

# E21 - Spartan Crafts Club

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**[00:11] Senku**

With gears and a waterwheel,  
the age of human power is over.

**[00:20] Senku**

With an infinite contraption  
that requires no fuel...

**[00:26] Senku**

We're finally harnessing  
the power of nature.

**[00:34] Senku**

We're overcoming manpower and  
entering the age of energy!

***SIGN*** Hydroelectric power plant acquired!!

**[00:45] Kohaku**

Wh-What is this?

**[00:47] Senku**

It's a hydroelectric generator.

**[00:49] Kinro**

Hydroelectric?

**[00:50] Ginro**

Generator?

**[00:52] Gen**

This is insane, Senku-chan.

**[00:56] Senku**

Save your praise for Chrome  
and Grandpa Kaseki here.

**[01:00] Senku**

They built this huge-ass waterwheel.

**[01:04] Senku**

It's not done yet, though.

**[01:06] Senku**

All our precious electricity  
is still leaking away.

**[01:11] Kohaku**

What does that mean?

**[01:13] Senku**

We're building a box to store the electricity.

**[01:16] Ginro**

We can store that spinning power?

**[01:19] Senku**

Yeah, although it'll be a bit of a pain to build.

**[01:23] Senku**

Get off your asses.

**SIGN** Copper

**SIGN** Coal

**SIGN** Charcoal

**SIGN** Beehive

**SIGN** Sulfuric

Acid

**SIGN** Lead

**SIGN** Tin

**SIGN** Solder

**SIGN** Gold

**SIGN** Wire

**SIGN** Coil

**SIGN** Mercury

**SIGN** Vacuum

Pump

**SIGN** Phosphorus

**SIGN** Rochelle

Salt

**SIGN** Plastic

**SIGN** Battery

**SIGN** Circuit Board

**SIGN** Vacuum Tube

**SIGN** Light Bulb

**SIGN** Wine

**SIGN** Microphone

**SIGN** Headphones

**SIGN** Cell Phone

**[01:26] Senku**

We have a ton of high-difficulty crafting to do

**[01:30] Senku**

before we get to our cell phones.

**[01:35] Chrome**

Damn...

**[01:37] Senku**

It's the start of our Spartan crafts club.

**[01:41] Senku**

Damn, this is exhilarating.

**SIGN** Spartan Crafts Club

**[03:22] Senku**

To make a box for storing electricity,  
a battery, all we need to do

**[03:26] Senku**

is dip two sheets of lead in our old  
two-faced goddess friend, sulfuric acid.

**[03:34] Gen**

Ryu-san?

**[03:36] Gen**

Oh, sulfuric acid.

**[03:37] Senku**

Send electricity into this,  
and it'll store power on its own.

**[03:42] Senku**

It's simpler than you'd think, huh?

**[03:44] Chrome**

It's not simple at all.

**[03:45] Chrome**

This is pretty brutal.

**[03:46] Senku**

We'll make five more of these  
and connect all of them.

**[03:50] Kaseki**

Don't you think the crafts team has  
been working a bit too hard lately?

**SIGN** Batteries acquired!!

**[04:01] Ginro**

Is it really being stored  
in these tiny containers?

**[04:05] Ginro**

All the spinning power from those disk—

**[04:08] Kohaku**

It's definitely in there.

**SIGN** Battery

**[04:15] Ginro**

Does that mean I don't have to do all  
that painful turning with Kinro anymore?!

**[04:21] Senku**

Yep. Never again.

**[04:24] Senku**

I told you, it's the age of energy.

**[04:28] Ginro**

Hooray for energy!

**[04:31] Kokuyo**

I'm not surprised about lazy Ginro,

**[04:33] Kokuyo**

but even super-diligent Kinro is excited.

**[04:36] Suika**

Turning that thing must've been really hard.

**[04:39] Senku**

It's not meant to make your lives easier.

**[04:41] Senku**

It just means we're using  
your manpower elsewhere.

