

Sue Nelson

Hello, I'm Sue Nelson and welcome to the Create the Future podcast, brought to you by the Queen Elizabeth Prize for Engineering. Celebrating engineering visionaries and inspiring creative minds.

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Today's guest is Lily Hevesh and she is social media royalty. Her YouTube channel has more than 1 billion views and around 4 million subscribers. She was the youngest member of Forbes 30 Under 30 for Art and Design in 2020, has been on the cover of Science World Magazine and worked with big names from Disney LEGO and Marvel to Jimmy Fallon and Katy Perry. Lily is considered the world's number one domino artist and features in the documentary Lily Topples the World. She has her own line of dominoes, is on a mission to inspire others to be creative and use dominoes to get involved with STEAM because she believes physics, engineering, design, and geometry are naturally embedded in domino art. And before we hear how, Lily, perhaps you could begin by explaining what domino art is, because for many of us, we just play dominoes.

Lily Hevesh

Of course, so domino art involves setting up dominoes in very intricate ways, using different colours. You can make things like designs, you can make a person's name out of dominoes, or a logo and image. Some people even use them to stack on top of each other. So, you can make large towers and different types of structures. There's a lot of really interesting pieces that you can make with small little bricks, almost. And once you set it all up, of course, there's a big moment where you just tap the first piece and then everything falls down in a chain reaction. It's the most exciting part because it's kind of like all this work has built up to this very pinnacle moment and you get to see a full, you know, show go down. It's really exciting.

Sue Nelson

It's a mix of being zen like, and mesmerising. As you just watch all these hundreds and hundreds, in many cases, thousands of dominoes go and then go off into different branches. But also, it is a sort of creative, artistic performance?

Lily Hevesh

Absolutely. Yeah. With dominoes, there's so much artistically embedded in your setups, whether it is you know, playing with colour schemes and different patterns, or making kinds of shapes with the dominoes, there's a lot that involves, like, I don't know, not just the artistic side, but also the technical aspect that's fused into building and setting up because you have to make something that not only looks good, you know, people will want to look at it and think it's a cool design to see topple over. But the technicality also requires you to kind of do a lot of engineering and figure out the weights that dominoes topple so that your tricks work. Because you know with dominoes, it's all about motion and kinetic art. So, when you combine the two, you get something really creative and I think that's kind of what drew me to dominoes, because you get to be technical, but also very artistic with it.

Sue Nelson

And also it's sort of 2D in some places, but 3D in others where your dominoes make huge, enormous structures. Is this where the sort of engineering principles apply in your constructions? What sort of considerations do you have to take?

Lily Hevesh

Yeah, I mean, with building dominoes, you have to do a lot of tests. And I remember especially when I first got into dominoes, I was around nine years old. I would set up dominoes all the time, and it would just stop halfway through and I'd have to figure out "oh man, like why didn't that work? Like, did my domino like hit it in the wrong direction was something out of place?". And you kind of just do a lot of small scale designs, just seeing

how each piece falls. And sometimes what I'll do is I'll record it with my phone and play it in slow motion so I can really get a close-up view of how the dominoes are toppling. And then just through that I can see like, "oh, this this domino needed to be, you know, maybe a centimetre more to the left". Like there's a lot of very precise angles and I think just doing it through experience and practising and seeing how dominoes fall, you kind of get a sense of how everything moves like physically. And then you can apply that to your structures and make even bigger projects, and then connect it all to make something that will work in a fluid chain reaction.

Sue Nelson

And you've already touched on some of these aspects with the engineering principles. But how do you get the STEAM then playing a role in your, in your domino art?

Lily Hevesh

Oh STEAM plays a really big role in various types of ways. Like with dominoes, specifically, physics is a big part of it, you know, you're learning about motion, you're learning about how one hits another domino, you're learning about kinetic energy and potential energy, and friction, how dominoes fall and how they slide on the floor and affect other things around them. I think dominoes have a really natural parallel with all types of science, specifically, physics. Technology, I use that all the time when planning my projects, whether it's, you know, using Microsoft Excel to make field plans, there's actually a way to design complicated images by filling in sort of like a, it looks like a grid, but you fill in with a paint bucket tool, different colours on Excel, and you sort of get to design a pixel art version of what you're going to make on Excel, and then use that sheet to then build a domino setup in real life. So there's a lot of interesting technology behind it. In terms of art. You know, the colours are really great aspect in it and making different designs with patterns and geometry. Like, I think with art, it's interesting, because some people, they focus a lot more on the artistic side making really flowing patterns, making organic designs, or some people go with a theme that's kind of more chaotic and goes all over the place.

