range and raise one hand to indicate that assistance is needed. Since we are working in **coach-pupil** teams, the "coach" must watch the muzzle to be sure it is properly controlled. Intervene to keep it down range if necessary. That is part of your job. Let the range staff clear the problem. It is not necessary to call a cease fire unless a down-range safety problem exists.

If the pistol must be handed to the person responding to your request for help, first explain the problem. The instructor will grasp the pistol. When they have it under control they will indicate their control verbally by saying, "I have the pistol" or "thank you." Only after they have indicated that the pistol is under their control should you relax your own grip. That ensures that the pistol will not be dropped in the transaction.

Range Commands

We will use a standard set of range commands for most of our shooting. Observe the shooters on the line while they follow the range commands.



"Shooters to the line" Note that the pistols are carried with the muzzles pointed in a safe direction and their actions are open. The first thing the shooter does when reaching the firing line is to place the pistol on the mat with the action open and visible.

"Is the line ready? Respond by firing point numbers." Note that each shooter says "ready" or "not ready" and states their firing point number. After the shooters become more experienced, only those who are not ready need respond. For now, we will wait for a positive response from every firing point until all shooters are familiar with range procedures.

"The line is ready" This means that the range officer has determined that all shooters are ready to prepare for shooting. The command also means that the range is live or hot. No one should be down range.

"Fire when ready" Shooters may fire at their own discretion if the range remains active. No ammunition is loaded until this command is given.

"Cease fire!" The cease fire command means that all shooting must stop *immediately*. Even a shot that is in the process of being fired should be held if possible. If the cease fire is an interruption for some range problem, shooters must wait for the range officer to give a fire when ready command before resuming.

"Make your pistols safe" If the shooter has not already done so, all ammunition must be removed from the pistol and the action must be locked open. Note that the muzzles remain pointed down range at all times.

"Ground your pistols " Once the pistols have been made safe, they are placed on the mat with the muzzle down range and the action open and exposed for inspection.

Shooting Procedure

In the beginning, we will use an expanded set of range commands. Doing that increases safety consciousness and reinforces proper shooting technique. Follow the shooters on the line through the shooting sequence.

"Shooters (or relay number [#1]) to the line." Shooters will proceed to the firing line with their coaches. Coaches will carry the pistols, or the pistols will be grounded at the firing line.

"Is the line ready? Respond by firing point number" Each shooter or coach should respond by saying "firing point (#) ready" or "not ready." If any point is not ready, the range officer will check them again. Once all points are ready, he or she will open the range.

"The line is ready." This means that the range is open and preparing for firing. No one should be down range.

"Pick up your pistol " The shooters will pick up their pistols, keeping them pointed down range and wait for an additional command. Note that the action is open, the pistol is pointed down range and the safety remain in the "on" position.

"Load your pistols" A projectile or round is placed in the chamber, and the action is closed. Remember that any closed action means the firearm is loaded and ready to fire. If an air gun is being used, charging it with air is part of the loading sequence.

"Assume your shooting position" The coach will assist the shooter in taking a proper grip. Both arms are extended at an angle, allowing the muzzle of the pistol to touch the mat, bench or table.

"Safeties off" This helps to instill the use of the mechanical safety where one is present. Many instructors will have the coach load the pistol, switch the safety to the "off" position and place the pistol in the shooter's hands for the first few shots. When that is done, the shooter signals control over the pistol by saying "thank you." The coach signals when preparing to release it by saying "you're welcome."

"Align your sights" With the pistols still touching the shooting bench, align the front sight in the rear sight notch.

"Raise your pistols" Keeping the sights aligned, raise the pistol to its shooting position. The pistol and arms should rise as a unit, with the eyes locked on the front sight and the sight alignment maintained.

"Fire when ready" The shooter places the aligned sights on the target and presses the trigger without disturbing the sight alignment. Sight alignment is held until the projectile hits the backstop. This is known as follow through.

"Cease fire!" This command always demands immediate attention and an immediate response. It requires you to stop shooting and make your pistol safe immediately. Do not resume firing until told to do so by the range officer.

"Make your pistols safe." Open the action and remove any ammunition while keeping the muzzle pointed down range. On pistols with a mechanical safety, the safety should be placed in the "on" position.

"Ground your pistols " With the action open, the pistol empty and the muzzle pointed down range, place the pistol on the mat with the open action exposed to view. If your relay is finished, step back one step from the bench to signal that your pistol is cleared and grounded.

This firing sequence will become a practiced process after a while. Once it has been mastered, the range officer will shorten the command structure and allow individual shooters more freedom and responsibility.

Summary

We have learned about the facilities here and reviewed the basics of firearms safety. We focused on self-control, muzzle control, keeping the action open and keeping the finger off the trigger except during a shot. We have seen that a pistol, like other firearms, is made up of a stock, an action and a barrel. We saw how the various parts operate. We saw why sight alignment is important, what proper sight alignment is and how to control the trigger during a shot so that the sight alignment is not disturbed. In addition, we practiced safe range procedures and dry fired pistols to develop shooting form more fully. Next time we will begin live firing.

Summary Activities

1. Review the parts of the pistols being used, having those who identify the parts explain what they do and the importance of those parts to pistol shooting safety and accuracy.
2. Review pistol safety and the three basic rules of shooting safety.
3. Using blocks or a sighting device, have participants demonstrate how the sights of a pistol should be aligned and discuss the errors associated with misaligned sights.
4. Discuss and review trigger control and its importance to proper shooting form.
5. Discuss the reasons for using range commands and appropriate responses to various hypothetical situations.

Sharing and Exhibit Ideas

1. Illustrate the parts of the pistol you are using. Label the parts and describe their functions in your shooting journal or on a poster.
2. Develop a game board on identification of pistol parts or functions.
3. Enter the items you have learned in this session in your shooting journal, making them available for review during the course of this program.
4. Make a set of instructional posters illustrating the basic rules of pistol safety.
5. Make a set of posters or signs outlining range commands and proper responses to them. Post them near the firing line.
6. Make or illustrate something that interests you particularly in the content of this lesson.

Dry Firing and Live Firing on Target Backs

William F. Stevens, John Kvasnicka, Ronald A. Howard Jr, and Marilyn Bergum*

Objectives

Participating youth and adults will:

1. Understand and practice dry firing.
2. Understand and practice live firing at target backs.
3. Understand and practice using a proper stance and grip.
4. Practice safe range and shooting procedures.
5. Have fun while learning.

Roles for Teen and Junior Leaders

- Review pistol orientation.
- Demonstrate proper pistol shooting form.
- Demonstrate range procedures and commands.
- Assist “coaches” in helping shooters with problems.
- Tutor shooters with difficulties.
- Act as range officers or assistants.
- Assist with the trigger control exercise.

Parental Involvement

- See Roles for Teen and Junior Leaders above.
- Control or monitor one or two shooting stations, assisting range officers and instructors.
- Provide or coordinate transportation to and from the range.
- Provide or coordinate refreshments.
- Assist with developing exhibits or filling out shooting journal entries.

* Conservation Affairs Manager for Federal Cartridge Company, Anoka, MN; Executive Director, Minnesota Deer Hunter’s Association; 4-H and Youth Development Specialist, Texas Agricultural Extension Service; and National Rifle Association Field Representative to Minnesota, North Dakota and South Dakota/

Best Time to Teach

Any time of year, but prior to live firing

Best Location

Any safe shooting range

Time Required

About 1 hour (may be repeated as many times as necessary)

Materials/Equipment

- pistols
- adequate backstop
- blank paper or pistol targets
- eye and ear protection
- shooting bench
- rug, mat or pad for bench
- chairs or bench for shooters
- narrow cardboard box
- knife
- tape or other target mounting materials
- pen, pencil or fine felt-tip pen
- eye droppers

References

The Basics of Pistol Shooting,
National Rifle Association,
Washington, D.C. 1991.
Colorado State University
S.T.E.M. item # SC8332
1-877-692-9358

Teaching Outline

Presentation (2-4 min)

I. Review of previous lesson

- A. Facilities
- B. Basic rules of pistol safety
- C. Pistol parts and function
- D. Sight alignment
- E. Trigger control
- F. Range commands
- G. Eye and ear protection
- H. Shooting procedures

II. Pistol Shooting positions

- A. Supported shooting position
 1. Seated at bench
 2. Pistol supported on rest
 3. Grip resting on table
- B. Stance for two-handed standing position
 1. Standing facing target
 2. Feet shoulder-width apart
 3. Nearly touching shooting bench or table
 4. At least 1 m (3 feet) apart
- C. Two-handed grip
 1. Thumb-lock grip
 - heel of grip placed in web of shooting hand
 - thumb alongside of grip
 - fingers around grip
 - trigger finger along trigger guard
 - bracing or supporting hand
 - fingers on fingers
 - thumb on thumb
 - grip consistent, firm but relaxed
 - arms evenly extended
 - elbows rotated down
 - relaxed arms shoulder high
 2. Palm-rest grip
 - shooting hand as above
 - supporting hand cupped under base of grip and fingers
 - arm of shooting hand pushing forward slightly
 - arm of cupped hand slightly bent and pulling back slightly

Application

ASK participants to REVIEW what they learned in last session. Use their review as base line for introducing safety on range.

Give assignment of safety poster for the next meeting.

Do pistol activity sheet - activity sheet (Life Skills—Self motivation, self-discipline, self-esteem)

DEMONSTRATE and have all shooters PRACTICE using supported shooting position from bench.

Teach body mechanics and their importance in shooting (Life Skill Do STEM Activity p 27)

DEMONSTRATE and have all shooters PRACTICE a two-handed shooting position and stance.

DEMONSTRATE thumb-lock grip and have each pair of shooters PRACTICE it using safe (open and empty) pistols. SHOW that it may be used with either eye from same side. USE “strong” and “weak” carefully. (Life- Skill- Teamwork)

REMIND shooters that “firm but relaxed” grip is really firm. DEMONSTRATE elbow rotation and arm position.

DEMONSTRATE and have shooters PRACTICE palm-rest position.

CAUTION: This grip is not recommended for use with semiautomatic pistols.

DEMONSTRATE push-pull tension in arms using this method.

I. Dry Firing (15-20 min)

- A. Going through the shooting sequence without ammunition
 - 1. Avoid tension and noise of live firing
 - greater concentration on learning how to shoot
 - develop feel for trigger - develop smoothness - develop consistent sight alignment
 - 2. Use dummy ammunition

BE SURE NO LIVE AMMUNITION is present on range for dry- firing exercises.
Review MAT and eye protection

IV. Dry firing at target backs

- A. Reasons for using blank targets
 - 1. Less distraction
 - 2. Concentration on sight alignment
 - 3. Concentration on trigger control
- B. “Coaches” and range assistants watch form and safety
 - 1. Muzzle control
 - 2. Focus on front sight
 - 3. Trigger control
 - 4. Follow through
- C. Dry firing by command
 - 1. Assume pistol shooting position
 - 2. Expanded range commands
 - 3. Expanded shooting procedures
 - 4. Repeat several times
 - 5. Reverse roles and repeat sequence

(4-6 min)

CONDUCT a dry firing exercise.

DISCUSS purpose of using the wrong side of target.

REINFORCE idea that we are working on form.

MAINTAIN constant and immediate ability to control each firing point throughout exercise.

CONSULT previous lesson and *Fact Sheet 17: Pistol and Rifle Shooting Procedures*.

(10-12 min)

V. Live firing at target backs

- A. Define live firing
 - 1. Actually, firing a projectile
 - 2. Point of impact obvious
 - 3. Indicates where muzzle was pointed
- B. Ammunition being used
 - 1. Discuss type
 - rim fire
 - center fire
 - pellet
 - 2. “Coaches” control ammunition

DEMONSTRATE live firing process with junior or teen leaders. USE pistols that shooters will be using

BE SURE coaches understand their role in controlling ammunition.

- C. Shooting for groups
1. Objective is to shoot groups
 2. How to shoot groups
 - proper sight alignment
 - good trigger control
 - consistent hold on target center
 3. “Coaches” and assistants watch form and safety
 - muzzle control
 - focus on front sight
 - trigger control
- D. Demonstrate proper loading procedures
1. Refer to owner’s manual
 2. Reinforce safety rules
- E. Live firing at target backs
1. Assume proper pistol shooting position
 2. Dry fire by command
 3. Live fire by command
 4. Live fire on shooter’s discretion
 5. Reverse roles and repeat sequence

STRESS importance of shooting groups, not group location on target.

REVIEW these elements once more.

MAINTAIN constant and immediate control over every firing point with adult or experienced teen leader.

USE coach/pupil pair made up of teen leaders or parents to

DEMONSTRATE loading and unloading with pistols being used in session.

CONSULT *Fact Sheet 17: Pistol and Rifle Shooting Procedures* for additional information.

VI. Evaluating groups

- A. Review shooting for groups
1. Consistency
 2. Sight alignment
 3. Trigger control
 4. Center of mass hold
- B. Fire a carefully held, five-shot group
1. Small groups
 - adequate mastery of basics
 - ready to move on to target faces
 - location not important
 2. Large or inconsistent groups
 - continue using supported position
 - keep pressure OFF shooter by staying with target backs
 3. Allow shooters to proceed as they are ready

15-20 min)

ASK what factors control size of groups being fired? STRESS factors outlined.

Refer to Life Wheel: Critical thinking, team work, empathy, use of resources, managing feelings

Have each shooter FIRE a five-shot string and ANALYZE each one for group size. DO NOT worry about group location or altering sight settings. Reference Fact Sheet 18, Caswell Sheet Handgun Target Analysis.

Have shooters with large groups REVIEW keys to good shooting form and FIRE another string from supported position.

Take every precaution to KEEP PRESSURE OFF shooter. ISOLATE them for review if needed to reduce pressure.

VII. Summary (1-2 min)

- A. Sight alignment
 - 1. Front sight in focus
 - 2. Front sight centered in rear
 - 3. Tops of front and rear sights even
 - 4. Need for practice
- B. Trigger control
 - 1. Fire without changing sight alignment
 - 2. Follow through
- C. Range safety and procedure
- D. Dry firing at target backs
 - 1. Concentration on shooting fundamentals
 - 2. Practice without shooting
- E. Live firing on target backs
 - 1. Focus on form
 - 2. Shooting groups

Use questions to GUIDE a review of materials covered thus far. STRESS main ideas: self-control, muzzle control and sight alignment.

Note that we will continue live firing next session. ASK for any questions.

Lesson Narrative

Instructor's note: Review any specific rules and regulations related to using the facility and note the locations of bathrooms and other needed facilities.

In the last session, we learned about the parts of pistols, how they operate and how to handle them properly. We also discussed and practiced proper behavior on the range and the set of range commands we will be using. We learned about the importance of personal protective gear for the eyes and ears. Most importantly, we learned about personal responsibility for safety. What are the basic pistol safety rules? *Always* keep the muzzle under control and pointed in a safe direction. *Always* keep the pistol empty and the action open except when actually firing on the range. *Always* keep fingers off the trigger except when actually firing a shot. All the other rules we could put together for safe pistol shooting build on these three.

What are the basic parts of a pistol and what do they do? Pistols are built around a frame, which serves as the **receiver** of the pistol. The **stock** or **grip** provides an area for holding and controlling the pistol. The **action** includes all the moving parts that load and fire the arm. The **barrel** contains and directs the projectile and the propellant gases. Common pistol actions include hinge, bolt, revolver and semi-automatic actions.



What is meant by sight alignment, and how should pistols sights be aligned? **Sights** are aligned by placing the front and rear sights in a consistent relationship to one another. The most commonly used type of pistol sights, **partridge-style sights**, includes a square notch rear sight and a flat-topped post or blade front sight. With the eye focused on the front sight, the shooter aligns the top of front sight with the top of rear sight and centers the front sight in rear notch. Precise sight alignment is necessary for accurate shooting.

Trigger control refers to firing the pistol without disturbing the sight alignment. This is accomplished by pressing the trigger straight back without changing the grip applied to the pistol with the rest of the hand or hands.

Range operations are under the control of a range officer, but safety is the responsibility of every shooter. We practiced a formal shooting process without actually firing projectiles. We established protocols for malfunctions and for passing a pistol from one person to another safely. Today we will start by dry firing. Then move to shooting live ammunition.

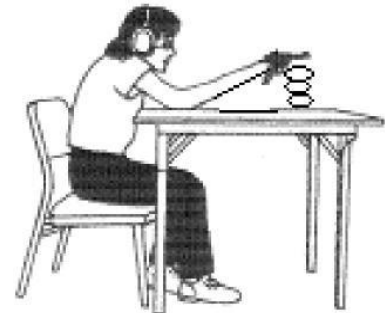
Pistol Shooting Positions

Before we do any shooting, each shooter needs to learn how to hold the pistol properly. A one-handed shooting form is used for most formal target shooting with handguns. We will use a supported position to help develop the basics of pistol shooting form. Once they have been developed, you will be ready to move to a two-handed standing position, then a one-handed position. Watch carefully as these positions are demonstrated. You may want to sketch each one in your journal or notebook with comments to help you remember how to use each of them

Supported Position

The supported position is steady and relieves the shooter of supporting the pistol. Many shooters use it to adjust their sights. Hunters often use it to ensure clean, killing shots on game.

The shooter is seated at the shooting bench, facing the target squarely. The arms are extended with the elbows resting on the bench or table. The butt of the pistol and the hands rest on the table surface. The barrel is supported by sandbags or a rest. All supports should be adjusted so the pistol points to the intended point of impact without having to use muscle power to move the pistol. Be sure the muzzle clears the forward support. Move to the firing line and practice the supported position without your pistols.



Two-handed Standing Position

Two-handed shooting positions are quite varied. We will use a square stance. The shooter stands facing the target, nearly touching the shooting bench or table. The feet are planted a comfortable distance apart approximately shoulder width. The weight is equally balanced on the feet. As the arms are extended and raised to shooting position, the back is arched slightly to balance the body. When shooting from a standing position, shooters are spaced adequately to keep them from interfering with each other. Practice this position without your pistols.

Two-handed Grip

Two basic types of two-handed grips are used by pistol shooters; the **thumb-lock grip** and the **palm-rest grip**. In both grips, the pistol is grasped in a handshake fashion with the heel of the grip (the back-strap of the frame) firmly in the web of the shooting hand. The index finger is extended along the frame above the trigger guard. The remaining fingers grasp the grips firmly, but without excessive squeezing. Rest the thumb along the opposite side of the grip.

When using a thumb-lock grip, position the supporting hand so the fingers grip the fingers of the shooting hand. The supporting index finger overlaps the middle finger of shooting hand, and the little finger tends to wrap around the butt of pistol grip. The thumb of supporting hand rests on the thumb of shooting hand. When shooting semi-automatic pistols, be careful to keep thumbs clear of the slide.



Experienced pistol shooters grip the pistol with a “firm, but relaxed” grip. That translates to a very firm grip. Apply even pressure with both hands until muscle tremors cause the pistol to quiver, and then reduce the pressure evenly until they stop. That is what “firm, but relaxed” feels like. Develop your own level of grip pressure, but be sure that the pressure is consistently firm.

Extend the arms evenly with the elbows rotated downward. Hold arms at shoulder height by rotating them upward from the shoulders. Flexing the forearms at the elbows should bring the hands toward the center of the face. During shooting, the upper arms should be relaxed, allowing the forearms to be supported by the elbow joints. Adjustments in height are made from the shoulders. Practice this grip without a pistol.

When using a palm-rest grip the supporting hand is cupped under the butt of the pistol and the shooting hand. The thumb of the supporting hand is on the lower fingers of the shooting hand. The fingers of the supporting hand grip the base of the fingers and the back of the shooting hand. The shooting arm is pushed forward slightly. The supporting arm is slightly pulled backward to balance the forward push of the shooting arm. The shooting arm is straight, and the supporting arm is bent slightly at the elbow. Try this grip without the pistol.

The palm-rest grip is not recommended for use with semi-automatic pistols. A firing malfunction may result in high-pressure hot gasses blowing down past the magazine and resulting in severe injury to the hand cupped under the grip.

The thumb-lock grip involves fewer muscles, making a consistent hold somewhat easier to achieve. The palm-rest grip is preferred by many shooters. Try them both, if you like; but stick to one type of grip for each string of shots. Once you have found a grip that feels good to you and produces smaller groups, stick with it and learn to use it well.

Dry Firing

Dry firing is an excellent way to practice shooting form. It involves going through the entire shooting sequence without ammunition in the firearm. It allows the shooter to practice the fundamentals of proper shooting without the tension and noise of live firing. That allows greater concentration on learning how to shoot. The shooter can develop a feel for the trigger, experiment with finger placement for better control and develop a smooth, consistent trigger press. Dry firing allows the shooter to concentrate on sight alignment and follow through. With rim fire or center fire handguns, many shooters use dummy (inert) ammunition or snap caps to protect the firing mechanism.

We will begin by dry firing at target backs. The blank target provides less distraction and forces the shooter to focus on the front sight and concentrate on sight alignment. It also aids in trigger control development. Coaches and range assistants will be watching for safety and form during the dry-firing exercises. Remember, muzzles must always point down range. Your eyes should be focused on the front sight. Your sights must be carefully and

consistently aligned. Point the aligned sights at the middle of the target back and press the trigger, keeping the sights aligned through the shot. We will let each shooter dry fire several shots, first on command, then on their own.

Live Firing at Target Backs

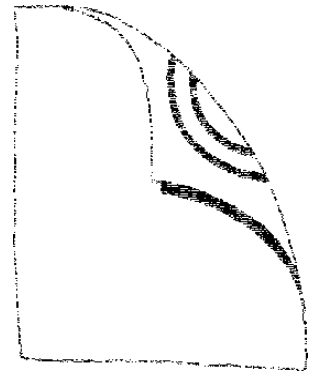
Let's review the fundamentals of good two-handed pistol shooting form. The stance is a comfortable and erect one with the head relaxed and normally upright. The feet are square with the firing line and a comfortable distance apart. The elbows are nearly vertical, and the arms are fully extended. The two-handed grip features the fingers of the offhand overlapping those of the shooting hand (with the exception of the trigger finger), and the off-thumb resting on the dominant thumb.

