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Stone Age

Power: None

Storage: Chests

Significant Milestones: Furnace, Tinker's Tools, Coke Oven, Bucket

Goals: Smeltery

This is where you start. Standard minecraft stuff, punch trees, live in a cave, etc. Notable differences from regular minecraft include the more difficult bucket recipe and the fact that you can't really make iron tools.

Goals

Your goals here will be to build a coke oven and a smeltery. You can put off the coke oven until later if you happen to find enough creosote bottles in a village or mineshaft

Tips

- Your terrible flint tools will last longer if you put a ball of moss on them. If you didn't happen to start near a biome with any mossy cobble, you can chisel stone bricks into mossy stone bricks to make the ball of moss.
- You sure don't have to use terrible flint tools. Better pre-smeltery Tinker's Construct materials include Certus Quartz, Sapphire, Peridot or Ruby. Don't spend too long

upgrading though--these materials will all become obsolete when you get the Smeltery running.

- It may be worth your time even at this early stage to hunt down a village and loot its smeltery.
- Haunted Greatwood Trees (The ones with cobwebs) have chests full of loot (watch out for the cave spider spawner) that are a great early-game source of several things, including ender lily seeds. Keep an eye out for these, as they are a good way to collect pearls for use in Smeltery Age machines.
- Forestry Cans are an easy, cheap (single use) alternative to a bucket for moving liquids around.

Smeltery Age

Power: Survivalist/Furnace/Culinary Generator, Water Wheel, 5-100 RF/tick

Storage: Chests, Caches, Machinist's Workbench, Portable Tanks

Significant Milestones: IC2 Metal Former, Assembly Table (with lasers)

Optional Milestones: Forestry or Steve's Carts Tree Farm, open a Nether Portal early

Goals: Blast Furnace, Rock Crusher

A smeltery is a big advancement! Gears! Remember, gears can only be made with the smeltery. Ore doubling! Bronze tools! You can start some of your first machines here. Most machines require chipsets, so an assembly table and lasers is an important start. They need 10 diamonds, so get mining early! As you start to get some power flowing, I recommend a Metal Former, which makes metal plates twice as

efficiently as a hammer. You can also build an Electric Furnace if you're tired of using coal, and start on some basic forestry machines, like the Carpenter and Thermionic Fabricator.

Although you can't start on Thermal Expansion machines yet, you may want to build some of the accessories. The Machinist's Workbench is like a combination crafting table/storage, and you can click to craft many items at once. Portable Tanks are a good way to transport lava in quantity. Satchels and Strongboxes are good if you don't have a permanent base, as are Immersive Engineering storage crates.

Goals

None of these machines or gadgets will directly help you in your actual goal, which is to get a reliable source of steel. If you've scavenged 36 steel from villages and dungeons, you may skip directly to the Rock Crusher and Induction Smelter. But normally you'll want to build a Blast Furnace. There are 3 recipes for the Blast Furnace, involving glue, TNT, or ender pearls. Most people choose glue, which will involve getting a horse or two into a smeltery. Good luck!

Tips

- To mine obsidian, you can put a diamond on a bronze pickaxe.
- Or, you can create obsidian using the Smeltery by putting water and lava in drain. There's a variety of methods of getting the water and lava in there. You could try pipes, portable tanks, seared faucets, or several other methods.

- Creating a pickaxe with a head of Yellorium will make a cheap, albeit slow, method to obtain obsidian without using a diamond.
- You can also use a chisel to convert a piece of obsidian into a chiseled version by left-clicking. You can then mine it without an obsidian level pickaxe.
- To convert between RF and EUs, use the Immersive Engineering connectors and wires.
- Lead Energy Cells and even the upgraded Hardened Energy cells are easy craft and are a nice way to store energy to begin with.
- If you have extra creosote, the Immersive Engineering capacitors are also fairly cheap to craft.
- Earlier versions of IC2 had machines that exploded if they were supplied with too much power, but the version in this pack does not include this "feature." Relax.
- The Induction Smelter version of steel is called Refined Iron. It's the same as steel though, and can be used in any recipe that involves steel.
- IC2 also has a Blast Furnace you can use to progress through this age. It requires considerably more infrastructure than the Railcraft or Immersive Engineering blast furnaces though.
- This is the earliest you can get AE2 crystal seeds, as they use an iron gear to create the grindstone. Create that and grind up some crystal to grow them, as it takes 16 realtime hours to grow to completion and you need to for AE2.
- Do not break IC2 machines with your pickaxe. This converts them into basic machine casing, use an IC2 Electric Wrench in lossless mode instead.

Tutorial Links

- Forestry Farms:
[http://ftb.gamepedia.com/Getting_Started_\(Forestry_-_Farms\)](http://ftb.gamepedia.com/Getting_Started_(Forestry_-_Farms))
- Steve's Carts Tree Farm:
[http://ftb.gamepedia.com/Getting_Started_\(Steve%27s_Carts_-_Treefarm\)](http://ftb.gamepedia.com/Getting_Started_(Steve%27s_Carts_-_Treefarm))

Steel Age

Power: Lots more water wheels, Solar, possible culinary generator, 100-1000 RF/tick

Storage: Chests, Storage Drawers, Barrels, Logistics System

Significant Milestones: Induction Smelter, The Vat, Blaze Rods, Alloy Smelter, Magma Crucible, Fluid Transposer

Optional Milestones: Jetpack, Ender Chest, killing the Wither, Ender IO Inventory Panel

Goals: Eventually the IC2 Nuclear Reactor, and the Ender Quarry.

