Forge of Legends:

Crafting Weapons, Shields, and Armor in TinkerCAD

Why Model?

Your next line is “Wait, I’m a programmer, why should I learn to model using TinkerCAD?”

To truly enter the world of technology and robotics, you need much more than software - you need hardware too!

In this Jam, you'll be creating an awesome weapon (or other item) in TinkerCAD. You will learn valuable skills around 3D modeling and how designers plan their craft.

Building something tangible while learning important concepts - two birds with one stone!

Intro

Today, we'll be designing the blade of our sword using TinkerCAD!

This tutorial walks you through the design process of a simple sword. **You are encouraged to customize it!**

After today, you will end up with:

1. Blade for our sword (hilt in part 2)
2. Skills for 3D modeling!

Outline

1. An Introduction to Smithing (what is CAD?)
2. Enter The Virtual Forge (setting up TinkerCAD in your browser)
3. Navigating Your Workshop (using the TinkerCAD dashboard)
4. Learning the Ways of the Craft (Navigating the Tools)
5. The World of Magic (using TinkerCAD shortcuts)
6. Forging by Parts (learning to use the sidebar)
7. The Body of the Blade (creating the long part of the blade)
8. Forging the Blade (but actually this time) (making the bone of your sword)
9. Sharpening the Tip (creating the top of the blade)
10. (Optional) A Guide to the Elements (3D filetype guide)

An Introduction to Smithing (short ver)

In short, CAD (Computer Aided Design) is using computers to help in designing things. It's got a lot of uses in industry and design. Todal, you'll learn how to make simple items in TinkerCAD, an online CAD software.

Or in even shorter terms, funny wacky computer app lets you make cool thing from useless block.

(The long and detailed introduction to the potential, uses, and details of CAD is on the Jam instruction page!)

Part 2: Enter the Virtual Forge.

Setting up TinkerCAD in your Browser

But before you start...

Prepare a mouse!!!

TinkerCAD (and most other 3D Modeling programs) are wayyyy easier to use with a mouse.

It is a really bad idea to do trackpad CAD, especially in more advanced programs.

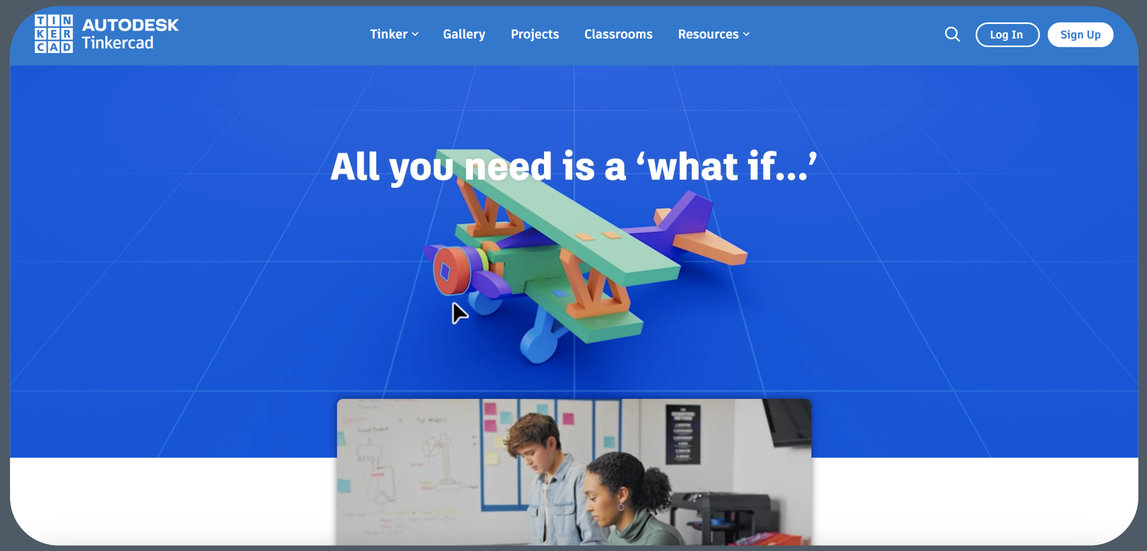
Think of it as your hammer or anvil →

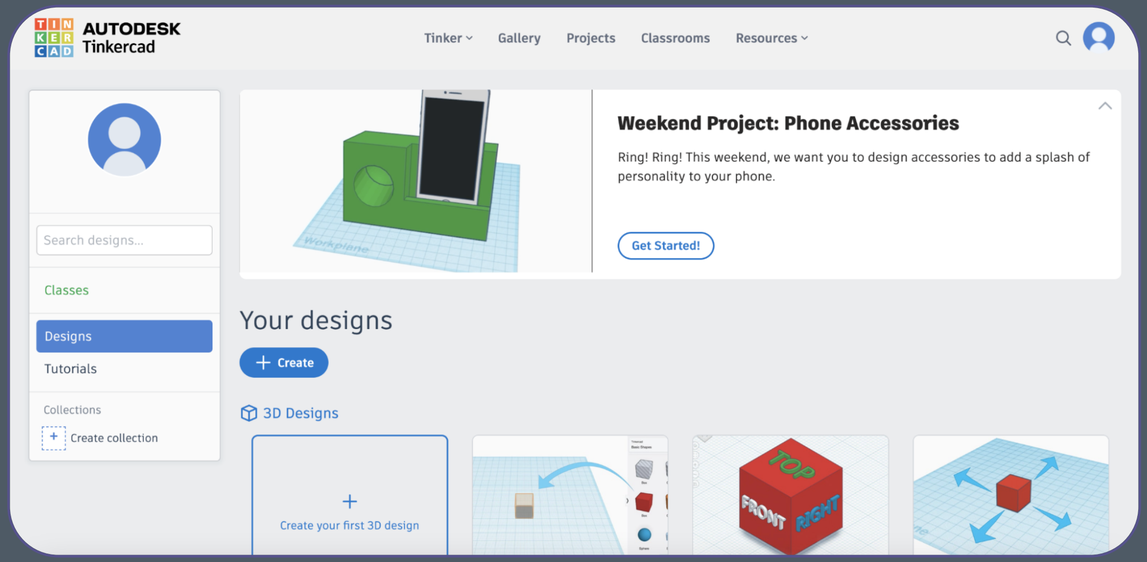
Create an account.

