

Fortifications of Nashville, Then and Now

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Winter 2023



Forts, Fortifications, and Fortresses

Fort- A fully enclosed work that is constructed at an important position or location. It can be isolated or built in a larger fortified area

Fortification- The military art of strengthening a position to resist an attack from a superior force. A Position can be strengthened by the use of natural resources such as rivers or hills or by artificial (constructed) means. Generally two types:

Permanent- built in a position of great importance for long-term use using durable materials (stone, masonry)

Field or Temporary- built for shorter-term use from available materials,

Fortress- a Fortified town, city, or large area, so strongly fortified that it is capable of resisting a large or sustained attack

Fortifications

Across Europe Fortifications were built to establish ownership of an area and enhance ability to defend it

Example- Norman Conquest, 1066

As warfare becomes more expeditionary, series of forts are built as part of a logistical chain to house foodstuffs and supplies

Early Forts were often built on hills, especially in England



Fortification Design

Questions: What is the best shape?

How do you design the entrance?

Some basic axioms:

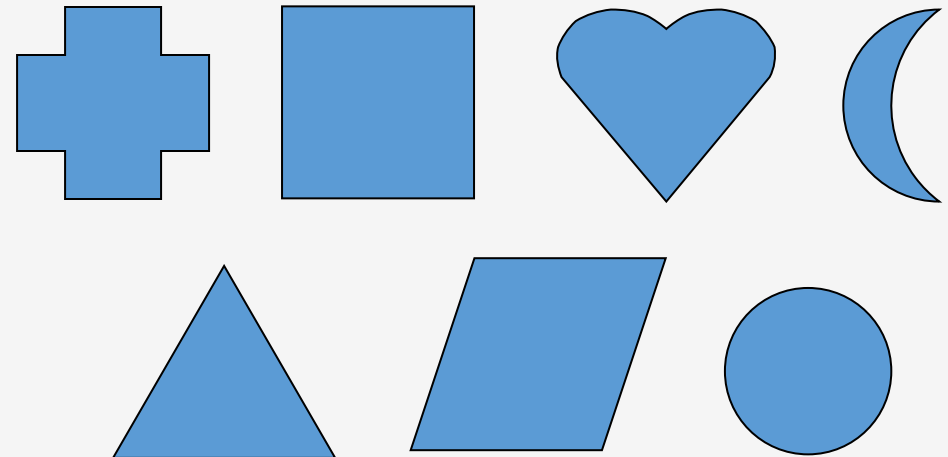
1. Want to have as **short a perimeter** as possible

2. Want to enclose the **largest area** as possible

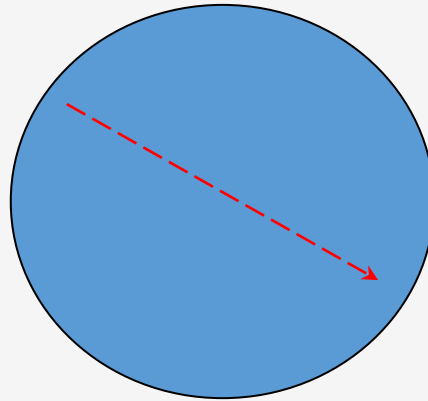
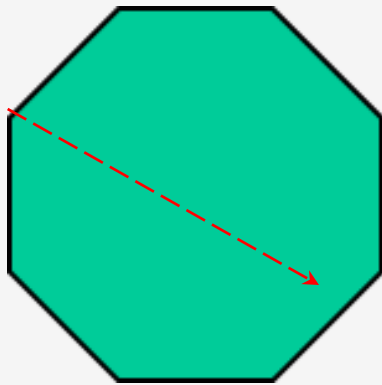
3. It should be **convex** Any two defenders must be able to see each other

4. It should be **symmetric** .. No weak spots

Which shape do you think is best and why?



Circular shapes enclose the **largest area** with the **smallest perimeter**, and are also **convex** and as **symmetric** as possible



= Line of sight

The **isoperimetric theorem**

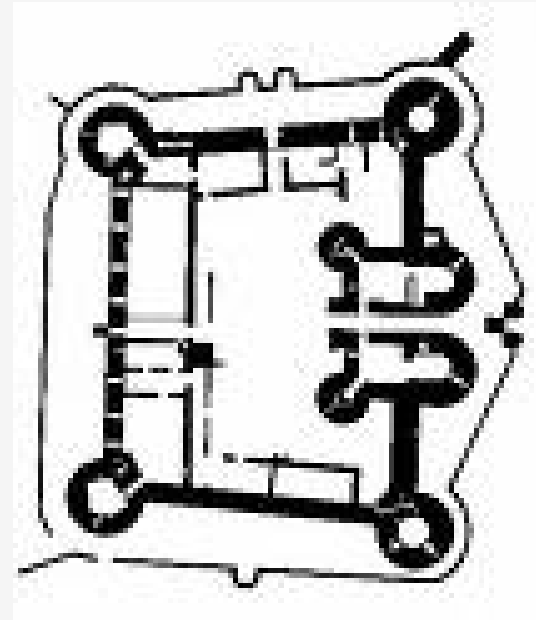


Medieval Castles

Medieval castles started with a **Motte and Bailey** design similar to a hill fort



Later castles had an outer wall (with turrets)
and a keep



Harlech

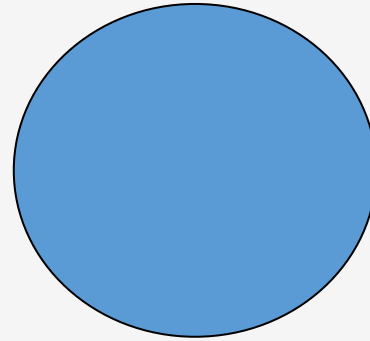


Keeps were very symmetric

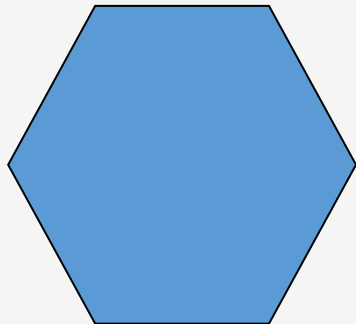
Harlech



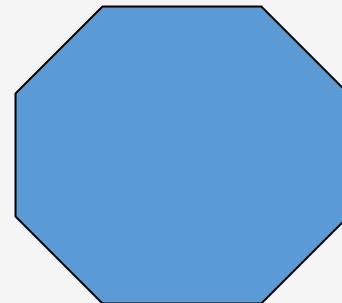
Conigsburgh



Raglan

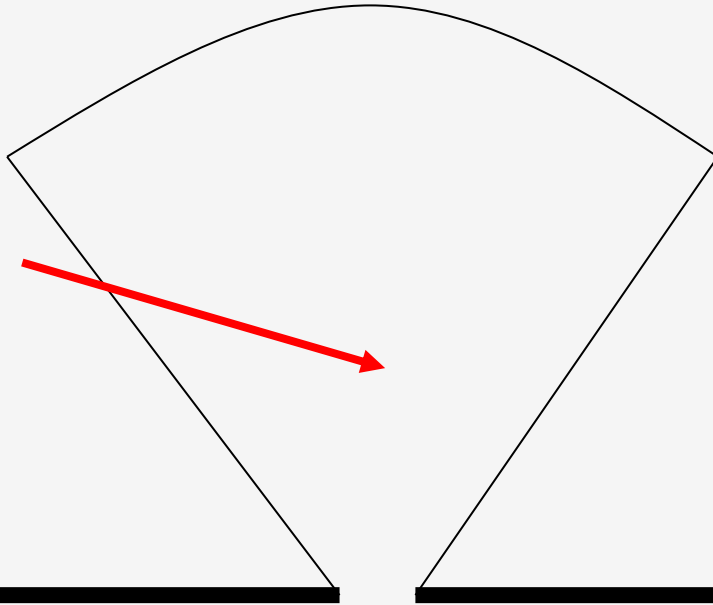


Caernarfon

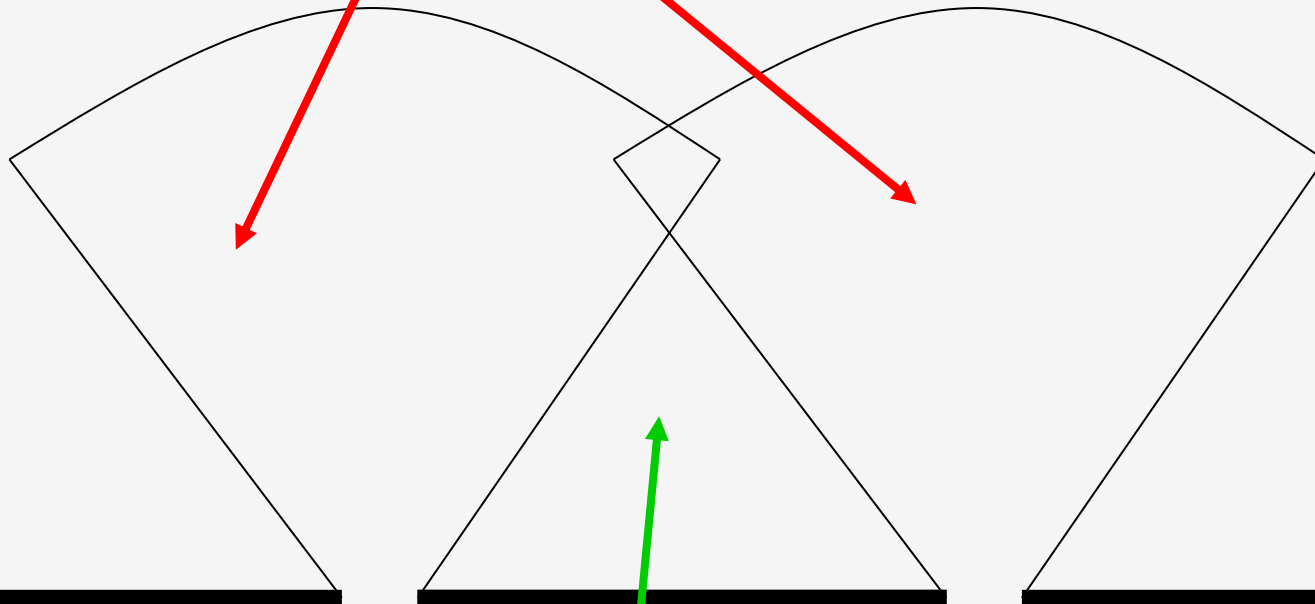
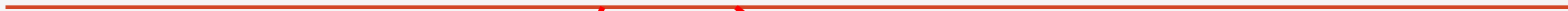