With a reliable source of steel, the tech tree opens up here. In fact, it may become an impenetrable thicket of branches. There are a lot of goals to work towards, so sometimes it's nice to make a to-do list, either out of game, or using the BiblioCraft clipboard in-game.

You'll probably want a permanent base at this point, with lots of room for machines, storage, agriculture, etc. I went with a 50x50 main base

designed to fit in a single chunk loader zone, with several external areas for crops, animals, magic mods, etc.

Steel unlocks the Tool Forge for your smeltery, so it's time to make some nice equipment that's going to last a while. I went with a bronze and then eventually signalum hammer and pick (Steel tools are also pretty good). I used a Simply Jetpacks jetpack, which I upgraded to Tier 3 pretty quickly. I also made Flux-Infused armor, upgrading the boots into Long Fall Boots, which lasted well into the endgame. There are plenty of alternatives to these, so feel free to use your favorite items, especially if you're also progressing in some of the magic mods.

Storage is a significant challenge in this age. For bulk storage, I used an array of about 200 Storage Drawers of various sizes, linked with a Drawer Controller. I also had about a half-dozen Diamond Chests for items where I only had 1-2 stacks or less. Eventually I made an Ender IO Inventory Panel to manage searching & mass crafting.

Alternative storage solutions include JABBA Barrels and Thermal Expansion Caches. Like Storage Drawers, these both store one type of item in large quantities. Early on Caches beat the other blocks in terms of items stored (10000 versus 4096 or 2048.) Later on, the JABBA Barrel B-space upgrade is a powerful feature. To me, the Storage Drawers Drawer Controller made it the winner overall, but it's really down to personal preference.

If you are sick of searching through items in chests you can also make a logistics storage system, this requires general knowledge of buildcraft and logistic pipes but can save a lot of time. To store items in a

logistics system you will still need storage but you can hide it for example underground.

Unless you picked an amazingly ideal location for your base, you'll probably be travelling fairly far to mine, explore, scavenge in villages, etc. You can extend your inventory with satchels, strongboxes, knapsacks, bags of holding and etc., but it's nicer to have a way to send things back home. I made a batch of enderium, and used it to make a Resonant Machine Frame, used that for an Ender Tank Frame, then used that for an Ender Chest. I then had the Ender Chest emptying into my storage system, and used an Ender Pouch to send stuff home when I was travelling. A lot of work, but a worthwhile investment. Notably, a single Resonant Machine Frame makes 8 Ender Tank Frames, so you can have several Ender Chests or Tanks helping to centralize your storage.

Goals

The next two ages don't have hard boundaries the way the previous ages did. Move into and out of them as you feel ready. To move towards the IC2 reactor, you'll need an ample supply of Uranium Ore, and the full IC2 ore production line of the Macerator, Ore Washer and Thermal Centrifuge. Moving towards the Ender Quarry involves a vast array of machines, notably the AE2 Inscriber (which you can power with RF power,) and the MFR Slaughterhouse for Pink Slime.

Machine Roll Call

Let's go through all the machines you'll need to make the Ender Quarry and IC2 reactor, roughly in order. If you're lost on what to work on in this age, just look here. This list just includes permanent machines that you set up and operate. You'll make several more machines as crafting ingredients, but I did not include them.

Let's assume you're starting with a Smeltery and a Blast Furnace of some type. Let's also skip the details of basic power generation, as these tend to vary wildly with personal preference.

- Thermionic Fabricator
- Assembly Table & Lasers (the more lasers the better)
- Metal Former
- Rock Crusher
- Carpenter
- Compressor

At this point you can make basic Thermal Expansion Machine Frames, so let's get some of that going

- Pulverizer
- Redstone Furnace (semi-optional)
- Induction Smelter
- Sawmill (optional - but highly advised)
- Magma Crucible
- Fluid Transposer

Getting much further requires EnderIO Capacitors, and those require Signalum. Making Signalum manually is a pain, so let's make the Alloy Smelter a priority at this point.

- Alloy Smelter (requires several IC2 furnaces in the recipe)
- The Vat
- Slice'N'Splice (semi-optional, used for Inventory Panel, Farming Station, etc.)
- Soul Binder (optional, used for Inventory Panel, Staff of Travelling)

At this point you can make an IC2 Nuclear Reactor. To actually run it though, you need fuel rods. Let's get set up there, and then proceed to iridium replication.

- Macerator (semi-optional)
- Ore Washer
- Electric Kinetic Generator
- Turning Table
- Thermal Centrifuge
- Canning Machine (Solid or Fluid/Solid)
- Nuclear Reactor
- Reactor Chamber x6 (technically optional)
- Mass Fabricator
- Recycler (as many needed to keep up with your power supply)
- Scanner
- Pattern Storage
- Replicator

And now for the specific Ender Quarry Requirements

- Fluid/Solid Canning Machine (you can share this with your fuel rod production line)
- AE2 Inscriber
- MFR Slaughterhouse
- MFR Breeder (optional, I suppose)
- MFR Chronotyper (same)
- Ender Quarry

And while you can use fences to mark your quarry, let's take the sane option and make:

- QED (another Resonant Machine Frame)
- Ender-Flux Crystal (more is better--I usually make 6 minimum)
- Ender-Marker (3 or 4, depending on your style)

Tips

- The OpenBlocks Glider is a great way to get more mileage out of early jetpacks.
- Consider adding 450 Lapis Lazuli to your Pickaxe or Hammer to get more drops from mining. If you're short on lapis, you can add a single one, and mining resources will slowly build up the stacks.
- Depending on how close Nether Fortresses are, getting the blaze rods or powder you need for some machines may be a challenge. There are alternate ways, if you check through NEI. You can manufacture your own blaze powder with glowstone and redstone in the Fluid Transposer. Alternatively, with a little Agricraft breeding, you can grow Cinderpearls. You can even compress blaze powder into rods with the IC2 Compressor.