Head over to TinkerCAD and create an account! Generally you can just tie it to your Google/Email account

If you want to use more Autodesk products it may help to make an Autodesk account and link it there.

You should soon see your dashboard!





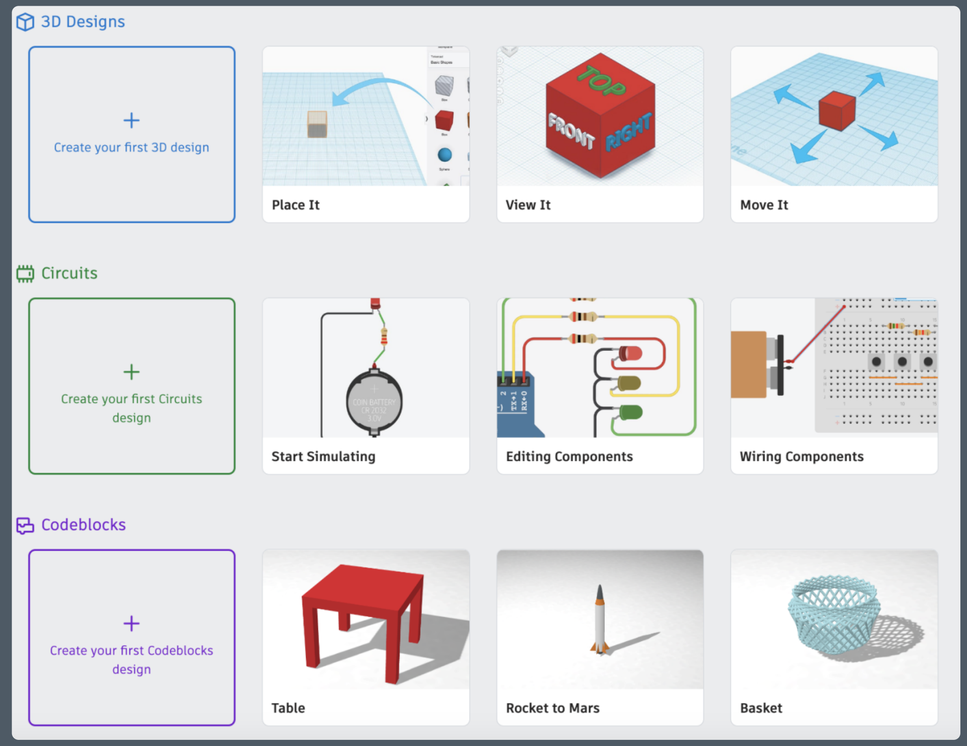
Part 3: Navigating your Workshop

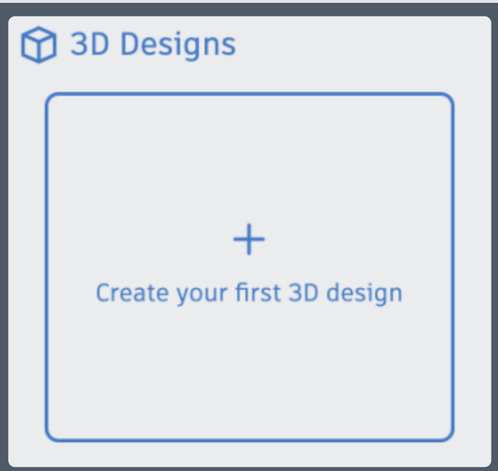
There’s a lot of details, they are all broken down in the instructions page.

Scroll down and you can find these design options to the right:

Go ahead and click the first blue square: Create your first 3D Design.

Let’s hop in!