Sue Nelson

Like engineers, you know, you have to learn from failure, I see assume, especially when you're thinking in 3D?

Lily Hevesh

Absolutely. You know, I'm failing all the time, even now, after building dominoes, what for about 13 years. But I think the failures are really what's made me you know, such an expert in dominoes now. And I think that not just with dominoes, but with anything, if you're able to sort of embrace the failures, and not just shy away from it, but kind of go into the failure and lean into it, and use that as a learning experience. You're gonna be equipped with so many things, and it'll help you learn and become better at what you're doing. So, you know, I think it's just kind of part of the process when I'm building. And every single time it makes me a better builder.

Sue Nelson

Now, I mentioned, you know, hundreds or thousands of dominoes, but actually, the scale of some of your constructions are much more than that. Give me an idea of some of the bigger projects that you've done in terms of scale and floor space and the number of dominoes?

Lily Hevesh

Oh, yeah, so the largest domino project that I've been a part of contained 300,000 dominoes. This was the Turkish domino record. And it had a whole team of builders involved. I believe there was about 14 builders and we set it up over 10 days, and it filled an entire gym. It was crazy. I don't know the exact dimensions but it was a massive floor space and we were working long hours, even sometimes doing some night shifts to finish it on time, but it was a really great topple and it went all the way through to the end.

Sue Nelson

How do you plan something that has 300,000, that's almost a third of a million moving parts?

Lily Hevesh

Yeah, the planning process is quite significant. When something is that large, and especially if there's a big team involved, you have to have a very detailed master plan. So what we'll do is we'll make the designs. And you know, whether that's on Excel or different programmes, we'll have smaller sections of the build, where then we can place that onto a canvas. Sometimes people use Photoshop, sometimes people draw it out. But it's kind of a floor plan to scale, where you can see how big each project is where it's laid out on the floor. And then you can draw out all of the connecting lines that will go from project to project and then rearrange that if you need to. But throughout the whole planning process, we have to keep track of how many dominoes we're using, of each colour, and figure out the precise, you know, placements of where everything is going to be. And make sure that, you know, everything just looks good visually, from an overall standpoint. It's a lot to do. But you know, once you have that full plan done, you can hand that over to all the other builders and they'll be on the same page to build it as well.

Sue Nelson

So that when you said took 10 days to build, how long would it take to knock down?

Lily Hevesh

Funny that you say that, probably like, five minutes, couple minutes.

Sue Nelson

It's like five minutes of glory.

Lily Hevesh

Oh, yeah.

Sue Nelson

Where is your creative process coming from if you're allowed a bit more of a, sort of free rein in what you can do?

Lily Hevesh

I think my creativity comes from just watching the world. And I know that sounds kind of cheesy, but seeing motion in things or seeing designs in real life. Like, I think the geometry of just things like inherently how they're built, is inspiring. Like, I could look outside and see, you know, "oh, like there's a tree and it makes this really interesting shape. I wonder like, how can I build that in dominoes? Is there a way to even build out in dominoes that it'll work?" And it gets me curious to then try that and see how I can use different types of domino techniques to recreate something that I see or put my own spin on it.

Sue Nelson

Is there a limit though, to say the height of a domino construction? What so far has been your limit in terms of almost like a civil engineering project?

Lily Hevesh

Yeah, there is a limit. I once made a domino tower with my friend. And I think it was around like 25 feet tall. But unfortunately, it was getting unstable. And at a certain point, it tipped over. But I think the factor also has to do

with the dominoes that you're using and how neatly the structure is that you're building. You know, some people if they build it very precise, everything's like exactly on the edge, you can probably build that a little taller. Or if you make the base of the structure larger, and then slowly towards the top, make it a little bit less wide, that'll make it more structurally sound. There is a limit with dominoes is, you know, eventually it is probably going to tip over but...