Nuclear Age

Power: Nuclear Reactor, Solar Panels, 300-2000 EU/tick

Significant Milestones: 6-chamber reactor, Mass Fabricator, Replicator

Optional Milestones: Multiple reactors, MOX reactor, Ultimate Hybrid Solar Panel, Big Reactor

Goals: Mass production of iridium and plutonium

The nuclear age downshifts from the rapid upgrading of previous ages. Advancements through this age can often take days, which is difficult if you don't have a dedicated server to play on.

Your goal is the mass production of iridium, specifically the 128 iridium necessary for the AE2 Controller. Each 2.75 hour reactor cycle produces 1 plutonium nugget per fuel rod, and you need 54 plutonium nuggets per iridium. The Replicator can make iridium faster, at a cost of about 20 million EU per iridium.

Most ways of upgrading your power, listed in the optional milestones section above, involve using some of your accumulated plutonium or iridium in order to make further production faster.

There's no one optimal way through, but there doesn't need to be. Just keep on incrementally upgrading your power and production and you'll get there eventually.

Goals

Your goal for this age is to collect the materials for the AE2 Controller block, so as mentioned, your nuclear project will need to supply 128 iridium. You'll also need a Molecular Transformer to make 20 Sunnarium. Each Sunnarium takes 1 Glowstone Block and 9 million EU, but that's a small fraction of the power you'll have spent on the iridium.

Tips

- Do put your IC2 reactor in a blast-proof room, especially if it's your first time playing with them.
- Fused Quartz from the Ender IO mod or Reinforced Dark Glass from the Extra Utilities mod are cheaper and easier than many of the other blast-resistant blocks.
- It may be worthwhile to blow up a few reactors in creative mode to better understand the significant dangers involved.
- You can also get Iridium Ore in dungeon chests. The Botania Loonium is disabled in Expert Mode, but you can find plenty of chests in Runic Dungeons. Alternately, if you're very advanced in Blood Magic, the city generated by the Convocation of the Damned ritual is another source of chests. (UPDATE: now you get Iridium Shards, which are precisely 9.02 times less useful.)
- You can use a combination of the portal gun and ender quarry to automatically 'mine' the chests in runic dungeon for easy access to iridium ore.

Automated Acquisition Age

Power: Diesel Generators, x64 Generators, Nuclear Reactor, Big Reactor 1k-10k RF/tick

Significant Milestones: Mass production of enderium & other expensive alloys

Optional Milestones: MFR Laser Drill, swappable mob spawning

Goals: Automated mining and mob drops

Automated Mining

The steel age gadgets can turn you into a mining juggernaut, but you're not mining when you're back at base, tending your machines. If only there was a machine that would mine for you. Well good news, this is FTB and there's about a dozen. This guide will focus on the Ender Quarry, as has the best versatility/efficiency/ease of use profile, but feel free to use your favorite alternative if you prefer.

The special Ender Quarry recipe in Infinity Evolved Expert mode involves 8 different items, 5 of which are powerful machines on their own. To build all these you will need close to a dozen different machines, notably the AE2 Inscriber (which you can power with RF) and the MFR Slaughterhouse for Pink Slime.

The Inscriber is challenging as it involves not only another Resonant Machine Frame, but also a Pure Certus Quartz Crystal which will take sixteen hours to grow. I hope you planned ahead and grew this

already, as otherwise you've got a wait ahead of you. The recipe also uses an IC2 Overclocker Upgrade. If this is your first time making the Overclocker Upgrade or the crystals, go ahead and make a batch. The Overclocker Upgrade speeds up most IC2 machines, and once you have an ample supply of IC2 power, you'll want 8-12 upgrades in every machine you use. As for the crystal, you'll need at least 2 more of them eventually to make your first ME Controller. It's the same speed to make a stack of crystals as it is to make one, so I recommend making a stack or two. You'll need them later.

The Ender Quarry takes about 600 RF/tick un-upgraded, 1,800 with the Speed I Upgrade, 5,400 with the Speed II, and 16,200 with the Speed III Upgrade. You can sometimes supply it with less power, and it will just mine more slowly, but it's not especially efficient to add upgrades if you can't fully supply them with power. The Fortune upgrades are generally overpriced for what they provide. The Silk Touch upgrade can be nice, but until you have an oversupply of power it's usually more efficient to just quarry faster or quarry more.

It may be heartbreaking to lose all those potential materials by not using the Silk Touch upgrade, and if that's how you feel, use it. But in most cases, you'll be getting more materials both per-time and per-RF with the speed upgrades. One exception to that is Draconic Ore, which seems to at least double Fortune outputs. Once you begin looking for specific outputs in your quarry, you may need to tailor your quarry upgrades to optimize finding them.

Where do you get all that power? If you've been progressing through the IC2 nuclear program you should have some ideas. To get through this age you'll probably only need the un-upgraded Ender Quarry or the

Speed I Upgrade. Unless you're a wizard at managing your storage, it's a good move to limit your quarrying to what's necessary to progress, at least until you get AE2 up and running.

Alternatives to the Ender Quarry

There are, of course, many alternatives to the Ender Quarry. In my humble opinion, they are all lacking in some combination of speed, versatility, or upgradability, but some are worth exploring. Many offer some situational advantage, and you may get some use out of them.

