



# VETERANS

## APPRECIATION CHALLENGE



# Section 1: Challenge Overview

## Challenge Overview

4<sup>th</sup> -12<sup>th</sup> grade students, your challenge is to create a digital 3D model of a wearable pin to be 3D printed and distributed to US Veterans. Your pin should be original and designed to show appreciation or gratitude for Veterans of any U.S. military service branch. Your entry must include:

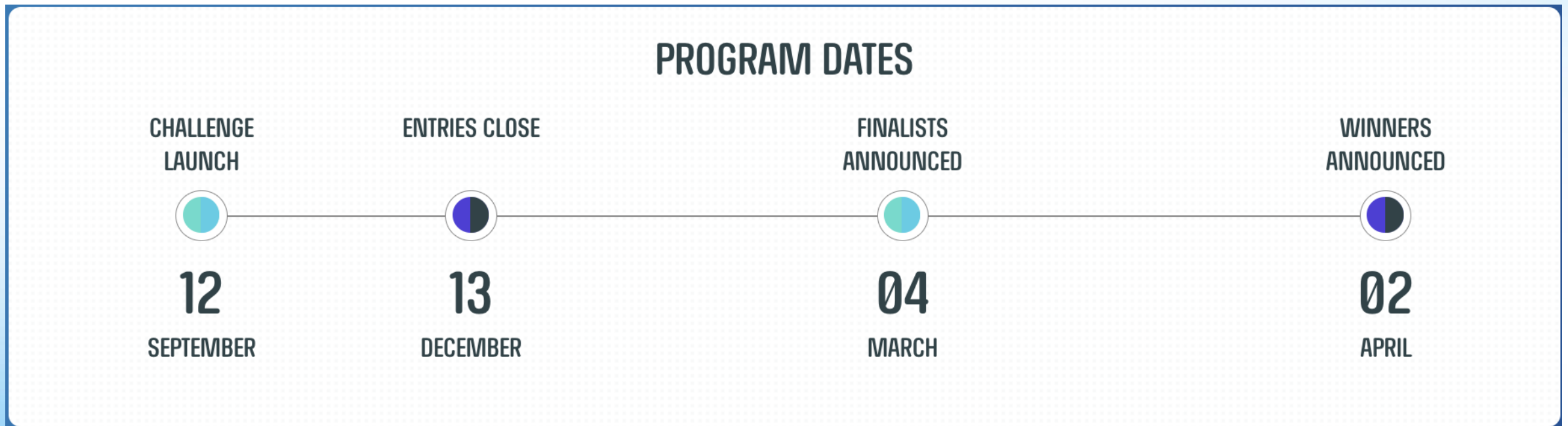
- STL file of your 3D model (max 20 MB)
- Image of your design (max 3MB)
- Text description of your entry (max 150 words)

Entries will be judged in two grade-level categories: Grades 4-8 and Grades 9-12.

To enter, submit an entry by December 13, 2024!



# Challenge Overview





## Prizes

The top 10 finalists in each grade-level category will get their designs 3D printed, glued to pin backs (if necessary), and handed out to Veterans who visit the museum.

Finalists will also each receive five prints of their design and a \$100 gift card toward a professional 3D print.

The challenge winner from each age group will win a trip for two to Columbus, OH, to attend a special event at the National Veterans Memorial Museum on Memorial Day.

Each winner will also receive a 3D printer donated to the school, library, or organization of their choice!





## Section 2: Veterans Day and Veterans

Let's learn about the heroes you will be designing the wearable pin for!



## What is Veterans Day?

Veterans Day is on November 11 each year, it honors all Veterans who have served in times of war and peace.

However, it didn't start off that way. It was originally called Armistice Day and commemorated the day of the ceasefire between Germany and the Allies in World War I, which took place at the eleventh hour of the eleventh day of the eleventh month.



## What is Veterans Day?

November 11, 1918, was officially recognized as the end of the war by congress in 1926, and became an official holiday in 1938 specifically to remember the Veterans of World War I.

After World War II and the Korean War once again saw troops being deployed, the holiday's name was changed in 1954 to Veterans Day to honor all American Veterans for their service.