**[04:43] Kohaku**

The fighters can focus on training.

**[04:47] Kohaku**

Put your back into it!

**[04:51] Kohaku**

We only have a few months until the big battle.

**[04:54] Kohaku**

You need to be in shape to  
defeat Tsukasa and Hyoga!

**[04:58] Senku**

This isn't the time to be  
taking a break, you two.

**[05:01] Chrome**

This is way too Spartan!

**[05:03] Suika**

Grandpa Kaseki's going to die!

**[05:05] Senku**

There's one more vitally important  
use for the waterwheel.

**[05:11] Senku**

It's time for some fun gear-making.

**[05:13] Senku**

It'll work magic on the waterwheel's motion.

**[05:18] Senku**

Damn it. It broke again.

**[05:20] Senku**

Back to copying the designs again.

**[05:27] Chrome**

The teeth on just half of the disk  
catch the top and bottom in turn,

**[05:33] Chrome**

and that turns a rotational motion  
into a back-and-forth motion.

**[05:37] Chrome**

These ideas humanity came  
up with are incredible.

**[05:40] Chrome**

This is insane.

**[05:42] Kaseki**

The craftsman in me is  
getting way too excited.

**[05:45] Kaseki**

It's pissing me off.

**[05:47] Kaseki**

Here, leave the intricate work to the pro.

**[05:52] Suika**

They were so worn out when  
they saw the diagram,

**[05:55] Suika**

and now they're being all tough.

**[06:07] Ginro**

I-Is this...

**[06:10] Chrome**

It's the air-blowing machine for building fires!

**[06:13] Chrome**

Level one!

**SIGN** Level 1

**[06:15] Chrome**

Level two!

**SIGN** Level 2

**[06:17] Chrome**

And finally, level three!

**SIGN** Level 3

**[06:24] Ganen**

This was the hardest work we had  
to do in exchange for ramen.

**[06:29] Gen**

The hellish iron-making  
work is finally mechanized!

**[06:32] Ganen**

Hooray for energy!

**[06:35] Senku**

I told you, this doesn't  
mean you can slack off!

**[06:37] Kokuyo**

The non-fighters can focus  
on preparing for the winter.

**[06:46] Kokuyo**

Everything I see, I see for the first time.

**[06:50] Kokuyo**

This is called bottling, huh?

**[06:52] Gen**

It's the ancestor of canning.

**[06:55] Ganen**

I can't believe we can preserve meat  
for the winter. I must be in heaven.

**[07:00] Gen**

What's the Spartan crafts

club making this time?

**[07:04] Senku**

Light bulbs.

**[07:07] Gen**

*Sure, that's crazy enough.*

**[07:10] Gen**

*I'm starting to get used to it, though.*

**[07:13] Senku**

It gets up to about 2,000  
degrees once it's lit.

**[07:16] Senku**

That makes the metal connections melt apart.

**[07:19] Senku**

We're going to have to use  
glass as a tiny adhesive.

**[07:24] Kaseki**

This is so intricate, it's tough even for me.

**[07:30] Chrome**

Damn it! This is so hard!

**[07:34] Senku**

What's the matter? Giving up already?

**[07:37] Kaseki**

Not at all.

**[07:38] Kaseki**

Although my body gave up a long time ago.

**[07:41] Senku**

I always know I can count on a craftsman.

**[07:44] Kaseki**

Sheesh.

**[07:45] Kaseki**

I've lived such an easy life  
here for the past sixty years.

**[07:50] Kaseki**

But Senku, ever since you showed up,

**[07:54] Kaseki**

it's been so much harder,

**[07:57] Kaseki**

and so much more fun.

**[08:01] Kaseki**

Aside from a few, I bet everyone  
in the village feels the same way.

**SIGN** Ramen

**[09:42] Chrome**

Wow.

**[09:43] Chrome**

Last time we made a light, though,  
it burnt out instantly.

**[09:51] Chrome**

What do we do?

**[09:52] Senku**

What do you do to make things burn fast?