With the arms extended and the muzzle resting on the padded shooting bench, the sights are aligned properly. Focus on the front sight. Once the sights are properly aligned, the pistol is rotated into shooting position from the shoulders. The sights are centered on the blank target, and the pistol is fired.

The trigger is pressed straight back without disturbing the sight alignment, and the pistol is held on the target until the projectile hits the backstop. Holding your position on the target until the shot strikes is called "follow through."

Coaches and range assistants need to watch for all of these elements during the shooting sequence. Be particularly aware of any potentially dangerous situations as we fire this first group step-by-step. Coaches will control the ammunition and switch the safety off during this activity. We will use the same firing sequence used in the dry-firing exercise with the exception of leading the pistol. Be sure the muzzle remains pointed down range at all times.

Is everyone ready? First relay to the line. Coaches, verify that the pistols are safe. Is the line ready? Respond by firing point numbers. The line is ready. Pick up your pistols. Load one round. Charge your pistols. Set the safety off. Assume a proper and firm grip. Align the sights with the muzzle resting on the padded bench and the eyes focused on the front sight. Raise the arms to shooting position with the sights remaining aligned. Center the sights on the blank target. Press the trigger, keeping the sights aligned until the bullet hits the backstop. Open the action; set the safety on and lower the pistol to the bench. Go ahead and fire three or four more shots. Coaches, if your shooters show signs of fatigue, have them stop shooting. Remember, we are trying to shoot groups at the target back, not hit some precise point on the target. Make your pistols safe. Ground your pistols. Reverse roles between the coaches and pupils and repeat this exercise. Several repetitions should be made.



Summary

Sight alignment is an essential element in good shooting. It involves focusing the eye on the front sight and placing the front and rear sights in a consistent relationship to one another. We keep the tops of the front and rear sights even and allow equal amounts of space on either side of the front sight in the rear notch. Sight alignment can be practiced with an empty pistol, and practice aids proper sight alignment.

Trigger control is also a practiced skill. The trigger must be pressed until the pistol fires without disturbing the sight alignment. Holding the sight alignment after the shot is fired is vitally important. That after-hold is known as follow through. Like sight alignment, trigger control and follow through can be practiced by dry firing.

We practiced range procedures with two exercises. First, we dry fired the pistols at blank targets. That allowed us to check form and practice in an environment where concentration on form was easy. Then we fired several groups at target backs using live ammunition.

Next time we will continue shooting at target backs, learn some different stances and grips and develop more consistency in shooting groups with the pistol.

Summary Activities

1. Have shooters discuss the differences between the groups they “shot” while dry firing and those fired during the live firing session. Ask why those groups differ in size and discuss some of those reasons.
2. Review the elements of good shooting form, having participants discuss parts they find easy or difficult. Challenge them to practice the form at home without firing.
3. Suggest a series of dry-firing exercises to practice at home. Ask the shooters not to shoot any live ammunition, but to concentrate on dry firing to develop their shooting form.

Sharing and Exhibit Ideas

1. Record your experiences and the new things you learned in this session in your shooting journal or notebook.
2. Demonstrate proper pistol shooting form for your parents or another interested adult.
3. Illustrate basic pistol shooting form in a series of posters to be used in pistol instruction.

Shooting for Groups on Blank Targets

William F. Stevens, John Kvasnicka, Ronald A. Howard Jr., and Marilyn Bergum*

Objectives

Participating youth and adults will:

1. Know and demonstrate proper stance and grips
2. Shoot groups effectively using a center-of-mass hold on a blank target or target back.
3. Demonstrate and practice safe range and shooting procedures.
4. Have fun while learning.

Roles for Teen and Junior Leaders

- Review pistol orientation.
- Demonstrate proper pistol shooting form.
- Demonstrate range procedures and commands.
- Assist “coaches” in helping shooters with problems.
- Tutor shooters with difficulties.
- Act as assistant range officers.
- Assist shooters needing to repeat the triangulation exercise.
- Assist shooters needing to repeat the trigger control exercise

Parental Involvement

- See Roles for Teen and Junior Leaders above.
- Control or monitor one or two shooting stations, assisting range officers and instructors.
- Arrange for or provide transportation to the range.
- Arrange for or provide refreshments.
- Assist with developing exhibits or filling out shooting journal entries.

* Conservation Affairs Manager for Federal Cartridge Company, Anoka, MN; Executive Director, Minnesota Deer Hunters Association; 4-H and Youth Development Specialist, Texas Agricultural Extension Service; and National Rifle Association Field Representative to Minnesota, North Dakota and South Dakota.

Best Time to Teach

Any time of year but should follow dry and live firing on target backs lesson

Best Location

Any safe shooting range

Time Required

Approximately 1 hour

Materials/Equipment

- pistols
- appropriate ammunition
- adequate backstop
- blank paper or pistol targets (backs)
- eye and ear protection
- shooting bench with pad
- chairs or bench for support
- narrow cardboard box (less than pistol length)
- knife
- tape
- pen, pencil or fine felt-tip pen
- eye droppers

References

The Basics of Pistol Shooting,
National Rifle Association,
Washington, DC. 1991. *Fact Sheet 19: Trigger Squeeze*

Colorado State University
S.T.E.M. item # SC8332
1-877-692-9358.

Teaching Outline

Presentation

I. Review of previous lessons (1-2 min)

- A. Safety rules
 - 1. Muzzle control
 - 2. Open and empty
 - 3. Finger off trigger
- B. Importance of eye and ear protection
- C. Stance and grip
 - 1. Feet and posture
 - 2. Head erect
 - 3. Hand position and grip
- D. Sight alignment
 - 1. Front sight focus
 - 2. Consistent alignment
- E. Trigger control
- F. Range commands
- G. Shooting procedures

II. Review the dry-firing exercise

- A. Press trigger to refresh feel
- B. Align sights and press trigger
- C. Align sights, raise to shooting position and press trigger
- D. Point aligned sights at target back and press trigger

III. Review the live-firing exercise (1-2 min)

- A. Objectives of using blank targets
 - 1. Shooting groups
 - 2. Developing shooting form
- B. Means of reaching objectives
 - 1. Proper sight alignment
 - 2. Good trigger control
 - 3. Consistent hold on center of paper
- C. Shooting procedure
 - 1. Follow standard shooting procedures
 - 2. Coach only critical items
 - one at a time
 - priority items
 - consistency with teaching
 - 3. Avoid excessive shooting and fatigue

Application

ASK participants to REVIEW each of these factors. USE their points to begin quick but thorough review of safety and shooting considerations (Life Skills)

Have youth teach their previous assignment for the safety posters to the group which will teach communication, self-esteem, managing feelings, teamwork self-motivation and social skills.)

DEMONSTRATE proper shooting position.

Have participants REVIEW range commands and shooting procedures.

(1-2Min)

Have each shooter REPEAT these actions to refresh their memories and sense of feel for actions involved.

REVIEW live-firing objectives and procedures. ASK shooters to outline each step-in procedure.

REMIND instructors to MAINTAIN constant and immediate control on each firing point.

Refer to Fact Sheet No. 17, Rifle and Pistol shooting Procedures for details.

CAUTION coaches NOT to over-instruct and to AVOID fatigue.

During this lesson, you may choose to utilize your teens or parents to participate in a demonstration of various skills.

- D. Repeat firing at target backs
- E. Each shooter fires five-shot string
 - 1. Analyze groups
 - ready to shift to regular target
 - adequate mastery of basics
 - 2. Small groups
 - 3. Large groups
 - review basics
 - use supported shooting position
 - keep pressure off shooter by using target back

Have each shooter FIRE a five-shot string and ANALYZE each one for group size.

Have shooters with large groups REVIEW keys to good shooting and FIRE another string from a supported position.

If necessary, REPEAT appropriate exercised while keeping pressure off shooter.

IV. Summary

- A. Stance
- B. Grip
 - 1. Thumb-lock
 - 2. Palm rest
- C. Review sight alignment
- D. Review trigger control
- E. Review requirements for shooting good groups
- F. Review range procedures as needed

Let shooters LEAD a review of lesson responding to leading questions you ask.

ASK for any questions and prepare them for next session.

Lesson Narrative

This shooting session continues development of the basics of sound pistol shooting. Safety is always important to shooters. Remember, you are responsible for safety with your pistol. Muzzles will always be pointed in a safe direction - down range when on the firing line. Pistols will be kept empty with the actions open and exposed to view except when firing. The trigger finger is only placed inside the trigger guard when the shooter is getting ready to fire. All persons on or near the range will use adequate eye and ear protection. We expect responsible and adult behavior. No nonsense will be tolerated.

Sound pistol shooting begins with a proper stance and grip. We will use either two-handed standing position or a supported shooting position for all shooters. The stance should be comfortable and relaxed, square to the target. The head should be erect and relaxed. The grip should be firm in either the thumb-lock or palm-rest positions.

Proper sight alignment involves focusing the eye on the front sight and consistently aligning the front and rear sights. Trigger control allows the shooter to squeeze the trigger and fire a shot without disturbing the sight alignment. Holding the sight alignment through the shot achieves a proper follow through. These are the principles we have practiced in dry firing and live firing in earlier sessions. We will continue to use them today. Remember that practice alone does not make perfect. Perfect practice makes perfect.

We will continue to use the same basic range commands and firing procedures practiced in the last session. Does anyone have a question about those commands or what they mean?

Dry-firing Review

Check your pistols to make sure they are safe, bring them to the shooting line and ground them with the muzzles pointed down range. Assume a suitable shooting position. Is the line ready? Respond by firing point number, please. The line is ready. Cock your pistols. Dry fire the pistol to refresh your memory of the trigger feel. Align the sights and dry fire once more. Align the sights; raise the pistol to firing position and dry fire again. Finally, point the aligned sights at the center of the target back and dry fire one more time. Make your pistols safe. Ground your pistols and step back from the firing line.

Live-firing Review

Now, let's review the live-firing process by firing a shot on command. Coaches will load the pistols and hand them to the shooters. Remember to keep the pistol under control and pointed down range always.

Do not relax your grip on the pistol until the other person gives verbal acknowledgement that he or she has it under control. Blank targets are used to increase concentration on proper shooting form and shooting groups. Those objectives require three elements: proper and consistent sight alignment, good trigger control (including follow through) and a consistent hold on the center of the target back. "Coaches" will control all ammunition, and everyone will be watching both form and safety. Are there any questions?

First relay to the line. Is the line ready? Respond by firing point number, please. The line is ready. Shooters, pick up your pistols, verify that they are safe and pass them to your coaches. Coaches, load and charge the pistols with one round. Place the safety in the "on" position and pass them to the shooters. Remind them that the safety is on and wait for a verbal signal before releasing the pistol.

Instructor note: Instructors differ on the use of the safety in this context. Some feel it is an unnecessary distraction since the pistol is being single loaded for each shot. Others feel it is essential as preparation for field use of the firearm.

Shooters, switch the safety to the "fire" position. With the proper grip and the muzzle resting on the table, align the sights, keeping the front sight sharply in focus. Raise your arms to the firing position and center the aligned sights on the target back. Press the trigger, taking care to keep the sights aligned and centered on the target. Follow through with that hold until the projectile hits the backstop. Switch the safety to the "on" position and; lower the muzzle to the table or bench. Make the pistol safe and ground it.

Call the next relay to the line and repeat the process. This exercise should be repeated several times with each shooter. Correct all form faults, taking multiple faults one at a time and in priority. Stress what needs to be done, not what is being done wrong. BEWARE of excessive shooting. Stop for reviews or discussion to give shooters a break and quit for the day before group sizes start to expand because of fatigue. Analyze a series of groups for each shooter. If group sizes are inconsistent or erratic, review the fundamentals of good form or repeat the triangulation and trigger control exercises. Address obvious form faults as needed. This requires high ratio of adults or accomplished teen leaders to young people.

Summary Exercise

Good shooting requires consistency. The stance and grip must be consistent. The sight alignment must be precise. Trigger control must not disturb the sight alignment throughout the shot. The hold on the target must be consistent. We shot quite a bit in this session. Let's shoot one more group of five shots, concentrating on shooting a good group. Remember to follow the basics of good shooting as you fire

Coaches and instructors should analyze each of these groups. Shooters firing fairly small groups have demonstrated adequate mastery of the basics to move on to shooting at standard targets. Those who are still shooting large or inconsistent groups may need to use a supported shooting position, repeat the triangulation or trigger control exercises or practice with the target backs in another session. If time permits and frustration is not evident, that may be done now. Otherwise, this lesson should be repeated until the shooter is comfortable with the basics. Pushing them on to standard targets may hurt their progress.

Summary

In this session we reviewed shooting positions, the fundamentals of sound pistol shooting and safety. We reviewed sight alignment, trigger control and the requirements for shooting good, consistent groups. These elements were practiced during dry firing and live firing. Continue practicing the dry firing exercises at home. Next time we will continue live firing.

Summary Activities

1. Fire a final five-shot group for analysis. Determine if shooters are ready to work on sight pictures and standard targets or if they need to repeat this session to tighten groups further.
2. Question participants to see what they learned. Try to involve all shooters in the process. Give teens and range assistants an opportunity to comment.

Sharing and Exhibit Ideas

1. Demonstrate the position and grip options learned in this session to an interested adult.
2. Construct instructional posters on the positions and grip types for use with later classes.
3. Compare your group sizes using different grips or positions. Note the results in your shooting journal or notebook and discuss the reasons you can see for those differences.
4. Develop a poster of range commands or another type of safety poster for use on the range.
5. Make something that can be used in the supported shooting position.
6. Make, demonstrate or display something that you found interesting or useful in this lesson.

Sight Picture and Sight Adjustment for Pistols

William F. Stevens, John Kvasnicka, Ronald A. Howard. And Marilyn Bergum*

Objectives

Participating youth and adults will:

1. Demonstrate an understanding of sight picture
2. Demonstrate the ability to shoot groups using consistent and proper shooting form.
3. Demonstrate a sound two-handed shooting technique from the stand position.
4. Demonstrate an understanding of how to adjust sights to move and scoring ability using standard bulls-eye targets.
5. Improve scoring ability using standard bulls-eye targets.
6. Have fun while learning

Roles for Teen and Junior Leaders

- Demonstrate sight picture.
- Demonstrate sight adjustment.
- Assist shooters with sight adjustments.
- Act as ranger office or assistants.
- Score and evaluate targets.
- Demonstrate use of a scoring gauge.

Parental Involvement

- See Roles for Teen and Junior Leaders above.
- Control or monitor one or two shooting stations, assisting range officers and instructors.
- Arrange for or coordinate transportation to the range.
- Arrange for or coordinate refreshments.
- Assist with developing exhibits or filling out shooting journal entries.
- Assist and support shooters having specific problems.

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Best Time to Teach

Any time of year, when shooters are able to shoot consistent groups at target backs (repeat as needed)

Best Location

Safe shooting area

Materials/Equipment

- pistols
- ammunition
- targets
- eye and ear protection
- scoring gauge
- adequate backstop
- shooting bench or table with pad
- dummy or inert ammunition
 - manufacturer's ammunition and ballistics catalogs

References

- The Basics of Pistol Shooting.*
National Rifle Association,
Washington, DC. 1991.
- Shooting FUNdamentally.*
Training video. Contact your
state
coordinator or Daisy
Manufacturing
- Fact Sheet 18: Analyzing
Groups for Form Faults in
Pistol Shooting.*
Colorado State University
S.T.E.M.
Connections. Item #SC8332. 1-
877-692-0358.

Teaching Outline

Presentation

I. Review of previous lessons

- A. Safety considerations
- B. Range commands
- C. Shooting procedure and fundamentals
- D. Grip and stance
- E. Live firing at target backs
- F. Shooting backs

II. Sight Picture

- A. Define sight picture
 1. Aligned sights in relation to a target
 2. Elements of a proper sight picture
 - focus on front sight
 - rear sight and target slightly out of focus
- B. Types of sight pictures
 1. Center of sight pictures
 - top-center of front sight on point of impact
 - hold on center of target
 2. Six o'clock hold
 - “pumpkin on a post”
 - set bulls eye on center of front sight
 3. Both acceptable, but stick with one type

III. Live firing at target faces

- A. Shooting bulls eye target on command
 1. Follow range procedures fact sheet
 2. Follow shooting procedures fact sheet
- B. Fire remaining shots at shooter discretion
 1. Fire only five to ten shots
 2. Focus on firing groups
 - consistent sight alignment
 - consistent sight picture
- C. Reverse roles and repeat

Application

Lead a REVIEW to REINFORCE main points in these areas. EXPAND on any areas that are weak.

SHOOT at least one group on target backs to settle group.

STRESS role of sight alignment in accurate shooting. NOTE that errors in sight alignment are more serious than errors in sight picture.

Have shooters DRAW what they see when they look at the sight. (Life Skills--Critical thinking skills, keeping records)

ILLUSTRATE sight picture with diagrams or models to show concept.

ILLUSTRATE both types of holds and discuss the advantages of each one. STRESS sticking with one type of hold to avoid confusion.

Have each relay FIRE first shot of five- to ten-shot string on command. Have shooters analyze target and grouping (Life Skills--problem solving.)

REINFORCE focus on front sight and priority of sight alignment over sight picture.

Determine if sight alignment is correct and movement needs to be done. (Life Skills- Self- discipline problem solving, critical thinking.)

REPEAT exercise until group sizes stabilize.

- D. Repeat the exercise several times with more standard range commands
1. Watch for constant groups
 2. Provide support for shooters who need to use a supported position

IV. Developing consistent sight picture

- A. Precise shooting requires consistent sight alignment
1. Alignment errors magnified by distance to target
 2. Precision comes from consistent action
 3. Practice essential for consistency
- B. Triangulation exercise
1. Mount pistol in vise or set in notches in a small box
 2. Align pistol with blank target
 - move box or vise to position sights
 - fix box or vise in place
 3. Have participant align sights
 4. Have participant direct the marker to the aligned sights with verbal directions
 5. Mark location through center of marker
 6. Repeat at least three times
 - size of group shows precision in sight alignment
 - group sizes of quarter to dime size adequate
 - large groups show inconsistent sight alignment
 7. Discuss and repeat exercise if needed

V. Sight adjustment

- A. Objective is to match point of aim and point of impact
- B. Move sights to align with the bore
- C. Rear sight adjustment
1. Most common
 2. Move rear sight in the direction you want the point of impact to move

BE PREPARED for some shooters to fire from supported position.

ILLUSTRATE properly aligned sights using models or drawings.

Use triangulation exercise to demonstrate proper sight alignment. CRITIQUE each shooter's sight alignment, but DO NOT embarrass any shooter who has difficulty.

REVIEW and DEMONSTRATE proper sight alignment using visual aids.

PROVIDE a private area where shooters having difficulty can REPEAT exercise with assistants or teen leaders.

(Life Skills—Teamwork, problem solving, communication)

Note: Training Aid -Simulated Pistol can be made using a 1" X 3" X 3' wooden board with a front and rear sight mounted to the narrow side of the board.

DEMONSTRATE sight adjustment using models or illustrations.

DEMONSTRATE how moving rear sight in direction hits need to move makes proper correction. STRESS using center of group as reference point.

- use center of group for reference point
- note distance and direction from desired point of impact
- move sights in the desired direction
- shoot group with same sight picture
- adjust to center of bull by trial and error

- D. Front sight adjustment
1. Less commonly needed
 2. Move front sight toward the current point of impact (chase the hits with the sight)
- E. Adjust sights to place group center in center of bulls eye

VI. Shoot ten shots for scoring

- A. Scoring
1. scoring in concentric bands
 2. Highest band touched is scored
 3. Lines between bands part of higher scoring area
 4. Scored from center out
 - center is scored as “10”
 - each ring one point less
 - shots outside scoring area are scored as “0”
- B. Use of scoring gauge
1. Inward scoring gauge
 2. Outward scoring gauge

VII. Summary

- A. Sight alignment and sight picture
- B. Sight adjustment
- C. Scoring

STRESS recording change in impact for each unit of change in sights.

NOTE that front sight adjustment is MUCH less common.

Have each shooter ADJUST their sights, taking turns at bench. FIRE ten-shot string for scoring purposes.

ILLUSTRATE proper scoring of target.

Have each shooter SCORE their last target, and then CHECK them for scoring accuracy.

DEMONSTRATE use of scoring gauges.

SUMMARIZE lesson-using questions to draw comments from shooters.

Lesson Narrative

Before moving on to the new material in this session, let's review some of the things we learned earlier. Eye and ear protection is essential to personal safety. Three basic pistol shooting safety rules are:

1. *Always* keep the muzzle under control and pointed down range.
2. *Always* keep the action open and exposed with the pistol empty except when it is actually being fired.
3. *Always* keep the finger off the trigger except when actually firing the pistol.

Basic range commands and shooting procedures are familiar to you now. You know your personal responsibility for shooting safety and the role of the range officers and instructors.

You have learned that good shooting involves consistent practice of a few fundamentals. You have established a sound stance and grip, and you are developing more stamina and strength in your shooting form. You have learned how to align sights properly and consistently and how to control the trigger. You have practiced these things both on the range and at home by dry firing and live firing on target backs. Adding sight picture and the ability to adjust sights is the objective of this session.

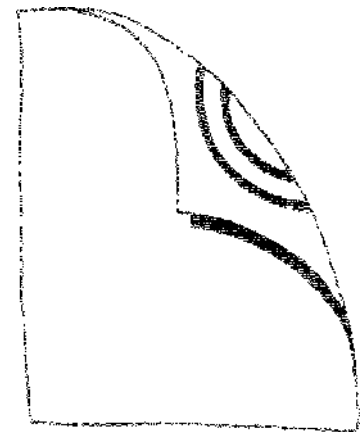
Shooting at Target Backs

Before we start shooting at target faces, let's refresh our shooting form and feel by firing a series of shots at a target back. Concentrate on your form and remember that perfect practice makes perfect. Focus on the front sight and align the sights precisely. Hold on the center of the target back, using the same hold each time. Press the trigger through the shot, trying not to disturb the sight alignment. Hold the aligned sights on the center of the target until the pellet strikes the backstop. Do not worry about shot placement; concentrate on shooting a nice, tight group. [Use the standard shooting procedure.]

