EDUCATIONAL MATERIALS

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THE GOSPEL ACCORDING TO FEDERAL POSTER

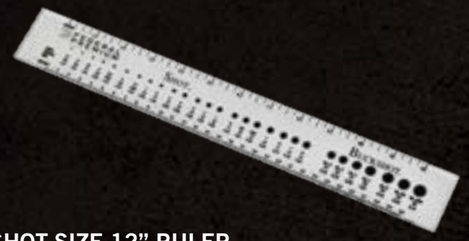
This full color, two-sided 3' x 2' poster is designed for classroom use and is packed with images of ammunition construction, bullet types and side-by-side photos of 25 rifle cartridges.

WILDLIFE PAMPHLETS

Big Game Animals, Small Game and Furbearers, Upland Game Birds and Ducks, Geese & Swans are written by wildlife professionals and include full color photos and illustrations, life history and distribution maps.

UNPRIMED SHOTSHELL ID KIT

Box of unprimed color-coded shotshells including 10, 12, 16, 20, 28 and 410.



SHOT-SIZE 12" RULER

The clear, 12 inch ruler shows actual sizes of 28 shot pellets from #12 to 000 Buck.

AMMO 101 DVD

This fast paced video is broken into Rimfire, Centerfire and Shotshell Chapters and describes with animated footage the construction and function of different ammunition types. Excellent for classroom settings.

SHOOTING INSTRUCTION 4-IN-1 DVD

Produced in cooperation with the 4H Shooting Sports Program, each chapter details how to teach a new shooter a specific shooting discipline. Basic Rifle, Basic Pistol, Basic Shotgun, and Flying Targets.

FEDERAL PREMIUM® AMMUNITION

FEDERAL CARTRIDGE COMPANY • 900 EHLEN DRIVE • ANOKA, MINNESOTA 55303

FEDERAL PREMIUM® AMMUNITION

AMMUNITION BASICS

ANATOMY OF A SHOTSHELL

Federal loads six different gauges of shotshells: 10, 12, 16, 20, 28 and 410. Their lengths and shot charges vary from the 2½ inch–½ oz. 410 to the 3½ inch–2¼ oz. 10-gauge. They are loaded with lead, steel and HEAVYWEIGHT® shot, as well as slugs and buckshot.

There are similarities and differences in the component parts and construction of a shotshell. The head and primer are similar in all shells. The tube and base wad are either paper or plastic. The shot wad design and powder vary with the type of shotshell.

Lead Shot: Pellets and buckshot are formed by pouring melted lead through a sieve or swaged (formed in a die). Traditional wads for lead shot are molded from flexible, low-density polyethylene plastic and have a cushion section on the bottom. The cushion helps reduce the number of deformed pellets and recoil.

Steel Shot: Made by cutting steel wire into short lengths which are formed and ground. Premium shot is coated with a rust inhibitor. Wads for steel shot are molded from high-density polyethylene. They have thick sidewalls to prevent the pellets from contacting the shotgun bore surface. Steel shot ammunition requires large charges of special slow-burning powders to give the large shot column a gentler start but a faster exit from the bore.

FLITESTOPPER™ Shot: Available in all-steel pellets for waterfowl and upland birds, and nickel-plated lead pellets for upland birds. Features a ring to cut on impact and better edge to edge patterns.

HEAVYWEIGHT® Shot: Pellets are made of tungsten-alloy. The FLITECONTROL® wad protects the bore from hard pellets. HEAVYWEIGHT shot is 35% denser than lead. This shot can be used in a steel safe barrel.

FLITECONTROL® WAD

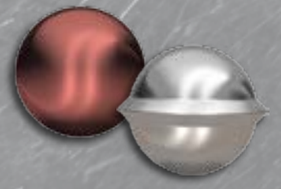
PHOTO TAKEN 19 FEET FROM MUZZLE

The FLITECONTROL® wad opens at the rear, creating an air brake that pulls the wad off the shot string. The pellets are released at the optimum moment for accuracy and power. The FLITECONTROL wad is combined with unique shot types by game to get better performance on target. This unique wad system is featured in Mag-Shok™ turkey, select Vital-Shok™ Buckshot, Black Cloud® waterfowl and Prairie Storm™ upland loads.

FLITESTOPPER® PELLETS

FLITESTOPPER® Steel (FS Steel®) creates consistent edge-to-edge patterns, putting lethal pellets on game even outside the pattern center. Get cutting power with no loss of penetration.