Part 4: Learning the Ways of the Craft
Part 5: The World of Magic

Navigating Tools of TinkerCAD and Using its Shortcuts

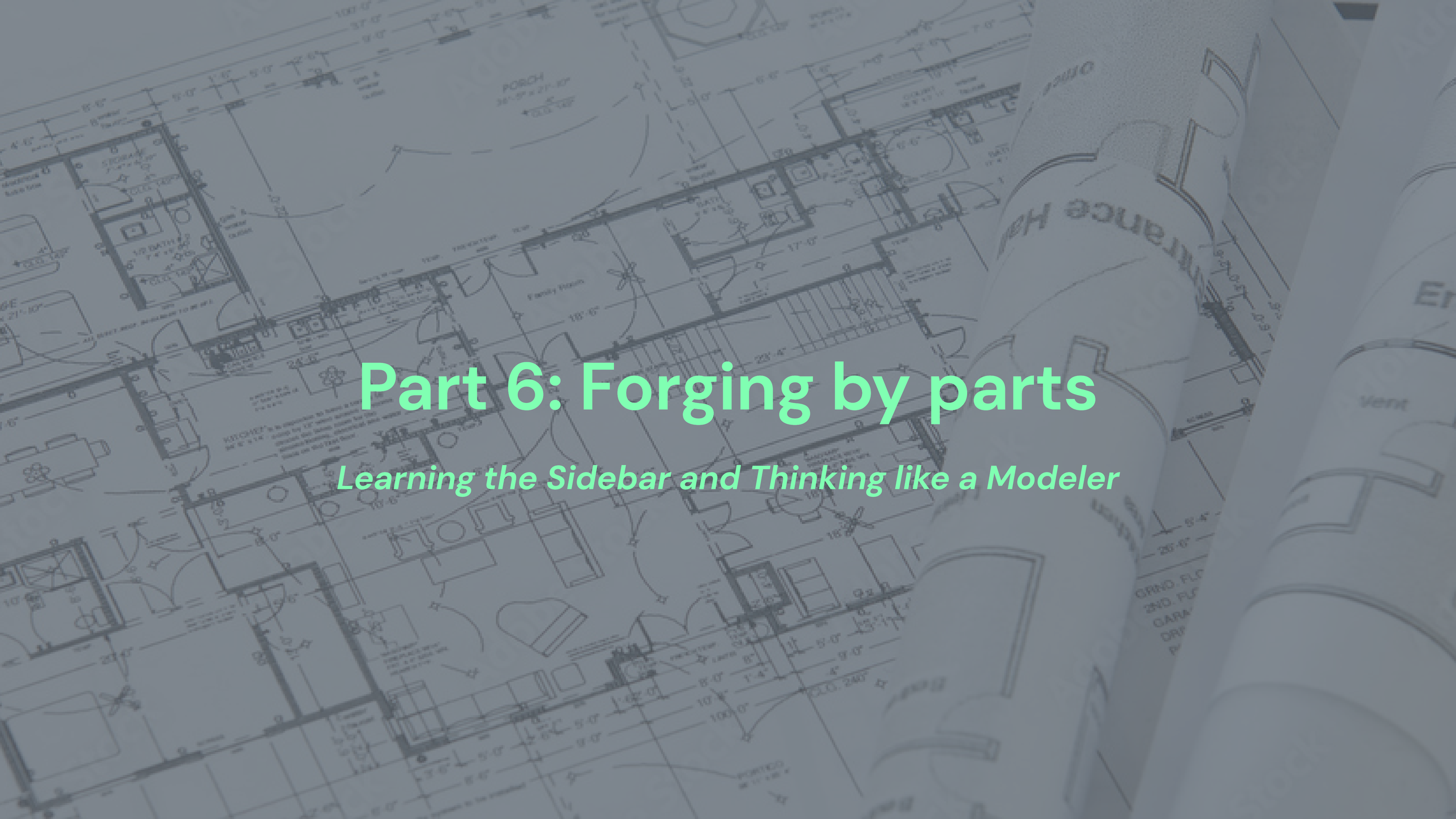
What to do:

In these sections, we introduce a lot of tools.

Most of them will be used later so this section is mostly an overview and a guide for if you want to come back and check what something does.

All of the information is outlined with more detail in the Jam website page, it is better to work through the tools on the website, and explore on your own if you finish reading!

Consult your handout if you need quick help!!!



Part 6: Forging by parts

Learning the Sidebar and Thinking like a Modeler

The Shapes Menu

Now, let’s address the elephant in the room: **the shapes menu.**

In TinkerCAD, there’s a lot of regular polyhedrons that you can combine and cut to build complex shapes.

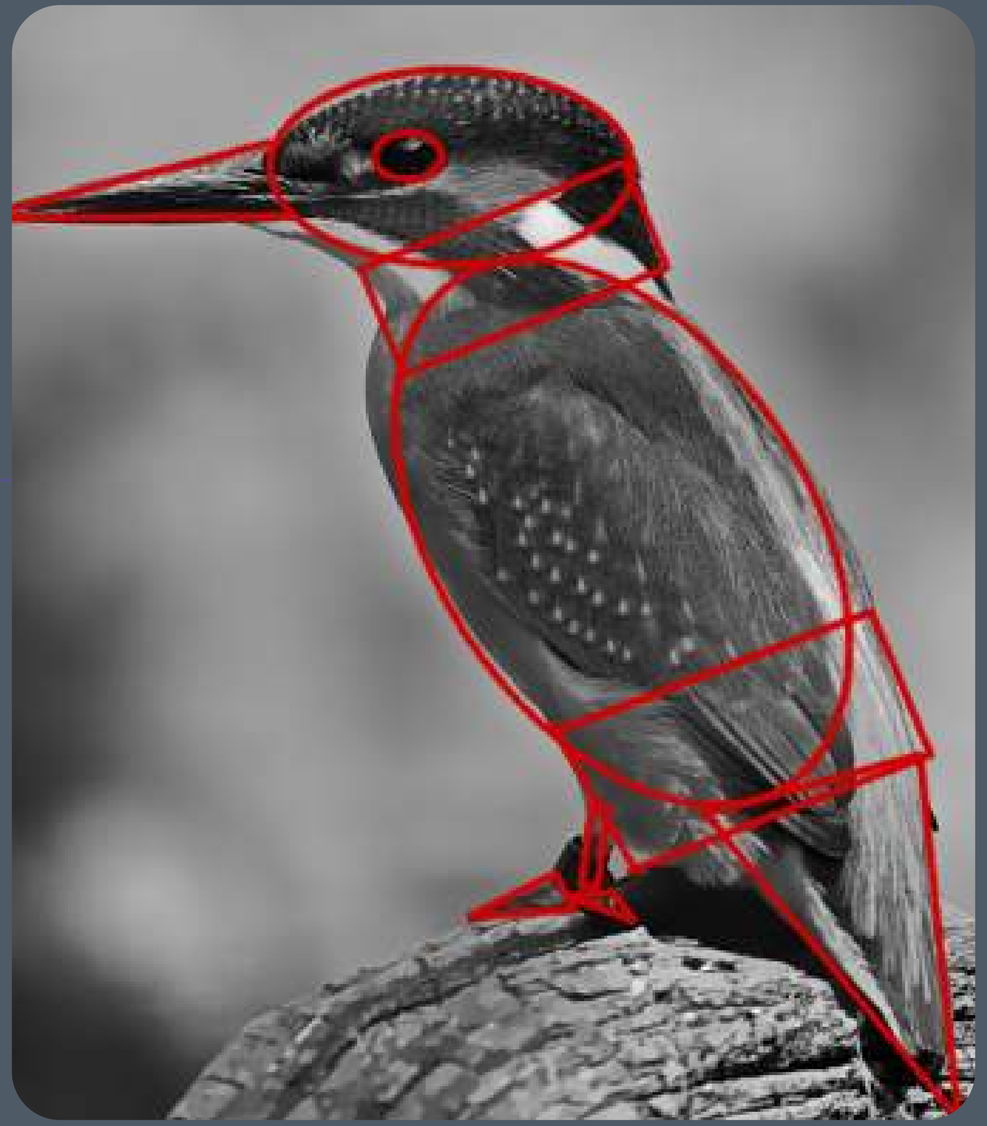
These are the **raw components** for your modeling adventure!