Sight Picture

Sight picture is the next step in good shooting. It includes sight alignment and the position of the aligned sights relative to the target. The eyes should remain focused on the front sight, with both the target and the rear sight slightly blurry.

Two types of sight pictures or "holds" are commonly used by pistol shooters. The center-of-mass hold places the point of impact at the top center of the front sight. The sight is held where the shooter intends the point of impact to be. The six o'clock hold centers the entire bull's eye on the top of the front sight, like a pumpkin sitting on a post. Many shooters like to see a hair's breadth of white between the bottom of the bull and the bottom of the bull and the top of the sight. The point of



impact is the center of the bull when the bull is sitting on the sight. Both types of sight pictures are acceptable, but you should stick with one to avoid confusion. Practice developing sight pictures with the models or sighting devices provided.

Shooting at Target Faces

With the concept of sight picture firmly in mind, let's move to the range and shoot some bulls eye targets. Each shooter will fire about ten shots, using the same sight picture. Do not worry where the group is located on the target. We will learn how to adjust the sights shortly. On command, fire the first shot using our standard shooting procedures. You may fire the remaining shots at your own discretion. (The firing procedure should be repeated several times, alternating roles between the pupil and the coach. Be prepared to use supported shooting positions for those shooters who need the extra support.)

Improving Sight Alignment

Precise shooting requires precise, consistent sight alignment. Errors in sight picture are less critical than errors in sight alignment. Alignment errors are magnified by the distance from the pistol to the target. Concentrate on keeping the sight alignment crisp.

A triangulation exercise is an excellent way to practice and improve sight alignment. Make a pistol safe and leave the action open. Firmly fix the pistol in place so it points at a blank target or piece of paper. Align the sights and direct the person down range to move a marker until it forms a proper sight picture with the aligned sights. The other person will mark through a tiny hole in the center of the marker. Repeat the procedure at least three times. The size of the group indicates the combined precision of your sight alignment and sight picture. Consistent sight alignment will result in a small group. If the group is too large, review the principles of sight alignment and sight picture before going on to shooting at regulation targets.

Sight Alignment

Sight alignment is the process of moving the sights into an alignment with the bore so the point of aim and point of impact are in the desired relationship. The sights are moved into alignment with the bore and the trajectory curve of the projectile.

Most pistols allow the shooter to adjust the rear sight. The basic rule for adjusting the rear sight is to move the sight in the direction you want the hits to move. If the group is to the right of the point of aim. The rear sight must be moved to the left. The center of a group is used as a reference point for sight adjustment because it is an average for all the shots fired. The distance and direction from the desired point of the impact is measured on both the vertical (elevation) and horizontal (windage) directions.

An example may help to clarify the point. On this target a nice, tight group is centered a little over 7.6 centimeters (3 inches) to the left and about 5 centimeters (2 inches) low. Raising the sight two full turns and moving it to the right three full turns, moved the group center to a new location 1 centimeter (0.4 inch) low and 3.6 centimeters (1.5 inches) to the left. The windage adjustment for this range seems to move the group about 1.3 centimeters (0.5 inch) per turn. Moving it three more full turns to the right should put the group center on the center of the bull. The elevation adjustment moved the point of impact 4 centimeters (1.6 inches) for two turns. Raising the sight an additional half turn should put the group center where you want it. Shoot another group to confirm the setting and make any minor adjustments that may be needed. Be sure to record the sight setting changes for your pistol at this range in your shooting journal. Recording those numbers eliminates a lot of trial and error.

Target pistols normally have adjustable rear sights, but some pistols have an adjustable front sight. Adjusting the front sight is based on the same principle as the rear one. The main difference is that the front sight should be adjusted toward the point of impact. Experienced shooters refer to this as “chasing the hits.”

Let’s adjust our sights, based upon the group locations we have been shooting. Make the amount and direction of adjustment you think you need when the make-ready period is announced. As usual, we will be using our standard shooting procedures. You may fire as many rounds as necessary to accomplish your corrections as long as the range remains hot. Raise a hand if you and your coach need assistance. When you are satisfied with the sight setting, make your pistol safe and ground it. Reverse roles and repeat the process. When both shooters have finished, and the pistols are safe and grounded, step back off the line.

Assistants and teen leaders should circulate throughout this exercise assisting all shooters who need help. If approximate sight adjustment values are known, share them before the shooters start working on the sight settings. Shooters must be shooting good groups before this exercise can be effective.

Shooting for Scores

Standard pistol targets have concentric bands of score values that surround a central scoring circle. The innermost circle is scored as a “10”. Each successive ring has a value one less than the one inside it. The outermost scoring band is scored as a “4”. Shots that fail to touch any of the scoring bands are scored as “0”. Lines dividing the scoring of the impact is measured on both the vertical (elevation) and horizontal (windage) directions.

bands are part of the higher value band. Shots that touch the line receive the higher score. Shots that are hard to interpret are evaluated with a scoring gauge. The gauge “plugs” the bullet hole and references its location to another ring. It is essential when those close shots are scored. A different gauge is used for each caliber of pistol used in competition.

We are going to shoot a 10-shot match and score the targets. Write your name on the target and hang it on the carriers. Each relay will shoot a 10-shot string following the range officer’s commands. Score your targets and have your partner check the scoring. If you have questionable shots, ask one of the teen leaders or assistants for help. We will continue shooting for improved scores over the next several meetings.

Summary

In addition to reviewing previous instruction, we learned how to develop a consistent sight picture. We fired groups, then learned how to adjust the sights to set the point of aim and the point of impact in the desired relationship. We also shot a 10-shot match and learned how to score our targets. Next time we will look at other kinds of handguns and handgun ammunition. We will also continue to shoot for improved scores.

Summary Activities

1. Display a series of groups or illustrations of groups with a variety of group sizes and locations. Ask participants whether the shooter should adjust the sights, and if so, how much adjustment is needed in which direction.
2. Have the entire group score a set of pistol targets, using either projected visuals, enlarged posters or a set of actual targets.
3. Review all shooting journals and assist shooters with entries for this session. Be sure information on sight adjustment is entered.

Sharing and Exhibit Ideas

1. Shoot a series of groups adjusting the sights a given amount and direction. With each group illustrate how sight adjustment can move the point of impact relative to the point of aim.
2. Post a series of targets, showing improvement in shooting skill. List the dates and the things you learned or practiced improving.
3. Display your shooting journal or notebook.
4. Show someone how to score a pistol target using a scoring gauge.
5. Look up the rules of any pistol shooting game and describe the game to the club or another interested person.

Pistols, Revolvers and Ammunition

Ronald A. Howard Jr., William F. Sevens and John Kvasnicka#

Objectives

Participating youth and adults will:

1. Understand how to clear and operate assorted types of pistols.
2. Understand and distinguish among various pistol actions.
3. Distinguish handgun ammunition and understand safety considerations for handgun ammunition.

Roles for Teen and Junior Leaders

- Demonstrate operation of various pistol actions.
- Assist shooters with operation of pistol actions.
- Monitor materials being passed around and being sure all participants have an opportunity to see them.
- Supervise a shooting station where handguns are being fired.
- Assist with a shooting demonstration

Parental Involvement

- See Roles for Teen and Junior Leaders above.
- Arrange for or provide transportation.
- Arrange for or provide refreshments.
- Arrange for or provide equipment or materials for the program.

* 4-H and Youth Development Specialist, Texas Agricultural Extension Service; Conservation Affairs Manager for Federal Cartridge Company, Anoka, MN; and Executive Director, Minnesota Deer Hunters Association.

Best Time to Teach

Any time of year; after sight picture and other pistol shooting fundamentals have been introduced

Best Location

Indoor or outdoor classroom or range

Time Required

About 1 hour; exploring games will extend teaching time needed

Materials/Equipment

- handguns of various designs, models and manufacturers including: single-action revolver, double-action revolver, semi-automatic pistol, break-action pistol or illustration and bolt-action pistol or illustration
- selected rim fire and center-fire ammunition
- fired cases or dummy rounds (rim fire and center-fire)
- targets of appropriate size and type
- eye and ear protection
- illustrations of handgun actions
- illustrations of handgun ammunition - manufacturers' ballistics and ammunition charts
- manufacturers' handgun catalogs

References

The Basics of Pistol Shooting.

National Rifle Association, Washington, DC. 1991.

State hunter education manuals. Contact state hunter education coordinator for availability.

Handguns and Ammunition for Hunting. Hunting and wildlife lesson plan. National 4-H Shooting Sports Program. Contact your state 4-H shooting sports coordinator.

Teaching Outline

Instructors Note: Once the shooters have begun live firing, each meeting should allow time for shooting practice or include some type of shooting event or activity. When to schedule instruction sessions in relation to shooting sessions, and the amount of instruction, is at the discretion of the instructors.

Presentation

Application

I. Introducing other pistol types

A. Revolvers (1-2 min)

1. General structure reference sheet #6 5-9
 - frame
 - barrel
 - action (parts that load, fire, and unload the fun)
2. Single action (1-2 min)
 - requires manual cocking for each shot
 - may use internal safety devices
 - wise to carry on empty chamber
 - generally loaded through loading gate
3. Double action (1-2 min)
 - may be used single action
 - may be cocked and fired by trigger press alone
 - cylinder usually exposed for loading and unloading

DISPLAY or ILLUSTRATE various types of handguns available today. Take a field trip to a local gun merchant to allow youth to experience different types of pistols in a controlled environment. (Life Skill Responsible citizenship. Character building, social skills, self-responsibility, marketable skills, service learning.)

ORIENT participants to their basic operation and safety. If possible, let each young person HANDLE each type, learning how to clear, load, unload and fire it.

Pay special attention to SAFETIES and checking for LOADED chambers.

B. Pistols

1. Semi-automatic pistols (1-2 min)
 - energy from fired round used to eject, cock and load for next shot
 - magazine fed
 - magazine
 - magazine release
 - external safeties
 - grip safety
 - other safeties
 - demonstrate operation
 - frame
 - barrel
 - slide
 - grips

Reference pistol illustration sheets 3 and 4, 10 and 17

If no pistols of this type are available, USE rifles, shotguns or models in conjunction with illustrations.

2. Bolt-action pistol (1-2 min)
 - like bolt-action rifles
 - usually single shot
 - specialized uses
 - silhouette shooting
 - varmint hunting
 - big game hunting
 3. Break-action pistols
 - like break action rifles and shotguns
 - usually single shot
 - specialized uses
 - silhouette shooting
 - hunting
 - survival arm
- C. Black powder handguns
1. Muzzleloading pistols
 - single shot or multiple barrels
 2. Cap-and-ball revolvers
 - revolver with cylinders loaded like muzzleloader
 - importance of grease sealer over balls

USE dummy or inert ammunition and large or projected illustrations to let kids get a hands-on look at various types of ammunition.

II. Ammunition

- A. Air gun ammunition
1. BBs
 - “round” steel projectiles
 - .177 caliber
 - will damage rifled barrels
 2. Pellets
 - three sizes common
 - .177 caliber
 - 5 mm
 - .22 caliber
 - several designs
 - air pistol competitions use standard .177 pellets
- B. Rim fire ammunition
1. .22 caliber most common
 2. Components
 - rimmed case
 - priming compound
 - powder
 - bullet or shot capsule

Find Reference picture of rimfire diagram

Reference 1 and 2

SHOW a diagram or other illustration of a rim fire cartridge. POINT OUT components as you DISCUSS them.

3. Used in small bore shooting of all types and in Olympic pistol events

C. Centerfire Ammunition

1. Numerous calibers and chamberings
 - varies with intended use
 - paper target shooting
 - .38 Special (.357)
 - 9 mm
 - 10 mm
 - .45 SCP
 - silhouettes
 - 7 mm to .44 Magnum
 - hunting
 - .224 to .458 in many chamberings
 - varies with game, distance and regulations.
2. Basic structure
 - case (rimmed, rimless or)
 - primer
 - powder
 - bullet (many different styles and designs)

D. Fitting handguns to your use

1. Rules and regulations
2. Power and regulations
3. Handgun design
4. Using available information

III. Summary (3-5 min)

- A. Learned basics of range behavior
- B. Learned basic pistol shooting techniques
- C. Learned variety and uses of handguns
- D. Rest up to you

USE a factory catalog to illustrate the types of cartridges and variety of chamberings available. POINT OUT restrictions to certain types and calibers for specific shooting events.

DISCUSS any special interests young people have. AVOID discussion on personal protection. Refer them to a course on that topic.

REVIEW the process completed thus far in the basic pistol course. USE discovery methods to let them reach conclusions.

EMPHASIZE personal commitment and responsibility.

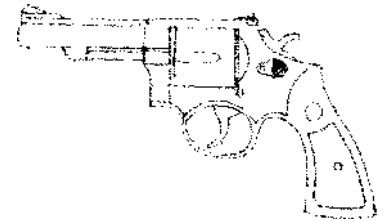
Lesson Narrative

Learning the basics of pistol safety and proper pistol shooting have been the main objectives of this program. In this session we will introduce other kinds of handguns and ammunition. We will also spend time considering selection of handgun for various uses.

Handguns include muzzleloading pistols, revolvers, semi-automatics, bolt-action pistols and hinge-action pistols. Their characteristics and uses differ. They also vary in safety features and in some handling or use features. For example, a load that is completely safe in one of the strong, hinge-action or bolt-action pistols may be extremely dangerous in a revolver. A pistol shooter needs to be aware of the types of arms available and their characteristics.

Revolvers

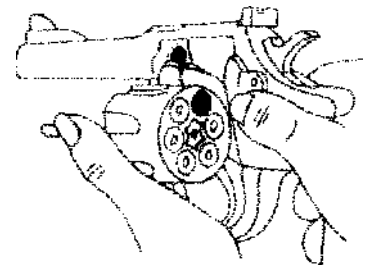
Like other handguns, revolvers have a **frame, barrel, grip** or **stock** and an action. The action includes all the parts that load, fire and unload the gun. They are unique in having a revolving set of **chambers** placed in a cylinder. The chambers are indexed to align with the barrel when the revolver is fired. Revolvers may be either single action or double action.



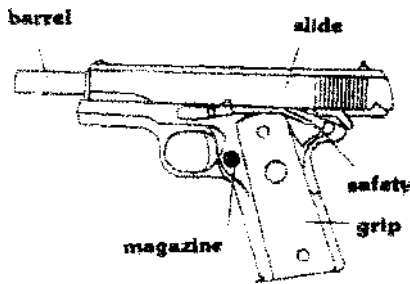
Single-action revolvers require the shooter to cock the hammer manually before each shot. The trigger releases a sear to drop the hammer and fire the pistol, but it does not cock the hammer spring. Some single-action revolvers have an internal safety mechanism that prevents the hammer from striking the firing pin unless the trigger is pulled. Others do not. When the handgun is carried in a holster, many shooters carry the revolver with the hammer resting on an empty cylinder. Usually this provides the only safety device on a single action.

Single-action revolvers are loaded and unloaded through a loading gate, a hinged plate opened to expose the chambers in the cylinder. An extractor rod aligns with the gate for easy removal of the cartridge from the chamber.

Double-action revolvers may be used in a single-action mode, cocking the hammer manually before each shot. The trigger is also capable of cocking the hammer spring and indexing the next cylinder in the process of firing. Double-action revolvers usually have an internal mechanism to prevent them from firing without the trigger being pressed. However, many shooters still carry them with an empty chamber under the hammer for safety. The cylinder of a double-action revolver normally swings to the side for loading and unloading. A cylinder release unlocks a latch that holds the cylinder in place in the frame, permitting it to be swung out for loading or unloading. A central **ejector rod** usually clears all chambers with a single stroke, and speed loaders are available to permit loading all chambers at once.



Semi-automatic or Self-loading Pistols



Semi-automatic pistols use energy from a fired round to eject the spent round, cock the firing mechanism and load another round from the **magazine**. Most models use a clip magazine that is housed inside the frame of the grip. A magazine release allows it to be removed. In addition to a frame, barrel, fire control mechanism and grip, semi-automatics have a slide. The **slide** is the moveable part of the action. It may be external to the barrel or housed in the rear portion of the receiver. Slides usually lock open when the pistol is empty unless a slide release is operated to close it.

Semi-automatic or self-loading pistols are used extensively in target shooting. They may be either single-action (hammer cocked manually) or double-action (pulling trigger cocks the hammer) on the first shot. They normally have one or more mechanical safety devices. Some of them are internal. Others are located on the frame, usually just under the slide. Still others are moveable parts of the grip, requiring pressure on the safety to unlock the firing mechanism. Like all mechanical safety devices, these are used only as an adjunct to proper firearm handling.

Bolt-action Pistols

Bolt-action pistols are very much like shortened bolt-action rifles. Each one has a receiver. All other parts (action, barrel and stock) attach to it. Bolt-action pistols are extremely strong and may be chambered for high-pressure rifle cartridges as well as standard pistol cartridges. Most bolt-action pistols are single-shot designs, and they feature rifle-styles sliding safeties.

Most bolt-action pistols are used in silhouette shooting or hunting. High velocity cartridges are often used in hunting varmints. Big bore cartridges are used in most big game hunting. These pistols are not suitable for standard pistol target shooting because their rate of fire is too low for the timed and rapid firing stages.

Hinge-action or Break-action Pistols

Like bolt-action pistols, these models are essentially shortened rifles (or shotguns). The frame or breechblock acts as a receiver and the other parts attach to it. Rather than using a top or tang lever, hinge-action pistols use an extended trigger guard as a lever to release the breech-locking mechanism. All these pistols are single-shot designs. They are extremely strong and versatile. Chamberings can be altered by mounting a different barrel fitted to the same frame. A rebounding or half cock hammer acts as a mechanical safety.

These handguns are used extensively in silhouette shooting and in hunting situations. Many are also included in survival gear.

Muzzleloading Pistols and Cap-and-Ball Revolvers

Muzzleloading pistols feature either single-shot or multiple-barrel designs. They are loaded in the conventional muzzleloader fashion by pouring a measured powder charge into the barrel, then seating a patched ball on the charge. Both flintlock and cap lock pistols are available. Most use a half-cock feature as a safety device.

Cap-and-ball revolvers provided a transition between muzzleloading pistols and those firing fixed ammunition. The cylinder is essentially a series of “muzzleloader” chambers, each with a percussion cap, powder charge and ball. Each cylinder is loaded from its muzzle end (not through the pistol’s muzzle), just like a muzzleloader. A ram on the pistol is used to seat the balls on the powder. The chambers are sealed with cup grease or some similar sealant before being fired. That prevents the flash from igniting the other charges and setting off a chain reaction.

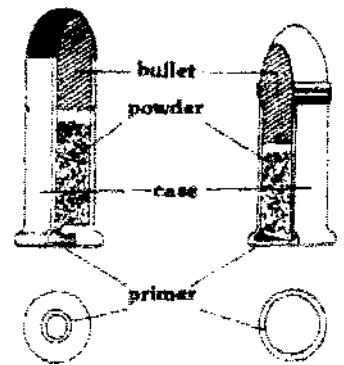
Ammunition for Pistols

Pistol ammunition ranges in size from .177 BBs and pellets to .458 bullets in a .45-70 case. BBs are nearly spherical steel balls. They are used in air guns with smoothbores but using them in high quality rifled barrels may result in damage to the rifling. The alternatives in air pistols are soft lead pellets. Most pellets are hollow-bodied projectiles. The most common sizes are .177 caliber, 5 mm and .22 caliber. Air rifle and air pistol events permit the use of only .177 caliber pellets, but others are useful for practice or shooting pleasure.

Fixed ammunition may be either rim fire or center-fire. The .22 caliber long rifle cartridge is the most commonly used rim fire ammunition in pistol shooting. It is composed of a metal case with a folded rim, a priming compound between the rim folds, a powder charge and a bullet. Some types of .22 rim fire ammunition contain a shot charge or capsule rather than a .22 caliber bullet. The .22 rim fire is used in all small-bore pistol shooting and in the international or Olympic pistol events.

The array of center-fire pistol cartridges is much larger. Bullet diameters from .224 to .458 caliber are available. The chambering and caliber are selected to meet the intended use. Most big bore paper target shooting is done with pistols having bore diameters between .357 caliber (such as the .38 Special) and .45 caliber (such as the .45 ACP). Service cartridges like the 9mm and 10mm are also used in some types of target shooting, particularly in combat shooting events.

High power silhouette shooting uses a wide range of pistol chamberings. For consistent results, most shooters use bullets in the 7 mm to .44 caliber class. Many of those cartridges were developed as wildcats (non-commercial chamberings) specifically for long-range silhouette shooting or handgun hunting.



Hunting pistols also show a great deal of variety. On the small side are a number of center-fire .22 caliber rounds. The upper limit in commercially available American handguns is the .45-70 chambering. Cartridge and firearm selection varies with the game being hunted, distance and the regulations applied to handgun hunting.

The basic anatomy of center-fire cartridges applies to pistols as well as rifles. Cases may be rimmed, where the rim of the case is larger than the diameter of the case body. They may also be rimless, with the rim diameter equal to the diameter of the case at the head and an extractor groove milled into the case. Some cases are even rebated, meaning that the rim is slightly smaller than the diameter of the case at the head. The cartridge also includes a primer, a powder charge and a bullet. Center-fire cartridges frequently contain jacketed bullets. Lead bullets may include a half jacket or a gilding metal gas check at the base. The jacket or gas check material is harder than lead and helps to prevent lead fouling in the bore of the pistol.

Fitting Handguns to Your Use

Selecting a handgun is a complex decision-making process. The intended use is a primary consideration. Hunting or silhouette handguns can be single-shot models, but those intended for serious target shooting or international competitive shooting need to be capable of shooting several rounds in rapid succession. Semi-automatics dominate that field. Revolvers are reliable tools that may be used in either type of shooting with some sacrifice in efficiency for both purposes.