Danger zone



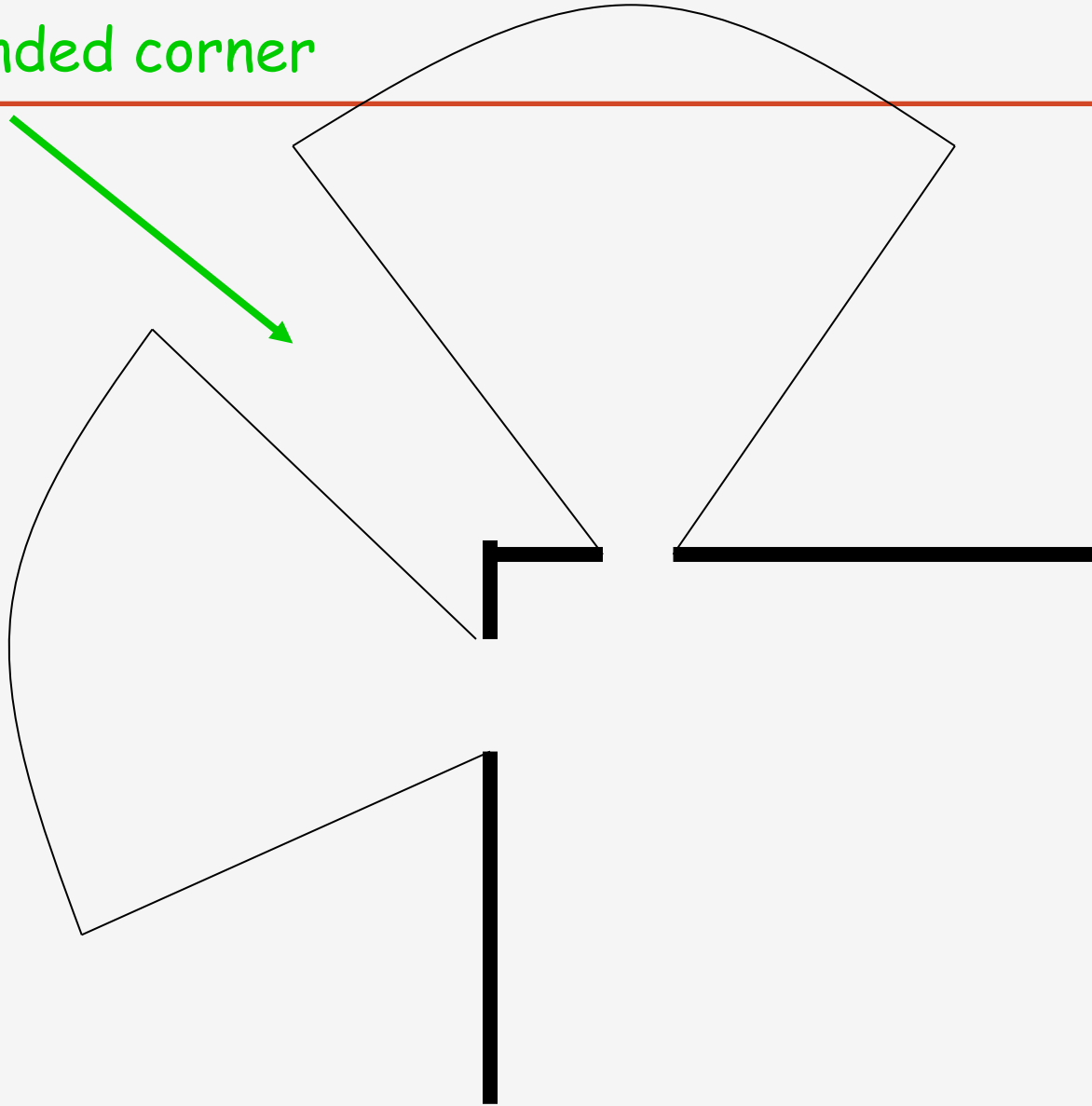
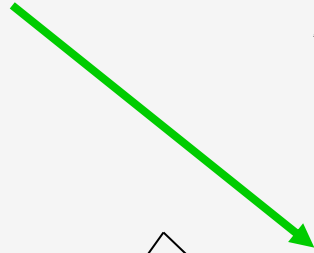
Danger zone