- Steve's Carts - Time-consuming to build, but fairly cheap to operate. Be careful, as the carts are very vulnerable to lava until you can build in the (expensive) safeguards.
- Railcraft Tunnel Bore - Cheaper than the basic Steve's Cart but just as useful. Not upgradable though.
- Immersive Engineering Excavator - Quite useful but it only produces minerals that you can find veins for. You will have to set up and run this 4-6 times to get the variety of minerals you need. Also a power hog.
- Arcane Bore - Expensive and you have to keep moving it
- Manual Mining - Particularly viable with some of the mega-picks from the magic side, like the Bound Pickaxe or a high-rank Terra Shatterer. You'll never keep up with a quarry though.
- RFTools Builder with Shape Card (Quarry) - Perhaps even better than the Ender Quarry, which is why in Expert Mode it requires an Ender Quarry and a BC Quarry in its recipe.
- Funky Locomotion - While by itself not very useful for mining, by combining these moving frames with machines from other mods

such as block breakers, mining wells or annihilation planes, a very powerful mining solution can be created.

- Bees - (Almost) all ores have bees that can create them, including rare ores -- Diamonds, Flux and Enderium, for example. For those going the nuclear route, a Radioactive, Corroded, and Rusty queen + Logistics Autocrafting setup can feed multiple Nuclear Reactors -- similar setups exist for Big Reactors and more. If you can stomach breeding up manually to the Infinity Bee, Gendustry makes creating super-bees with automation trivial.

Mob Spawning

Along with automatic mining, you'll want to automate a way to collect mob drops. It's not usually difficult at this point to collect a dozen blaze rods or ender pearls, but you'll need hundreds and eventually thousands of these to progress. The easiest mob grinder at this point in the game is a room with cursed earth on the floor, and several MFR Grinder blocks pointed in at it. I had 3-4 Grinders running at this stage.

The cursed earth only spawns monsters normal to the area where it's placed, so normally it spawns skeletons, zombies, creepers and spiders, with rare endermen and witches. To meet your goals for this age, you will also need to collect drops from blazes, ghasts, and slimes (or magma cubes.)

The easiest way to add blaze spawning to your cursed earth spawner is to move a blaze spawner block from a nether fortress to directly on top of the cursed earth. That will make it spawn monsters even when

no player is nearby. To move spawners in Infinity Evolved, your main options are the MFR PortaSpawner or the Portal Gun gravity gun mode (press “g”). The Portal Gun is more difficult to use, but the PortaSpawner is only good for a single use. I picked the Portal Gun, but either is fine.

For ghaſt spawning, you can usually find a Carminite Ghaſtling ſpawner in a Dark Tower in the Twilight Forest. This requires hours of Twilight Forest progression. An alternative would be to use Blood Magic to multiply ghaſt tears alchemically, or to breed bees to get the tears, but theſe are alſo difficult and time-consuming options. Finally, it’s not impossible to collect the 54 ghaſt tears you’ll need by hand, but you will eventually need a way to produce theſe by the thousands.

For ſlime or magma cube spawning, you will probably need to make your own ſpawner. The MFR Auto-Spawner, the Ender IO Powered Spawner, and the Draconic Evolution Stabilized Mob Spawner are all good options at this point in the game. The MFR ſpawner is the eaſieſt to ſwitch between different mob types as the need ariſes.

Combined Efforts

Uniting your mining and mob grinding efforts in this age is the need for a reliable ſource of enderium. Enderium is uſed in many high-end machines, and makes the beſt tools in the ſmeltery. You’ll have plenty of ores and ender pearls at this point, ſo your main obſtacle will be ſhiny metal. You can get ſhiny ore from the MFR Laser Drill, but it’s eaſier to manufacture it in the Induction Smelter. Each time you process Ferrous Ore and Cinnabar (the Cinnabar produced by running

gold and redstone ore through the Pulverizer, NOT Thaumcraft Cinnabar) in the Induction Smelter, you'll get 2 Ferrous Ingots and 1 Shiny Ingot. You can get bonus Shiny Ingots by adding the Secondary Sieve series of augments to your Induction Smelter, but it may be just as easy to just get more Cinnabar.

As you can see in NEI, you get Cinnabar as a random bonus product when processing Gold Ore or Redstone Ore in the Pulverizer or Crusher. You'll need silk touch to mine Redstone Ore. Alternately, if you have a well-developed mob spawning system at this point, you can manufacture Cinnabar by injecting Thaumcraft Cinnabar Ore with Gelid Cryotheum in the Fluid Transposer. If you choose to add blizz mobs to your mob spawning system, do not spawn them in the same room as blazes if the room also contains Cursed Earth. The blizzes and blazes will fight, the projectiles will hit a creeper, and the creeper will take explosive revenge. That's bad for your spawners and other machines.

Other Methods

Alternate ways to begin collecting mass quantities include Agricraft and bees (BEES!) Agricraft can produce some resources, such as blaze powder. Naturally, it's also a great way to produce food, and food can become power with the Culinary Generator, or Botania mana with the Gourmaryllis and Kekimurus.

Agricraft can also produce Quicksilver, which you can use with Thaumcraft methods to double many of your existing metals.

Bees can produce almost every metal and mob drop, up to and including wither skeleton heads, dragon eggs, ghastr tears, enderium and more. Bees do require significant amounts of breeding and manual management, at least to the point where you can make the Gendustry Mutatron and Industrial Apiary. These are both locked behind the Infinity Bee, which you'll have to breed manually. If you enjoy bees, they can be very rewarding.