The intended use also influences the chambering that should be selected. Olympic competition uses only .22-rim fire ammunition, so no center-fire cartridges may be used. American target shooting uses only a selected array of pistols from .22 rim fire to .45 ACP. Handgun silhouette shooters use .22 rim fire for small-bore events and a wide array of handguns for big-bore events. Rapid fire is not a consideration, but accuracy and adequate down-range momentum are vitally important.

Handgun hunters need to meet the energy and bullet mass demands of quick, clean kills on the intended game. They also must meet the rules and regulations that might be set forth by the wildlife agency. Reliability, accuracy, dependability and down-range energy are much more important considerations than rate of fire.

Handgun design is a critically important feature to consider. A handgun that does not fit or an action types that is not comfortable or suitable for the purpose is a poor investment. A prospective purchaser should use all the information available from manufacturers, the sporting press and other shooters in selecting a handgun for his or her purposes.

Summary

In this session, we focused on the nature of handguns and ammunition. We discussed some considerations for selecting a handgun for personal use. As we continue with handgun shooting, we will reinforce the basics of good marksmanship, safety, range behavior and sportsmanship that have been established. Becoming a good pistol shot is a challenging goal that requires good shooting form. Shooting safety resides in the mind of the person behind the firearm. What you do with this experience, your success as a shooter and sportsman and your safety on the range and in the field are up to you.

Summary Activities

1. Allow shooters to fire all the types of handguns available with a variety of chamberings if adequate range space is available.
2. Hold a “fun shoot” where a variety of novelty targets are used to stimulate both accurate shooting and fun with pistol shooting.
3. Arrange to have shooters observe or participate in a formal pistol-shooting event.
4. Hold a consumer-judging event where the participants select from a series of handguns and/or chamberings based on several sets of criteria. Have them give reasons for their placings and selections.
5. Hold an identification quiz where participants try to identify the handguns, components, ammunition and other equipment used throughout the program.
6. Keep providing an opportunity to shoot and to develop handgun-shooting skills.

Sharing and Exhibit Ideas

1. Design a set of posters that illustrate types of handguns and handgun ammunition.
2. Share your understanding of handguns and handgun shooting with another interested person.
3. Start a collection of handgun ammunition.
4. Study the handguns available for some purpose. Select one that would fit your needs and interests, and then explain why that combination of make, model, action type and chambering was selected.
5. Display your shooting notebook or journal, indicating the things you have learned about handgun shooting.
6. Study a handgun shooting game. Outline the rules and the procedures used in that game. Share that information with the rest of the handgun-shooting group.

Determining Eye Dominance

Ronald A Howard Jr. and James V. Peter, Jr. *

Eye Dominance

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.

Humans have binocular vision – they get slightly different images from each eye and blend them in the brain to yield one image and a sense of depth or distance. With both eyes open, you have a wider field of vision with more peripheral vision and better motion detection. In shooting, you simply see better when both eyes are used. Experience shows that shooting skills are learned more easily and often better developed when a shooter learns from the dominant eye side. Where eyedness and handedness are on the same side, new shooters easily use the dominant side. Cross-dominant shooters have a greater challenge, but they

do better when they learn to shoot with the dominant eye.

Some shooters, particularly those with successful experience in shooting with the non-dominant eye, are reluctant to switch. The switching process usually involves a brief period of reduced success and frustration, followed by improved skill levels beyond their original level. Some experienced shooters have learned to shoot one-eyed, closing the dominant eye or obstructing it with a shield, blinder, spot of tape of a small object on the lens of the shooting glasses. Others have learned to override their dominant eye through practiced concentration or to compensate in some other fashion. Fewer than 1 percent of all shooters must shoot one-eyed because of dominance switching. In most cases, the shooter learns to use both eyes and shoot from the dominant-eye side. Learning one-eyed or with the dominant eye obstructed or closed increases stress and fatigue and reduces concentration and quickness. Results indicate reduced performance levels, increased frustration for the shooter and slower learning.

Learning to shoot well is a challenge. You need every advantage to meet that challenge effectively. Learning from the dominant-eye side is a major advantage.

How to Determine Eye Dominance

Four basic methods for determining eye dominance are described. Those that provide a check for “cheating” are more effective in an instructional setting. Regardless of the method selected, the exercise should be repeated several times. Instructors should remain alert for eye-dominance related problems with shooting performance.

Coach-pupil Method

Shooters should get into their coach-pupil pairs, standing several arm-lengths apart and facing each other squarely. The “pupil” should place one thumb over the other, then cross the fingers of the top hand over those of the bottom one. This leaves a small, triangular opening. Raise the hands, keeping both eyes open, and center the “coach’s” nose in the triangular opening. At this point the coach should note which eye is visible in the opening. Then the “pupil” should bring his or her hands slowly back to the face, keeping the “coach’s” nose in the opening. The hands should come to the dominant eye. Coaches must watch closely for wavering between the eyes, an indication of “cheating” or forcing the hands to a predetermined eye. The exercise should be repeated several times to confirm original results with both partners checking their eye dominance.

Option: Shooters could cup their hands together, leaving small openings between the bases of the little fingers and the thumbs. A card or a sheet of notebook paper with a small hole centered in it could also be used.

Distant-object Method

Use any of the methods of making an aiming device outlined above. Center a distant object in the opening. Make sure both eyes stay open and face the object squarely.

Finger-point Method

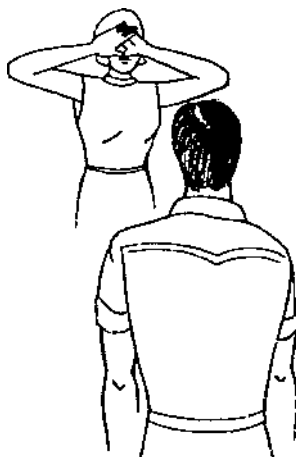
With a pointing method, a distant object or a partner is used. The finger is pointed naturally at the object with both eyes open and the face square to the object. The eyes are covered or closed alternately. When the dominant eye is closed or covered the finger appears to jump away from the original location.

Tube Methods

Kaleidoscopes, toilet paper tubes and similar objects can be used with many young people to determine eye dominance. When the person is not aware of being tested for eye dominance, the tube will almost always be brought to the dominant eye. This also occurs with spotting scopes, telescopes and similar tools where one-eyed viewing is needed.

Troubleshooting for Coaches and Instructors

Some shooters will bring the opening back to their own noses because they are looking at the paper or their hands rather than at the target. Those who use the finger-point method will see two fingers if they focus on their hand rather than on the target. If inconclusive results are obtained, try another method. Make note of that shooter, however, and watch for evidence of switching dominance in the act of shooting. Consistently missing to one side of the target usually indicates an eye-dominance related problem.

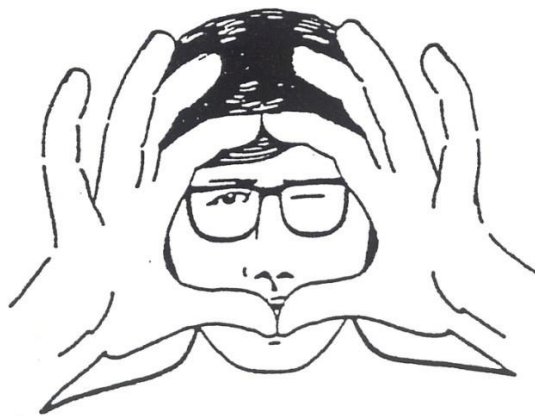
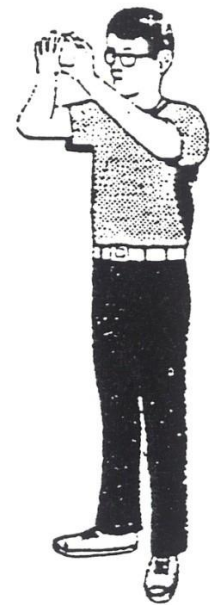
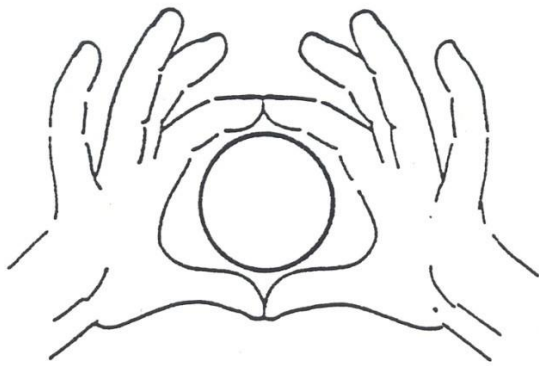


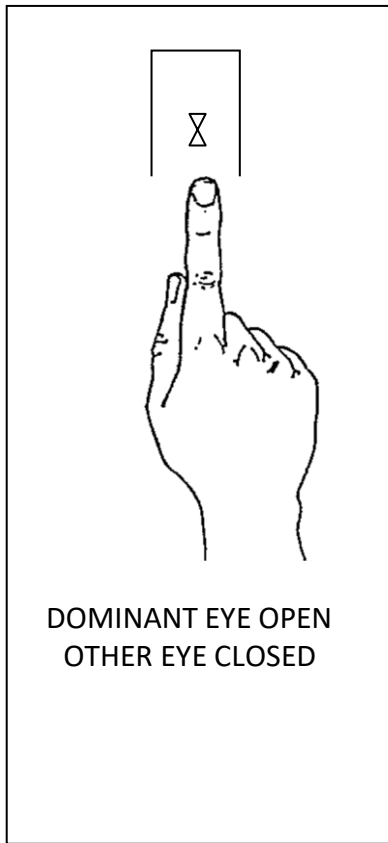
A Note of Caution

Vision problems can have a serious impact on shooting ability. Often, they go undetected by the shooter or those around them. Unless you are an ophthalmologist or optometrist, avoid “diagnosing” vision problems, but be aware of the types of problems a shooter with vision problems may face. Discuss any potential problems you observe with the shooter and his or her parents. Like teachers who notice reading problems or other vision related difficulties, the shooting instructor may notice things that even the shooter misses.

Finally, be sure that all shooters are wearing adequate eye protection while they are on or near the firing line. Some people recommend the use of shooting glasses even for archers. Eyes are precious, and vision is vital to shooting. Let’s do our part in protecting them.

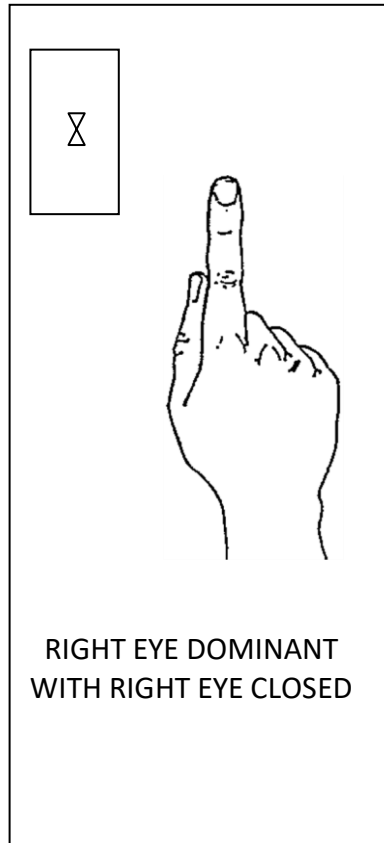
DOMINANT EYE





Check for Eye Dominance

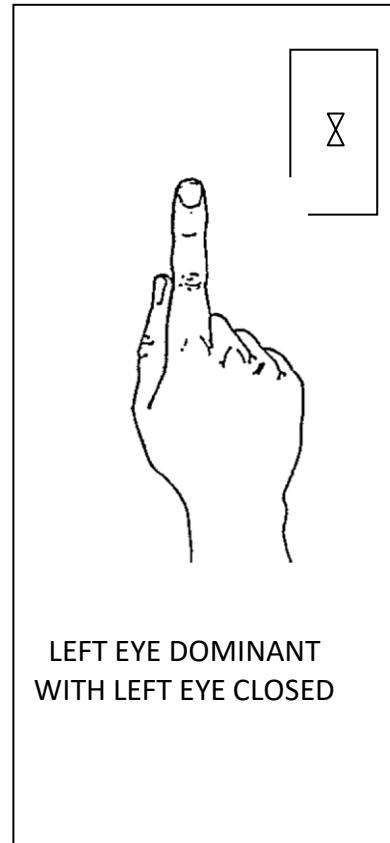
With both eyes open, point your finger at a small object 10 - 20 feet from you.



Right Eye Dominance

Close your left eye and the object will not move.

Close your right eye and the object will appear to jump to the left of your finger.



Left Eye Dominance

Close your right eye and the object will not move.

Close your left eye and the object will appear to jump to the right of your finger



Figure A-1: Two fingers of left hand simulate rear sight. Index finger of right hand simulates front sight. Represents perfect sight alignment.

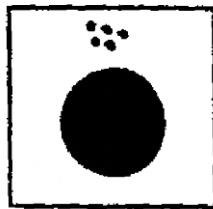


Figure A-2: Keeping tight hand stationary, move left hand down to simulate moving rear sight down.

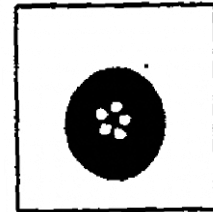


Figure A-3: After the rear sight (left hand) is moved down, realign sights. Thus, right hand moves down to simulate moving muzzle down.

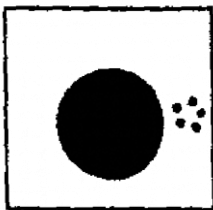
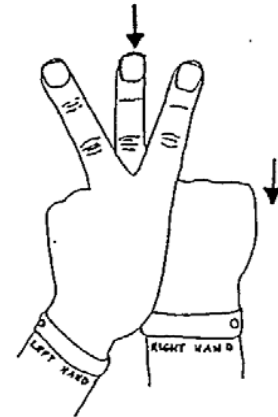
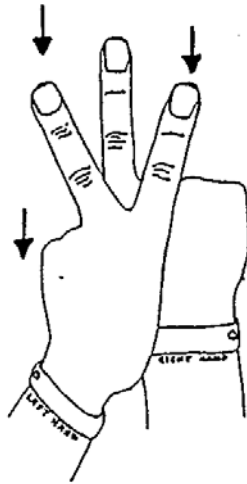
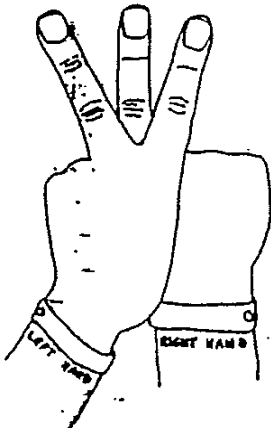


Figure B-1: Two fingers of left hand simulate rear sight. Index finger of right hand simulates front sight. Represents perfect sight alignment.

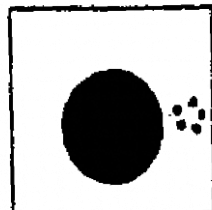


Figure B-2: Keeping right hand stationary, move left hand to the left to simulate moving rear sight to the left.

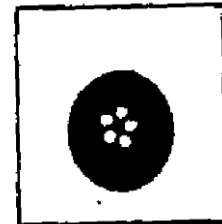
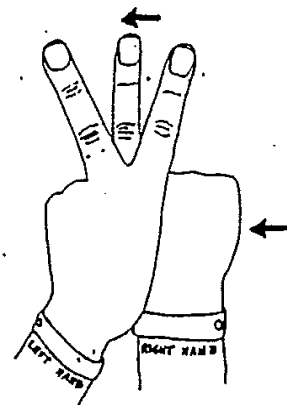
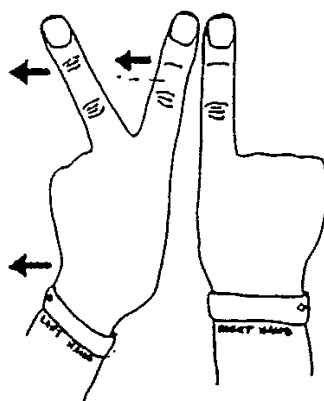


Figure B-3: After the rear sight, left hand) is moved left, realign sights. Thus, right hand moves left to simulate moving muzzle left.



Non-threatening Hands-on Instruction

James V. Peter, Jr.*

A major element of shooting is stance. When working with shooters, particularly beginners, instructors frequently must use their hands to position them or correct their form or assisting them with equipment and shooting clothing. Even though close contact with the shooter is essential for effective instruction, the instructor must be careful to avoid any action that could appear improper or cause the student anxiety. A few simple actions can ensure a working relationship between instructor or coach and student without any question of anxiety or impropriety.

Respectful, non-threatening treatment of shooters begins with demonstration. Use a junior leader or an assistant to demonstrate proper posture or position and then as to how instructors will handle/assist shooters to correct their posture or position. By telling the shooter what you are about to do you can further reduce his or her anxiety. Ask permission before touching and tell the shooter you are going to push his or her torso forward, raise an

elbow or reposition a hand. The posture of your hands when contacting the student can also ease anxiety. Except in an unsafe situation where immediate and decisive action is required, it is seldom necessary to “grab” a student or the firearm. When your hands are held relatively rigid with the fingers straight and the thumbs resting on the top of the hands, they are much less threatened. Pressure from the palms of flattened hands (fingers not curled) can accomplish most positioning and controlling needs. This is called “Non-threatening Hands on Instruction.”

Non-Threatening Hands on Instruction

- Positioning or Stance
- Equipment & Shooting Clothing
- Always Respectful
- Use Demonstrations
- Request Permission to touch
- In response to students need
- Avoid Breasts, Buttocks, and Groin

- Should Be Open & Not Secretive
- Governed by Age
- Always Appropriate When Safety of the Individual or Group is At Stake

Examples and Advice

Assisting with coats, shooting vests or shooting coat or jacket. There are several adjustments that can be made on a shooting jacket/coat that help the fit and performance of the individual. As we teach in instructor training there are appropriate methods and inappropriate ways of non-threatening hands on instruction or assistance. Utilizing same gender assistance or students helping students may be the most appropriate for the situation. Age of participants, gender, and individual permissions are also factors that must be considered. The one exclusion is when the immediate safety of the individual or others is at stake.

Trajectory and Trajectory Experiments

Ronald A. Howard Jr. *

Many people think that bullets, shot or arrows travel in straight lines just like light. It does not take much shooting experience to realize that projectiles and light behave quite differently. The physics of projectiles (ballistics) is discussed at the end of this fact sheet for those interested. The main purpose of this material is to help you understand how trajectory enters shooting.

Under normal conditions, light travels in straight lines. Changes in the density of substances it passes through may deflect it, but within substances of uniform density (like air) light travels in straight lines. Electromagnetic forces, like magnets can bend light, but it has no mass (weight).

Projectiles like bullets or arrows have mass. As a result, they respond to gravity under normal conditions. As soon as an arrow leaves the string or a bullet leaves the muzzle, it begins to fall, accelerating toward the earth under the influence of gravity. In fact, if an arrow or bullet was fired parallel to the surface of the earth on level ground, it would hit the earth at the same time as one dropped from the same height at the same time much farther away. In addition to their mass, projectiles are solid objects. Pushing them through a dense medium, like air, causes friction and turbulence. Both

* 4-H and Youth Development Specialist, Texas Agricultural Extension Service

forces affect the projectile immediately. The projectile begins to slow down as soon as it leaves the string or the muzzle.

The slowing influence is cumulative until the projectile finally comes to rest.

These two factors combined cause projectiles to follow a curved flight path. If two straight lines are used to show the line of the bore or the resting position on the string and the line of sight, the line of flight (path of the projectile) would relate to those lines as shown below (Figure 1).

The curved flight path requires that

the bore must be pointed above the line of sight to hit a distant object on the line of sight. If the sights are above the bore or the arrow, it must cross the line of sight twice, once while rising and a second time while falling toward the earth. The exact shape of the trajectory curve can be determined by complicated mathematics or by testing. Actual testing yields better results for a given shooter and his or her equipment and is more easily understood.

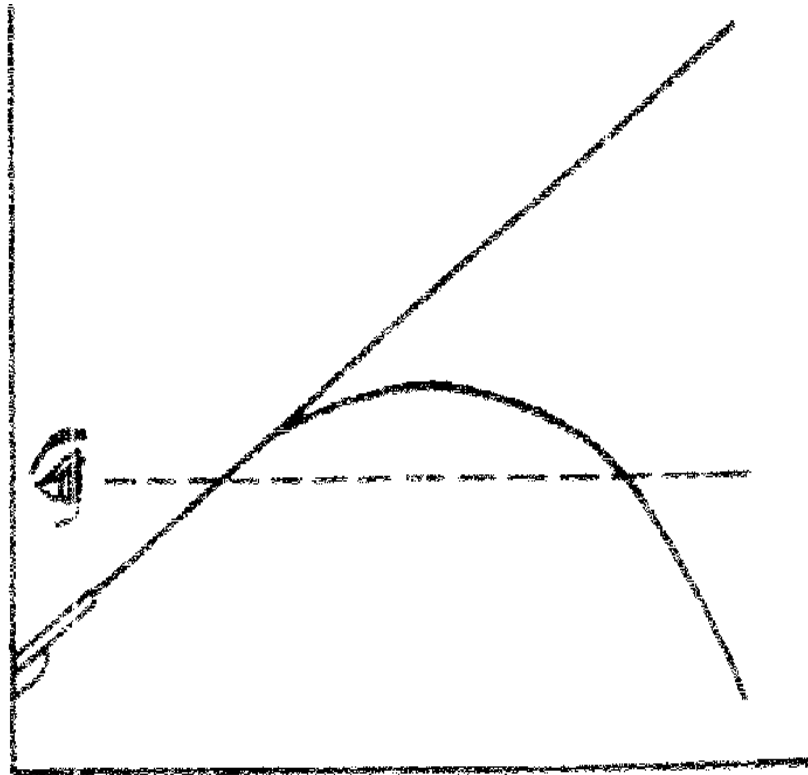


Figure 1. Relationships among line of sight, line of bore, flight path and drop.