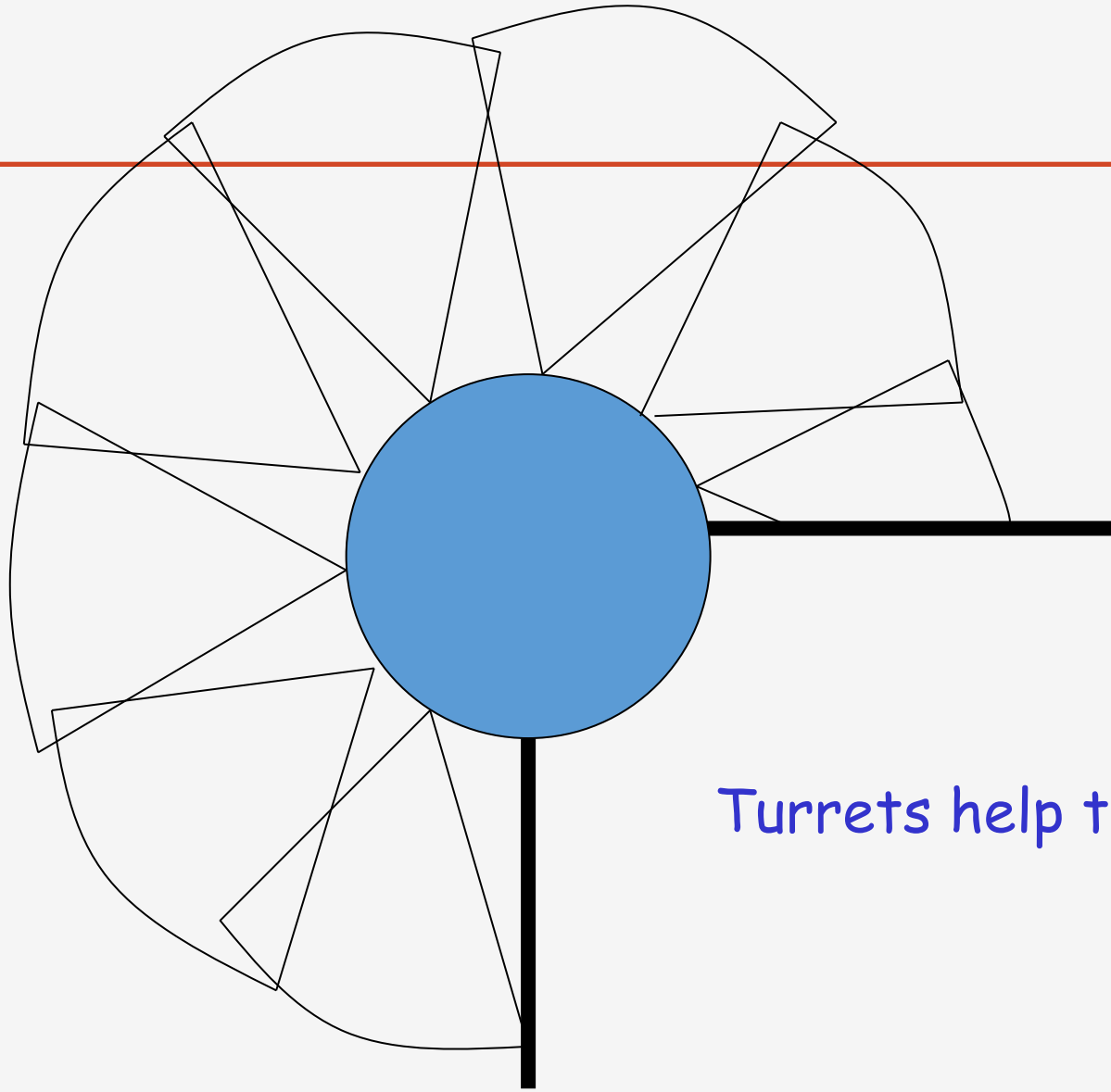


Safe zone



Undefended corner





Turrets help to cover blind spots

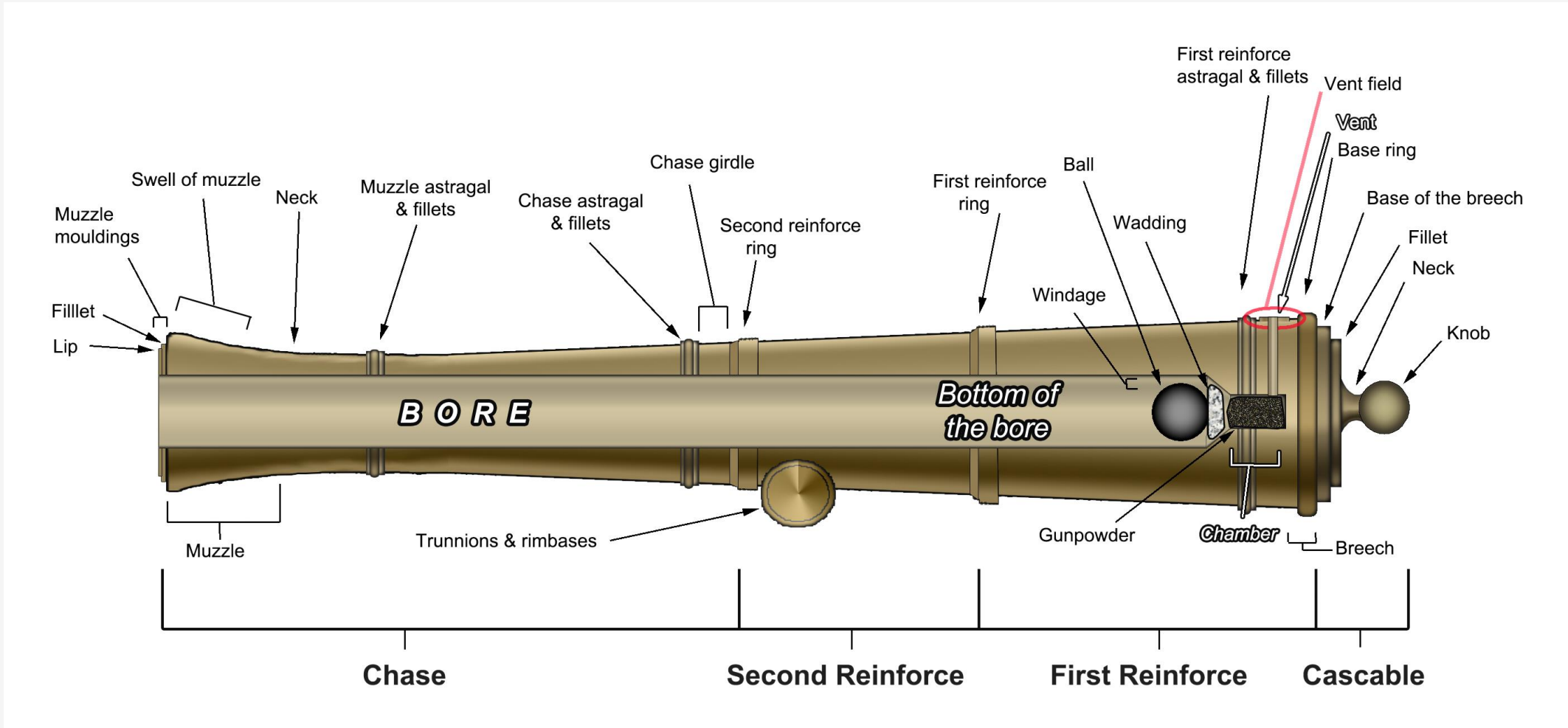
Tudor Castles:



Turrets on turrets



Gunpowder Weapons



Forts Change

More and more earth used in fortifications

- Easy to use, plentiful, cheap

- Easy to repair

- Superior to other materials in resisting shot

Fortifications using earth are referred to as “works”

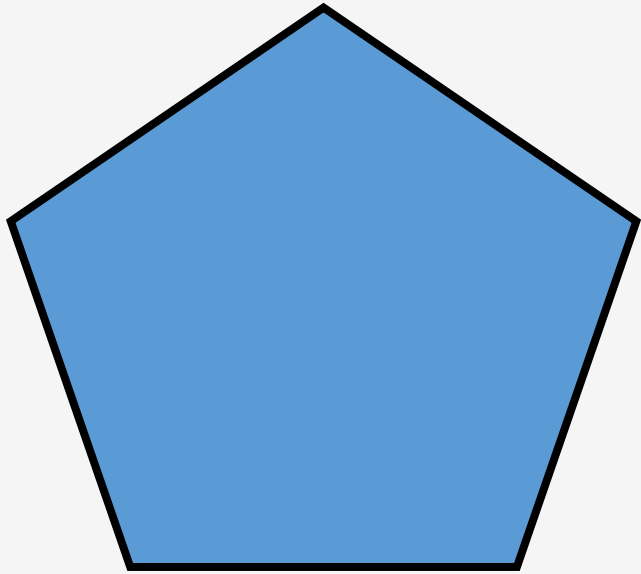
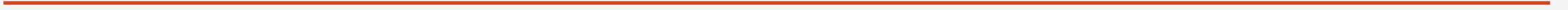
- Earthworks