Sue Nelson

then I mean, that's around eight metres or so. But that's several storeys high?

Lily Hevesh

Oh, yeah. That's requires a lot of ladders. And we were building on the second floor of a balcony. So yeah.

Sue Nelson

Have you ever had that moment where I mean, it's, you know, it's a sort of comedy moment, isn't it. Where you're almost about to finish and then somebody accidentally nudges something with an elbow or a knee and the whole thing comes tumbling down, or do you have sort of devices, you can put in between sections to prevent all of them crashing all at once, and maybe just isolate a topple to one part of the room?

Lily Hevesh

Yeah, that has happened many times, actually. You know, with dominoes, it's pretty precarious. So, the slightest thing could knock down just one domino and set off the entire chain reaction. It is, I will admit, it is pretty sad to see that happen. But I have developed some sort of like system for myself, where, when I'm building, I'll try to make what's called safety gaps, where I'll take out, you know, five or six consecutive dominoes and create this gap. So if I knock it down by accident, it'll just stop at that gap and knock down a very small section of the build instead of the entire thing. But the trick is, you have to remember to fill in all the gaps at the end. And that's when the stakes are really high.

Sue Nelson

And it sounds like you say you've got quite calm about it now as well, that there's a definite mindset that you need to have, in order to do this effectively?

Lily Hevesh

Yeah, I do think being patient is a really great and developed skill that you'll learn as you build dominoes. Like, it's going to take a long time to build these elaborate domino setups. And knowing that in and being, you know, embracing the fact that you're spending a long time leading up to one moment, is really going to help and I think dominoes have really shaped who I am, honestly, as a person with not just being patient, but learning how to persevere and if something goes wrong, like not, you know, internalising that but just, you know, going into problem solving mode, trying to figure out why something failed and learning from that and trying to flip it into more of a positive experience than something that I'm going to drown into sorrow with. You know, my catchphrase on my YouTube channel is keep on building. And I think that applies not just to dominoes, but really to anything in life.

Sue Nelson

Interestingly, you know, the documentary about your you know what you do, Lily Topples the World, which is incredibly popular, does cover some of those aspects. How did that documentary come about?

Lily Hevesh

There's this documentary filmmaker Jeremy Workman. And he makes documentaries about a lot of types of interesting artists. And one day out of the blue when I was in college, he sent me an email. And he was like, "Hey, I'm a documentary filmmaker, I love your work. This is really interesting. Like, I've never, you know, seen this world of domino builders online. I'm making a new film, I thought, you know, maybe there would be an opportunity to do some sort of story on you?" And, you know, when I read that email, I was like, "Oh, that's interesting. Like, I don't think anyone's made a film about dominos before, let alone a documentary about my life". So I was like, "oh, okay, that sounds kind of cool. Like, let's, let's try it. Sure". So, Jeremy, he got on a phone call with me and my dad. And we talked a little bit more about it, and then eventually met in person, he came to our house and just explained more about the process of what a documentary would look like, and what he was planning to film, like, not just my dominoes, and the projects that I do, but also kind of delving deeper into who I am as a person and in everything outside of dominoes and YouTube. And, you know, soon enough, we agreed, and he started filming quite a lot over the span of, I believe, three years, and then, now we have this full film of me, you know, growing up from being a teenager to now doing domino art full time. And, yeah, it's really brilliant to see and I'm so glad that people are enjoying it.

Sue Nelson

And in that documentary, we saw you grapple with dropping out of college, and you were studying mechanical engineering and product design, as a degree in you're enjoying it. But you did drop out after just one year, and you told your family that you'd more to promote STEM by continuing with your domino art. Was that a really difficult decision to make to follow your sort of heart effectively in terms of, this was the thing that was giving you the most joy?

Lily Hevesh

So the decision to drop out of college, I think, in some ways, it was easy, because I knew that, you know, getting a degree wouldn't really help me in what I wanted to do. I had already had my dream job, you know, I was building dominoes and I was able to make, you know, doing domino art and YouTube full time. But at the same time, it was it was difficult, because I really enjoyed College, like genuinely, it was a really great year for me, and I enjoyed my classes. I enjoyed the friends that I met there and the environment. I was like a little torn to, you know, leave that after just one year.