## Who is a Veteran?

Veterans are people who have served in the military for a minimum amount of required time and have now left the forces.

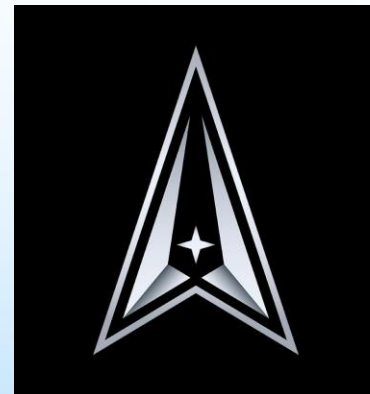
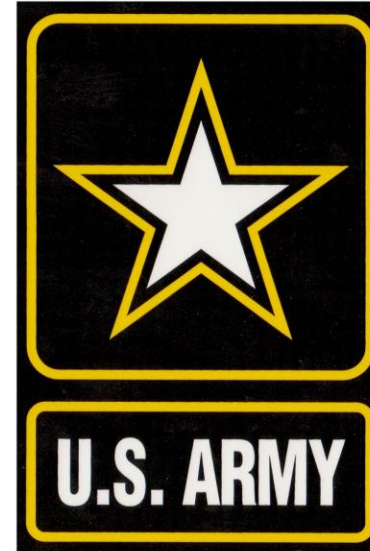
The U.S. has several different military branches. To give you some ideas for your challenge design, we will investigate who they are and what they do.



## Military Branches

There are six branches of the U.S. military:

- U.S. Army
- U.S. Navy
- U.S. Marine Corps
- U.S. Coast Guard
- U.S. Air Force
- U.S. Space Force





## U.S. Army

The Army provides the ground forces that protect the United States of America.

The U.S. Army is the largest and oldest service in the U.S. military. It was established during the American Revolution on June 14, 1775 when the Continental Congress voted to raise ten companies of riflemen in Pennsylvania, Maryland, and Virginia.

There are many mottos within the U.S. Army representing the core values of the various departments and regiments, but the phrase that we see on the Army Emblem and on the flag is “This We’ll Defend.”





## U.S. Navy

America's naval service also began during the American Revolution. On October 13, 1775, the Continental Congress authorized two vessels to be used to intercept supplies being shipped to the British Army.

The core values of the Navy are honor, courage, and commitment.

On, above, and below the water, the U.S. Navy is America's primary forward-deployed force, protecting American interests and preserving the freedom of the seas. Forward-deployed means that the forces are stationed outside of the U.S. territory.



## U.S. Marine Corps

The U.S. Marine Corps is part of the Department of the Navy. It has amphibious and ground units to serve on land and sea. The Marine Corps also provides security to American embassies and naval bases and carries out additional services as directed by the President of the United States.

The Marine Corps was established very soon after the formation of the Navy on November 10, 1775. The US Marine Corps motto is “*Semper Fidelis*,” **Always Faithful.**



Photo Credit: U.S. Marine Corps Sgt Levi Guerra



## U.S. Air Force

The U.S. Air Force got its start as a branch of the United States Army Signal Corps on August 1, 1907, but it was officially recognized as a separate branch of the military on September 18, 1947.

The U.S. Air Force is a rapid and flexible service that has the capability to deliver forces anywhere in the world within hours. Its mission is to fly, fight, and win — delivering airpower anytime, anywhere in defense of our nation

The Air Force adopted the motto, **Aim High ... Fly-Fight-Win.**



## U.S. Coast Guard

The Coast Guard provides law and maritime safety enforcement, marine and environmental protection, and military naval support. Part of the Department of Homeland Security during peacetime, the Coast Guard operates under the Navy during times of war.

The Coast Guard began life as the Revenue Marine on August 4, 1790, when Congress approved the construction of vessels called 'cutters' to protect the nation's revenue at sea. It went by various names, including the System of Cutters, Revenue Service, and Revenue Cutter Service. On January 28, 1915, the Revenue Cutter Service and the US Life-Saving Service were combined to create the US Coast Guard.