Part 7: The Body of the Blade

First, let’s put down all our tools and talk about how we should be thinking when we are modeling.

You need to know what part of the object you want to model at each step.

Artists will be familiar with the technique we will use: Breaking Shapes Apart.



Disassembling an Object

Just like 2D art, you need to generalize an object into its basic shape pieces.

Here the sword is already broken down, your job is to determine what shapes we need.

Here’s a top view of the blade and a cross section of the blade.

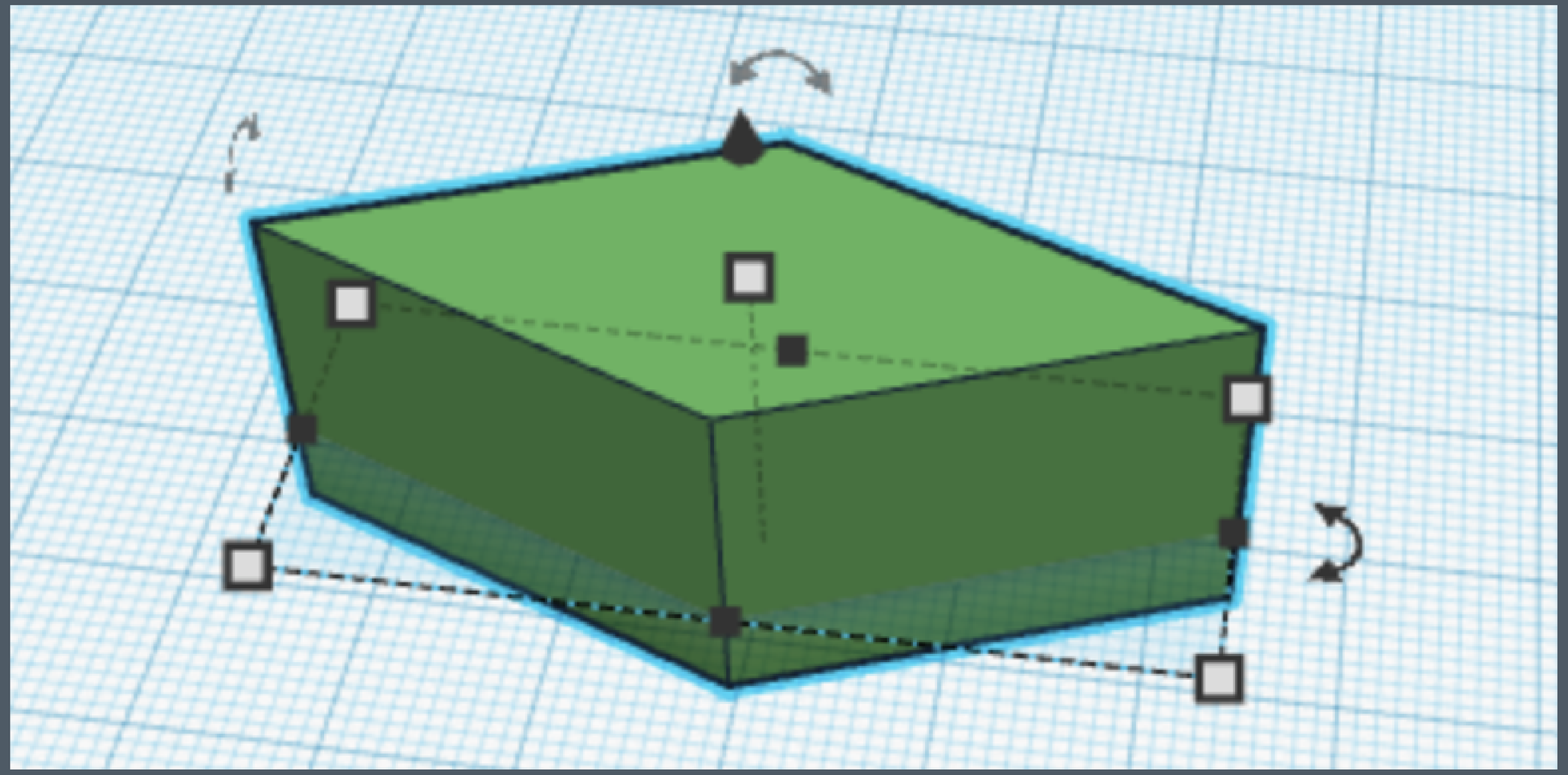
Quiz time!