**[09:56] Chrome**

You give it a ton of air  
with a blowing machine.

**[09:58] Chrome**

Like we did with the waterwheel, right?

**[10:00] Senku**

Then what do you do to  
keep things from burning?

**[10:06] Chrome**

You get rid of the air?

**[10:12] Senku**

We use the hefty weight of mercury  
to catch the air as it falls,

**SIGN** Air

**SIGN** Air

**[10:19] Senku**

creating a vacuum.

**[10:34] Senku**

No matter how hot it gets,  
if there's no air, it won't burn.

**[10:40] Senku**

That's how it can last a long  
time without burning out.

**[10:53] Kohaku**

Senku, I've brought everyone here.

**[10:56] Senku**

Okay, hang on.

**[10:59] Senku**

It's almost time.

**[11:03] Chrome**

Damn, it's snowing.

**[11:05] Chrome**

Are we calling off the test?

**[11:06] Senku**

No, I'd like to do it today.

**[11:11] Kaseki**

We're all set.

**[11:15] Senku**

All right, let's turn it on.

**[11:36] Suika**

They're like twinkling stars!

**[11:39] Gen**

Decorative lighting.

**[11:41] Gen**

I feel like I'm back in the modern world.

**[11:45] Kaseki**

It took two months to get here.

**[11:48] Kaseki**

That took a while.

**[11:49] Senku**

Nah, we're right on schedule, really.

**[11:55] Gen**

Hang on, is today Christmas?

**[12:00] Senku**

Oh, yeah, now that you mention it...

**[12:05] Senku**

What a coincidence.

**[12:07] Gen**

Yeah, right.

**[12:30] Chrome**

Oh, damn! I have an idea!

**[12:32] Chrome**

We can go deep into the caves,  
farther than we could with torches!

**SIGN** 'sup?

**[12:38] Senku**

Right, with batteries and light bulbs,  
we could go ten billion times deeper.

**[12:42] Chrome**

I bet there are tons of cool  
rocks deep in the caves!

**[12:46] Chrome**

Let's go, science spelunkers!

**[12:48] Chrome**

We're going to find some  
awesome mineral resources!

**[12:51] Chrome**

Yo, Senku, you may be way  
ahead of me in science,

**[12:55] Chrome**

but when it comes to exploring,  
I'm tens of billions of times better than you!

**[12:58] Senku**

I'm sure. You've had years at it.

**[13:00] Chrome**

What do you want?

**[13:02] Chrome**

Captain Chrome will go get it for you!

**[13:05] Chrome**

There's gotta be stuff on the cell phone

road map that we don't have, right?

**[13:09] Senku**

Oh, materials we're missing?

**[13:13] Senku**

Nothing.

**[13:13] Chrome**

There's nothing?!

**[13:15] Senku**

We have everything we need.

**SIGN** Copper

**SIGN** Coal

**SIGN** Charcoal

**SIGN** Beehive

**SIGN** Sulfuric

Acid

**SIGN** Lead

**SIGN** Tin

**SIGN** Solder

**SIGN** Gold

**SIGN** Wire

**SIGN** Coil

**SIGN** Mercury

**SIGN** Vacuum

Pump

**SIGN** Phosphorus

**SIGN** Rochelle

Salt

**SIGN** Plastic

**SIGN** Battery

**SIGN** Circuit Board

**SIGN** Vacuum Tube

**SIGN** Light Bulb

**SIGN** Wine

**SIGN** Microphone

**SIGN** Headphones

**SIGN** Cell Phone

**[13:17] Senku**

Thanks to our hard work in our past missions.

**[13:21] Kohaku**

Then is there a reason to go exploring now,

**[13:24] Kohaku**

when we're so short on labor?

**[13:26] Ginro**

I bet he just wants to go exploring,

now that he has some new gear.

**[13:31] ---**

Gulp!

**[13:34] Senku**

Well, it would be nice to have a ton of copper.

**[13:37] Senku**

There's no telling how much we're going to use during our next brutal crafting session.