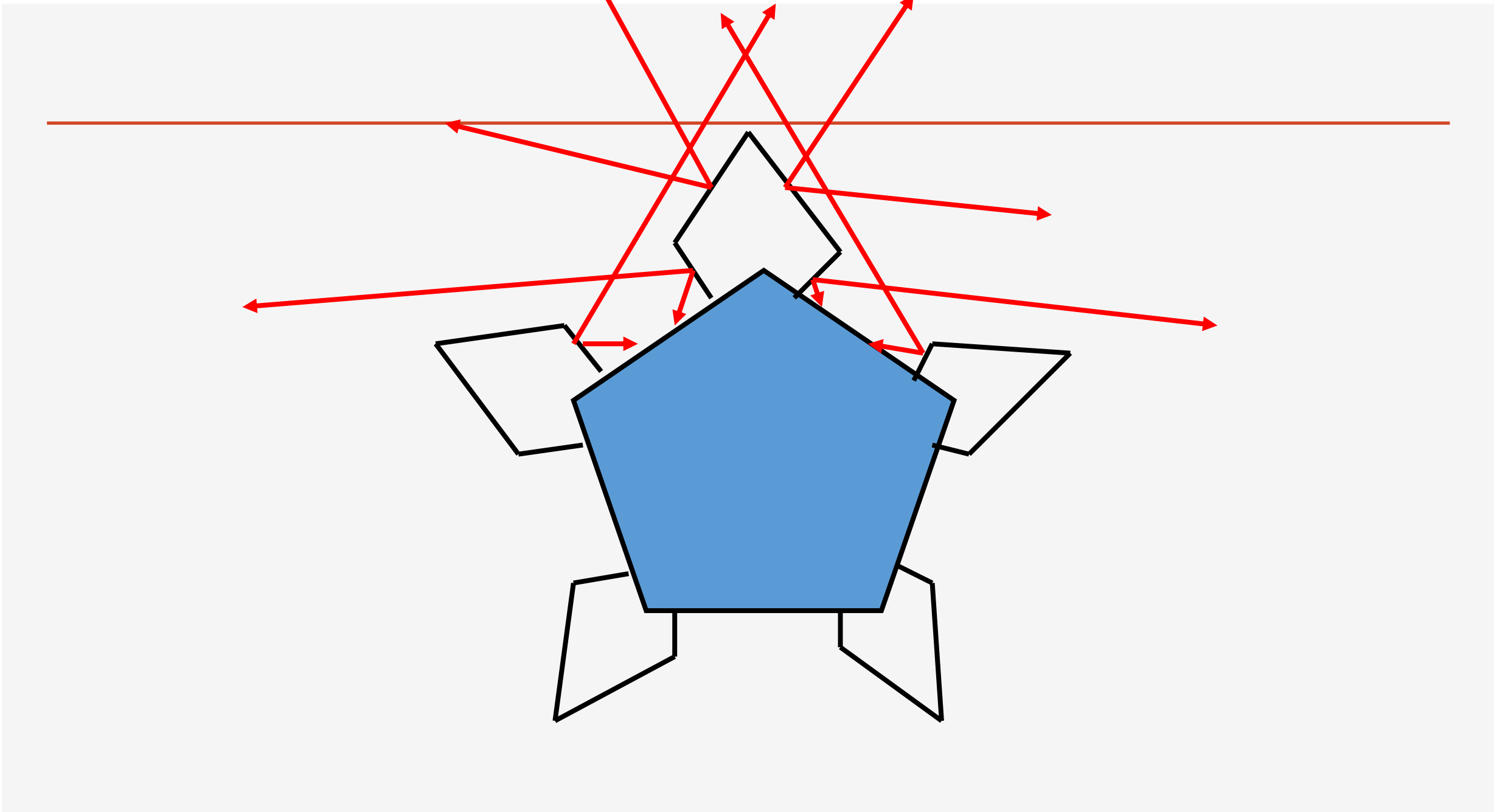
- Breastworks

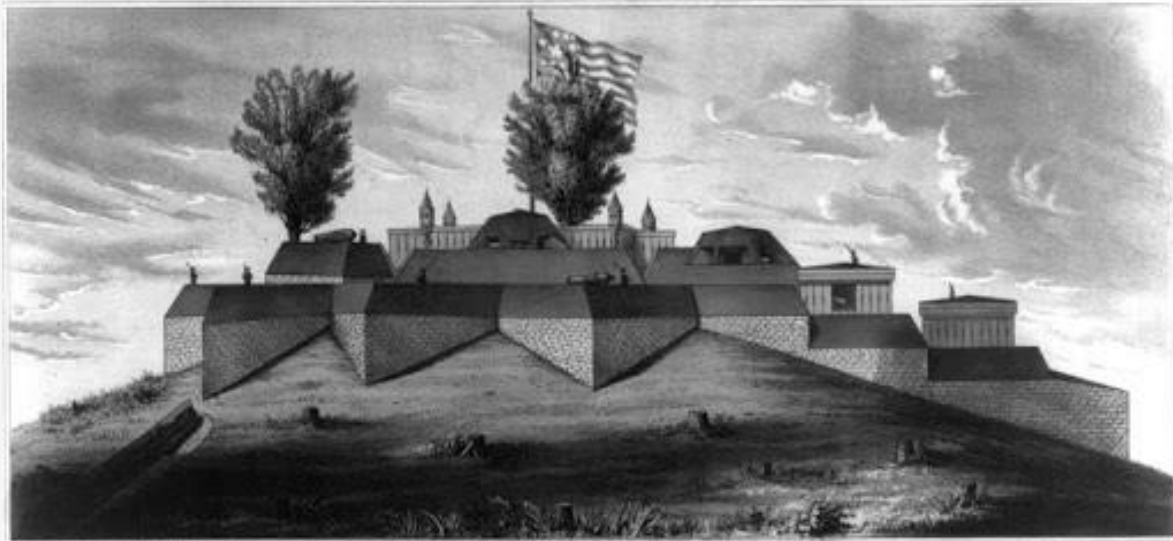
Platforms for firing gunpowder weapons

Vauban's Forts









SOUTH WEST VIEW OF FORT NEGLEY.



How do you defeat this type of fort?

Forts of this era generally were attacked "In Parallel"

Forces would move close to the fortification- just outside of the range of the guns (~600 yards or more)

Attacking force would then dig a zig-zag trench parallel to the fort reinforcing as they went

They would then dig toward the fort from the reinforced trench about 100-200 yards and dig another parallel

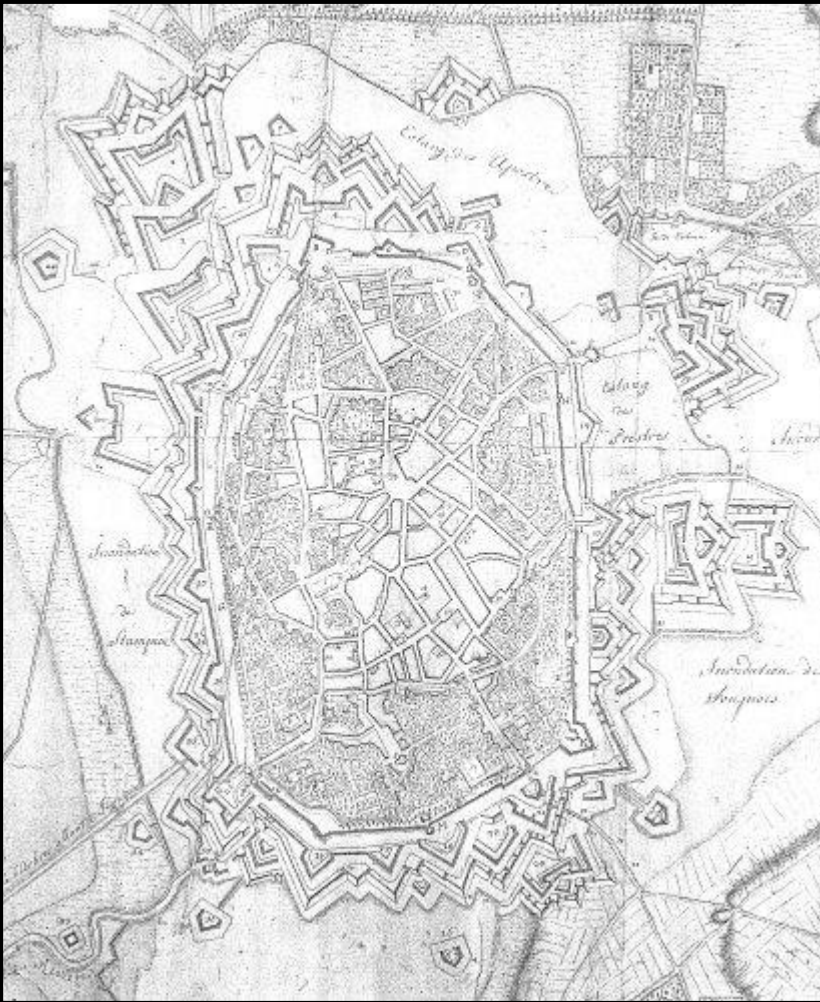
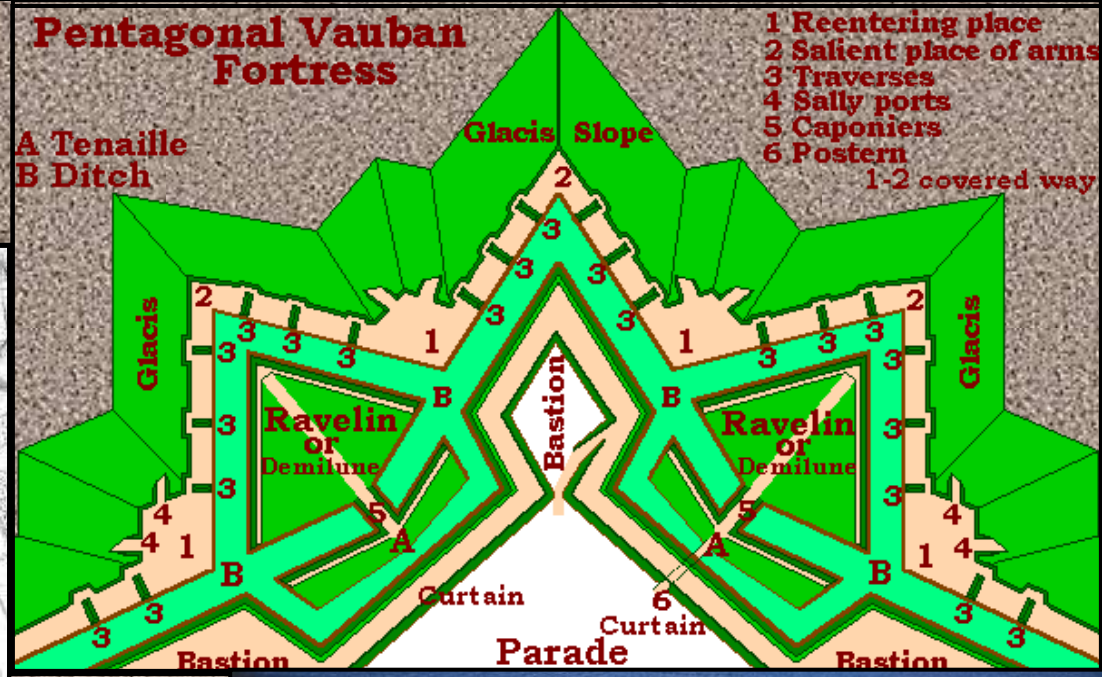
When close enough- about 200 yards they would bring up heavy guns, attack the fort until it fell then line up infantry and "exploit the breach"

In order to counter this, forts were built larger with more elaborate works farther out from the main fort with outposts, pickets, entrenchments redoubts, redans and other features