Goals

Your goal for this age is to collect the supplies necessary for the AE2 Controller. The shopping list is:

- 2 Enderium Blocks
- 2 Vibrant Blocks
- 2 Calculation Processors
- 2 Enhanced Galgadorian Metal, consisting of
 - 54 Brown mushrooms
 - 56 Obsidian
 - 9 Diamond blocks
 - 25 Iron Bars
 - 14 (additional) diamonds
 - 26 Iron ingots
 - 27 Glowstone dust
 - 54 Sugar
 - 27 Ender Pearls
 - 8 Blaze Rods
 - 54 Ghastr Tears

- 54 Spider Eyes
 - 108 Magma Cream
- 1 Quantum Core, consisting of
 - 4 Nether Stars
 - 128 Advanced Alloy
 - 128 Iridium
 - 20 Sunnarium
 - 128 Glowstone
 - 128 Uranium Ingots
 - 32 Diamonds
 - 1 Ender Eye

Good luck! By the time I had my infrastructure to this level, I found that the mushrooms were as challenging to mass produce as anything else on the list. Of course you can just go find 54 mushrooms, but it's worth your while to automate everything you can.

Tips

- This whole very long section is basically tips. Just keep acquiring! You will need unbelievable amounts of resources in expert mode.
- Having trouble fighting the Wither? **GO BACK TO VANILLA, NOOB!** Just kidding, we've all underestimated the Wither in modded Minecraft. You basically need Protection IV on all your armor to win. Red (and Yellow) Heart Containers from Tinker's Construct are also a big help. Alternately you can try killing the poor Wither with an overpowered Tinker's Construct crossbow without getting hit, but that's a higher-risk strategy.

AE2 Age

Power: Solar, Big Reactor Turbines 10k-50k RF/tick

Storage: ME Drives

Significant Milestones: Automated wither spawning/killing

Optional Milestones: Automated Mob Soul collection, automated everything production

Goals: Dimension Builder

Building an ME system isn't necessary in the strictest sense, but it's difficult to imagine managing millions of ingredients and hundreds of thousands of crafting steps without it.

You'll probably be limited to a single ME Controller block for this age, so make the most of it. You'll need to supply power to one of the controller's 6 sides, so the remaining 5 sides can supply 160 channels. I used 64 channels for crafting, 16 for drives, and 6 for terminals, leaving 72 for automation. This is not enough to give each machine an interface and an import bus, so try to limit most machines to just an interface. Use the full block version of the interface. You can then redirect the machine output with pipes or ducts to flow back into the interface, saving the need for an import bus.

In this age, you'll want to move from mass production, manually feeding machines with stacks of ingredients, to fully mechanized production, moving towards automation on an epic scale. Upgrade your machines to run as fast as possible, and increase your automated acquisition as appropriate.

At this point you will also need to progress to a certain stage in Thaumcraft and Botania, for which you'll also need Blood Magic and Witchery. Check out the magic part of this guide for details.

Goal

Your goal for this age is to craft the RFTools Dimension Builder. You will need 6 dragon hearts to craft the Awakened Draconium Blocks, so the list also includes the ingredients for 5 Rituals of Draconic Resurrection.

Dimension Builder shopping list:

- 1 RFTools Machine Frame + more for additional RFTools infrastructure
- 148 Nether Stars
- 148 Thaumium
- 148 Manasteel
- 148 Vibrant Alloy
- 148 Fluxed Electrum Ingots
- 20 Mob Souls
- 16 Void Metal Ingots
- 16 Terrasteel
- 16 Iridium Ingots
- 16 Bedrockium Ingots
- 6 Dragon Hearts
- 868 Diamonds
- 77 Iron ingots
- 2752 Gold Ingots

- 3152 Draconium
- 60 Pillar Quartz Blocks
- 20 Glowstone
- 4 Obsidian
- 6 TNT
- 1152 Redstone, melted into Destabilized Redstone
- 432 additional Draconium, melted in the smeltery

This does not include the fact that you'll probably need 2 Swords of the Wyvern. One for the Draconic Evolution Grinder for automated Nether Star collection, and one likely needed (and enchanted with Reaper V) to collect the 20 mob souls.

Making the Swords of the Wyvern involves Mana Dust. Mana Dust is made by pouring Primal Mana over Mana Infused Metal in the smeltery casting table. Primal Mana is challenging, but straightforward to make in the smeltery. Mana Infused Metal can come from the MFR Laser Drill, but there is a secret, easier way to make it. Make a bucket full of Primal Mana, and pour it over Thermal Foundation Silver Ore or Silver Blocks placed in the world. Voila!

Tips

- Still need more channels? You can actually use all 6 sides of the controller for channels if you use Ender IO Dense ME Conduits. Then you can have a power conduit supplying energy while getting all 192 possible channels.
- I did not replace my Storage Drawer array even when I got my ME system running. Instead, I just hooked a storage bus to the

Drawer Controller. This gives you most of the advantages of both systems at the same time.

- IC2 machines can use the Ejector Upgrade to output back into the same interface block that feeds them. Ender IO machines can be set to output and input on the same side using the Configure IO button. This means that Thermal Expansion and Forestry machines are the only ones you need to use external ducts for to just use one ME Interface per machine.

Dimlet Age

Power: Big Reactor Turbines, IE Lightning Rods, Nether Star Generators 20k-200k RF/tick

Storage: ME Drives

Significant Milestones: The end of material scarcity as an obstacle

Optional Milestones:

Goals: Creative Energy Cell

Things get a little unhinged at this point. You'll quickly find yourself wandering through worlds made of emerald blocks, orbs of molten bedrockium floating in the sky, while exploding chains of nether ore tendrils shower you with more riches than you can pick up (or kill your server--make backups!)