**[13:41] Chrome**

That's it!

**[13:43] Chrome**

I got this!

**[13:44] Senku**

Come home soon.

**[13:46] Senku**

At least by New Year's next week.

**[13:50] Kaseki**

So what's this brutal crafting?

**[13:53] Kaseki**

I want to have it done by the time Chrome's back so we can surprise him.

**[13:58] Senku**

The next-level light bulb.

**[14:01] Kaseki**

The light bulb was already brutal.

**[14:04] Kaseki**

This sounds exciting.

**[14:06] Senku**

We're making computer eggs.

**[14:09] Senku**

The gears of electrons...

**[14:11] Senku**

Vacuum tubes.

**[14:17] Gen**

Vacuum tubes, huh?

**[14:20] Gen**

We're getting to the point where I have no idea what you're making.

**[14:23] Gen**

I mean, I do.

**[14:24] Gen**

I know of the name, but if you asked me what exactly they do...

**[14:30] Senku**

They emit electrons at high temperatures,

**[14:33] Senku**

letting us control the direction of the current and make it stronger.

**[14:37] Senku**

Just think of them as the gears

of the electricity world.

**[14:41] Senku**

It's the heart of a cell phone.

**[14:44] Kaseki**

This is tough work, but it's almost the same as making a light bulb.

**[14:49] Senku**

Yeah.

**[14:50] Senku**

But as the name suggests, it's a vacuum tube,

**[14:54] Senku**

so we really need to get rid of all the air.

**[14:58] Senku**

So we put phosphorus on the filament, where it gets hot.

**[15:02] Senku**

It'll burn with heat, suck up all the air around it, and...

**[15:08] Kaseki**

I didn't do anything.

**[15:10] Suika**

It cracked at the base.

**[15:14] Senku**

The wires are expanding...

**[15:18] Senku**

The metal line going through the glass

**[15:21] Senku**

expands just a little from the heat of burning phosphorus.

**[15:24] Senku**

That size difference of just a few microns broke the glass.

**[15:27] Gen**

Is that the level of intricacy we're dealing with?

**[15:30] Gen**

What do we do, then?

**[15:35] Kaseki**

Nothing ever works right on the first try, does it?

**[15:40] Senku**

It's nothing but trial and error.

**[15:43] Senku**

When is it ever anything else?

**[15:47] Chrome**

I'm back!

**[15:51] Chrome**

And I copped some copper!

**[15:54] Chrome**

No pun intended.

**[15:57] Senku**

This is just the right time for that copper.

**[16:06] Gen**

A copper tube?

**[16:09] Senku**

A tube will just expand inward without cracking the glass around it.

**[16:15] Kaseki**

Finally! Man, making that vacuum tube was hard work.

**[16:26] Chrome**

Damn... The bamboo filament burnt out instantly.

**[16:43] Senku**

Damn it.

**[16:44] Senku**

Bamboo filaments are just fundamentally too weak for vacuum tubes.

**[16:50] Kohaku**

I don't get the science, but bamboo is too weak, is that right?

**[16:55] Chrome**

What do we need?

**[16:56] Chrome**

If we need something tougher, I'll go find it!

**[16:59] Senku**

No...

**[17:04] Senku**

There's nothing better in this age.

**[17:16] Chrome**

These are all the minerals I found lying around in the caves.

**[17:20] Chrome**

There must be something in here that's strong enough to hold up to the heat.

**[17:25] Ruby**

This one's like a gem!

**[17:27] Senku**

That's a jewel bug corpse.

**[17:30] Ginro**

What about this rock? It's really dark,

**[17:33] Ginro**

but light as a feather!

**[17:34] Senku**

Raccoon poop.

**[17:35] Ginro**

Well, poop!