Pentagonal Vauban Fortress

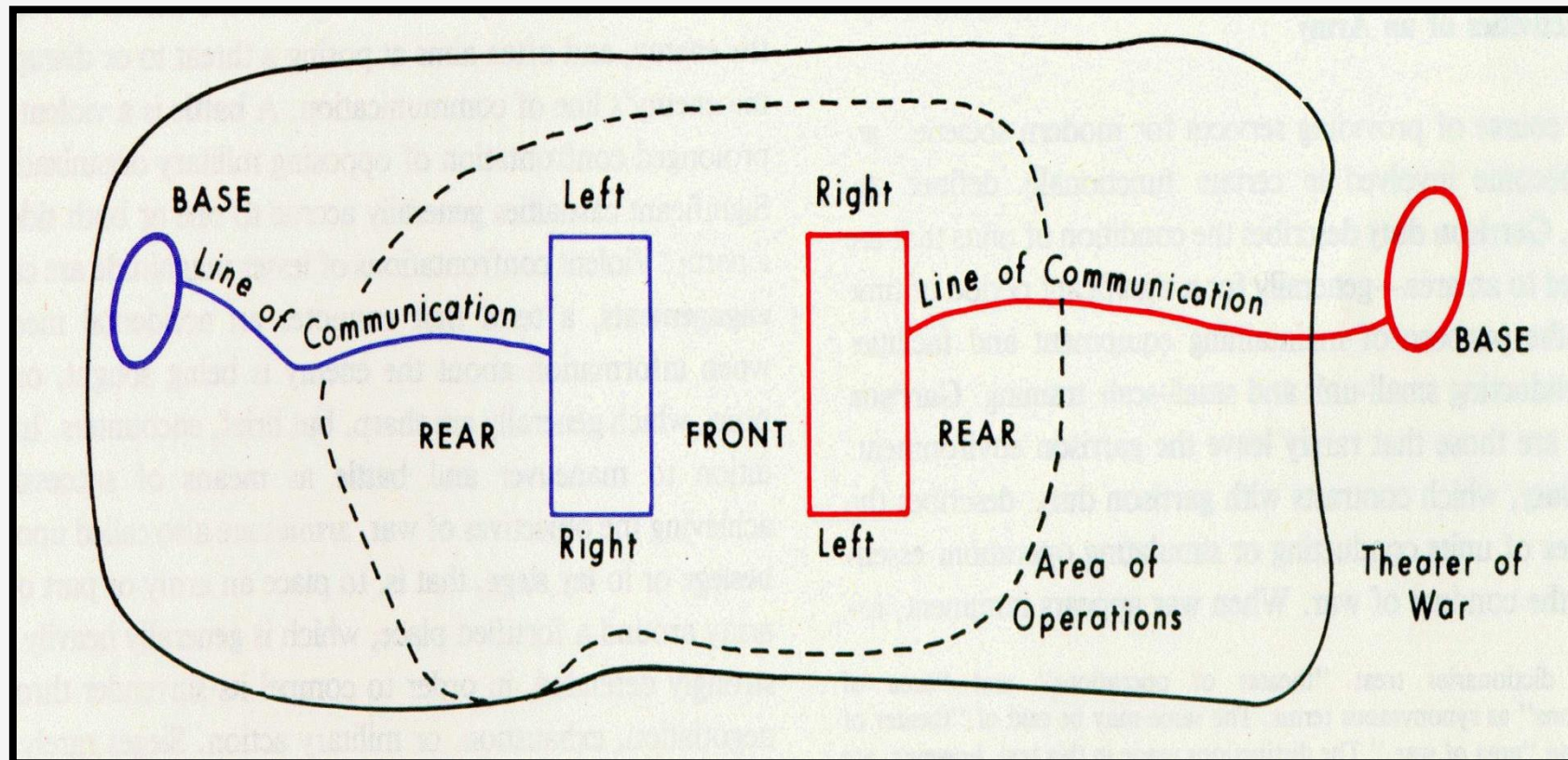
- 1 Reentering place
 - 2 Salient place of arms
 - 3 Traverses
 - 4 Sally ports
 - 5 Caponiers
 - 6 Postern
- 1-2 covered way

A Tenaille
B Ditch



Gunpowder & Fortresses:
Trace Italienne

Linear and Napoleonic Tactics



Antebellum United States

Officers studied Napoleonic tactics

Have drill manuals but no doctrinal manuals- some training on how to build forts but little on how to use the or how to assault them

Most permanent fortifications are coastal

Few officers have experience with large fortifications

No officers have any experience with large formations of Soldiers

Most combat experience was in the Mexican War

And...



Rifled vs. Smoothbore

TYPICAL CIVIL WAR SMALL ARMS

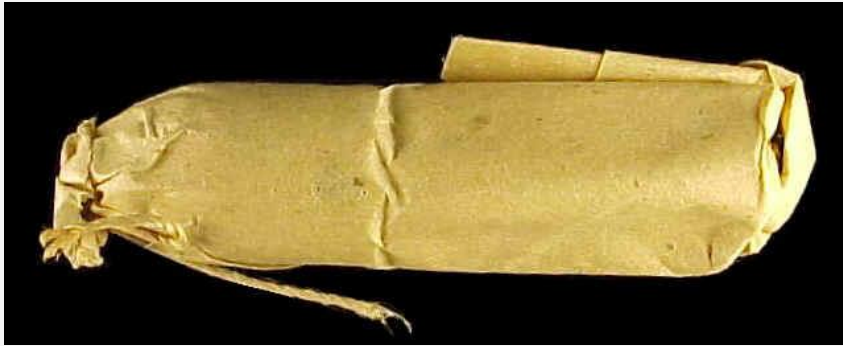
<i>Weapon</i>	<i>Effective Range (in yds)</i>	<i>Theoretical Rate of Fire (in rounds/minute)</i>
U.S. rifled musket, muzzle-loaded, .58-caliber	400-600	3
English Enfield rifled musket, muzzle-loaded, .577-caliber	400-600	3
Smoothbore musket, muzzle-loaded, .69-caliber	100-200	3



Small Arms



Enfield Rifled Musket—Minie Projectiles and Cartridge



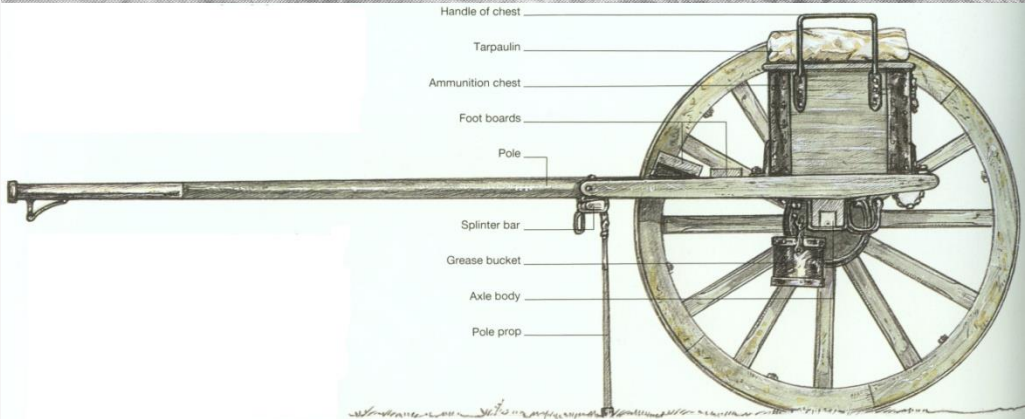
Model 1842 Smoothbore Musket—Buck and Ball Projectiles and Cartridge



Bayonet



TYPICAL CIVIL WAR FIELD ARTILLERY



12-Pounder Gun-Howitzer, Model 1857 (Napoleon)

The so-called "Napoleon" was the work-horse cannon for both sides throughout the conflict. Also cast in 6-pounder caliber this light, durable smooth bore weapon had a range of 2,000 yards and hurled more solid shot, case shot, grape and canister than all the other ordnance of the war combined. It was a simple piece, cast of bronze or iron, and mounted on an iron-bound wooden carriage on which was carried its own rammer, sponge, leather grease bucket and rope for hauling. Behind it stood its limber, really just an ammunition chest on wheels, and to which the piece was attached when pulled by its 6-horse team.

Weapon	Tube Composition	Tube Length (in inches)	Effective Range at 5 Elevation (in yards)
6-pdr smoothbore field gun 3.67 in. dia. bore	bronze	60	1,523
12-pdr smoothbore field howitzer 4.62 in. dia. bore	bronze	59	1,680
12-pdr smoothbore mountain howitzer 4.62 in. dia. bore	bronze	33	1,005
10-pdr Parrott rifle 2.9 in. dia. bore	iron	78	1,950
3-inch ordnance rifle 3.0 in. dia. bore	iron	73	1,835
12-pdr James rifle 3.67 in. dia. bore	bronze	69	1,700