The Dimension Builder can make entire worlds out of rare materials, with the costs just being dimlets and power. How do you get dimlets? Mostly you process Unknown Dimlets with the Dimlet Researcher. One of the most efficient ways to collect unknown dimlets is by setting up an enderman spawner. You can also scramble 3 unused dimlets into a

new dimlet in the Dimlet Scrambler. Additionally, you can find dimlets in special structures scattered in RFTools dimensions. Finally, you can craft some specific dimlets in the Dimlet Workbench, which usually requires 128 of the material you want a dimlet for.

There are some materials that you'll need in absurd quantities going forwards, where the only reasonable way to acquire them is dimlets. A non-exhaustive list is:

- Bedrockium (found as molten bedrockium)
- UU-matter
- Draconic Ore

The Dimension builder can also make dimensions out of diamonds, emeralds, ludicrite, glowstone, and more, and it's probably easier at this point to acquire them through dimlets than through overworld or nether quarrying.

Some of these dimlets are quite rare, so your progress at this point depends somewhat on luck. If you have a good mob spawner setup, you may find that you have a decent flow of Unknown Dimlets. These come as a rare drop from endermen, so making a very fast Draconic Evolution spawner may be the best way to increase your dimlet acquisition.

A special note about one of the rarest dimlets, the Mob Dragon Dimlet. You'll need about 18 Dragon Hearts for each Creative Energy Cell you want to make, plus possibly more for other Draconic Evolution equipment. You can get these through the Ritual of Draconic Resurrection, but it's much easier to get them in the Mob Dragon Dimlet. This dimlet is not craftable, so you'll need some luck. This kind

of luck is much easier to get if you have a good dimlet researching and scrambling system.

I ended up finding my Draconic Ore dimlet in a RFTools structure, making my UU-matter dimlet in the workbench, and getting my Mob Dragon Dimlet through random research.

Goals

You're headed towards the Creative Energy Cell. I'll skip the shopping list, as your ME system can do that for you by now. If you want an idea, it's somewhat like 50 ME controllers and 4 Dimension Builders rolled into one, but more expensive.

Tips

- Remember those exploding nether ore tendrils? Make a Botania Ring of Magnetization, and start stuffing ore into an Ender Pouch. This might honestly be as fast as quarrying in these absurd worlds.

Creative Age

Welp, once you've made one Creative Energy Cell, it's time to make more! You'll need 4 for the Creative Tank, and you may want at least one more for yourself. I can't think of anything you'd really need the

Creative Tank for, unless you made it this far without crafting a UU-matter dimlet.

The Creative Mana Pool requires reaching the end stages of Thaumcraft, Blood Magic and Botania. These stages are covered in the magic part of the guide.

The final infusion for the Creative Mana Pool is a fun little ritual. It took me 27 minutes to perform with no real manual intervention required. I had about 300 candles & skulls, which was probably overkill.

Goals

We're done! Congratulations on making it this far! Go build a giant castle out of Terrasteel blocks or fill an ocean with Primal Mana or something!

Magic Guide

Garden Age

Milestones: Filled Mana Pool, Wand, 2800 Altar Power, Blood Orb

Optional Milestones: Gold-capped Greatwood Wand, Tier 2 Blood Altar

Goals: All four altars (Runic Altar, Witchery Altar, Blood Altar, Infusion Altar)

You'll spend a lot of time in the natural world here, gathering and planting flowers for Botania, chopping wood for Thaumcraft, and finally breeding plants and growing trees for Witchery. Only Blood Magic seems to be mostly plant-free.

The in-game guide does a nice job walking you through these first steps, so I won't repeat the details. The in-game guide assumes that you're progressing with magic and technology at somewhat equal rates. It is possible, but difficult to play a pure magic game with this pack. The magic side of the pack has more to gain from simple technology than the tech side gains from simple magic.

Goals

Your goals for this age are to build all the altars for the four main magic mods. The in-game guidebooks has the details, guiding you all the way to the Thaumcraft structure known as the Infusion Altar. The expert mode recipe for the Runic Matrix is made on the Botania Runic Altar using items that require both a Blood Altar and a Witchery Altar, so your base should be a merry little village of altars at this point.

Tips

- As soon as you have 5 wool to spare, make a Botania Flower Pouch. You won't have to make every flower Botania offers, but you will make a lot.
- One of the simplest devices to drop coal for your Endoflames is to put a Pressure Plate on the ground and stack an Item Grate and then a Hopper on top of it. Fill up the hopper with coal or charcoal. You can put a barrel/cache/drawer on top of the hopper when you have enough fuel.

Altar Age

Goals: Botania Alfheim Portal

After mod-hopping like mad in the beginning, you can finally spend some time in depth with your favorite magic mods here. You will still need cross-mod items for major progression in each mod, but you will spend more time in each mod before switching.

As you build up your power in the magic mods, you'll want to begin automating parts of them.

Botania is designed with automation in mind. During this age you should get your Botania mana automated in some fashion. A tree farm feeding charcoal to some Endoflames is fairly simple, but other viable

options exist, based around the Gourmaryllis or even the Entropinnyum.

Thaumcraft is also fairly easy to automate. It even has its own unique type of automation, in the form of Golems. Golems can farm crops or wood for you if you don't have a machine doing that. They're also quite useful to fill up jars of essentia for alchemy or infusions. You can make some fairly complex automated systems for moving essentia around, but keep in mind if you plan to make an ME system that the Thaumic Energistics mod included in the pack makes moving and managing essentia trivial.