- *Sempre Paratus*” is the Coast Guard’s official motto, it means **Always Ready**



## U.S. Space Force

The United States Space Force is responsible for organizing, training, and equipping Guardians to conduct global space operations.

The Space Force is the newest branch of the armed forces; it was established on December 20, 2019.

Space Force's motto is "*Semper Supra,*"  
Always Above.







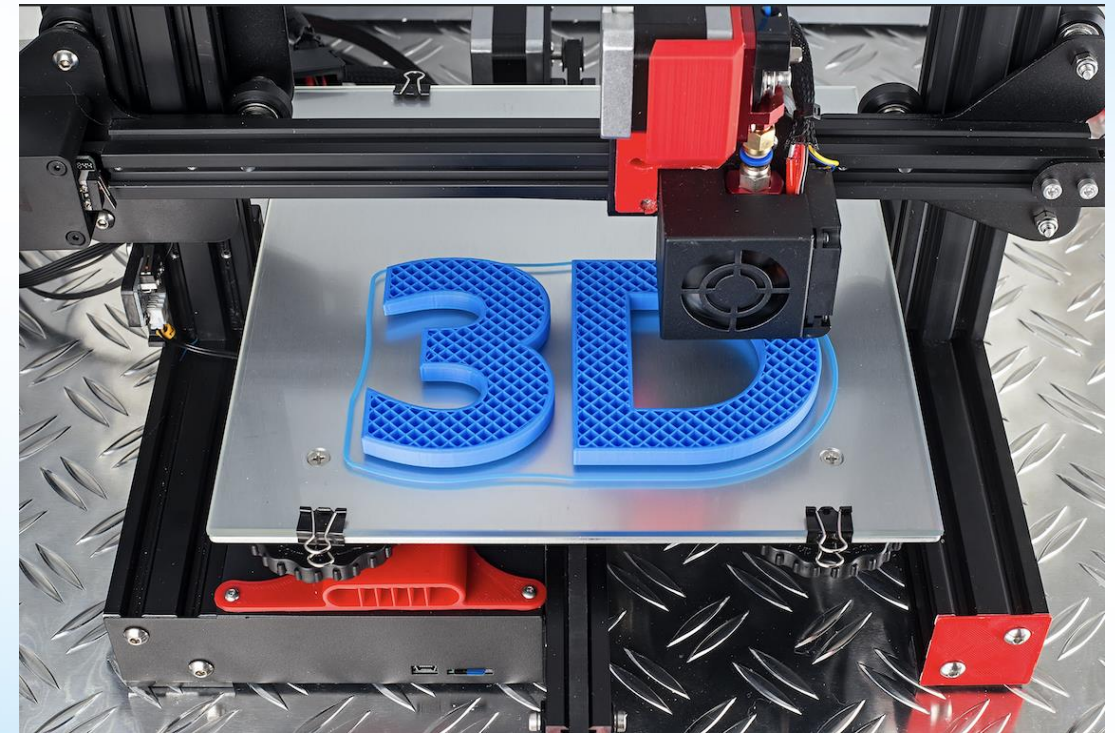
## Section 3: 3D Design and Printing

Now that you know about the who the pin is for, let's dive into 3D design.

## Designing for 3D Printing

Your challenge entry needs to be something which can be 3D printed. Designing it is different to creating a drawing that will only ever be 2D. 3D printing is exciting because it allows your design to have different shapes at different heights and sizes and even include some moving parts.

In the next few slides, we'll explore what 3D printing is to help you figure out what you can do with your design!



## What is 3D Printing?

Your entry will need an STL file of your pin design.

What is an STL file?

- An STL file is a type of digital design file that we send to a 3D printer, and it turns your design into a series of triangles. STL stands for “Standard Triangle Language.” The more complex the design, the more triangles are used and the higher the resolution.

Meet Chuck Hall in this video to learn how 3D printing was born.



## 3D Design

The beauty of 3D Printing is that once you understand how to use the design tools, you can create complex items in one step. You can make pieces that stick out or are recessed. You can replicate parts to be identical, bigger, smaller, or even mirror images.