Artillery

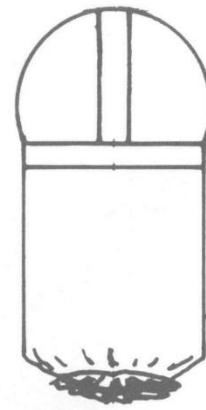
Artillery Projectiles



Shot



Bolt



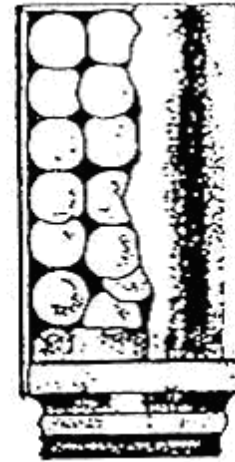
“Fixed” round of solid-shot ammunition



Spherical shell



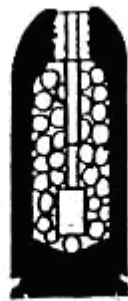
Rifled shell



Canister

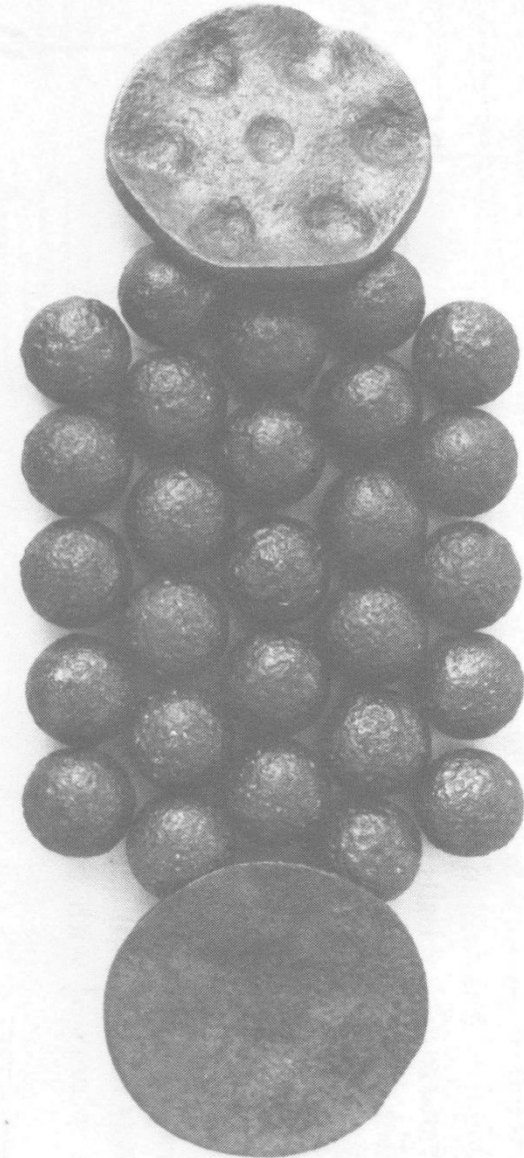


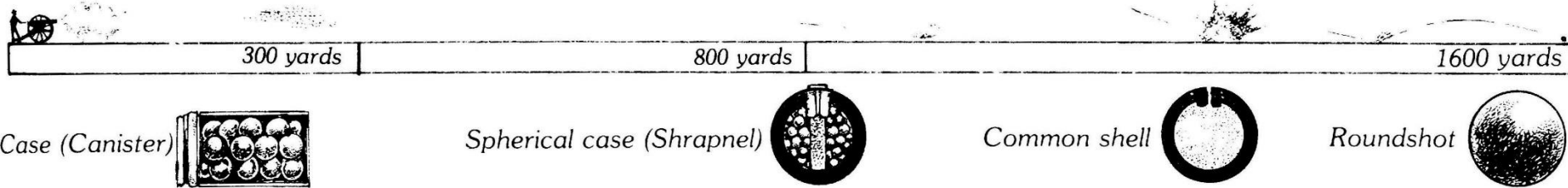
Spherical case shot



Rifled case shot

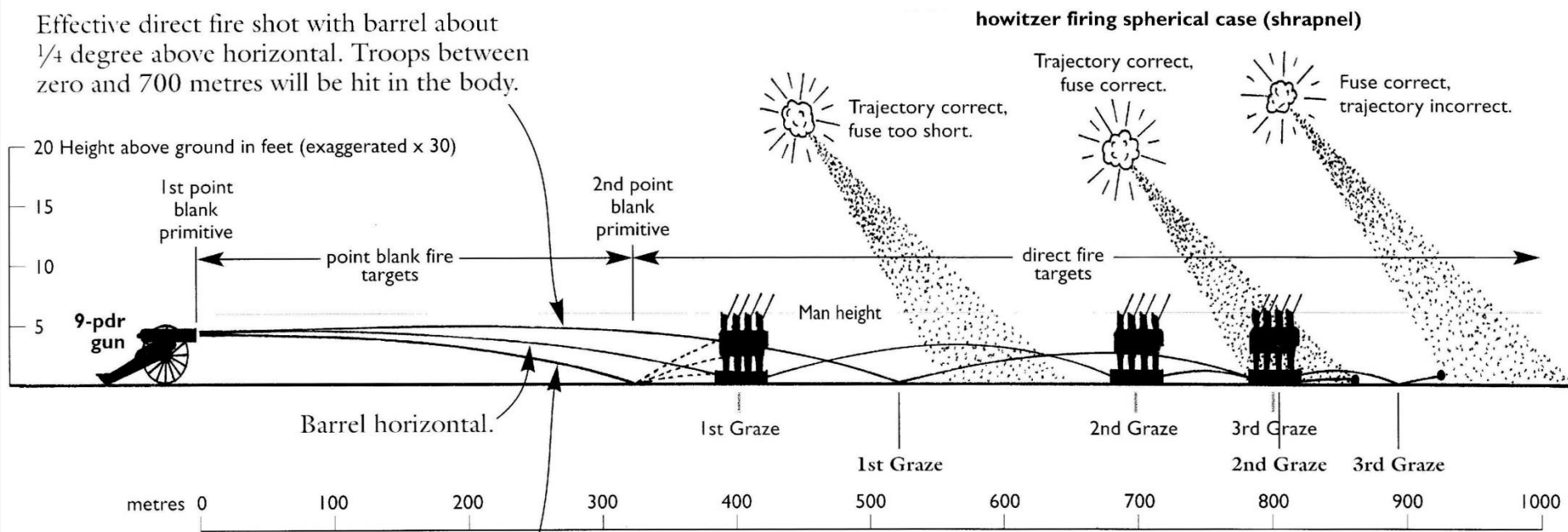
Contents of a fixed 12-pounder canister — 27 1.5” iron balls with plates.





The Effectiveness of Different Types of Artillery Fire – The Theory

Effective direct fire shot with barrel about $\frac{1}{4}$ degree above horizontal. Troops between zero and 700 metres will be hit in the body.

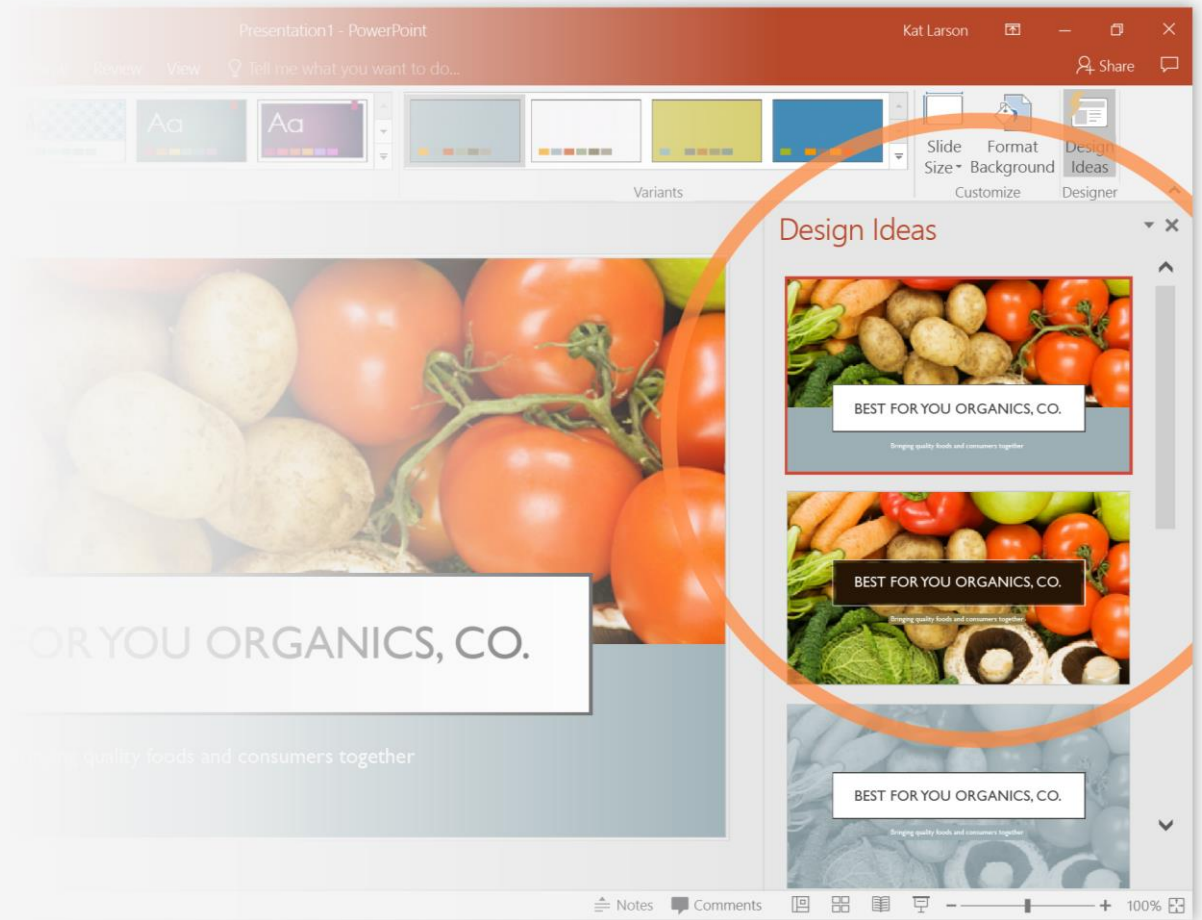


Canister ricochet fire at close range with barrel depressed about $\frac{1}{4}$ degree – extremely effective.

Designer helps you get your point across

PowerPoint Designer suggests professional designs for your presentation, based on the content in your slides.

Designer is a subscription-only feature. If you have an Office 365 subscription, the next slide shows you how it works in a new presentation.