What kind of 3D shape do we need for the long, straight part of the blade?

next slide for solution

Solution!

We need a Rhombus/Rhombic prism shape! 10 (virtual) blacksmith points if you were right!



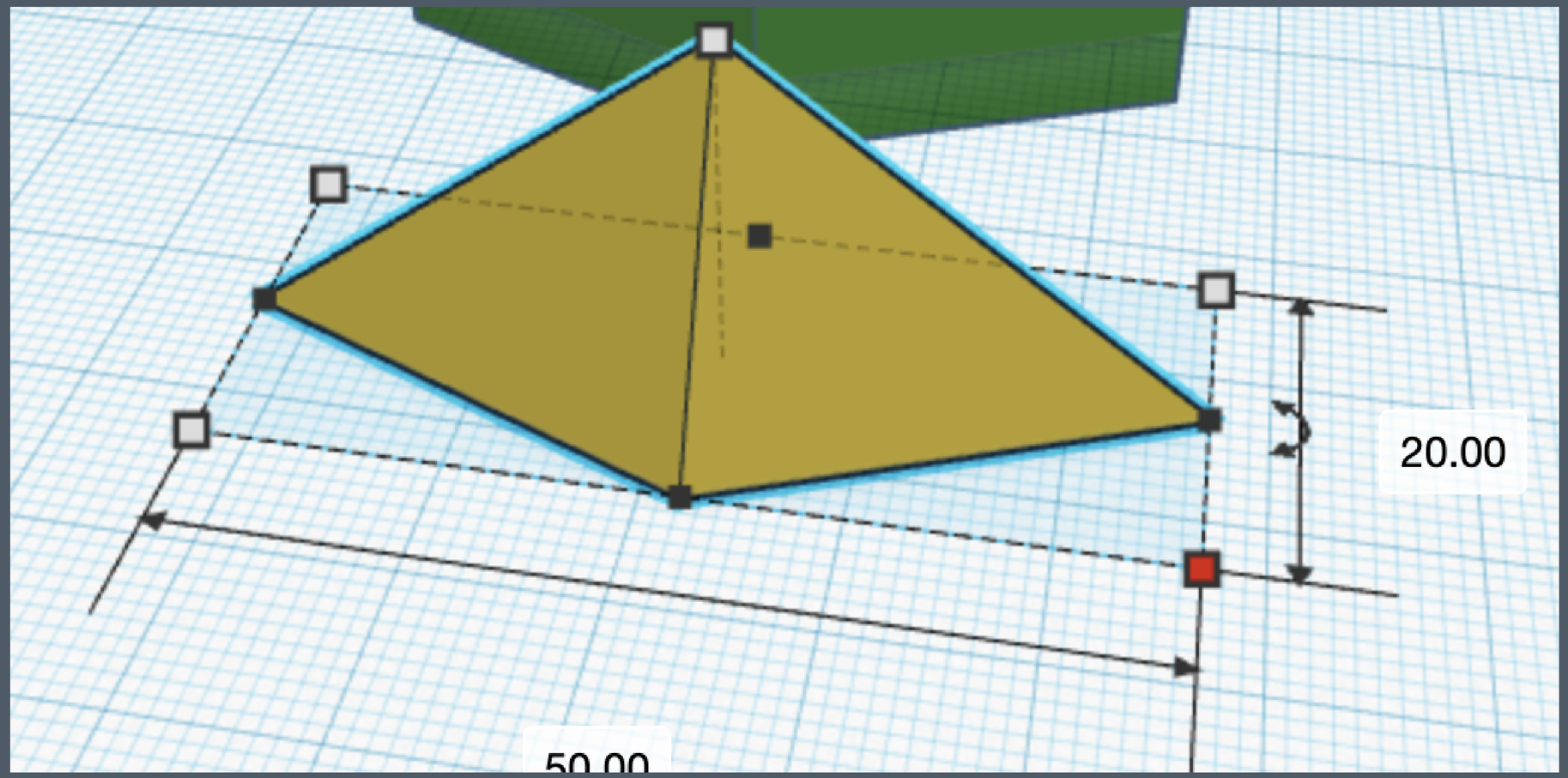
Quiz time!

What kind of 3D shape do we need for the pointy tip of the sword blade?

next slide for solution

Solution!

We need a Rhombus/Rhombic pyramid shape! 10 more (virtual) blacksmith points if you were right!



Part 8: Forging the Blade
Part 9: Sharpening the Tip

Getting to Work on the Actual Blade!