**[17:42] Senku**

*I guess we're stuck.*

**[17:43] Senku**

*After we came so far...*

**[17:53] Suika**

*I'm not a rock doctor like Senku,*

**[17:57] Suika**

*but I've seen a lot of rocks while  
playing in the mountains and forests.*

**[18:02] Suika**

*I'm going to find an unusual  
rock that might be helpful*

**[18:06] Suika**

*and be useful to everyone.*

**[18:24] Senku**

*If we can't do cell phones,  
we can't do cell phones.*

**[18:27] Senku**

*I don't have time to be bummed out.*

**[18:30] Senku**

*Think of something else.*

**[18:33] Gen**

Senku-chan, wakey-wakey!

**[18:37] Gen**

It's the new year.

**[18:39] Gen**

We should all watch the sunrise together.

**[18:44] Gen**

It's important to have a change  
of pace and a fresh mindset.

**[18:47] Gen**

That's my line of work, right?

**[18:49] Senku**

Mentalists are such a pain.

**[18:53] Suika**

I-I'm coming, too!

**[18:57] Chrome**

Wait, Suika, were you going  
through rocks all night?

**[19:00] Ruri**

You want to be useful too, huh, Suika?

**[19:03] Suika**

That's right.

**[19:05] Gen**

New Year's, huh?

**[19:07] Gen**

Our internal clocks are messed up  
from the petrification, though.

**[19:11] Gen**

I don't even know how old I am anymore.

**[19:14] Senku**

Think about how many days you've been alive.

**[19:18] Kohaku**

Why would we remember that?

**[19:22] Gen**

What about you?

**[19:24] Senku**

6,268 days.

**[19:31] Ruri**

We're almost there.

**[19:42] Kokuyo**

The sun's rising.

**[20:03] Senku**

*It's blue.*

**[20:06] Senku**

*A gemstone...*

**[20:09] Ruri**

It's pretty.

**[20:13] Suika**

Why... is it glowing?

**[20:17] Senku**

It's called scheelite.

**[20:19] Senku**

It glows blue when exposed  
to ultraviolet light.

**[20:24] Senku**

Reactions to ultraviolet  
light are especially visible

**[20:27] Senku**

right before the sun rises.

**[20:29] Senku**

In other words, only right now.

**[20:32] Gen**

A magic stone that glows  
just for this moment...

**[20:37] Chrome**

I've never seen anything like it.

**[20:40] Senku**

Me neither.

**[20:42] Senku**

It's an ultra-rare gem.

**[20:45] Senku**

You guys did an incredibly good job, Chrome and Suika.

**[20:49] Senku**

This stuff is used in modern filaments.

**[20:54] Senku**

Atomic number 74...

**[20:56] Senku**

Tungsten!

**[21:06] Senku**

Heat's got nothing on it.

**[21:08] Senku**

It's the strongest metal in the universe!

**[21:14] Chrome**

This small chunk won't be enough, but it came down the stream in the cave.

**[21:18] Chrome**

There must be tons further inside.

**[21:21] Chrome**

Tons of this heat-resistant treasure called tungsten!

**[21:25] Senku**

We only have one set of materials left to make a light.

**[21:27] Senku**

The last member of the exploration team will be...

**SIGN** Senku

**SIGN** Health

**SIGN** Attack

**SIGN** Skills

**SIGN** "This is exhilarating!"

**SIGN** "Petrification revival fluid"

**SIGN** "Cure-all sulfa drug"

**SIGN** "Continuous counting"

**SIGN** "Gourmet science dish 'foxtail millet ramen'"

**SIGN** "Science snack 'cotton candy'"

**SIGN** "Kingdom of science labor force"

**SIGN** Attribute: Science user

**SIGN** OP body of knowledge spanning

2,000,000 years of human science.

Not very strong.

**SIGN** Kohaku

**SIGN** Health

**SIGN** Attack

**SIGN** Skills

**SIGN** "So the only option is to strike first!"  
**SIGN** "High-speed foot dribbling"  
**SIGN** "Somersault kick"  
**SIGN** "Lioness"  
**SIGN** "Dual wielding""Dual wielding"  
**SIGN** "Mighty good eyesight (11.0)"  
**SIGN** "Mighty fast"  
**SIGN** Attribute: Gorilla  
**SIGN** Extraordinary stamina and unmatched power!