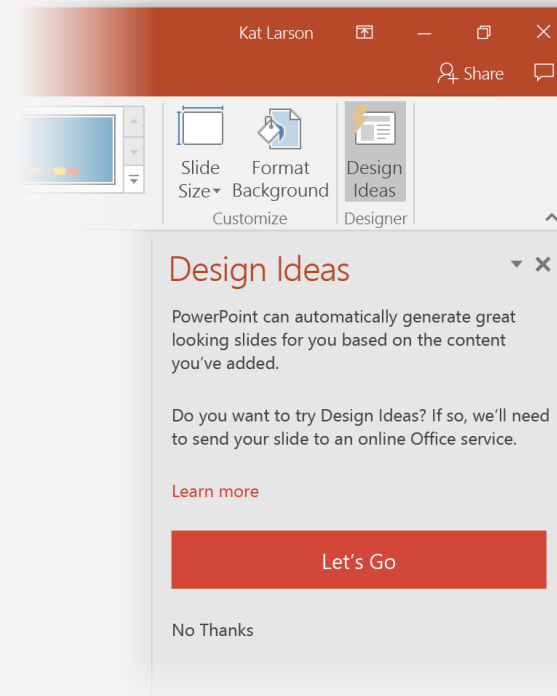
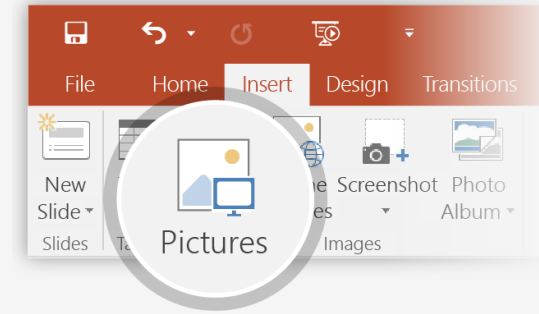
How to use PowerPoint Designer

How it works:

- 1 Start a new presentation by going to **File** > **New** > **Blank Presentation**.
- 2 On the very first slide, add a picture: Go to **Insert** > **Pictures** or **Insert** > **Online Pictures** and choose the picture.

Hint: You need to be online when you add the picture.

- 3 When PowerPoint asks your permission to get design ideas, select **Let's Go**.
- 4 Choose a design you like from the **Design Ideas** task pane.

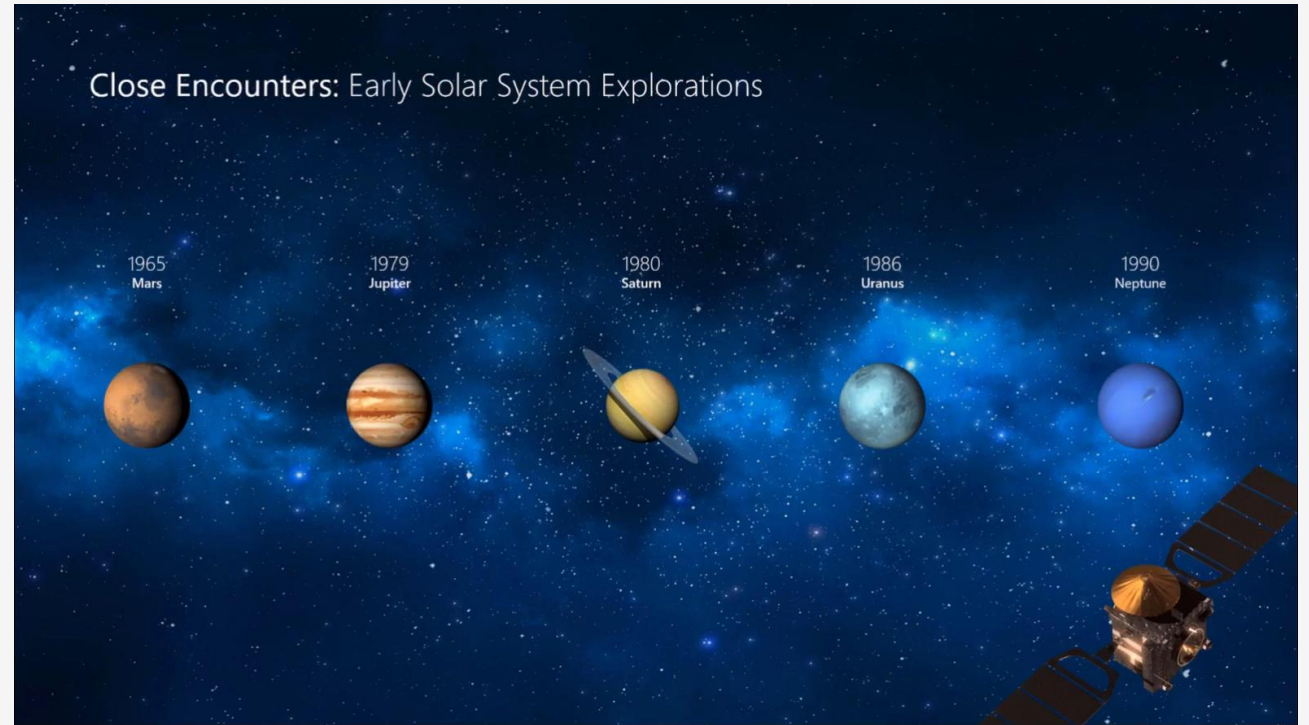


Morph

Morph makes smooth animations and object movements in your presentation. You use two similar slides to perform the animation, but it looks to your audience like the action happens on one slide.

Play the video on the right to see a quick example.

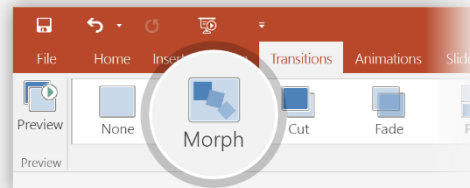
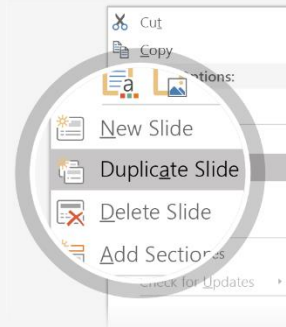
Morph is a subscription-only feature. If you have an Office 365 subscription, you can try it yourself with the steps on the next slide.



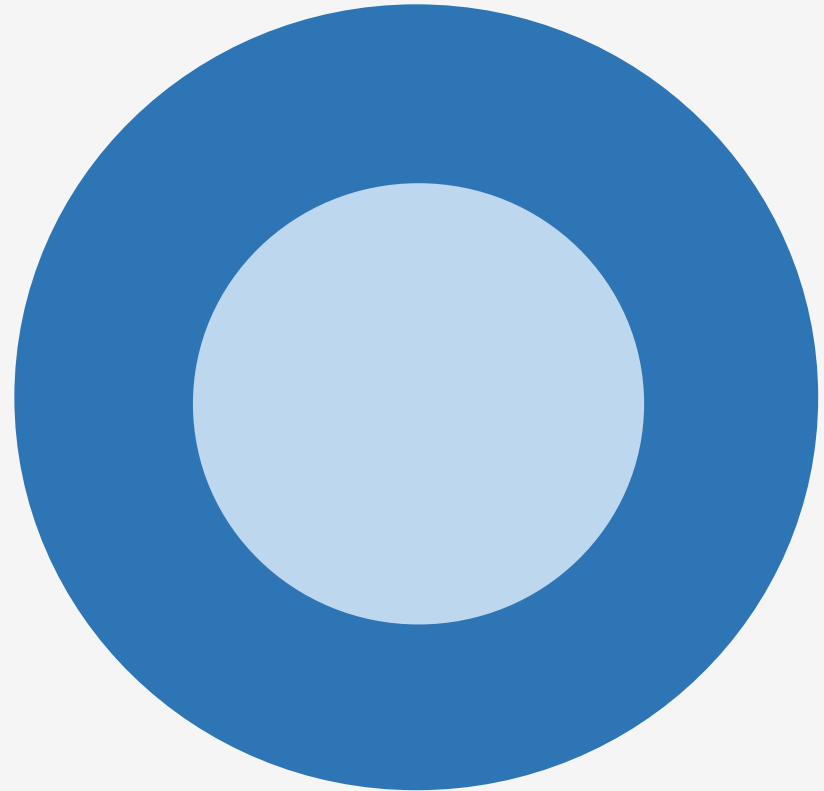
Setting up Morph

Try it yourself with these two simple “planets”:

- 1 Duplicate this slide: Right-click the slide thumbnail and select **Duplicate Slide**.
- 2 In the second of these two identical slides, change the shapes on the right in some way (move, resize, change color), then go to **Transitions > Morph**.
- 3 Return to the first of the two slides and press **Slide Show** button and then select **Play** to see your circle morph!



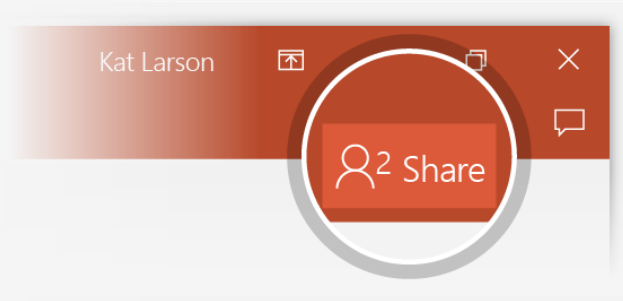
Hint: Effect Options gives you even more options for **Morph**.