In contrast, there is not much automation necessary for Witchery. You can pipe water into the Kettle and Witch's Cauldron if you like. If you're just doing Witchery for the purposes of progression through the pack, it's sufficient to run batches of items through the Witchery devices by hand. As you continue through the pack, you'll find Witchery being needed less and less until your cute little Witchery grove is covered with dust and cobwebs. Well not literally, but boy it would be even witchier if it was.

As far as Blood Magic is concerned, once you get your altar to Tier 3, you should strongly consider automating some way to acquire LPs. The main ways within the Blood Magic mod are the Well of Suffering ritual, which damages nearby mobs for LP, or the Ritual of the Feathered Knife + Ritual of Regeneration, which combine to damage and heal nearby players. There are other ways to gain LP if you're creative, such as a villager mob spawner. This lets you search for good villager trades while you sacrifice the unworthy.

In my playthrough at this point, I made my Botania mana with charcoal, had a Well of Suffering with cursed earth to power it, and only had rudimentary Thaumcraft until I got Thaumic Energistics running.

Goals

Your goal for this age is opening the Botania Alfheim Portal. This will require the Tier 3 Magician's Blood Orb from Blood Magic, a Primal Charm from Thaumcraft, several Witchery brews, and a few ingots of Terrasteel.

Tips

- Once you have a renewable source of Botania mana, keep it flowing. Link together multiple mana pools using sparks to create a mana reserve, and start building up a stash of Terrasteel.

Age of Wonders

This is where the magic mods crank it to 11, granting you epic, world altering powers. Of course, no power comes for free. Get your sword sharpened, as to gain your powers you'll go through epic battles

against a variety of epic bosses, in one case with epic guitar riffs playing in the background.

Botania

For Botania, opening the Alfheim portal means access to a bunch of new materials. You can upgrade to Elven Mana Spreaders. But don't get too attached. Once you get your Blood Altar to Tier 5, it's time to fight the Gaia Guardian, which gives you access to Gaia Mana Spreaders.

With all this upgrading, it's time to take a hard look at your mana generation. Botania is allergic to numbers, so I'll be approximate. It takes over 800 charcoal to fill a mana pool with the Endoflame. It takes about 250 steaks with the Gourmaryllis, 150 TNT with the Entropinnyum, and about 100 cakes with the Kekimurus. The speed of production depends on a variety of factors, but generally, the Entropinnyum is fastest, followed by the Gourmaryllis, then the Kekimurus, and the Endoflame in last place. Pick what works best for what you have available, but keep in mind that you'll need a minimum of 300 Terrasteel on your journey to the Creative Mana Pool and probably a good amount more. That requires filling over 150 mana pools, so get that mana flowing. I had a dozen Kekimuruses eating cake, and making Terrasteel was still the slowest part of the endgame.

Tips

- Running out of Glowstone Dust and thinking about getting a Conjunction Catalyst to make more? It takes about 10 times less mana to turn Redstone Dust into glowstone with the Alchemy Catalyst.

Thaumcraft

If you've made it this far without having the Eldritch Epiphany in Thaumcraft yet, get to having it! Start hanging around Eldritch Obelisks at night, eating Zombie Brains while getting beat on by an Eldritch Guardian or Crimson Priest.

If you have an ME system up and running, you may consider the Thaumic Energistics mod. The mod lets you store and move Essentia via your ME system. It is powerful enough that it feels like borderline cheating, so let your conscience weigh in here. If you're sick of jars, go ahead and use it. I give you permission. To get all the Ethereal Essence you'll need for the mod, you can dig up a wisp spawner from the Thaumcraft structure that appears in mountain-type biomes.

Around this time is when I usually start feeling overwhelmed by how much research I still have to do. When I'm doing research, I have the bad habit of converting most aspects to Ordo and then building chains of Ordo and Vitreus. The reason I do this is because the aspects needed to build these chains are all on the same last page of aspects

in the research table, and I find paging back and forth the slowest part of Thaumcraft research.

Of course I'm usually way, way out of Ordo research points at this point in the game, and have already scanned everything. The best way of getting more Ordo, as well as all 5 other primary aspect research points is to chow down on stacks of Knowledge Fragments. There are several ways of getting these, such as the Think Tank from Thaumic Esoterica, or as always, bees. I got mine by throwing a Crimson Cleric into an Ender IO Powered Spawner. This also got me loads of Void Seeds, making Void Metal generation rather easy.

Your Thaumcraft journey reaches its apex in The Outer Lands, where you will run through a confusing maze, find a tablet-shaped key, and fight one of four different bosses to gain the Primordial Pearl. Of course if you look at the recipe for the Creative Mana Tank, it turns out you'll need four of these Pearls. The mazes are randomly generated so it's random on how confusing they are. One of the mazes took me an hour, and then the next two took me five minutes each.

While the Primordial Pearl is a neat toy, it doesn't really unlock end-game level power. For that, you'll have to head back to the research desk and get all the way to Ichorium. This means researching every single bit of vanilla Thaumcraft research and most of the Thaumic Tinkerer research. You'll need an Ichorium Adorned Ichorcloth Strapped Silvercloth Wand to create the Creative Mana Pool, and you might want a second one for yourself, since they're fun. The wand is a bit of a pain to create, but the Thaumonomicon has all the directions for you.

Tips

- There is a Thaumcraft research helper at <http://ythri.github.io/tcresearch/>
- Another possible source of Thaumcraft research aspects is the Forbidden Magic Whisperweed. It's a flower that uses Botania mana to give you research points. It can also give you a lot of temporary flux, which may not be a bad thing, if you're waiting for the Eldritch Epiphany.