The projectile accelerates toward the earth at a rate of about 9.8 meters/second² (32 feet per second²). If the projectile was fired parallel to the ground, it would drop 4.9 centimeters (0.16 feet) in the first 0.1 second, 19.6 centimeters (0.64 feet) in 0.2 second, 122.5 centimeters (4 feet) in 0.5 second, and 490 centimeters (16 feet) in 1 second (Table 1). In 3 seconds it would have dropped 44.1 meters (144 feet). If a projectile were able to travel at a constant velocity of 60.96 meters/second (200 feet/second), the trajectory would look like the graph in Figure 2. The actual flight path would curve more sharply downward, since the projectile would be slowing its horizontal motion as gravity pulls it to earth.

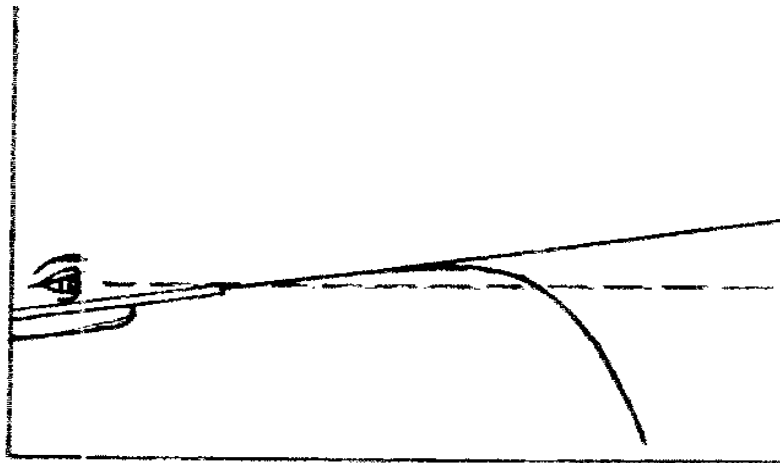


Figure 2. Trajectory of an idealized projectile traveling at a constant 60.96 meters/second (200 feet/second).

You can calculate the trajectory of your personal equipment as you have it set up using the worksheet attached. Shoot the same arrows throughout the experiment if possible. If not, shoot matched arrows with matched fletching. Leave the sight setting the same for all shots and use the same aiming point for each shot and all distances. Measure from the aiming point to the center of the group of arrows and carefully record the distance above (+) or below (-) the point of aim for each distance. Stop shooting if the arrows are falling short (or nearly falling short) of the target. Plot the flight path of the arrows relative to the line of sight. The elevation angle can be calculated if desired by following these steps.

1. Measure the true draw length of the arrow at full draw (the distance from the anchor point to the arrow rest).
2. Measure the height of the sight pin above the arrow rest.

3. Measure the height of the center of the eye above the bottom of the arrow shaft at the anchor point.
4. Subtract the sight pin height from the eye height.
5. Divide that length by the true draw length.
6. The dividend is the natural sine of the angle of elevation from the horizontal.
7. Use a sine table to locate the angle with that sine value.
8. Plot a horizontal line through the eye and sight to the center of the target.
9. Plot a line starting with the distance from the eye to the anchor point below the line of sight at the calculated angle of elevation above horizontal. This is the line of the shaft or the line of the bore.
10. Plot the true line of flight at the distances selected.

This same procedure can be used with rifle bullets, but a longer range is needed and the differences in impact points should be recorded in centimeters or inches rather than meters or feet.

For Those Who Want to Know More

Ballistics is the science of projectiles. It focuses on the dynamics of projectile flight and the energy stored and released by the projectile. One of the components of ballistics is the study of trajectory, the flight path of projectiles. In shooting, trajectory related the straight line of sight to a target with the curved flight line of the projectile. The ballistics of bullet or arrow trajectory involves complex concepts in physics and engineering.

Newton's first law, the law of inertia, states that objects tend to remain at rest or to travel in a straight line at a constant speed unless they are acted upon by an outside force. For projectiles, the forces include the energy that accelerates them initially, the acceleration of gravity, friction of the air and drag. Projectile mass, shape and even construction can influence those forces. Complex formulas have been developed to calculate the projectile's ability to retain its energy and velocity (speed)

in a direction). Sectional density and ballistic coefficient are two measures of the “slipperiness” of a projectile.

A projectile starting at rest is accelerated by the stored energy of the limbs, air charge or expanding gases of the fired round. The internal ballistics (those inside the firearm bore or while the arrow is on the rest) limit the motion to horizontal and vertical vectors (components of the total velocity of the projectile). Under most conditions the horizontal velocity is greatest.

External ballistics are more complex, and they begin as soon as the projectile leaves the bore or the bow. The horizontal vector of velocity is measured by its horizontal speed toward the target. The vertical vector is measured by its speed upward, perpendicular to the surface of the earth. Both the horizontal and the vertical vectors of velocity begin to decrease immediately. Friction and turbulence in the air reduce the horizontal velocity. The pull of gravity reduces the vertical velocity. Note that a negative acceleration or velocity in the vertical component means the projectile is moving toward the earth rather than away from it. Wind currents or the rotation of the projectile may cause a lateral movement.

High initial and retained velocities result in a “flatter” trajectory. That is, the arc of the projectile from the shooter to the target is less peaked. The less time the projectile is in flight, the less outside forces influence it. The obvious conclusion is that “faster is better.” However, obtaining optimum ballistic performance involves balancing competing factors rather than simple maximization of any one factor. Limits are imposed by the chemical structure of the powder, strength of the materials used, mass of the firearm and the strength or recoil

resistance of the shooter. Other factors, like barrel life, consistency in energy release, economics, projectile construction and many more reduce the upper limit toward some optimum value.

Changing a single factor of the internal ballistics can result in major changes in external ballistics. Altering the mass of a projectile results in changing its shape. Both sectional density (a measure of the mass divided by the diameter or basal area) and ballistic coefficient (a measure of the bullet’s ability to overcome resistance of the air, which involves sectional density in its calculation) are related to the shape of the bullet. Optimizing mass and initial velocity with performance and terminal velocity involves many factors.

The results of changing bullet mass may be surprising. An empirical test could be done using bullets of similar shape and diameter but different weights. Thirty caliber bullets are available in flat-based spitzer shapes in weights from about 110 grains to 200 grains. Interested shooters could fire a test series with bullet weight and compare trajectory curves to determine the optimum bullet weight for that shape in their rifle.

Both momentum and energy are related to the velocity and mass of the projectile. Momentum is the product of the mass and the velocity. Kinetic energy (the energy of moving objects) is the product of the mass and the square of the velocity divided by two.

Projectile use is a major determining factor in balancing momentum and energy. When a projectile comes to rest, the remaining energy and momentum are translated into penetration and shock. On target ranges bullets and arrows need only enough momentum and striking force to penetrate the target. The shot must have enough remaining energy and momentum to break clay targets. In

hunting situations, small game arrows, shot and bullets kill by hydrostatic shock. The energy of the striking bullet displaces water in the tissue, causing immediate disruption of vital functions. Momentum is not critical, but kinetic energy is. Big game arrows kill by penetration and hemorrhage. Very little hydrostatic shock is produced, so momentum is much more important than kinetic energy. Big game bullets must combine shock with adequate penetration to reach vital areas. Considering the use of the projectile adds complexity to making ballistic decisions. This may explain the large array of arms and ammunition available today.

Many ballistic experiments can be tried by shooting sports participants. Most would be worthy of entry in science fair competitions under the categories of physics and engineering. Altering one factor at a time, such as sectional density or velocity, may offer easier explanations of the events taking place. For the shooter more interested in performance on targets or game, the arms and ammunition companies have tables that can assist in selecting the appropriate combinations of factors to do the job at hand. Wise shooters will test the listed values for themselves using their own firearms, particularly where the shape of a trajectory curve is concerned. Their observed data is much more valuable than the theoretical data from the tables.

Table 1. Theoretical values for drop from the acceleration of gravity and distance traveled for idealized projectiles fired parallel to the surface of the earth at a constant velocity of 60.96 meters/second (200 feet/second) and 914 meters/second (3000 feet/second) is given below. The lower velocity corresponds to a very fast arrow. The higher velocity approximates a high velocity center-fire rifle cartridge.

| Time | Distance Dropped | | Distance Traveled @200ft.sec | | Distance Traveled @3000ft.sec | |
|-------------|-------------------------|-------------|-------------------------------------|------------|--------------------------------------|------------|
| | (sec) | (cm) | (ft) | (m) | (ft) | (m) |
| 0.1 | 4.7 | 0.16 | 6.1 | 20 | 91.4 | 300 |
| 0.5 | 19.6 | 0.64 | 12.2 | 40 | 182.8 | 600 |
| 0.3 | 44.1 | 1.44 | 18.3 | 60 | 271.2 | 900 |
| 0.4 | 78.4 | 2.56 | 24.4 | 80 | 365.6 | 1200 |
| 0.5 | 122.5 | 4.00 | 30.5 | 100 | 457.0 | 1500 |
| 0.6 | 176.4 | 5.76 | 36.6 | 120 | 584.4 | 1800 |
| 0.7 | 240.1 | 7.84 | 42.7 | 140 | 693.0 | 2100 |
| 0.8 | 313.6 | 10.24 | 48.8 | 160 | 731.0 | 2400 |
| 0.9 | 369.9 | 12.96 | 54.9 | 180 | 822.6 | 2700 |
| 1.0 | 490 | 16.00 | 61.0 | 200 | 914.0 | 3000 |
| 1.25 | 765.6 | 24.00 | 78.2 | 250 | 1142.5 | 3750 |
| 1.5 | 1102.5 | 36.00 | 91.4 | 300 | 1371.0 | 4500 |
| 1.75 | 1500.6 | 49.00 | 106.7 | 350 | 1599.5 | 5250 |
| 2.0 | 1960 | 64.00 | 121.9 | 400 | 1828.0 | 6000 |

Pistol and Rifle Range Commands

William F. Stevens, John Kavsnicka and Ronald A. Howard, Jr.*

Basic range control procedures are familiar to most rifle or pistol shooters. After shooters become familiar with range operations, behavior and etiquette use the conventional range commands. When new shooters are learning, however, modifications can enhance safety and provide better control. The following procedure is effective, and we recommend it to you. Range commands are in bold type. Coach, shooter or range assistant actions and comments are listed in normal type. Options or temporary parts of the command are indicated by brackets [] Parentheses () enclose alternative or additional commands that can be used with beginning shooters. Refer to Fact Sheet 13 for additional information.

Shooters (Relay {state number}) to the line.

Shooter-coach pairs move to the firing line with their rifles or pistols empty, actions open and exposed to view, muzzles pointed in a safe direction and fingers off the trigger. Range staff will also check each rifle or pistol on its way to the range.

Is the line ready? Respond by firing point number, please.

Each shooter or coach will reply with “ready” or “not ready” and state his or her

firing point number. Any firing point not responding will be queried directly to determine their situation and whether they need assistance. Once the line is ready, the range officer will declare its status.

The line is ready. [The range (line) is clear, you may handle your firearms (pistols, rifles).] OR

Pick up your firearm (pistol, rifle). Keep the muzzle down range, the action open, the safety on and the finger off the trigger.

Shooters pick up rifles or pistols, verify the condition, make any preparations with the empty rifle necessary for the shooting taking place and await further instructions. “Coaches” and range assistants observe muzzle control and maintain control over all ammunition. *See the Fact Sheet 17: Pistol and Rifle Shooting Procedures* for further information.

Load your firearm (rifle, pistol). Safeties off.

Assume a comfortable (proper) firing position.

Align your sights. (Focus on the front sight and obtain proper sight alignment.)

[Raise your pistol (rifle) to firing position. (Keep the front

sight in focus and maintain your sight alignment.)]

Obtain a proper sight picture. (Maintain your focus on the front sight and proper sight alignment.)

Fire when ready.

Squeeze (Press) the trigger. (Maintain your front sight focus, sight alignment and sight picture until the projectile {bullet, ball or pellet} hits the backstop.)

Cease fire.

The cease fire command must be obeyed immediately, even if a shot is nearly ready. It is complex and will need step-by-step reinforcement until it is nearly reflexive.

Make your firearm (rifle, pistol) safe. [Keep the muzzle pointed down range.]

Open the action and make sure all ammunition is removed from the firearm. Place the safety in the “on” or “safe” position.

Ground your firearm (rifle, pistol), leaving the action open and score targets.

Firearms may not be handled until the range has been declared clear once more.

Conventional Range Commands

Relay [X] (shooters, relay [X] match [Y] to the line.

Director, Minnesota Deer Hunters Association; and 4-H and Youth Development Specialist, Texas Agricultural Extension Service.

* Conservation Affairs Manager for Federal Cartridge Company, Anoka, MN; Executive

The preparation period begins now...The preparations period has ended

This command declares that the range is clear and unloaded firearms may be handled, adjusted or otherwise made ready. They may NOT be loaded.

Is the line ready?

Any shooter not ready must indicate he or she is not prepared to begin their relay. If any shooter is not ready, the range officer will announce that **the line is not ready** and repeat the process after a brief pause.

The line is ready.

This command indicates that all shooters have completed their preparations and are ready to begin the relay.

Ready on the right. Ready on the left. Ready on the firing line.

This command announces that the firing line is active. In some events, the shooter may insert a magazine or load after the “ready on the right” command.

Commence firing. (Fire when ready, fire at will, the range is hot.)

Live firing may commence. The first two terms are more commonly used. Their use is encouraged to promote consistency.

Cease firing. [Unload, open the action, ground your firearm.]

The initial command carries the implication of all the others, but they are used explicitly in some shooting events.

Change (score or score and paste) targets. (The range is clear, you may change targets.)

Shooters may proceed down range to replace, retrieve or score targets. Firearms may not be handled until the range has been declared clear once more.

Several additional commands may be used.

The firing line is clear. You may handle your guns.

This is equivalent to the “make ready” command.

Police firing points.

This command is used when shooters need to pick up their fired brass and other materials around the firing points, often at the end of one or more relays.

As you were.

This command rescinds the one immediately preceding it. It returns control to the previous level, for example, if the range officer has announced “the line is ready,” “as you were” would indicate that it is not ready.

Carry on.

This command allows shooters to proceed with the actions taking place before some interruption occurred.

Make your firearms (pistols, rifles) safe.

The range officer may include or expand this command. The firearm should be unloaded, magazines removed, and actions or cylinders opened and plainly exposed to view. Muzzles must continue to point down range.

Ground your firearms (rifles, pistols).

The safe firearm must be placed on the shooting mat, bench or other safe surface. It may not be picked up or handled without specific instruction from the range officer.

Each action is the same as for beginning shooters above. Do not rush to move to the “standard” range commands. The beginning shooter will benefit from the verbal reinforcement of the positive actions they should be taking. Move to the conventional commands after you are completely satisfied that the fundamentals of firing a shot and range safety are instilled in the shooters.

Rifle and Pistol Shooting Procedures

Ronald A. Howard, Jr., William F. Stevens and John Kvasnicka*

Beginning shooters must learn a protocol for handling firearms on the line. Instructors or coaches should use an expanded procedure to establish and reinforce safe and responsible firearms handling. Once those processes have become conditioned reflexes, control may revert to the basic range control commands. The protocols outlined here are designed to produce safe and responsible shooters. Numbered items are the basic commands. All items in bold print should be explicitly mentioned during the shooting process for beginning shooters.

1. Pick up your firearm [rifle, pistol]. Several elements are implicit in this process.

Keep muzzles in a safe direction. That means down range while on the firing line and away from people (usually straight up) at all other times. Take time to teach a proper position. Muzzle control is the shooter's personal responsibility with the coach and range personnel reinforcing it constantly and having immediate access to each shooter.

Check firearms to be sure they are empty. Verify that each firearm is empty. Control of all ammunition by range assistants or coaches is essential during the early stages of instruction.

Actions open and exposed to view for visual inspection. A closed action means "loaded and ready to fire." This, too, is a shooter's responsibility with reinforcement from their coach and all range staff.

Keep fingers off the trigger until in the act of firing. Until keeping the finger along the trigger guard becomes a habit, all range staff must watch this carefully.

Safeties on. The location and operation of the safety must be thoroughly explained. Define what is meant by "safe" or "on" and "fire" or "off." [Note: Instructors debate the importance of using the safety during range instruction. Many feel it is unnecessary since the firearm is only loaded when a shot is going to be fired. They consider using the safety unnecessary and potentially confusing. Many others feel use of the safety reinforces proper firearms handling and prepares the shooter for field shooting.]

2. Load [and charge] your firearm. Safe loading, unloading and charging (air rifles) must be thoroughly demonstrated and explained. Even when coaches will be loading the firearm, reinforce the process step by step early in instruction. Each coach and shooter must be sure the ammunition provided is appropriate to the firearm being used. When dry

firing, **absolutely no live ammunition** should be on the firing line, or in the possession of anyone on the firing line. Ammunition must be distributed through range staff or coaches until shooters can handle their own.

Place one round in the changer. If air guns are used, remind shooters that the skirt of the pellet goes to the rear, at least for the first few shooting sessions.

Close and lock the action. Reverse this sequence to unload a firearm.

Charge the arm [rifle, pistol] with air. To ensure consistent performance, explicit instructions may be needed in the early stages of instruction.

3, Assume a proper shooting position. The coach and range staff should assist each shooter into a proper shooting position, oriented and positioned for effectiveness. Each point in the position should be checked to give the shooter advantage. During the early stages of instruction, the position, including foot position orientation to the target, stance, grip and other form elements should be developed gradually and in sequence.

*4-H and Youth Development Specialist, Texas Agricultural Extension Service; Conservation Affairs Manager for Federal Cartridge Company, Anoka, MN; and Executive Director, Minnesota Deer Hunters Associations.

4. Safety off.

5. Align your sights. In the beginning, consider this a two-step process.

Focus your vision on the front sight. Align the front and rear sights.

6. Fire when ready. The firing process is complex and should be considered in a step-by-step fashion for beginning shooters. Often the first shot is fired “by commands.”

Obtain sight alignment and sight picture.

Squeeze the trigger (press the trigger straight back) while keeping the sights aligned, focusing on the front sight and maintaining your sight picture.

Maintain the sight alignment and sight picture through the shot until the projectile strikes the backstop.

11. Cease fire. The cease fire command is also complex and requires step-by-step reinforcement.

Cease fire. [Reinforce immediate response.]

Make your firearms [pistols, rifles] safe.

Open all actions.

Remove all ammunition.

Ground all firearms [rifles, pistols] with the actions open and visible for inspection.

Take one step back from the firing line.

Analyzing Groups for Form Faults in Pistol Shooting

Ronald A. Howard Jr.*

The NRA instructional manual, *The Basics of Pistol Shooting*, is an excellent teaching tool for pistol instructors. Appendix D lists some common shooting errors and illustrates their impact on group location and pattern and suggestions for correcting errors. It refers to right-handed shooters but states that left-handers will show a mirror image of the illustrated error. Some instructors experience difficulty in translating the illustrations. The following chart is written in ambidextrous terms as a supplement to Appendix D. Two-handed shooting adds potential for form faults, although they will often mimic those illustrated.

When working with students, instructors should try to use ambidextrous directions and illustrations when possible. When working with beginning shooters refrain from pointing out errors.

Stress the elements of good shooting form to correct the error. Reinforcing good basic shooting form is a much more effective teaching strategy. It does not clutter the shooter's thoughts with things that must be avoided, but provides a simple set of sound, practiced fundamentals.

The vast majority of the shooting faults and associated group location problems result from difficulties during the follow through. Many involve the shooter anticipating recoil or attempting to control it by grabbing the pistol, pushing it into the recoil, "choking" the grip with excessive pressure or related problems. These problems often result from excessive shooting without adequate breaks, fatigue, shooting big bore pistols with heavy recoil before developing adequate basics, failure to use eye and ear protection (noise,

muzzle flash, or gas blow-back) or poor concentration. Dry firing and ball and dummy exercises are recommended for correcting most of these form faults. Hundreds of dry-fired shots can establish the proper form, making it a habit when live firing is taking place. Air pistols are also excellent tools for correcting form in both pistol and rifle shooters. They are extremely sensitive to form faults and will assist the shooter in correcting many of them. They are noiseless, relatively free of recoil, modest in mass and shoot relatively slow projectiles that demand a strong follow through. They are inexpensive and adaptable to a wide variety of shooting ranges, including boxes stuffed with crumpled newspaper.

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Common form faults in pistol shooting and group locations often associated with them.

| Group Location | Form Fault | Correction |
|--|---|--|
| No group, shots scattered | Inconsistent shooting basics of sight alignment and trigger control inadequate. | Review and practice basics; use triangulation and trigger control exercises, return to shooting target backs |
| Diagonally low and to the “off” side | Jerking or snatching the trigger; squeezing with the whole hand during the trigger squeeze | Press with the trigger finger only; dry fire, keeping the sights aligned through the shot; use ball and dummy exercise |
| Diagonally high and to the “off” side | Anticipating the recoil and “throwing” the pistol into it; improper follow through – releasing the trigger finger upon firing | Repeat dry-firing or ball and dummy exercises; concentrate on follow through |
| Diagonally low and to the shooting side | Tightening (grabbing) the grip as the pistol is fired; tightening the forearm during the shot | Dry-firing exercise with focus on follow through; use air pistol to reduce recoil anticipation; ball and dummy exercise |
| Diagonally high to the shooting side | Anticipating the recoil and pushing with the heel of the shooting hand | Ball and dummy or dry-firing exercise with focus on follow through |
| Horizontally strung to the “off” side | Trigger finger placement wrong, pressed at angle, not straight back | Experiment with finger placement while dry firing; focus on grip and finger position. |
| Horizontally strung to the shooting side | Pressing with the thumb during the shot; pushing with the support hand; imbalance between hands using the palm- rest grip | Dry fire with focus on pressing only with the trigger finger; repeat trigger control exercise; concentrate on follow through |
| Strung low with proper windage | Pushing the wrist down at the shot, anticipating recoil; trying to control recoil; relaxing the shoulder at the shot | Dry fire or use ball and dummy exercise; concentrate on follow through; hold position until bullet strikes |

Trigger Squeeze

Ronald A. Howard Jr.*

Proper trigger control involves moving the trigger mechanism to fire a shot without disturbing sight alignment or sight picture. Rifle and pistol shooters commonly refer to this process as “squeezing the trigger.” Although “squeeze” may imply a prolonged pressure rather than a swift movement, it may carry some unintended messages for the shooter. Squeezing a rifle or pistol trigger must be an isolated action. It requires that pressure be exerted straight back on the trigger by the trigger finger alone. Squeezing with the rest of the hand or attempting to force the shot into the desired area by snatching or jerking the trigger is a serious form fault that may be difficult to cure. Using the entire hand or the thumb in the trigger squeezing process can have a serious impact on group size and location. Although it affects both rifle and pistol shooting, its impact on pistol marksmanship is much more evident. The coach or instructor must be conscious of the potential problem and be prepared to treat it.