But she acts first and thinks later.

**[21:35] Kohaku**

Not me. I have to train the fighters.

**[21:38] Kohaku**

Who, then?

**SIGN** Kinro  
**SIGN** Health  
**SIGN** Attack  
**SIGN** Skills  
**SIGN** "Rules are rules!"  
**SIGN** "Kinro the guard"  
**SIGN** "Golden spear"  
**SIGN** "Head-on strike"  
**SIGN** "Eyes of science: glasses"  
**SIGN** Attribute: Strait-laced  
**SIGN** Excels at both offense and defense.

Balanced, but serious as hell.

**[21:40] Kinro**

If I'm called upon, I will go.

**SIGN** Ginro  
**SIGN** Health  
**SIGN** Attack  
**SIGN** Skills  
**SIGN** "I'll overcome fear with my head and my heart!"  
**SIGN** "Friendship! Hard work! Victory!"  
**SIGN** "Maybe it's finally my time to shine!"  
**SIGN** "Ginro the bodyguard"  
**SIGN** "Ginro the awakened"  
**SIGN** "Secret technique: let someone else do it!"  
**SIGN** "Fastest at running away"  
**SIGN** Attribute: Loser  
**SIGN** Runs away the second he knows he's

at a disadvantage. You're scum, Ginro!

**[21:42] Ginro**

No way. Get someone else. I'm too scared.

**SIGN** Suika  
**SIGN** Health  
**SIGN** Attack  
**SIGN** Skills  
**SIGN** "I'm going to make myself useful!"  
**SIGN** "Great Detective Suika"  
**SIGN** "Spinny spin"  
**SIGN** "Stealth mode"  
**SIGN** Attribute: Sneaking  
**SIGN** She can turn into a simple watermelon

and snoop wherever she wants!

**[21:47] Suika**

If they need me, I'll make  
myself as useful as I can.

**SIGN** Kaseki  
**SIGN** Health  
**SIGN** Attack  
**SIGN** Skills  
**SIGN** "Oho! How exciting!"  
**SIGN** "Bump-up muscles"  
**SIGN** "Back muscles"  
**SIGN** "The fruit of 50 years as a craftsman: katana"  
**SIGN** Attribute: Craftsman  
**SIGN** A skilled craftsman who can craft anything.

When he gets excited about making something,

he tends to lose his clothes.

**[21:51] Kaseki**

I wouldn't mind, but you're talking  
about exploring caves, right?

**[21:54] Kaseki**

My back may give out.

**SIGN** Gen  
**SIGN** Health  
**SIGN** Attack  
**SIGN** Skills  
**SIGN** "I'm going to win, no matter who I have to dispose of."  
**SIGN** "Super awesome magic"  
**SIGN** "Mentalism: guessing the card (fraud)"  
**SIGN** "Mentalism: guessing birthdates (fraud)"  
**SIGN** "Vanishing act"  
**SIGN** "Black nightshade"  
**SIGN** "Ice-cold cola"  
**SIGN** "A curse to make one's heart explode"  
**SIGN** Attribute: Mentalist

**SIGN** Manipulates people with his words and magic.

But he's incredibly weak.

**[21:56] Gen**

I don't think you'll need  
a mentalist in the caves.

**[22:01] Senku**

Magma.

**[22:03] Senku**

Tungsten's tough as hell. We're going  
to need brute force to collect it.

**[22:09] Senku**

Let's go cave diving.  
We're a trio of spelunking buddies.

**[22:14] Senku**

To the fun treasure dungeon!

**[22:18] Magma**

Buddies?!

**SIGN** Next Episode

**SIGN** This is a work of fiction, but the plants, animals, and production methods described are based on reality. Foraging and making things on your own accord is extremely dangerous and, in some cases, illegal. Please do not imitate without expertise.

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