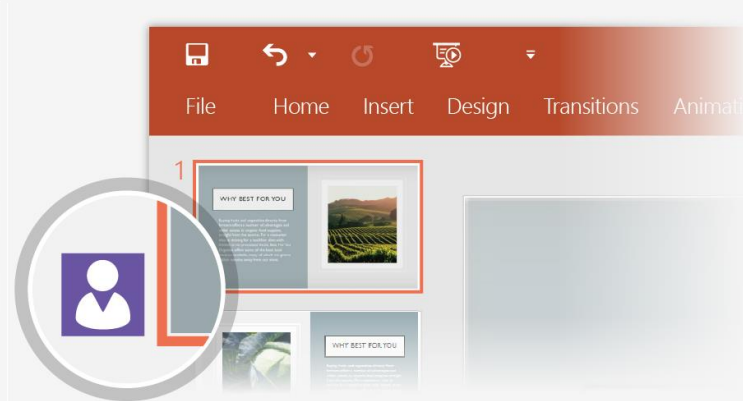
Working together in real time

When you share your presentation with others, you'll see them working with you at the same time.

How it works:



- 1 Select **Share** from above the ribbon, or by using short-key **Alt-ZS**, to invite people to work with you (You can save to the cloud at this point.)



- 2 When other people are in the presentation, a marker shows who is on which slide...



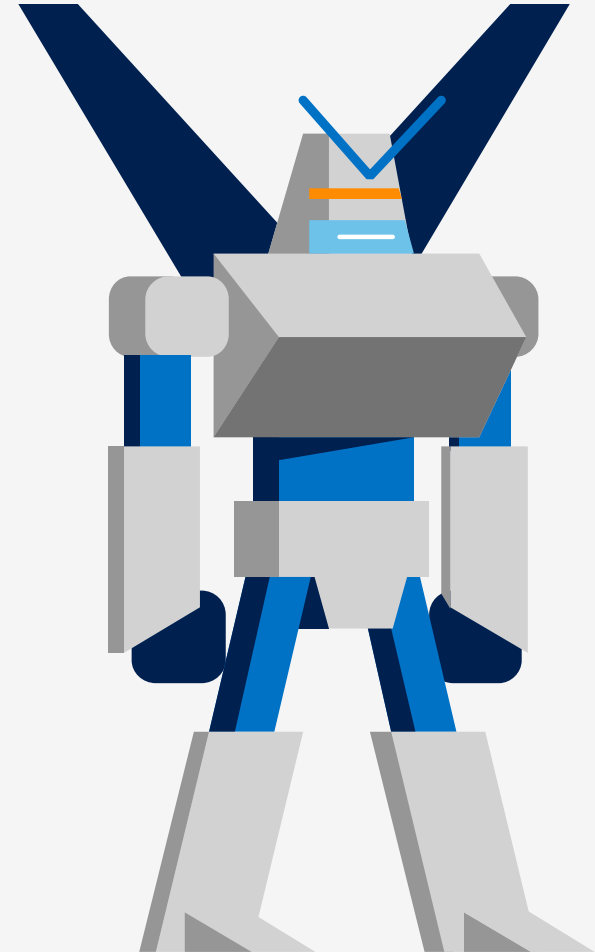
- 3 ...and the part of the slide they're editing.

You're an expert with Tell Me

The Tell Me box finds the right command when you need it, so you can save time and focus on your work.

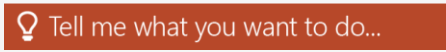
Try it:

SELECT ME

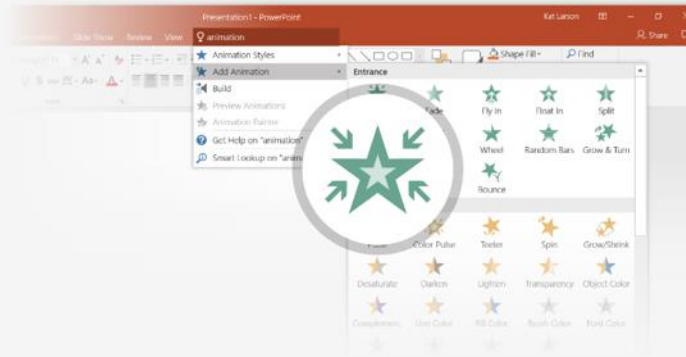


1 Select the Robot picture on the right.

2 Type *animation* in the **Tell Me** box, and then choose **Add Animation**.



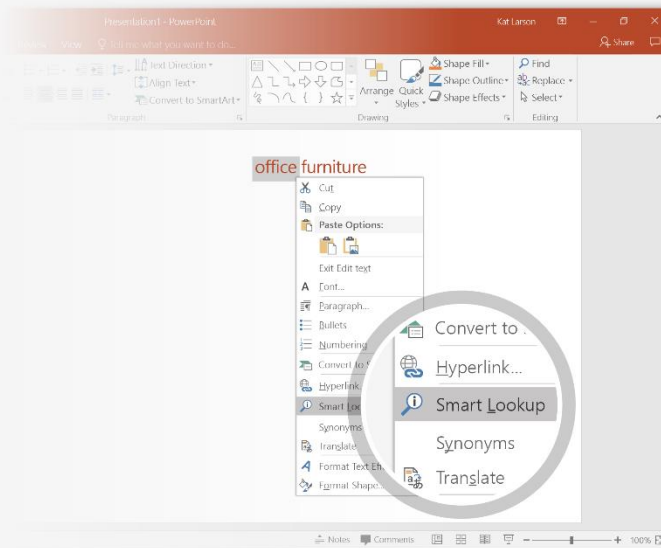
3 Choose an animation effect, like **Zoom**, and watch what happens.



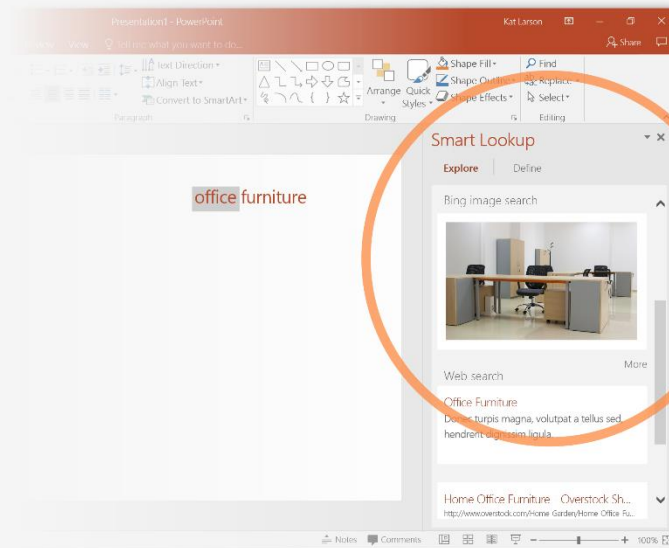
Explore without leaving your slides

Smart Lookup brings research directly in to PowerPoint.

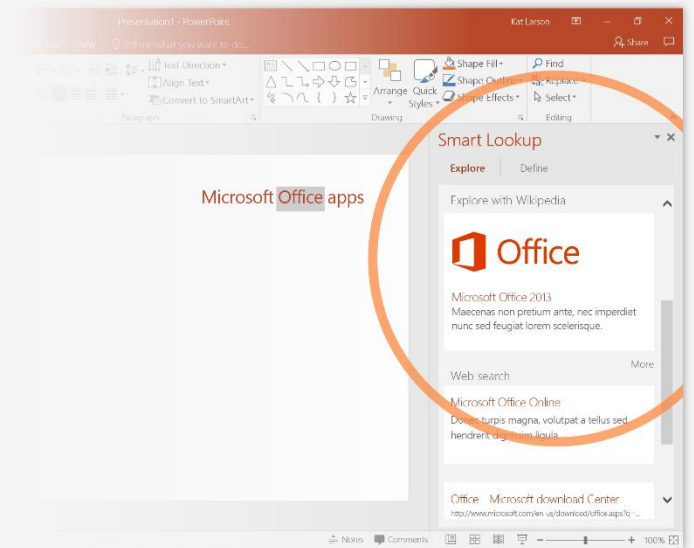
Try it:



1 Right-click in the word *office* in the following phrase: **office furniture**



2 Choose **Smart Lookup**, and notice that results are contextual for that phrase, not **Microsoft Office apps**.



3 Just for fun, try Smart Lookup again by right-clicking in the word *Office* in Step 2.

More questions about PowerPoint?

Select the **Tell Me**

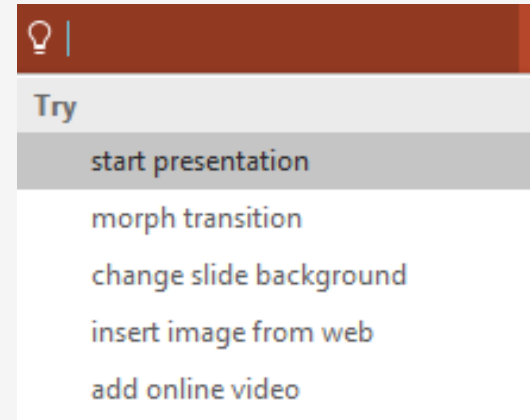


button and type what you want to know.

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SELECT THE ARROW WHEN IN SLIDE SHOW MODE