Thumbing or squeezing the grips can be diagnosed by reviewing the location of groups on the target. Dry-firing or ball and dummy exercises may reveal the problem more graphically. Practice can cure the tendency to grab, grasp or thumb; but the problem is easier to prevent than to cure.

Be sure to explain what trigger squeeze is and is not to naïve shooters. It may help to use other terms for the process. Many coaches like to use “press” since it conveys the same sense of prolonged pressure but does not imply action by the remainder of the hand. Caution former military shooters to avoid using the analogy of squeezing a lemon or other item with the entire hand. The amount of grip pressure should remain consistent from shot to shot and during the shot.

A simple exercise can help in teaching trigger control. Have each shooter hold their shooting hand in a relaxed manner but in the position, it would assume to hold a pistol. Ask them to practice removing the tip of their trigger finger back toward the wrist without moving the thumb or the other fingers. This exercise helps to develop a smooth trigger squeeze while avoiding extra muscular activity and tiny disturbances in sight alignment and sight picture. It has the advantage of requiring absolutely no equipment.

The more traditional, eye dropper technique is also excellent if thumb movement is carefully avoided during the squeeze. The eye dropper could even be mounted in a pine stock if desired.

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Penetration and Shock Demonstrations

Ronald A. Howard Jr.*

This demonstration is an effective way of contrasting the actions of firearms and archery equipment. It requires an adequate range. For best results, use a high velocity cartridge loaded with frangible bullets in the rifle. A bow powerful enough to completely penetrate the backstop material completely should be used. Have junior leaders or parents assist.

First, shoot water filled (completely!) milk jugs, oil cans or similar containers with each arm. The targets should be at the same range from the firing line and close enough to hit them easily. The rifle should produce a response resembling an explosion. The bullet has high

kinetic energy that is quickly transferred to the water as hydrostatic shock. Since water is incompressible, it moves away from the impact area violently. Water in living things behaves similarly, and the bullet kills by tissue disruption and hydrostatic shock.

The arrow should easily penetrate both sides of the jug and may pass through the container without too much disturbance, merely causing a leak or making the jug tip over. It has relatively little kinetic energy and causes very little hydrostatic shock. Arrows are penetrating and cutting projectiles, and they kill large game by massive and rapid hemorrhage.

Repeat the performance on jugs filled with sand, hay bales or some similar backstop. The rifle bullet should be stopped by the material, but the arrow should pass completely through again. This should help the youngster to realize that even a relatively light bow can drive an arrow through material that is capable of stopping a bullet. Use the graphic demonstration as an introduction to a discussion of safety and the functions of both bullets and arrows in taking game animals.

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Air Gun Range Setup

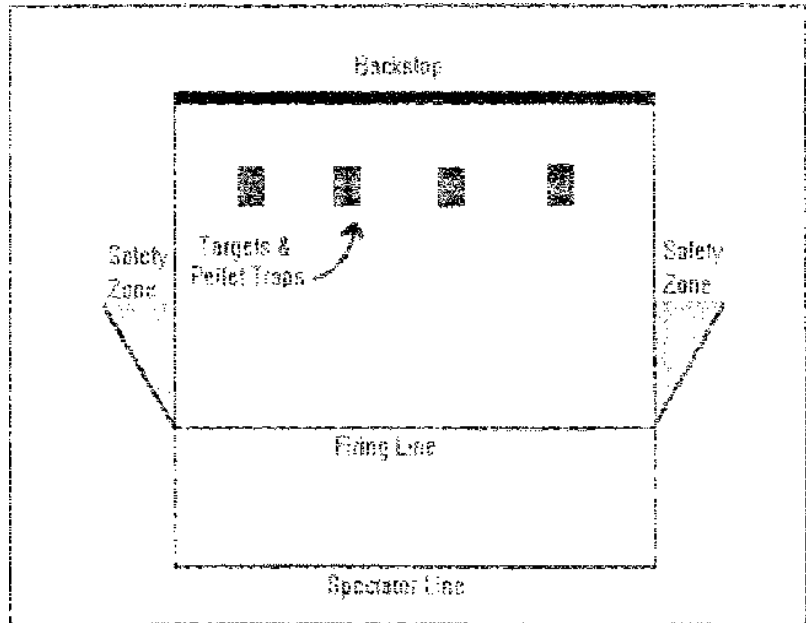
Donald L. Burtchin*

There are several reasons for using BB guns, air rifles, and air pistols rather than conventional firearms in a shooting sports training program. One is the lower cost of equipment and ammunition. Second is that the safety requirements and marksmanship skills needed when shooting conventional firearms are easily taught when using air guns. Another advantage in using air guns is the minimal space required for an air gun range. A simple air gun range can be set up indoors or outdoors, if safety requirements are observed.

Air gun ranges can be set up in locations where conventional firearms ranges cannot be used because concerns about cost, noise, weather and a variety of other conditions exclude them. An indoor air gun range does not need the expensive ventilation and filtration system for toxic lead fumes and particulate matter that is required for a conventional indoors firearms range. Outdoor air gun ranges require much less space than conventional firearms range and they do not attract the attention of neighbors.

Safety Considerations

When you are planning to set up an air gun range, you need to consider the following topics in your plan:



Air Gun Range Diagram

- The RANGE of the air gun;
- The PENETRATION of the projectiles;
- The possibility of RICOCHETS; and PERIMETER SECURITY to prevent people and animals wandering into the range.

Range and Penetration

The RANGE and PENETRATION of air guns will vary with the types of gun. It is reasonable to expect a simple spring-powered BB gun to shoot BB several hundred feet.

Compressed gas pellet guns may shoot pellet several hundred feet. Compressed gas pellet guns may shoot a pellet several hundred yards or more. Specific information is available from the gun manufacturer.

Ricochets

All projectiles tend to RICOCHET when they hit a hard surface and do not penetrate it. Projectiles from air guns are relatively low-powered and they are used for shooting at fairly short ranges, so ricochets need to be a particular concern.

* Volunteer, Arizona 4-H Shooting Education Volunteer Coordinator

BBs are quite hard and shot from low-powered guns. They readily bounce back at the shooter when they hit hard surfaces.

Pellets are made of soft lead. They deform and lose energy when they hit hard surfaces, so they do not bounce back as strongly as BBs.

EYE PROTECTION must be mandatory for all shooters and instructor staff. Look for the ANSI Z87-1 rating on safety glasses to be sure they provide adequate protection. Spectators should be kept well back of the shooting line and encouraged to wear eye protection as a precaution.

Perimeter Security

PERIMETER SECURITY is essential to prevent people and pets from wandering into the range area. Air guns make little noise, so sound will not alert people to the fact that the range is in operation. The range will need physical markers (surveyor tape, etc.) to delineate the boundaries and safety zones.

A SPECTATOR LINE should be established at least 15 feet behind the FIRING LINE to avoid crowding and distracting the shooters.

SAFETY ZONES should be established on each side of the range if it is outdoors. They should extend from the firing line at about a 30-degree angle to end of the range.

Distance from Firing Line to Target

The distance from the firing line to the target depends on the guns in use and the type of course to be fired. The following guidelines may be used.

- BB guns – 5 meters (16.4 feet) from the firing line to the target face.
- Air guns firing pellets – 10 meters (33 feet) is the usual distance from the firing line to the target face for most practice and target competition. It may vary from 25 to 45 yards for special courses of fire. If space is limited, targets may be set up at 5 yards for air gun practice.

Backstop Requirements

Good backstops are required to make sure projectiles do not go beyond the end of the range. Proper backstops also prevent the ricochets that occur when low-powered BBs and pellets hit a hard surface backstop. A backstop surface that absorbs energy will reduce the possibility of ricochets. Two backstops are commonly used on air gun ranges, a PRIMARY BACKSTOP and a SECONDARY BACKSTOP.

The PRIMARY BACKSTOP can be a commercially available metal pellet trap or a simple home-built pellet trap consisting of a cardboard box with a pellet-stopping interior. An effective pellet-stopping interior may be constructed by simply filling the

box with wadded newspapers and a few magazines in the rear of the box to completely stop the projectiles.

A loosely hanging piece of old carpet or canvas in the box will work with BB guns and pellet guns that have muzzle velocity less than 550 feet per second (fps). Pellets at velocities greater than 550 fps may penetrate the carpet or canvas. If a piece of rubber-backed carpet is used, be sure to keep the rubber to the rear so that projectiles will not bounce back at the shooter.

Always use tape to secure targets to the cardboard box backstop. Thumb tacks, clothes pins, spring clamps, paper clips, and other hard fastening devices can cause ricochets.

If a commercially available pellet trap is to be used, be sure to read the manufacturer's specifications to be sure the trap is appropriate for the air gun to be used.

Also, be sure to follow the manufacturer's recommendations regarding targets and the method of fastening the target to the pellet trap.

A SECONDARY BACKSTOP is needed to stop any projectiles that miss the primary backstop. Several suggestions for a secondary backstop include;

- A large piece of loosely hanging canvas or old carpeting;
- Bales of hay;
- A soft dirt bank;
- A large metal plate angled down at 45 degrees to direct

- projectiles into the ground
or
- Any other type of protective barrier that will stop the projectiles and not cause ricochets.

Caution: If loosely hanging canvas or carpet is used, leave the sides and bottom hanging loose. Depending on the material, projectiles may

ricochet or penetrate the material if it is tightly secured. Also keep in mind that projectiles traveling over 550 fps may penetrate the material.

NOTE:

Information on muzzle loading ranges can be obtained from the National Muzzle Loading Rifle Association, P.O. Box 67, Friendship, Indiana 47021.

Information on conventional rifle and pistol ranges can be obtained from the National Rifle Association, Range Division, 11250 Waples Mill Road, Fairfax, Virginia 22030-9400/



SHOOTING SPORTS

Making a Mousetrap Pistol

WILLIAM F. STEVEN

Volunteer Leader

Anoka County

WAYNE E. CARLSON

Extension Specialist

4-H Youth Development

IMPORTANCE OF THE TOPIC

It's fun to make things, especially something that can provide enjoyment while being used. Such is the case of the mousetrap pistol which shoots harmless ping pong balls with some degree of accuracy. It's also a good tool to teach proper and safe handling of firearms, proper sight alignment, trigger control and range etiquette commands.

WHAT YOUR 4-H'ERS WILL DO

By participating in the activities outlined in this guide, your members will accomplish the following:

1. Build a mousetrap pistol
2. Develop the life skills of reading directions, accomplishing a task and working together.

PREPARE FOR THE MEETING

Gather the following supplies for each mousetrap pistol.

- a) A piece of wood (#2 pine possibly) $\frac{3}{4}$ " thick, 1- $\frac{1}{2}$ " wide and 22" long (cut it into two pieces one about 15" the other about 7")
- b) A piece of $\frac{1}{4}$ " board 1- $\frac{7}{8}$ " x 3- $\frac{7}{8}$ "

- c) Twelve inches of number 14 - .0781 diameter wire – (coat hanger wire)
- d) One number 5 round head and 4 flat head wood screws $\frac{1}{2}$ " long
- e) One double spring mousetrap
- f) Ping pong balls, crosscut saw, hammer, wire cutters, chisel, screwdriver, needle nose pliers, epoxy cement, medium sandpaper, paint brush and varnish or paint
- g) Copy of the direction and picture for each group

If you have very young people in your group, involve some of your junior leaders in pre-sawing the pieces for the mousetrap gun or in gathering the materials. Involve them later in teaching safe handling of firearms or in teaching range commands using the mousetrap gun.

INVOLVING THE MEMBERS

Set up work tables with pre-sawed kits for as many younger members as you have. If you have not prepared the kits in advance, allow time for the preparation of all the mousetrap pistol parts and the construction of the pistols. Station junior leaders at each work station to assist younger members when necessary to complete each of these steps:

- 1) Sawing the wood to proper dimension

- 2) Preparing the lap joint between handle and barrel
- 3) Completing the joint with epoxy cement and two flat head screws
- 4) Mounting the mousetrap support board to pistol base with glue
- 5) Removing the bait holder and trap release wire from the mousetrap
- 6) Bending bait holder (jaw) wire inwards $\frac{1}{4}$ " to $\frac{1}{2}$ " on each side
- 7) Mounting the mousetrap on the support board with glue and 2 flathead wood screws
- 8) Forming the front and rear sights and trigger mechanisms using the cost hanger wire
- 9) Mounting the sights and trigger wire
- 10) Adjusting the mechanisms to work smoothly, sanding down rough edges and applying a coat or two of varnish or paint

SUPPORTING ACTIVITIES

Teach range commands and range etiquette using the mousetrap pistol. Stage a shooting contest. How about parents vs. youth? Leaders vs. youth? Leaders vs. parents? Set-up a shooting booth at the county fair to promote the shooting Sports/Wildlife program.

You might consider 4 work sites for 1) sawing the boards, 2) preparing the lap joint, 3) modifying the mousetrap and 4) forming the sights. A junior leader at each work site could help the group complete each of these steps. At the end of the rotation everyone could assemble (screw and glue) the pistol as a group, prepare, mount and adjust the trigger mechanism, sand and varnish or paint.

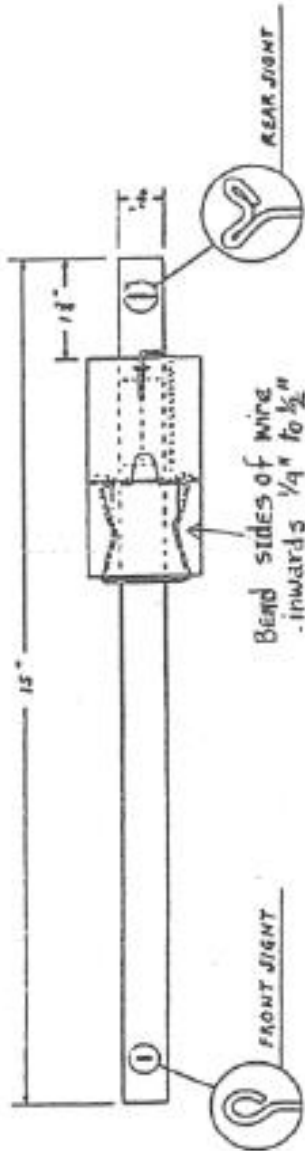
QUESTIONS TO ASK

1. What kinds of problems did you have in building the mousetrap pistol?
2. Why apply a coat of varnish or paint at the end?

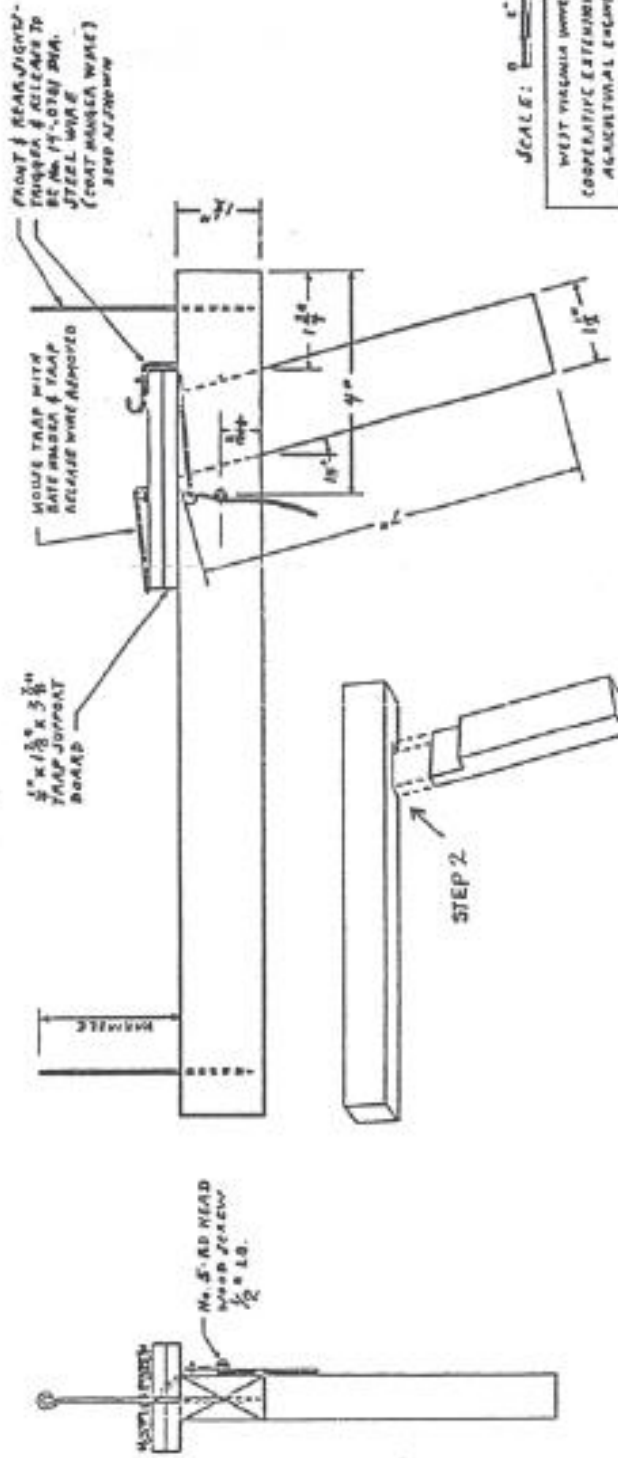
ANSWER: to protect it from getting dirty and to moisture proof it.

Summarize the Activity

Set up a shooting range and have them test out their mousetrap pistol for accuracy and distance. Whose pistol shoots the farthest? Whose pistol is most accurate? Adjust sights to improve accuracy.