What to do:

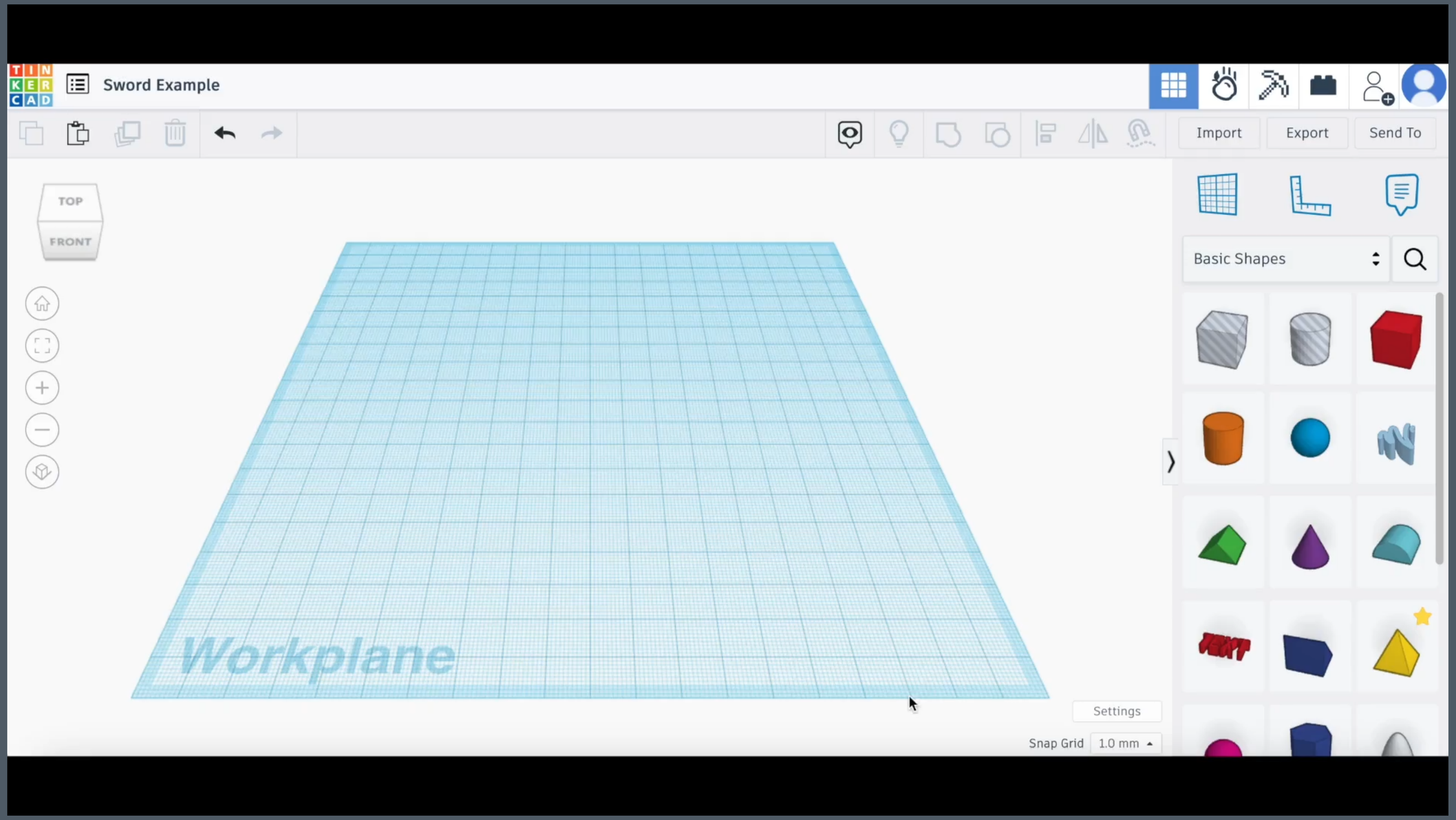
In this section the purpose is to walk you through how to create basic shapes like the blade.

Again, this section on the jam webpage has extremely detailed instructions walking you through the process of creating the blade.