Check out this video to understand some of the concepts and terminology you come across using 3D design software.



## 3D Design Software

Today there are many options for programs you can use to create your awesome designs to be 3D printed.

Check out the **DIGITAL TOOLS** section of the challenge page to learn about different 3D modeling tools you can use.

[Challenge Page](#)

### DIGITAL TOOLS

Learn about different tools you can use to create a 3D model



Online Service

Make basic 3D models by stacking blocks together to create interesting 3D shapes.  
Good for beginner students to get interested in 3D design and 3D printing.  
COPPA compliant site for kids under 13.



Mac or PC (Cloud Connected)

Take your skills to the next level with Fusion 360, a professional 3D design tool. It's good for making basic parametric shapes or complicated curves. Autodesk products are offered FREE for students, but you do need a student license to run the program.



# Section 4: Brainstorm and Design Activity

Brainstorm and sketch your pin design!





# Graphic Communication

A picture is worth a thousand words, and you can include one in your pin design. Think about the types of symbols and images you can use in your design that represent veterans and/or gratitude? How will you incorporate them into your 3D design?

Each of the forces has multiple emblems and logos, including an official seal which can only be used by that force. Whilst you can't exactly reproduce the seals in your design, you can use the same symbols that the military uses.





# Symbols

## Eagles

- The eagle is a symbol of power and strength representing the United States of America, and so it is found in all branches of the military.

## Anchors

- Anchors are most commonly associated with the navy and the marine corps; they represent many things: hope, unity, strength, and support.

## Thunderbolts

- Thunderbolts are featured on the Air Force seal, but these are universal symbols of great power and striking force.



## Symbols

### Planet Earth

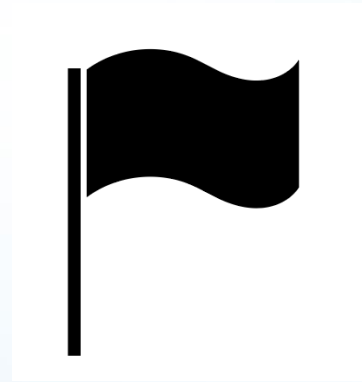
- This beautiful globe that we call home is often used as symbol of protection, peace and unity.

### Helmets

- A helmet is an instantly recognizable symbol of the military.

### Flags

- Found on many emblems a flag can have great impact. Its design can tell a powerful story of a community and the events that shaped it, a flag lets us know that people are proud of their history.



# Symbols

## Wings

- Wings are often used in designs to symbolize freedom, hope, strength and support.

## Stars

- From medals to flags, to denoting rank, to emblems and logos, shining stars are found everywhere in the military and the United States

## • Laurel Wreaths

- Since the era of Ancient Greece, laurels have been associated with honor and victory, and are frequently used today as a way of recognizing achievement and authority.



# Symbols

## Doves

- A global symbol of peace, love and freedom. Our armed forces are always working hard, whether it be during combat or in times of peace.



## Hands

- Hands can symbolize so many things because we use them for everything. They are practical tools demonstrating power, strength, ingenuity, and protection. We use them to say hello, goodbye and thank you. And when we are at a loss for words, a hand on heart speaks volumes.



# Symbols

## Chevrons

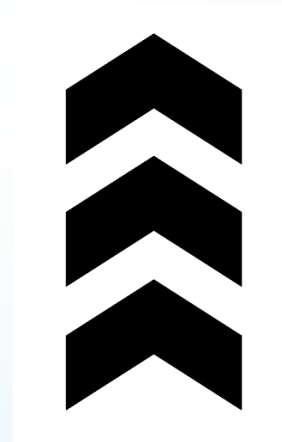
- Today chevrons denote rank in the military, but it is also an ancient symbol signifying protection.

## Hearts

- Probably the most easily understood symbol in the world, hearts speak to us of love, appreciation, gratitude and joy.

## Shields

- This image instantly speaks to us of protection: providing safety and shelter and defending our fellow humans.