Blood Magic

Blood Magic upgrades take the form of tier and orb upgrades, which will require some interesting rituals. If you haven't upgraded your altar to Tier 4, now's the time. You'll also need to make a Tier 4 Orb, which is sometimes harder to get than the Tier 5 one. The Tier 4 Master Blood Orb is made with an Eldritch Eye from Thaumcraft. You can manufacture these using Thaumcraft, but if your research isn't there yet, you can also get the Eldritch Eye as a rare drop from the Eldritch Guardians that hang around Eldritch Obelisks.

Your Tier 5 Blood Altar upgrade requires 4 beacons, which use the standard recipe. I suggest that you include at least 26 Runes of the Orb in your Tier 5 Altar, since you'll need them to move on to Tier 6.

The Tier 5 (Archmage's) Blood Orb needs a Demon Blood Shard, which means summoning a demon, or at least an elemental. You'll need 8 Blood Magic Arcane Pedestals, which you'll make out of the Thaumcraft block of the same name. You'll use two of the pedestals

along with a Null Catalyst to make the Arcane Plinth. The recipe does not seem to reliably show up in NEI, so I'll tell you that you need to throw those three ingredients into the Alfheim Portal.

The Tier 6 altar and orb both require Crystal Cluster blocks, which you'll see is made with a Thaumcraft Arcane Infusion. The recipe uses Gaia Spirit Ingots from Botania, some more Witchery Null Catalysts (actually made with Thaumcraft or Blood Magic in Expert Mode), and two types of Blood Magic shards. You get the shards from demons summoned via the ritual known as the Convocation of the Damned.

The mechanics of the Convocation of the Damned are unchanged in Expert Mode, so you'll want to look up a wiki or video for the specifics. You'll be doing a lot of alchemy, a little bit of demon summoning, and then you'll need to have 15 million LP in your orb, hence the 25+ Runes of the Orb I suggested earlier. You'll want to perform the ritual at least 1000 blocks away from your base. The ritual creates a slowly expanding demon city. If you leave the Demon Portal chunk-loaded, it will cover a biome-size area in a few hours, and a continent-sized area in a few days. The demon houses have lots of treasure chests with dungeon loot, so if you still need some of that, you're in luck. Impress your friends with your collection of 25 portal guns!

Anyhow, you'll need at least 9 Crystal Cluster blocks. Four for your altar, one for your orb, and four more for the Creative Mana Pool. You get more shards from demons if you have the Looting enchantment on your weapon.

Witchery

Witchery largely drops out of the cross-mod rotation during this age. The high-level Witchery item you'll need for other mod progression is the Null Catalyst, which is curiously not even made using Witchery in Expert Mode. Witchery has its own bosses, and a whole new form of magic, circle magic, but these all basically become optional side quests in Expert Mode.

One optional side quest you may want to pursue is the Spirit World. If you want to make the Botania Conjunction Catalyst, you'll need Brew of the Flowing Spirit, which you can only brew in the Spirit World. Brewing anything in the Spirit World though is going to be tricky. For starters, until you can make the Dream Weaver of Nightmares, you'll spend most of your time in the Spirit World being pursued by an invincible monster. The Spirit World looks just like the Overworld, but you start with a fresh inventory and can't take most items back and forth.

The general idea is that you gather enough Disturbed Cotton to make the Dream Weaver of Nightmares, at which point you have a chance of getting to the Spirit World in daytime, with no nightmare monster. At this point you're supposed to start the game over, making a new base and advancing until you can cook up Brew of the Flowing Spirit. There are two main problems with this. First, Expert Mode makes this whole idea absurdly time-consuming. Second, (and this may be fixed in a future patch to the pack) there are no Thaumcraft ores in the Spirit World, so you can't complete the progression over again no matter how much you want to. To fix this, you'll need some creative use of game mechanics in order to sneak items into the Spirit World. Personally, I

used Agricraft to breed Cinderpearls for Blaze Powder, then combined this with an Ender Pearl from a Thaumcraft treasure bag to make an Ender Pouch. Then I transferred over the cauldron and brewing ingredients. Other people report success in using the Tinker's Construct Traveller's Belt to bring over items stashed in a second hotbar. In any case it's an ordeal, so consider whether you really need that Conjunction Catalyst in the first place.

Draconic Evolution

If you've been keeping the tech side up to date, the Draconic Evolution mod will draw on your combined technical and magical resources to create some new powerful equipment and machines.

Draconic Evolution is largely a tech mod with magic themes, so it's mostly covered in the tech side of the guide. You may find the items it offers useful for magical purposes. It offers fast, RF-less mob spawners if you can manage to get a Mob Soul for the monster you want to spawn. As mentioned previously, your Thaumcraft pursuits can be greatly accelerated by stuffing a Crimson Cleric soul into one of these spawners. You could also consider spawning Eldrich Guardians for an endless supply of Eldrich Eyes, although you'll only need about 17.

You can use Draconic Evolution equipment to overpower the boss challenges in the other mods to a certain extent. The Botania Gaia Guardian will ignore damage beyond what it considers reasonable (about 20 hearts per hit,) so there's no real advantage in using a Draconic Sword against it. Hitting the Thaumcraft bosses too hard will cause them to enter a harder "enrage" mode, so consider using the

rapid-fire Draconic Bow, rather than an overpowered Tinker's Construct weapon or Draconic Sword.

Goals

As far as progression, your goal is to create the Creative Mana Pool. This will require endgame-level items from all 4 mods. The magic mods also offer many other fun rewards, so pursue as many of those as you desire.

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