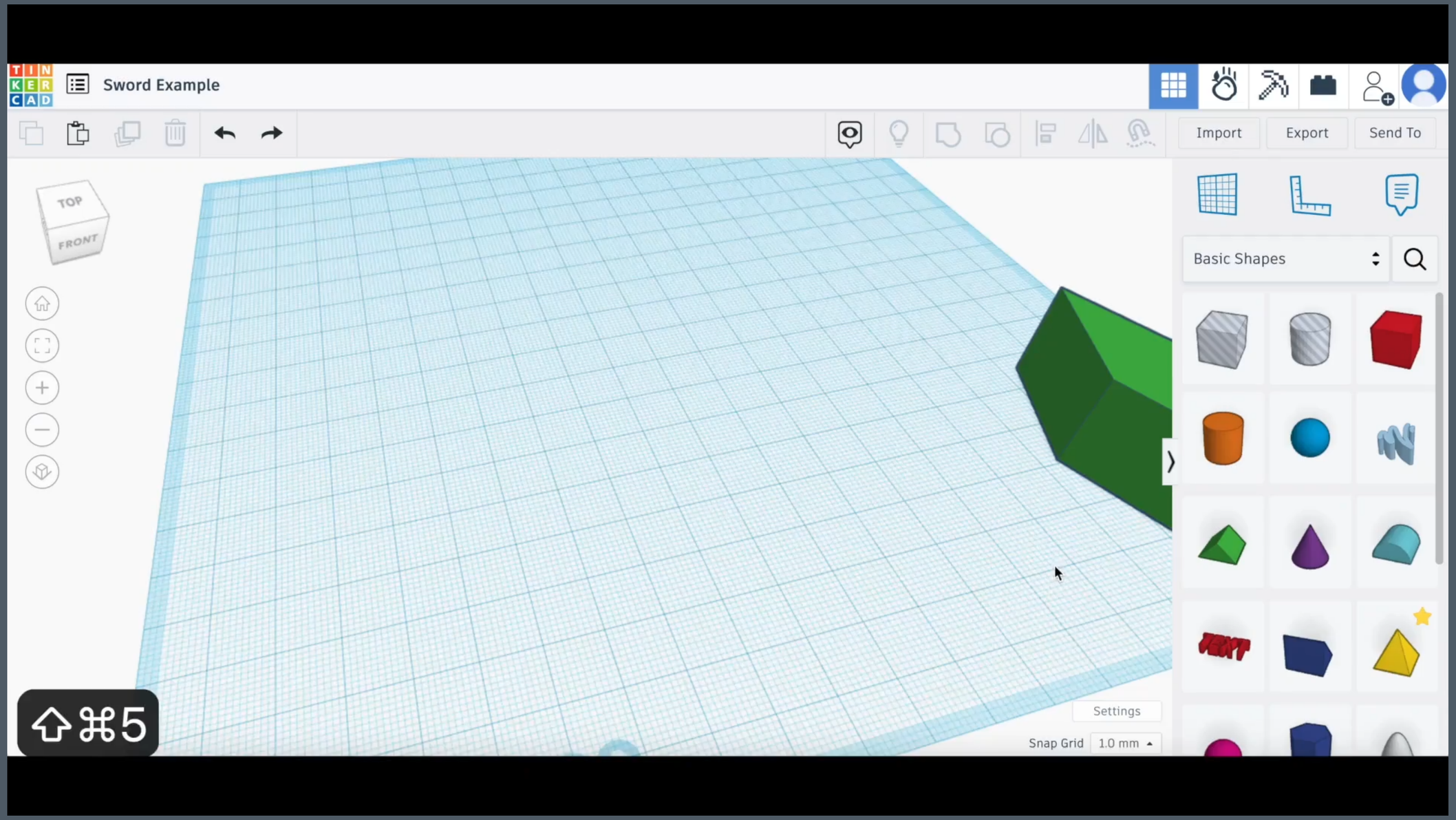
Go ahead and walk through the instructions on your own! Remember, add creativity to differentiate your creation from those of your friends!

Remember: Consult your handout for quick shortcuts and helpful explanation! The videos on the next few slides will help you!