NOTE:
ALL WOOD MEMBERS TO
BE BONDED TOGETHER
WITH EPOXY CEMENT



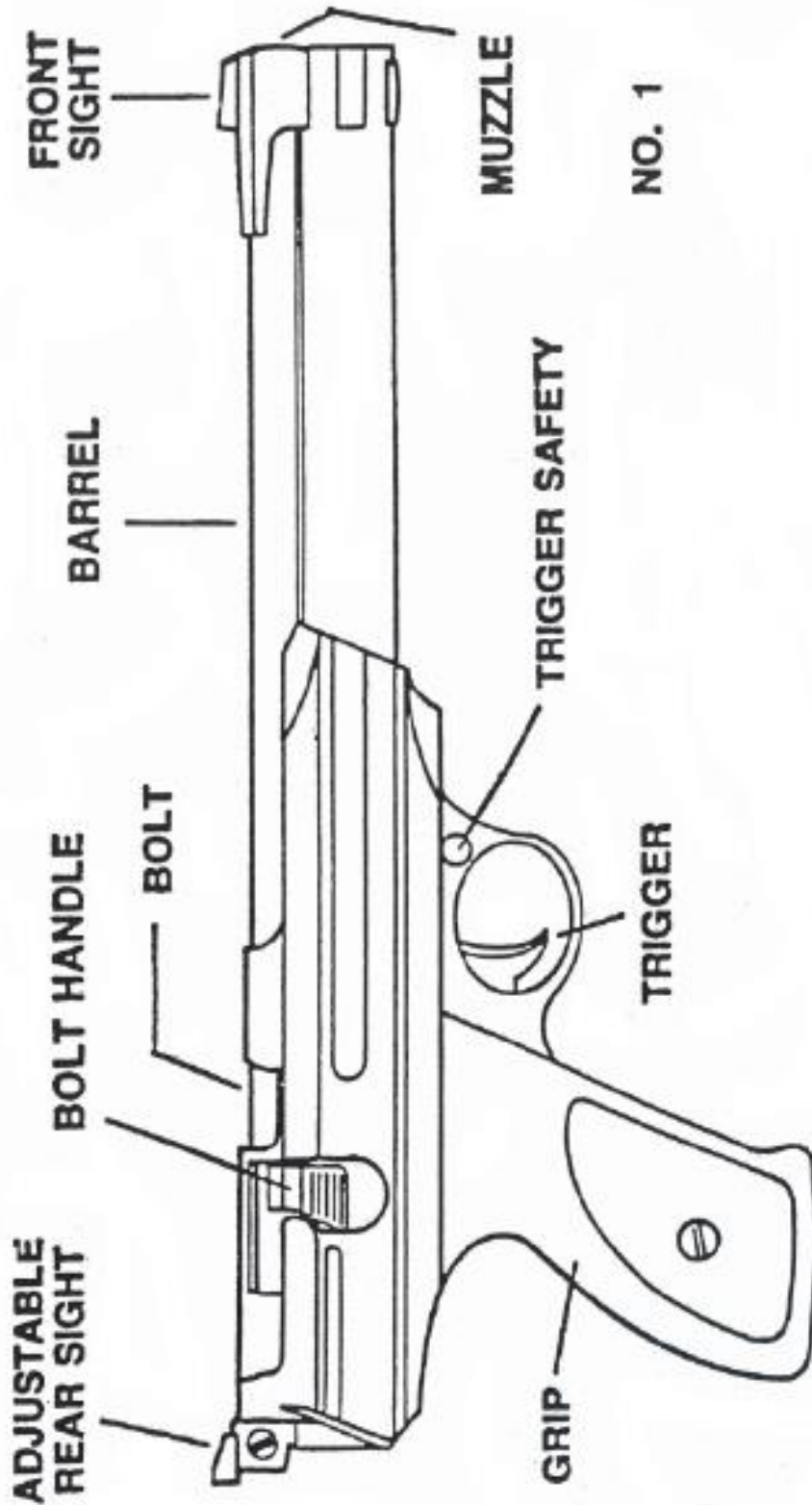
SCALE: 0 1 2 3 4 5 6 7 8 9 10

WEST VIRGINIA UNIVERSITY
COOPERATIVE EXTENSION SERVICE
AGRICULTURAL ENGINEERING

9-14 MOUSE TRAP PISTON

| | | | |
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| 6-23-65 | REV. BY | DESIGN | DATE |
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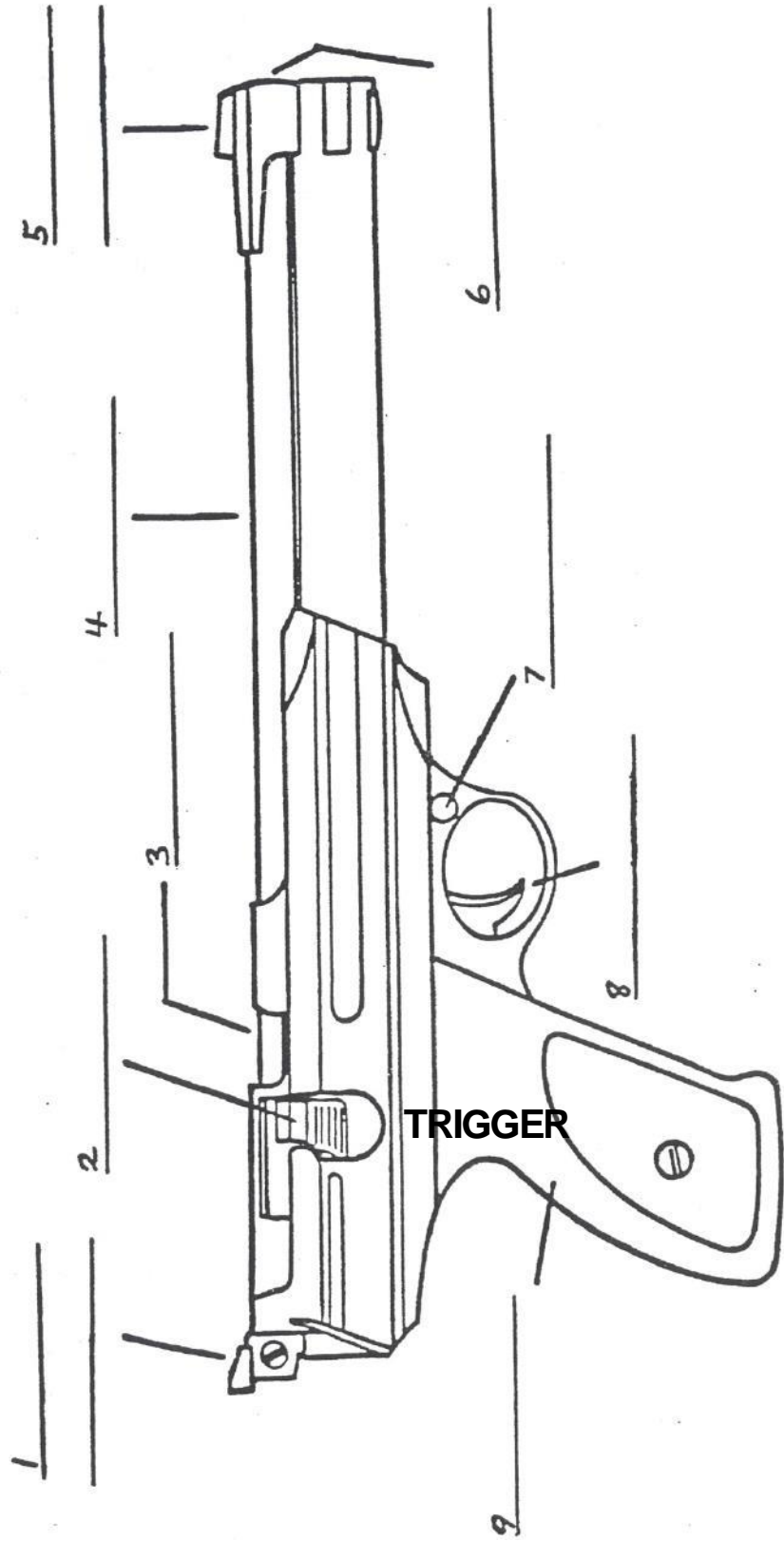
AIR PISTOL



NO. 1

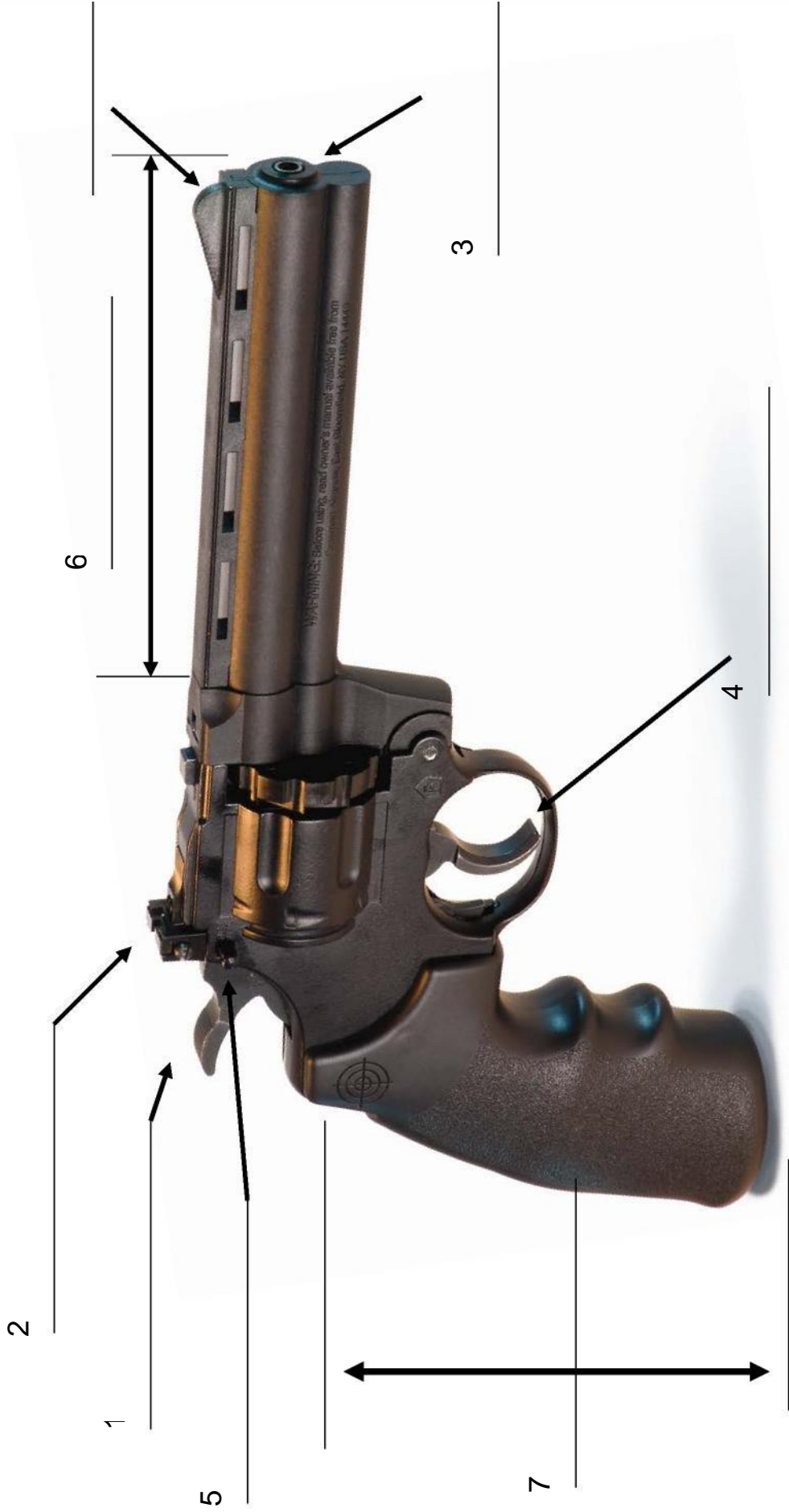
AIR PISTOL

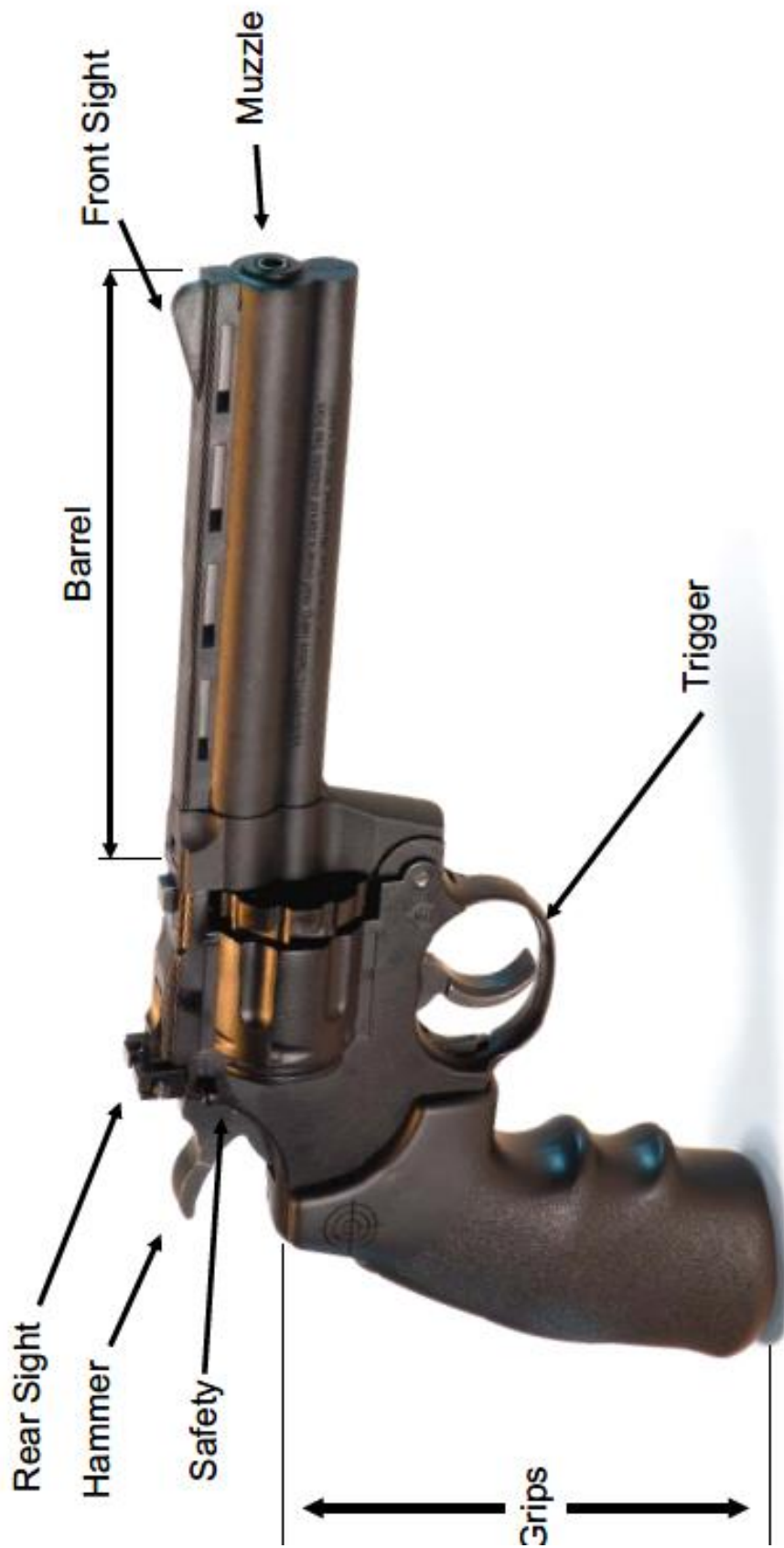
ACTIVITY SHEET

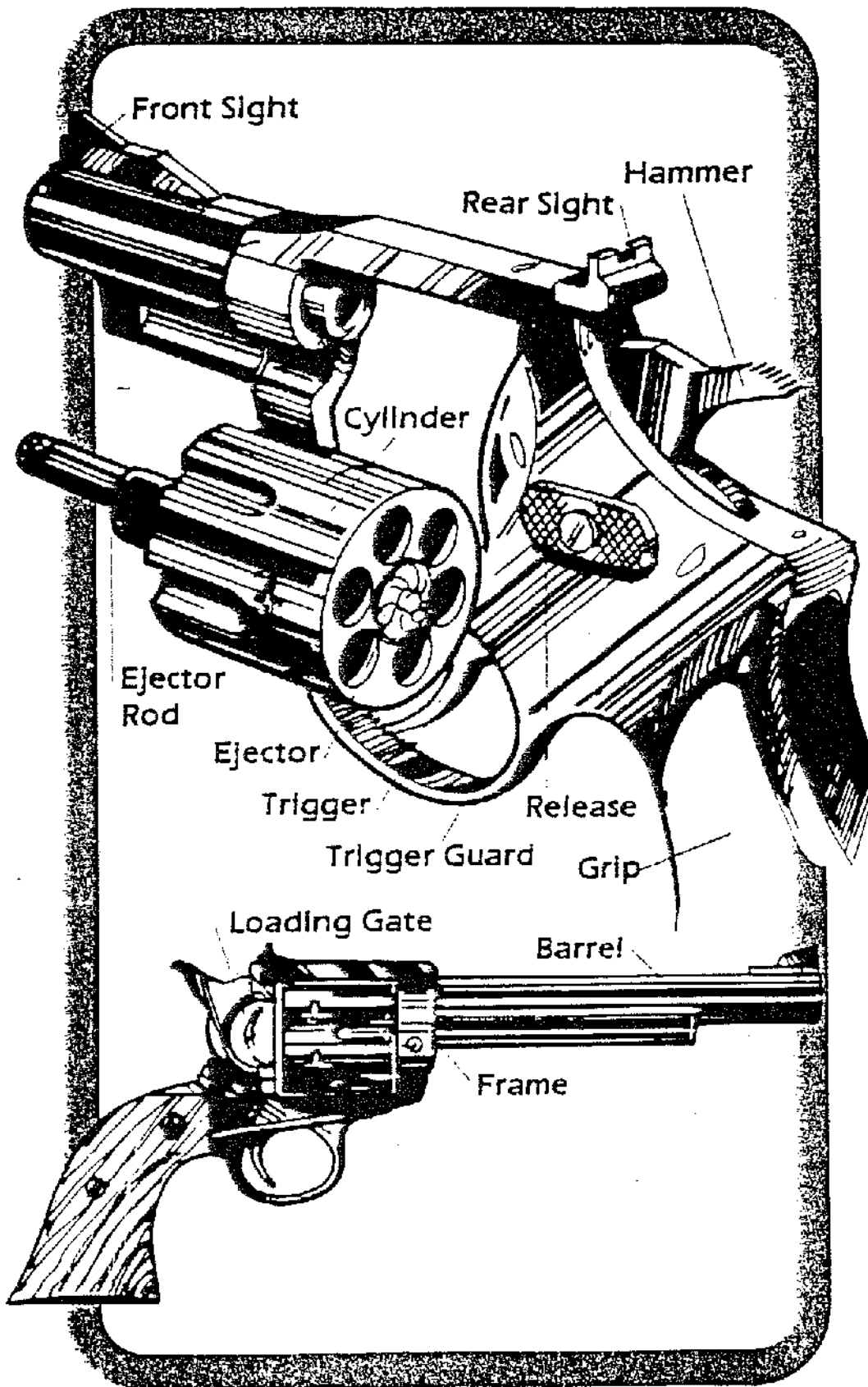


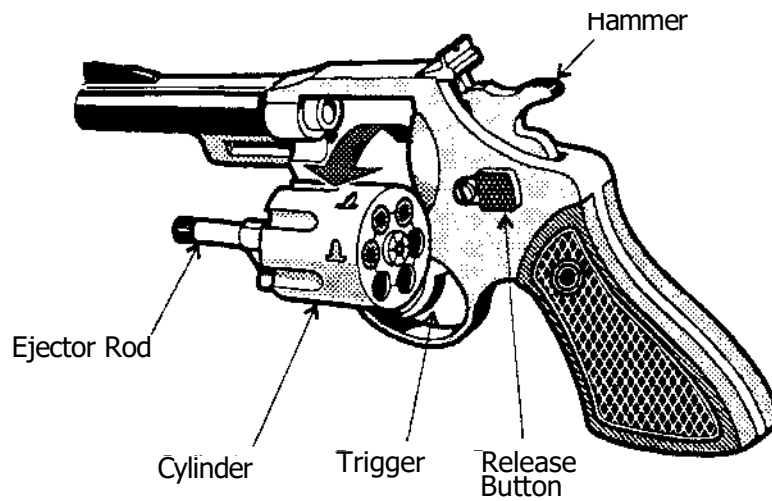
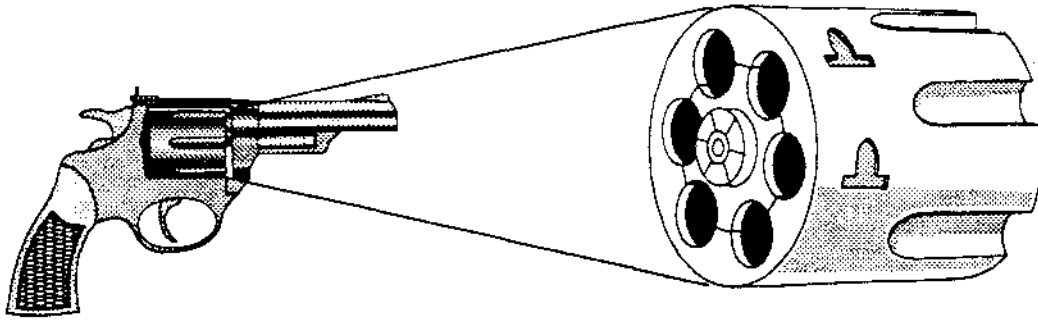




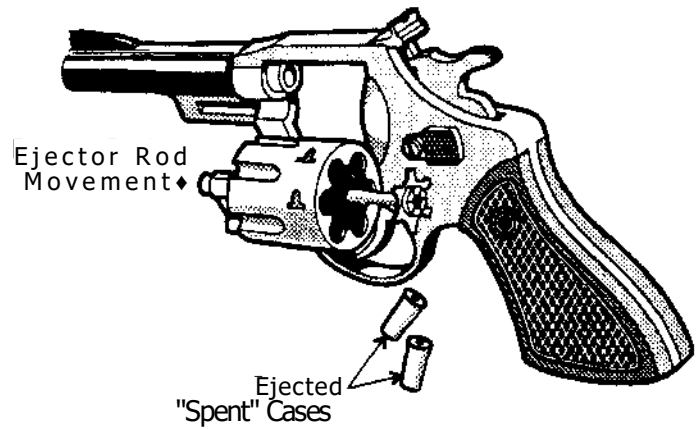




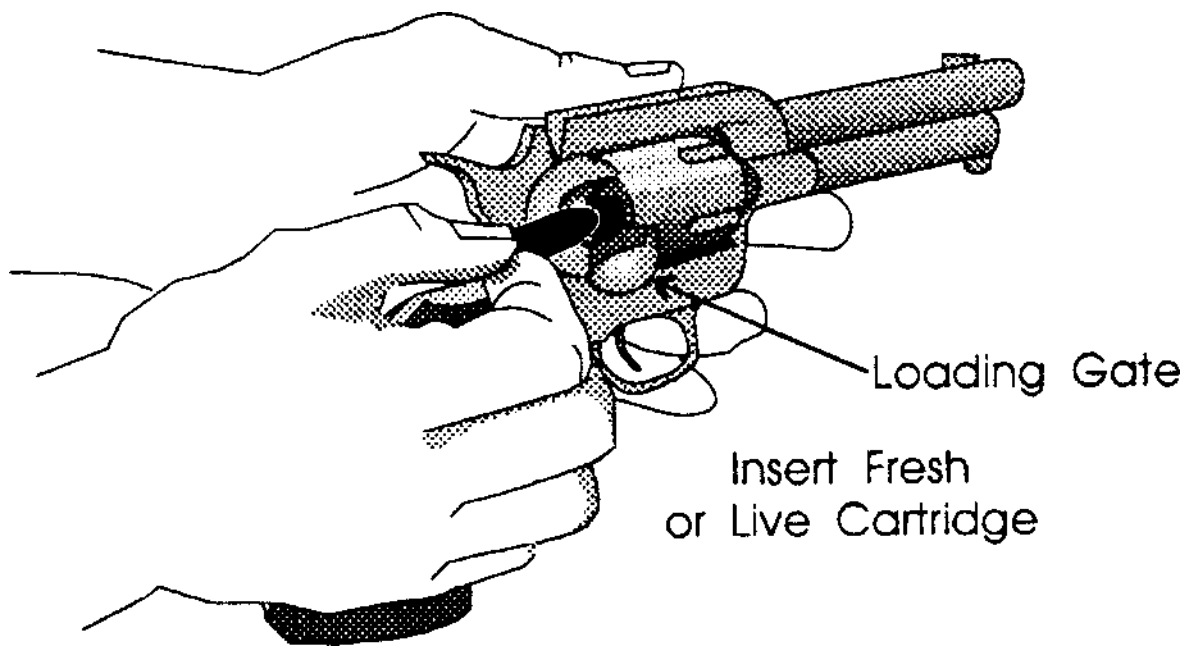
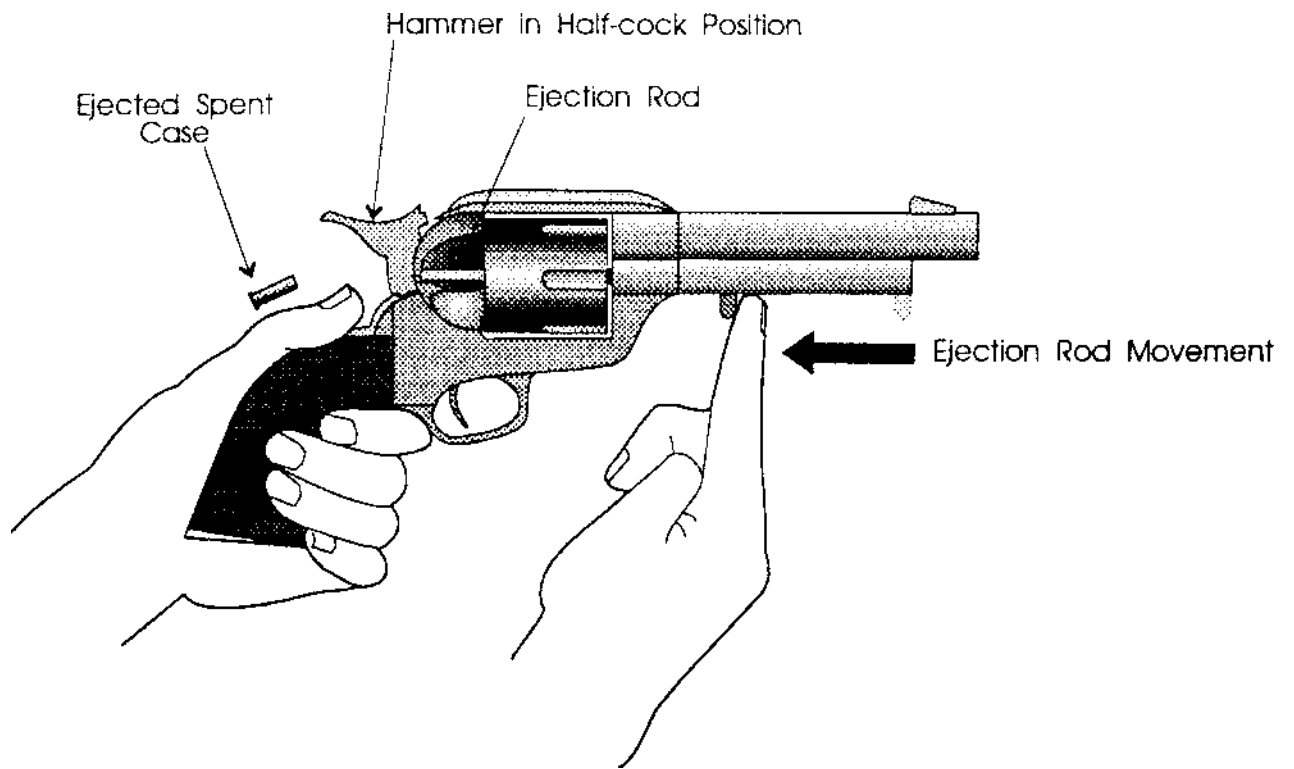