## Text

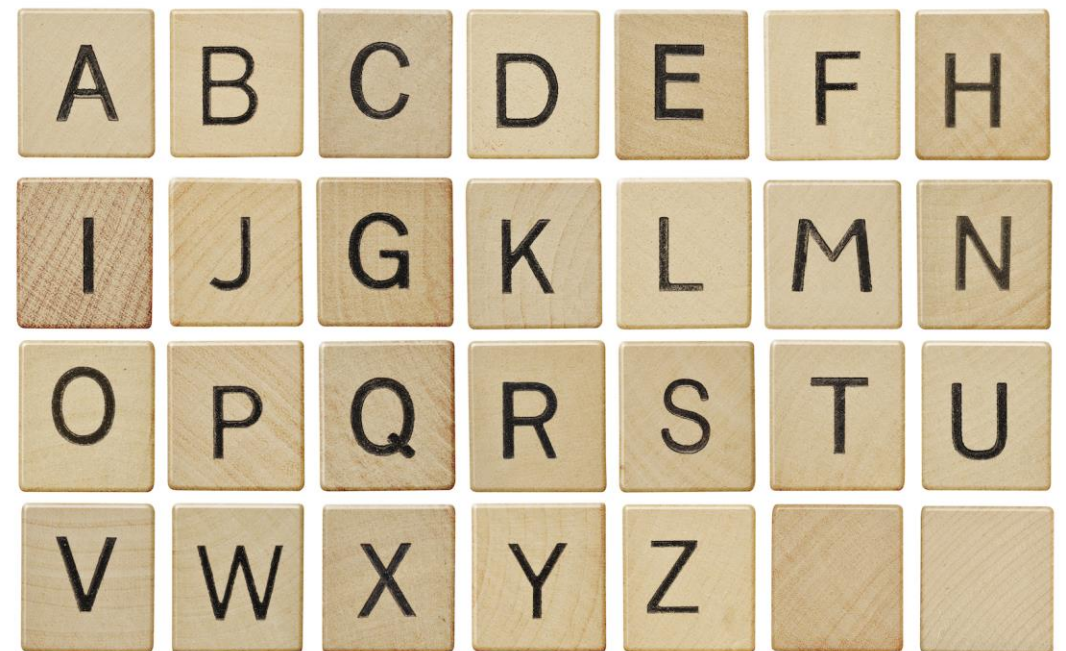
Will your pin have text?

If the answer is “yes”, what will your pin say and how will it communicate your message?

Will you use letters, braille, or something else?

Will you use an existing font or create your own?

You have limited space so choose your letters/words wisely.



## Mechanical Movement

Pins can dangle, bobble, sway, slide, and spin. Will your design include movement?

- Dangle pins typically have an extension from the base of the pin that hangs from small loops of chains.
- Bobble pins use a spring to create their jiggly motion.
- Slider pins have a piece that slides back and forth across the base of a pin.
- Spinner pins have parts that can move 360 degrees.

What kind of moving pin will you choose and how will your design make it happen?



## Intentional Color

Whether you use pastels, primary, bright or dark colors, color choice can have meaning. For example, light red or pink often represents love; red, white and blue represent freedom. Being intentional with the color your 3D print can bring an added layer of meaning to your pin.





## Intentional Color

Colors can also be used to represent character. The Department of the Army Emblem has this to say about the colors in their design.

*“Blue is symbolic of loyalty, vigilance, perseverance, and truth.  
Red denotes courage, zeal, and fortitude.  
White alludes to deeds worth of remembrance.  
Black is indicative of determination and constancy.  
Gold represents achievement, dignity, and honor.”*



## Flat Art vs Sculptural

Three-dimensional objects have width, height, and depth.

How will you vary the size of your height, width, and depth to bring your pin idea to life?

Will your pin be flat, or will it pop out like 3D sculpted object?



2021-2022 Finalists Pin Prints

## Design and Submit

Take all the ideas you came up with in the brainstorming activity, decide which ones you want to keep, and develop a design for your wearable pin.

Use the [Take-home worksheet](#) to sketch out your design and draft your write-up. Then, bring that design to life with your favorite 3D design software. Save the STL file and submit your entry at <https://www.futureengineers.org/aeopvetsappreciation>.

Get creative, and good luck!