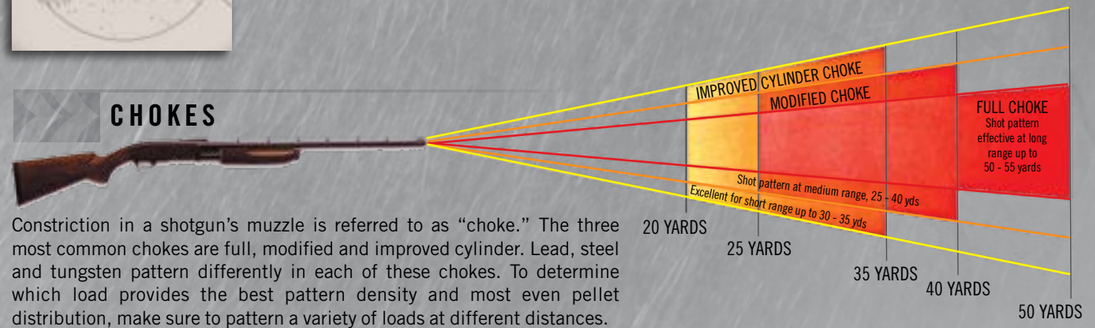
Nickel-plated FLITESTOPPER® Lead together with Premium® copper-plated lead produces consistent patterns that put more pellets on target.



PATTERNING A SHOTGUN

1. In a safe location, set up a 40-inch square paper target with an aiming point in the center.
2. While wearing eye and ear protection, shoot once at the aiming point from 20 yards. Repeat from 30, 40 and 50 yards on separate targets.
3. Check the pattern for uniformity, gaps or holes in the shot pattern.
4. Try different chokes, loads and shot sizes to find the performance you prefer.

CHOKES



Constriction in a shotgun's muzzle is referred to as "choke." The three most common chokes are full, modified and improved cylinder. Lead, steel and tungsten pattern differently in each of these chokes. To determine which load provides the best pattern density and most even pellet distribution, make sure to pattern a variety of loads at different distances.

SHOTGUN GAUGES

The gauge of a shotgun was first determined by a simple method that used lead balls. A gun maker would use lead balls the same diameter of the shotgun bore, count how many of those balls it takes to equal one pound of weight, and that would be the gauge of the gun. For example, it will take 12 lead balls the size of a 12-gauge shotgun bore to weigh a pound. The only exception is the 410, which is measured in inches. Shotguns and shotgun shells should also be matched. Failure to properly match the ammunition to the firearm can cause firearm damage and/or personal injury.

Note: Black Cloud 12-gauge loads feature all-black hulls.

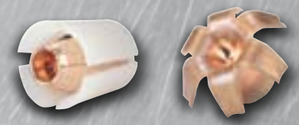
SHOTGUN SLUGS

Sabot style slugs feature a lead or copper bullet enclosed in a polyethylene sleeve that grips the rifling to provide spin and increased accuracy. For rifled barrels only.

Rifled or "Foster" slug has helix ribbing to enhance stability through the bore. It has a hollow point that is designed for maximum expansion. The rifled slug is recommended for smooth bore shotgun barrels.

TruBall® Rifled Slug is the most accurate slug ever made for smooth bore shotguns. The unique TruBall locks the slug and wad in place, to punch out as tight as 2-inch groups at 50 yards with up to 75% improvement in group size consistency over standard rifled slugs.

LEAD SABOT SLUG



BARNES® EXPANDER® SABOT SLUG

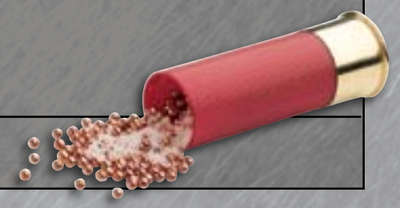
RIFLED "FOSTER" SLUG

TRUBALL RIFLED SLUG

SHOT SIZES

PELLET DIAMETER	SHOT T	BBB	BB	1	2	3	4	5	6	7	7½	8	8½	9
INCHES	.20	.19	.18	.16	.15	.14	.13	.12	.11	.10	.095	.09	.085	.08
MM	5.08	4.83	4.57	4.06	3.81	3.56	3.30	3.05	2.79	2.54	2.41	2.29	2.16	2.03

PELLET DIAMETER	BUCKSHOT SIZES NO.000	NO.00	NO.0	NO.1	NO.2	NO.3	NO.4
INCHES	.36	.33	.32	.30	.27	.25	.24
MM	9.14	8.38	8.13	7.62	6.86	6.35	6.10