Double-action revolver unloading



Handguns



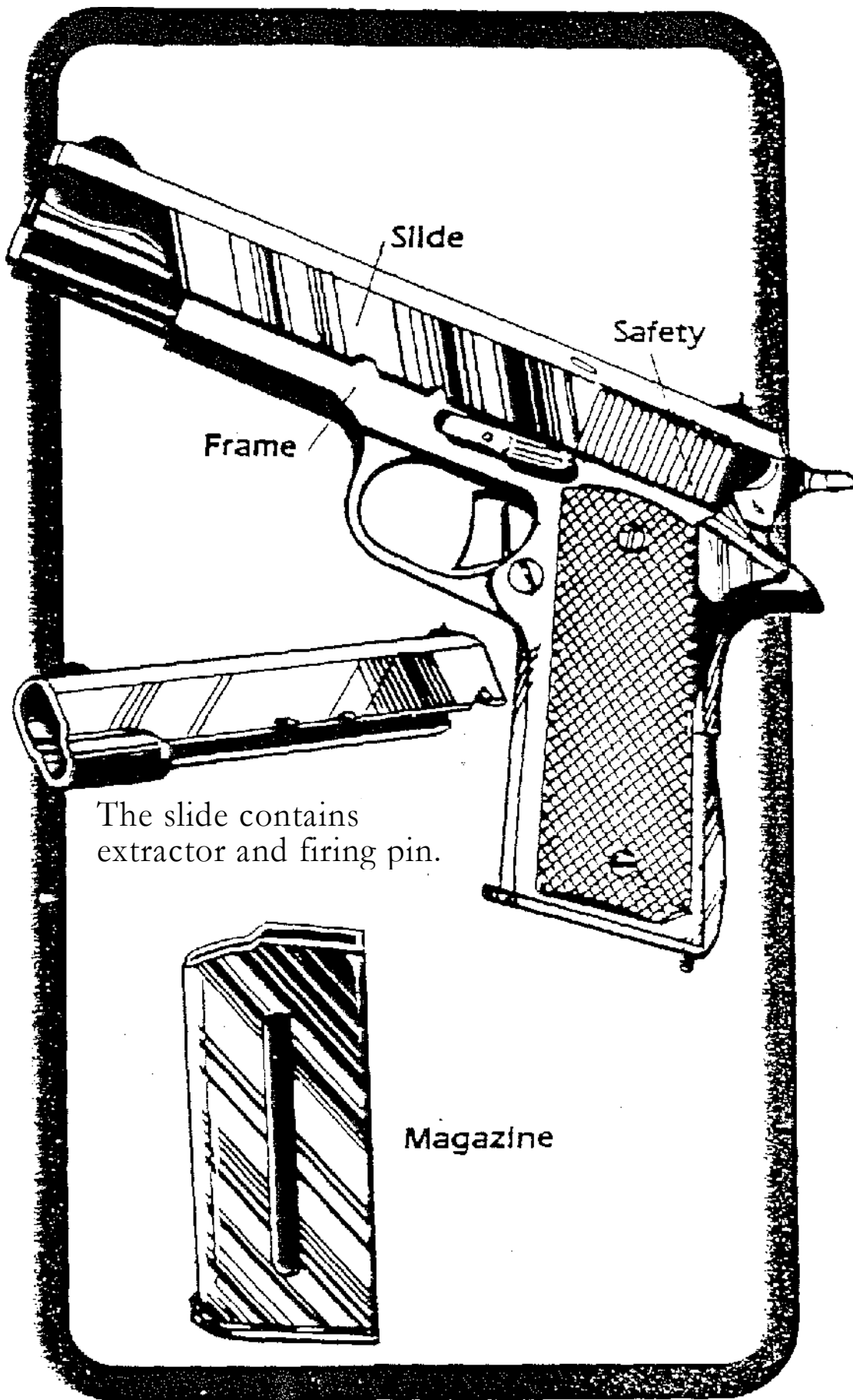
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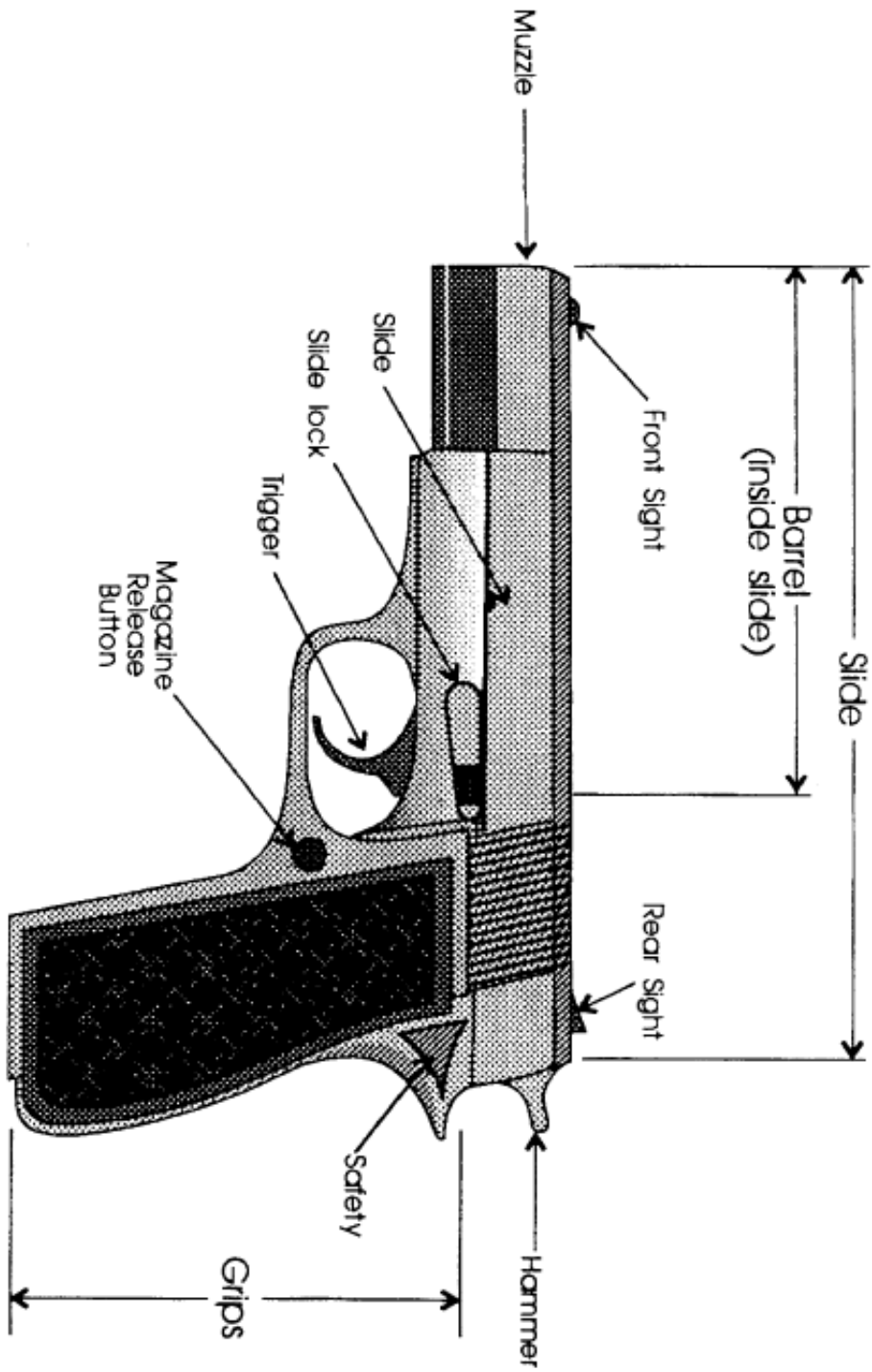
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The slide contains extractor and firing pin.

Handguns



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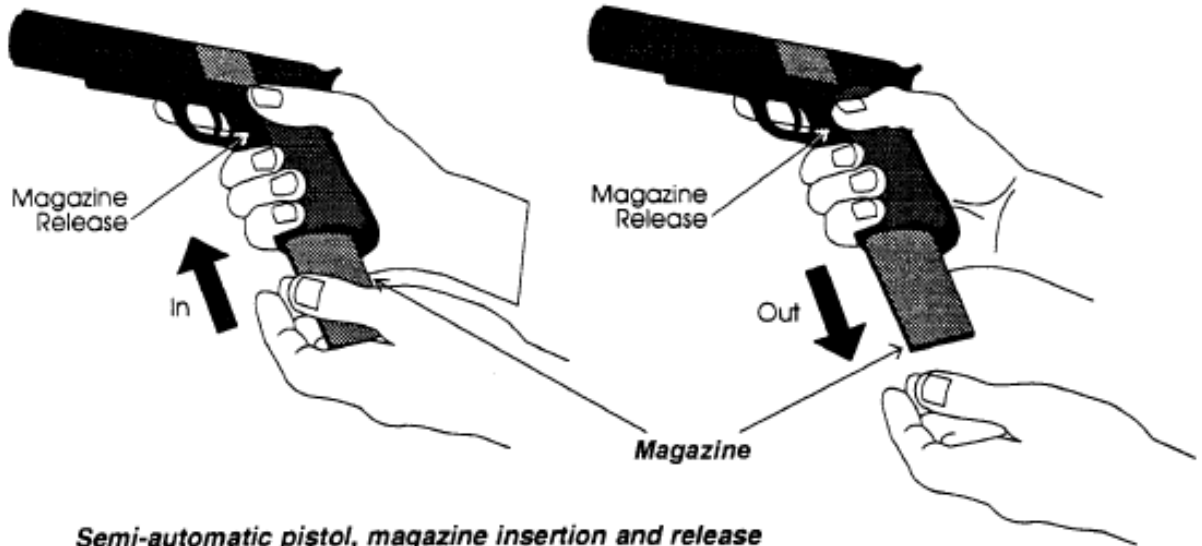
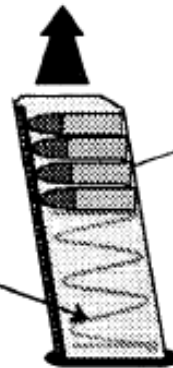
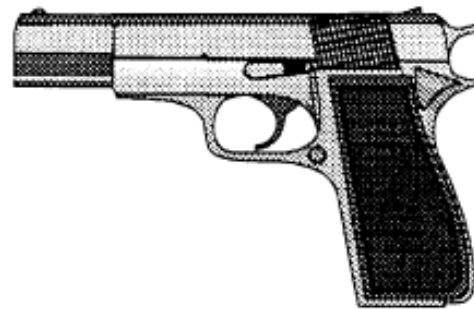
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Revised

Handguns



Semi-automatic pistol, magazine insertion and release

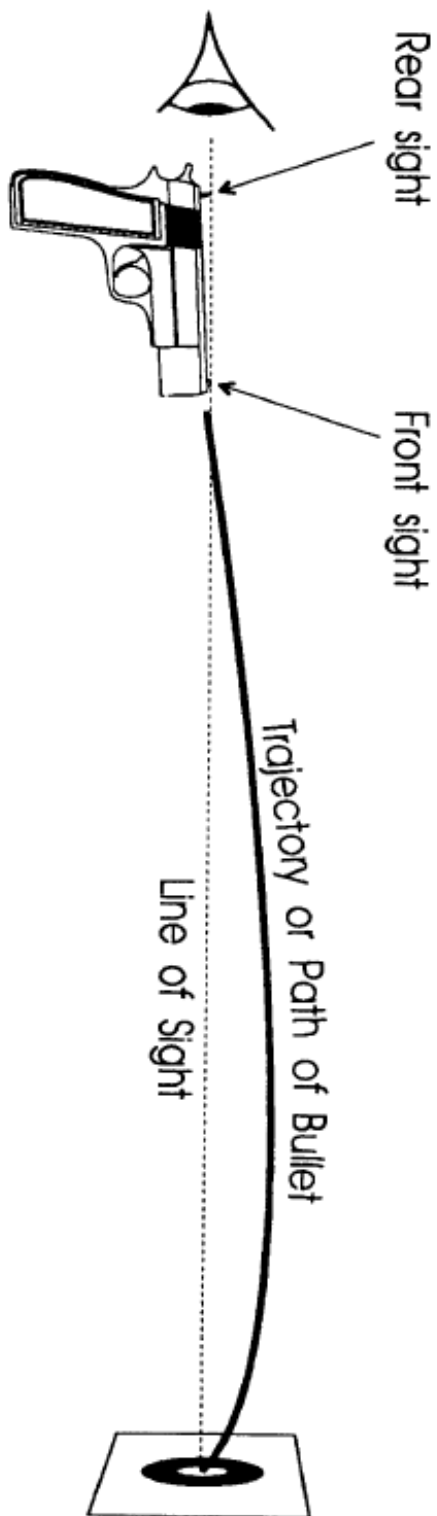


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Trajectory



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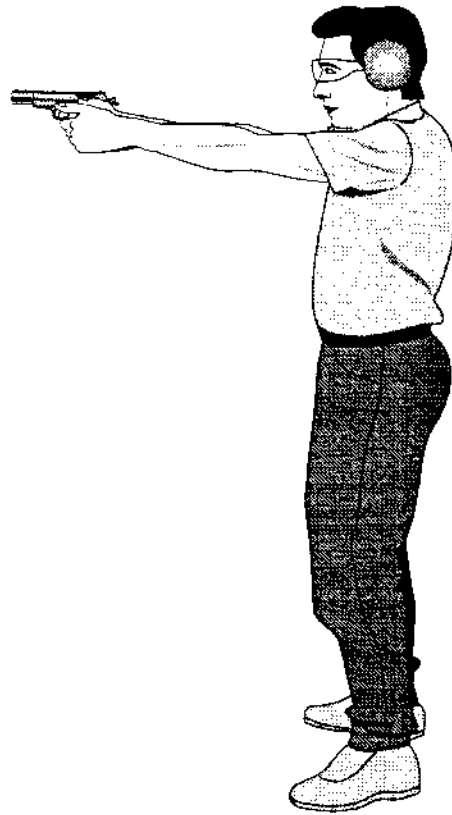
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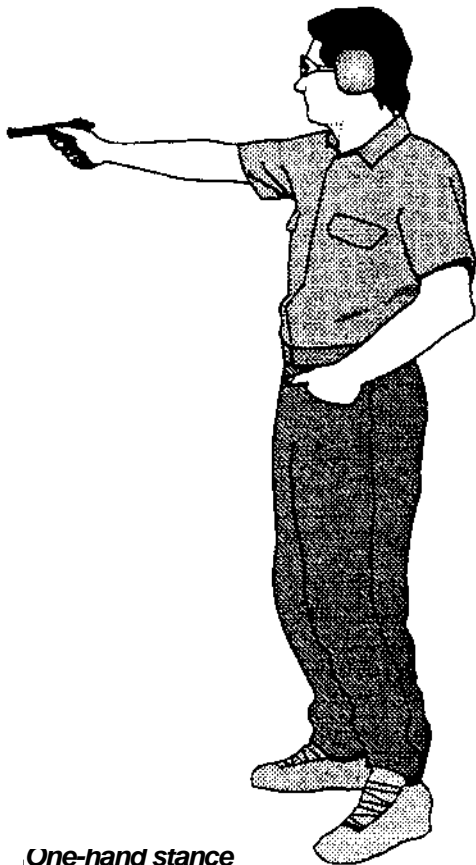
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Revised

Shooting Positions Pistol



Two-handed Stance



One-hand stance



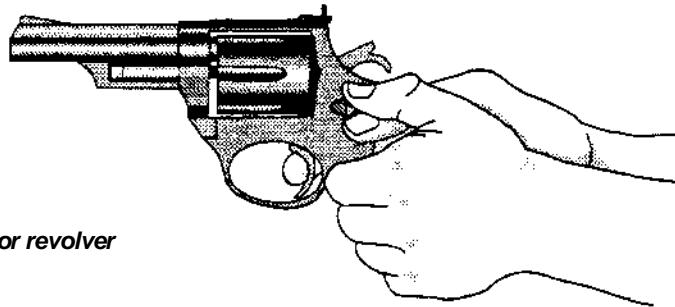
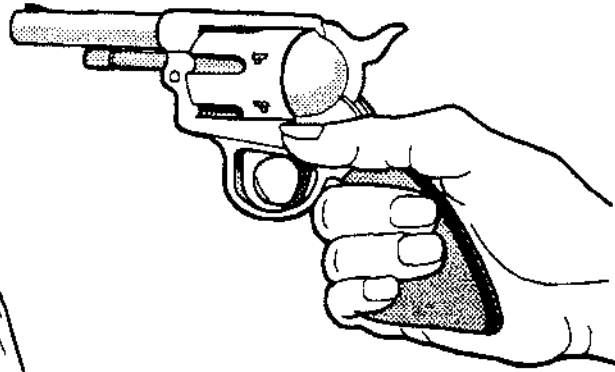
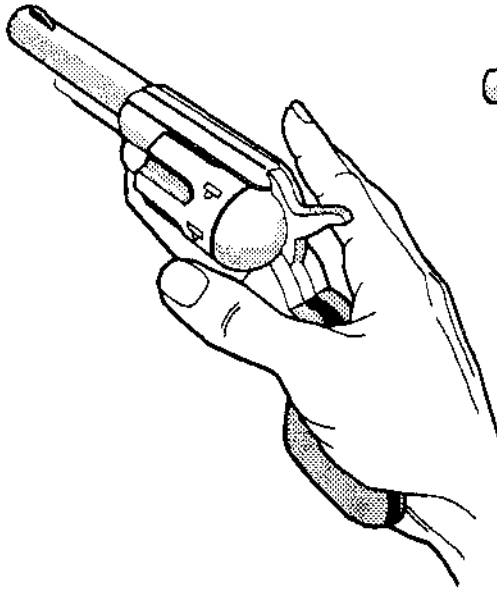
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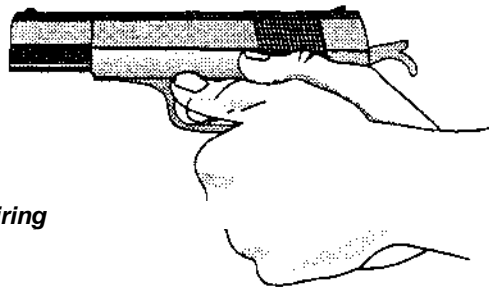
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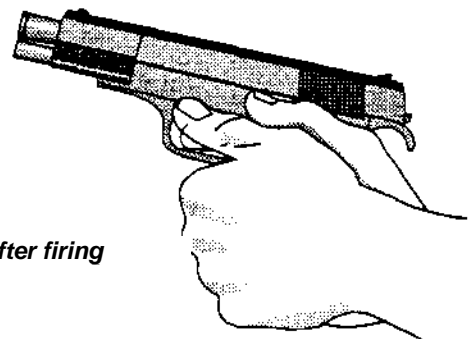
Shooting Positions Pistol



Two-hand grip for revolver



Before firing



After firing

Two-hand grip for semi-automatic





Ammunition

Dangerous Range of the Handgun*

| Type | 0 Km | .5 Km | 1 Km | 1.5 Km | 2 Km |
|--------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| .25 ACP | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| .45 ACP | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| .38 SPL | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| .357 MAG | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| .40 S&W | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| 9x19 mm para | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| .44 MAG | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ | ████████████████████ |
| | 0 mi | .31 mi | .62 mi | .94 mi | 1.25 mi |

* Using conventional ammunition



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