

Buzz! Bang! Fireworks!



photo by Kumar Appalah

Is a big fireworks display part of your Fourth of July celebration? When the beautiful colors are exploding in the sky, you may wonder how manufacturers create them.

The displays that we watch on special occasions start with an idea. A fireworks designer might see a flower or a tree that sparks an idea for making a firework.



photo by Gonzalo Alonso

Once the design is in place, **pyrotechnicians*** (PIE-roh-tehk-NISH-uns) can begin to build the firework.

Start with stars

The small, hard balls that make the lights we see in a fireworks display are called **stars**. These marble-sized balls are made out of black powder that's rolled into a tight ball. The ball also includes an **oxidizer** (OX-ih-dize-er), which makes the powder burn bright, and salts or metals that give the star its color.

Making a shell

The next step is creating a **shell**. These paper cases may hold many stars or **comets**, cylinder-shaped fireworks that make long streaks across the sky.

The pyrotechnician places the stars or comets into the shell in a pattern. For instance,

*Pyro comes from the Greek word *pur*, meaning fire. A *technician* is someone who is an expert in details of a certain subject.

a smiley face with a red smile, blue eyes and an orange nose will appear in that same pattern when the shell explodes. The shell may be only 6 inches in diameter, but the display might be as large as a football field in the sky!

Making them fly

Next, the shells get a **lift charge**, which carries the firework up into the sky. The pyrotechnician also adds a **time fuse**, which explodes the firework. This fuse lets him control how long after launch the firework will explode.

Putting it all together

Once the shells are ready, they're loaded into **mortars**, metal tubes used to launch the fireworks. Mortars may be arranged in **batteries**, wooden frames that hold several mortars in place.

Some pyrotechnicians may fire the shells by hand. Today, most fireworks are attached to an electrical circuit. When the technician gives a signal, the circuit turns on a firing device, much like you turn on a light in your house.




photo by Dave Rauenbueher

Computers are also used to launch fireworks, especially those that are choreographed (KOR-ee-oh-graffed), or arranged, to music.

Fireworks Words

- **Aerial** — a firework that explodes high in the sky.
- **Break** — the explosion of an aerial shell.
- **Chrysanthemum** — a round burst of stars that keeps its shape before fading. It can be several colors or change color.
- **Illuminations** — fireworks that explode nearer to the ground.
- **Magazine** — a metal or concrete building used to store fireworks.
- **Peony** — a star that bursts from the center without trailing glitter.
- **Salutes** — loud, repeated booms.
- **Set pieces** — fireworks that are attached to wooden grids on the ground. They might make a picture or spell out words.
- **Spiderweb** — a bright center with distinct lines shooting out from it.
- **Strobe** — flashing silver lights that float slowly to the ground.
- **Weeping willow** — stars that trail down, looking like a weeping willow tree.

Please remember: Fireworks are beautiful and exciting for some of us, but many pets and people are upset by the noise and flashes of bright light. Make sure your pets are indoors; leaving a radio or TV turned on may help soften the noises for them.



Resources



On the Web:

- youtu.be/2cBu_-byLcY
- bit.ly/MPfireworks

At the library:

- "The Explosive Story of Fireworks!" by Kama Einhorn

Try 'n' Find

Words that remind us of fireworks are hidden in this puzzle. Some words are hidden backward or diagonally, and some letters are used twice. See if you can find:



BATTERY,	T	Q	W	C	E	L	E	B	R	A	T	I	O	N	P
CELEBRATION, CHARGE,	W	E	M	I	T	F	B	A	T	T	E	R	Y	B	A
CHOREOGRAPHED,	O	C	H	O	R	E	O	G	R	A	P	H	E	D	T
COLORS, COMET,	S	E	D	O	L	P	X	E	R	A	T	R	O	M	T
EXPLODE, FIREWORKS,	C	O	L	O	R	S	G	R	V	S	T	R	O	B	E
FUSE, JULY, LIFT, MORTAR,	N	A	I	C	I	N	H	C	E	T	O	R	Y	P	R
OXIDIZER, PATTERN,	U	L	I	F	T	P	W	F	L	L	E	H	S	O	N
PYROTECHNICIAN, SHELL,	G	J	U	L	Y	S	T	A	R	C	H	A	R	G	E
STAR, STROBE, TIME.	D	S	K	R	O	W	E	R	I	F	Z	F	Q	E	Z
	E	N	O	X	I	D	I	Z	E	R	C	O	M	E	T

Cook's Corner

Pineapple Pudding Cake

You'll need:

- 1 box yellow cake mix
- 3 whole eggs
- 1 large can crushed pineapple (with juice)
- 1 (1-ounce) box vanilla pudding mix (not instant)

- 2 cups reduced-fat milk
- 1 tub fat-free whipped topping
- 1 cup shredded coconut



What to do:

1. Prepare cake mix according to package directions. Be sure to use 3 whole eggs.
2. Pour cake batter into a 9-by-13-inch glass baking dish coated with cooking spray. Bake in oven according to package directions.
3. After removing cake from oven, immediately pierce holes in top of cake with a fork. Pour canned pineapple and juice over top. Allow to cool.
4. Prepare pudding according to package directions. Spread pudding over top of pineapple.
5. Spread whipped topping over pudding. Top with coconut and chill before serving.

* You'll need an adult's help with this recipe.

1. Something that can cause injury or harm (6-letter noun)

□ □ □ □ □ □

2. To observe, or eye

(5-letter verb)

□ □ □ □ □

3. To break open or into pieces (5-letter verb)

□ □ □ □ □

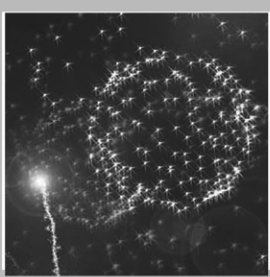
4. To give off small flashes of bright light (7-letter verb)

□ □ □ □ □ □ □

1. Julie will be in _____ if she gets too close to the fire.
2. Sylvia will _____ the sky to see many sprays of light.
3. The rocket flew very high and then _____ into colors.
4. When the fireworks explode, the sky will _____.

ROOTONYM®

by Jan & Carey Orr Cook



Study the definition. When you know the missing word, fill in the letter boxes and the sentence blanks.

Answers: Danger, Watch, Burst, Sparkle.

Mini Jokes



George: What is Uncle Sam's favorite snack?
Ben: Firecrackers!

Eco Note



Western monarch butterflies from the Pacific Northwest to California may not be going extinct as earlier feared, but are instead changing their breeding habitats and adapting to climate change. A Washington State University expert says last winter's count of the insects revealed a sharp drop. But entomologist David James says large populations were observed by citizen scientists in Los Angeles and the San Francisco Bay Area, where they had seldom been seen wintering before.

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For later:

Look in your newspaper and count how many fireworks displays are planned in your area.

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