AVERAGE PELLET COUNT

STEEL–8 G/CC

SHOT SIZE	3/4 (21.25)	7/8 (24.80)	15/16 (26.58)	1 (28.35)	1-1/8 (31.89)	1-1/4 (35.44)	1-3/8 (38.98)	1-1/2 (42.52)	1-9/16 (44.30)	1-5/8 (46.06)
7	316	369	395	422	475	527	580	633	659	685
6	236	276	295	315	354	394	433	472.5	492	512
5	182	213	228	243	273	304	334	364.5	380	395
4	144	168	180	192	216	240	264	288	300	312
3	118	138	143	158	178	197	217	237	247	257
2	94	109	117	125	141	156	172	187.5	195	203
1	77	90	97	103	116	129	142	154.5	161	167
BB	54	63	67	72	81	90	99	108	112	117
BBB	46	54	58	62	70	77	85	93	97	101
T	39	46	49	52	58	65	71	78	81	84
F	30	35	37	40	45	50	55	60		

HEAVYWEIGHT® 15 G/CC

SHOT SIZE	1-1/8 (31.90)	1-1/2 (42.52)	1-5/8 (46.07)	1-7/8 (53.16)	2 (53.16)
5	—	187	206	231	249
6	—	223	270	312	330
7	246	337	353	408	444

LEAD–11 G/CC (3% ANTIMONY)

SHOT SIZE	1/2 (14.17)	11/16 (19.49)	3/4 (21.25)	7/8 (24.80)	1 (28.35)	1-1/8 (31.89)	1-1/4 (35.44)	1-3/8 (38.98)	1-1/2 (42.52)	1-5/8 (46.06)	1-3/4 (49.61)	1-7/8 (53.15)	2 (56.70)	2-1/4 (63.78)
9	292	402	439	512	585	658	731	804	877	951	1024	1097	1170	1316
8½	249	342	373	435	497	559	621	683	745	808	870	932	994	1118
8	205	282	307	359	410	461	512	564	615	666	718	769	820	922
7½	175	241	262	306	350	394	437	481	525	569	613	656	700	787
6	112	155	169	197	225	253	281	309	337	366	394	422	450	506
5	85	117	127	149	170	191	212	234	255	276	298	319	340	382
4	67	93	101	118	135	152	169	186	202	219	236	253	270	304
2	43	60	65	76	87	98	109	120	130	141	152	163	174	196
BB	25	34	37	44	50	56	62	69	75	81	88	94	100	112

ANATOMY OF A PISTOL CARTRIDGE

Case Design: There are two basic pistol cartridge designs. Cartridges used in revolvers or single shot pistols are generally **Rimmed**, where the case head has a rim that extends beyond the case wall. Common revolver calibers are .38 Special, .357 Magnum and .44 Magnum. Semi-automatic handguns generally utilize a **Rimless** cartridge, where the head of the cartridge does not extend beyond the diameter of the case walls, and an extractor groove is cut into the base to enable the extractor on the firearm to grip the cartridge. Common semi-automatic calibers include 9mm, 40 S&W, and 45 ACP.

The smallest pistol cartridge manufactured by Federal is the .25 Auto, and the largest is the .500 S&W.

Bullet Design: Different bullets are designed for different uses. You should match the bullet style to what your application is.

Target Bullets: **Full Metal Jacket (FMJ)** bullets are often referred to as Ball Ammunition, and are designed to feed reliably in semi-automatic handguns but do not expand when they hit targets. **TMJ®** encapsulates the lead core and are generally used for indoor target ranges. **Semi-Wadcutters** are designed to cut clean holes in paper targets. Lower velocity rounds also can utilize a plain **Lead Round Nose** bullet that have no jacket.

Hunting Bullets: Most hunting handgun bullets are designed to expand and deliver the maximum energy into the game to ensure clean kills. The **Jacketed Hollow Point** is a very popular hunting bullet in the magnum calibers. High quality **Jacketed Soft Points** also provide a premium bullet option, including the Fusion® and Swift® A-Frame® bullets. Sometimes a hunting application calls for a deep penetrating, non-expanding bullet such as the **CastCore® Solid**.

Personal Defense: It is very important to carry a quality bullet in a personal defense handgun that is designed to neutralize a threat as quickly as possible. While the **Jacketed Hollow Point** in common defensive calibers can be effective, the **Hydra-Shok® HP** features a center post in the hollow point and controlled expansion to deliver reliable stopping power. In jurisdictions that prohibit hollow points, or for use in homes the **Expanding Full Metal Jacket** design of the Guard Dog™ may be the best option. The EFMJ's nose is filled with an expanding polymer that will mushroom on impact, even on wallboard which often will plug a hollow point and limit its expansion.