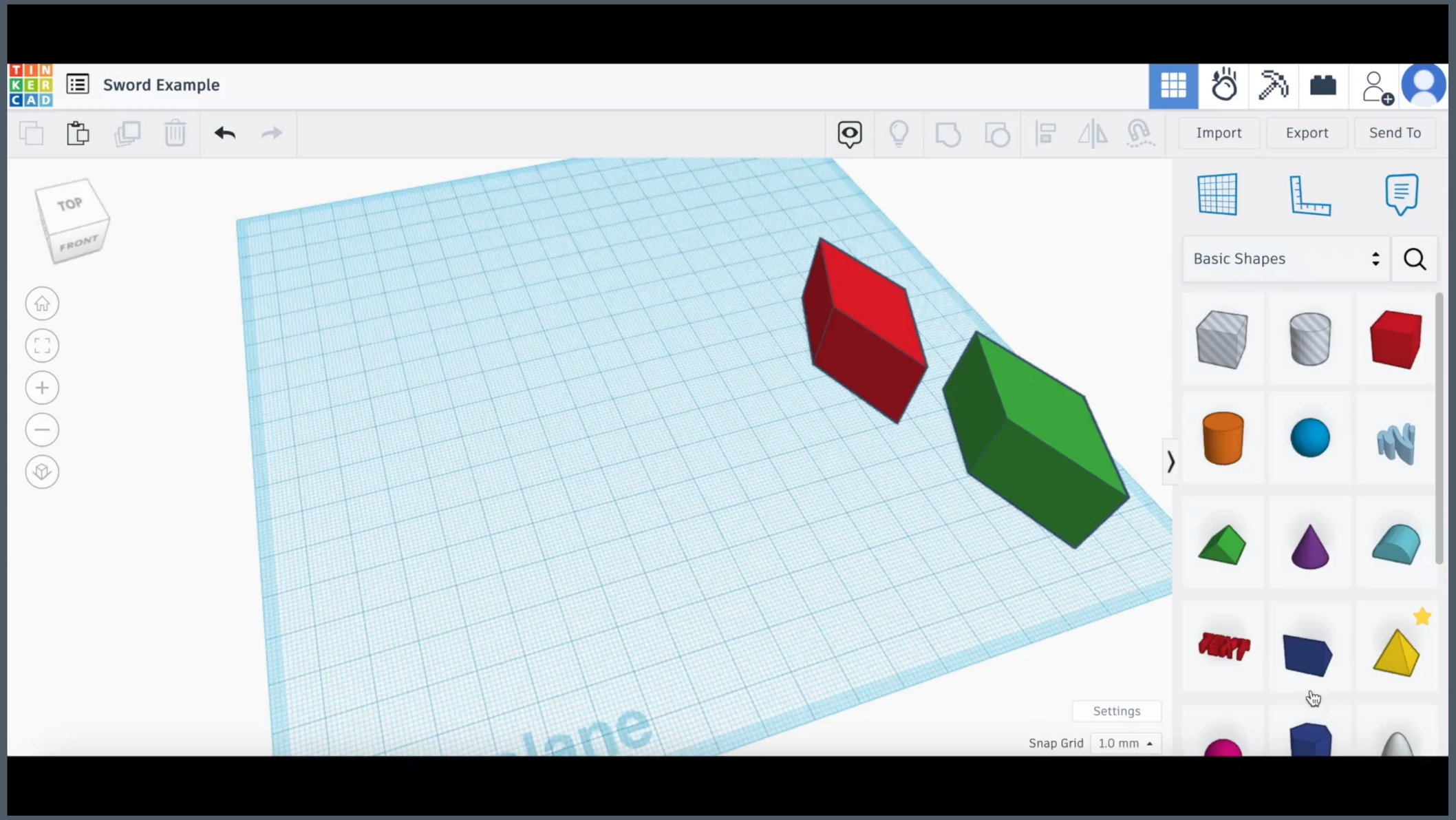
Blade/Stem Method 1



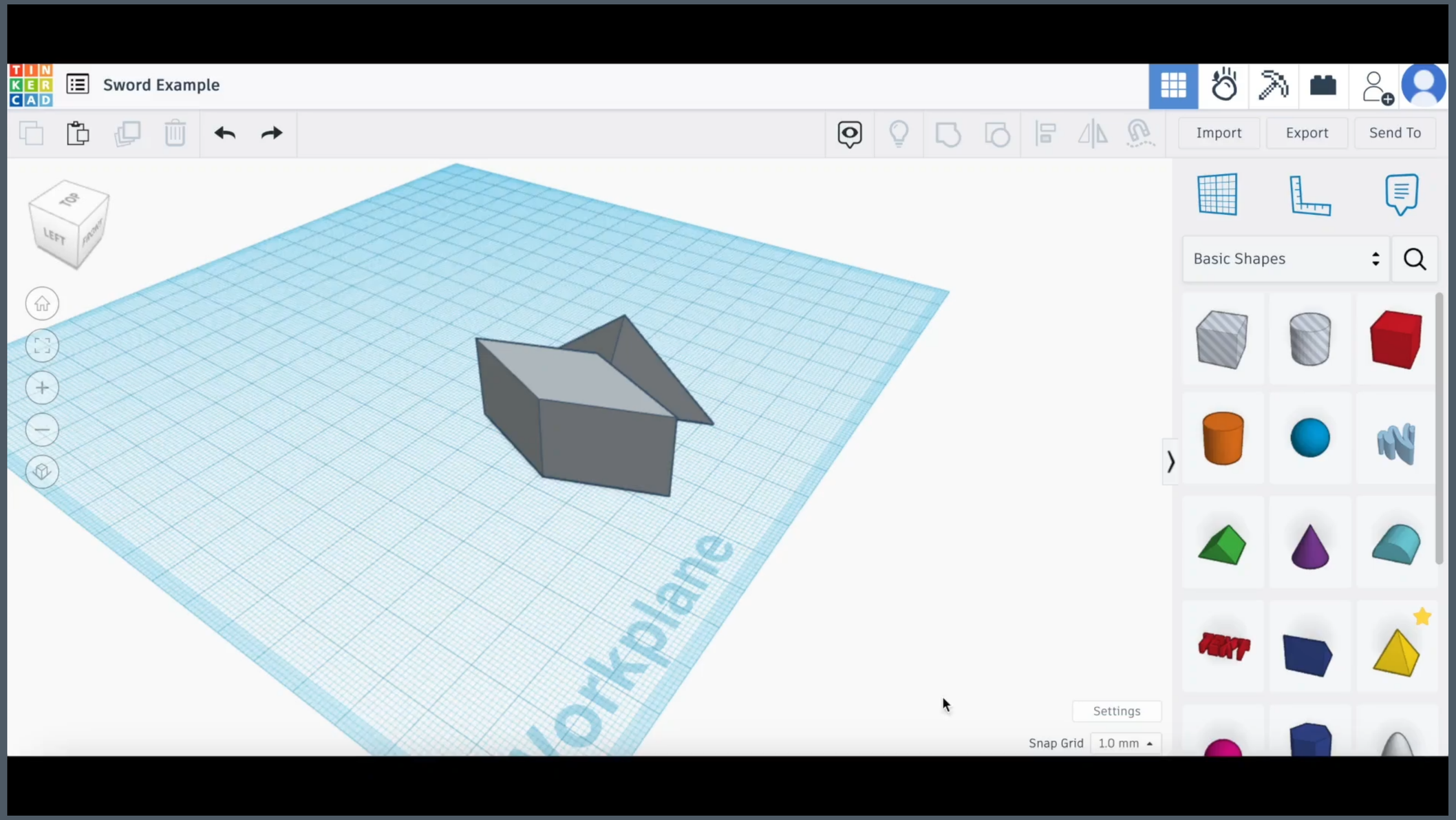
Blade/Stem Method 2



Making the Blade Tip



Combining the Two Parts



(Optional) Part 10: A Guide to the Elements

This section is recommended if you are planning to print your creation out later!

Here, we quickly summarize the most common and best filetypes used in CAD Software and printing.

- 3D
  - obj: relatively common, stores color, texture, and material
  - stl: most common, generally supported, doesn't track ^
  - 3mf: the best 3D printing filetype, because it tracks size
- 2D
  - svg: the go-to type for laser cutting and CNC machines

Summary and Next Steps

Thanks for choosing this Jam and for choosing the wonderful world of 3D modeling! With these skills, you can soon interact with your software in the real world!

Today, you learned how to Navigate TinkerCAD, Use its tools, and Think like a CAD designer!

On the next episode/step we will finish the sword by creating the hilt!

See you next time!