BULLET STYLES

LEAD ROUND NOSE

LEAD SEMI-WADCUTTER

SEMI-WADCUTTER HOLLOW POINT

HYDRA-SHOK® HOLLOW POINT

JACKETED HOLLOW POINT

FULL METAL JACKET

TMJ® ENCAPSULATED FULL METAL JACKET

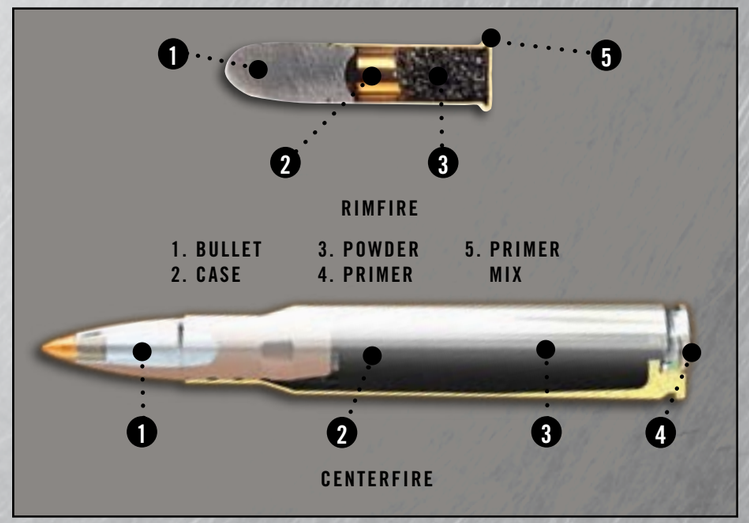
CASTCORE® SOLID

JACKETED SOFT POINT

GUARD DOG™ EXPANDING FMJ

ANATOMY OF A RIFLE CARTRIDGE

Ignition System: The two main types of rifle cartridges are **Rimfire** and **Centerfire**. Rimfire cartridges have **primer mix** located in the rim of the case which is ignited when the firing pin strikes the rim and creates a small spark. The most common rimfire cartridges are 22 Long Rifle and 17 HMR. Centerfire cartridges have a **primer** which contains primer mix and a metal anvil inside of a small cup. The primer is placed in the center of the case head, and is ignited when the firing pin strikes the center of the primer cup and forming a spark between the cup and the anvil. Most centerfire cartridges can be reloaded.



Case: The **case** is generally made of brass and is designed to contain all of the components and fit within the chamber of a firearm. Different calibers have different shapes and sizes of cases. Some cases have a **neck**, to accommodate a bullet with a much smaller diameter than the body of the cartridge. Others have straight walls. The case must fit the chamber because of the extreme pressures created by the burning of the **powder** pushes the case out against the chamber. It is this pressure from expanding gases that pushes the bullet down the barrel. The caliber of the cartridge is stamped on the head of the case, and must be matched to the caliber stamped on the gun barrel.

Bullets: There is a wide array of bullet types, and they all perform differently. It is important to match the bullet to the application. **Accuracy** and **precision** of a bullet are important to consider, but in a **hunting bullet** it is equally important to consider a bullet's terminal performance, or what a bullet does when it hits and travels through a target. Factors important to **terminal performance** include **penetration** (how deep a bullet travels into a target), **expansion** (how much a bullet mushrooms to increase energy transfer into the target) and **weight retention** (how well the bullet stays intact).

Target bullets are designed to be accurate and/or inexpensive, but they generally don't expand reliably for use on game. The **Full Metal Jacket (FMJ)** or **"Ball"** bullet is designed for military and target applications, and the jacket that extends from the point to base gives it a flat trajectory but poor expansion.

A hunting bullet that is designed not to expand is the **solid**. These generally large caliber bullets provide deep penetration and high weight retention for use on dangerous animals like cape buffalo. An example is the **Trophy Bonded® Sledgehammer® Solid**, which features a thick bronze jacket that is bonded to the lead core, and a flat nose that minimizes deflection for a straight and deep wound cavity.

All-copper or monolithic bullets are generally designed for medium or larger game, and have high weight retention, but generally don't expand as much as soft points. Their hollow point design peels back with hydrostatic pressure in game animals to expand the frontal diameter, and penetrate deeply.

Soft points are often used on small and medium sized game because the lead nose and tapered jacket are designed to expand as much as twice their original diameter. These are often considered the standard deer bullet, and can be found in Federal's Power-Shok™ line. The **Sierra® GameKing®** features a boat-tail design, meaning it has a tapered back end that improves its aerodynamics and accuracy. The **Nosler® Partition®** features improved weight retention and controlled expansion because the lead nose is divided from the lead base and limits how far the jacket can peel. Federal's **Fusion®** bullet offers a competitively priced option with a jacket that is molecularly fused to the core, increasing weight retention.

The **Trophy Bonded® Bear Claw®** is perhaps the most famous bonded bullet. Bonding means the jacket and the core are joined together chemically, similar to welding. This helps keep the bullet together and reduce separation. While this bullet is a soft point, the solid base of the bullet limits how far the jacket can peel and mushroom, improving penetration on big game and dangerous game. The **Trophy Bonded® Tip** is the next generation of medium and big game bullet and contains a number of features from other bullets. The polymer tip and boat-tail reduces the wind drag on this bullet compared to the Bear Claw making it flatter shooting and more accurate, particularly in smaller calibers. It has very high weight retention and controlled expansion like its predecessor, and is appropriate for deer, elk, and most African plains game.

The **Nosler® Ballistic Tip®** is a popular varmint to medium sized game bullet that features a polymer tip and boat-tail for fast, flat travel and very high expansion. Penetration is limited because of the rapid expansion. The tip is color coded by caliber.

A **varmint bullet** with explosive terminal performance is the **Speer® TNT Green®** bullet. This non-lead bullet is appropriate only for small game and varmints, and has a powdered metal core that breaks up completely on penetration, retaining little weight and transferring all of its energy into the target.

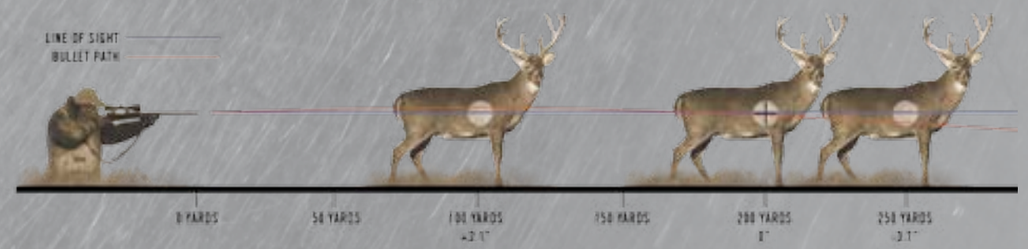
NOTE: Rifle bullets may perform differently in different rifles. To ensure the best possible results try various rifle bullet styles and weights to determine which round performs best in your rifle.

SIGHTING IN A RIFLE

THE PROCESS OF "SIGHTING IN" OR "ZEROING" CONSISTS OF MAKING THE RIFLE AND ITS SIGHT "AGREE" ABOUT WHERE THE BULLETS STRIKE. WITH PROPER PROCEDURES, SIGHTING IN IS NEITHER MYSTERIOUS NOR DIFFICULT.

1. Check sight screws or scope mounts. Bore sighting or the use of a collimator is not a substitute for actually sighting in by shooting on a range, but can speed up the process by getting "on paper."
2. Pick a safe area to shoot with an adequate backstop to stop your bullets. Wear shooting glasses and hearing protection.
3. Shoot from a solid rest, such as a benchrest or sand bags. Shoot at close range to get "on paper" but verify the final zero at expected hunting ranges.
4. From the solid rest, carefully squeeze off three aimed shots. The center of this group of bullet holes is the rifle's point of impact. Adjusting the sight moves this point of impact to your desired zero. Move open rear sights in the same direction you want the group to move. Adjust scopes following directions on the dials. Continue this process until the group is where you want it.
5. Different ammunition brands and/or bullet weights may change the point of impact and necessitate re-sighting. If your rifle gets bumped or dropped, be sure to re-verify your zero so you can bag your game with one shot.

TRAJECTORY



Note: 1. Drawing not to scale. 2. This example: Federal Load No. 3006B with "zero" at 200 yds.

"Trajectory" is the arc of the bullet from the firearm's muzzle. Bullets appear to "rise" because the barrel is angled up. The bullet's path crosses the line of sight twice—going up near the muzzle and going down through the downrange zero. The mid-range trajectory is the bullet's highest point above the line of sight. It usually occurs halfway between the muzzle and the zero range.

Velocity and bullet design determine trajectory. Low-velocity loads with round-nosed bullets, if sighted for long ranges, will have a very high mid-range trajectory—possibly high enough to cause a miss on close-range targets. Consult Federal's ballistic tables for velocity, trajectory and appropriate downrange zero estimates for your specific cartridge/bullet. For real time charting and quick comparison, visit www.federalpremium.com.

BULLET STYLES