Sue Nelson

And I know the answer to this question, but I'm going to ask it anyway. Do you ever regret your decision?

Lily Hevesh

Oh, no. I don't regret my decision. I think if I stayed in college, it would have been such a big missed opportunity. I couldn't see my channel die after spending, like a decade making videos, it would just completely crush me.

Sue Nelson

How old were you when you put that first video up?

Lily Hevesh

I was nine years old, I was really young.

Sue Nelson

You must find that really rewarding now that you're sharing your passion, teaching children how to set up dominos who were your age, probably, you know, when you started?

Lily Hevesh

Absolutely, yeah, it's it feels like it's come full circle now, where, you know, I got into dominoes, because of other people online making their domino videos. And now, I am so blessed to be able to, you know, kind of lead the domino scene online, and share my art and teach people how to build not just through the videos, but also doing workshops in person, and teaching people in various types of ways. It's so cool to see people learn about dominos, and it brings them so much joy in the way that you know, I experienced as a young child and still do now. And it's really great. I really enjoy it.

Sue Nelson

And what's quite interesting with what you do is that the Queen Elizabeth Prize for Engineering, the trophy that goes to the winning engineer, is built by young people. And it's called the Create the Trophy competition where young people can design, it's got to be a 3D printed trophy. And then that's presented by The Queen or a member of the Royal Family to the winner. So there are similarities with the STEAM aspect of your work. And this wonderful sort of competition. So, what advice would you give young people trying to make a memorable 3D design like your domino art, but for a trophy?

Lily Hevesh

Oh, I love that. That's so cool and creative. You know, you have to really think outside the box and do something that doesn't seem typical. Like if you really want to stand out, maybe it'll be fun to redesign what a trophy looks like, put your own spin on it, or combine it with something else. I feel like the more out there but cool it is, the more people will be like, "Oh, that's awesome".

Sue Nelson

Yeah, good advice, because it's lovely to see that everyone is unique and different. On the sort of commercial side and the entrepreneurial side of what you do, again, there's this overlap with engineering, because, you know, a lot of engineers do you have to think about the financial aspect, the business side of things of what they do. You sort of began with working with a company, I believe when you were aged 13, with Campbell's Soup, you know, since then mentioned some of the other brands you've worked with a huge at the beginning of the podcast. What has it been like working with companies, and how has that relationship changed, because effectively it's adults dealing with a young person?

Lily Hevesh

Right, yeah, the first inquiry I was just 13 and, you know, I was a kid then. So, my dad, he stepped in, you know, as my business manager, he would have the phone calls and try to, you know, field if these people were legit. And through that, you know, as I grew up, I learned a lot about the business side. And now, I feel much more comfortable, you know, being able to step in and have phone calls on my own and get an idea of how to work with clients. And it's just something that you learn through practice really, like anything.

Sue Nelson

And when did you decide to develop your own line of best-selling dominoes?

Lily Hevesh

I believe this was in 2018. And the whole process from start to finish, I think took over three years to get, you know, from finding a toy company to then having my own line of H5 Domino Creations and then have it be sold in stores and Walmart and online on Amazon. It was a long process to get there and a lot of failed attempts, talking to various types of toy companies trying to find the right fit, pitching our idea. But finally, we eventually landed on partnering with Spin Master. And it was a really great partnership. And now we're still making dominoes and coming out with new designs and accessories and different sets. And I'm just so thrilled with it.

Sue Nelson

And this product development journey. You must have learnt a lot from it then?

Lily Hevesh

Absolutely. Yeah, it was a whole learning curve, seeing how products are made. And the retail side of things because there's a lot that goes into just the packaging itself. And where the box can be like displayed or, you know, like what shelf it's going to be on. There's a lot of rules that you kind of have to fit into and use those as constraints. Every day. I'm still learning new things.

Sue Nelson

And for obviously, this is a podcast and we're not seeing what you're doing, although I expect as soon as this is over everybody will be rushing to have a look online to see, you know, how would you describe say how your dominoes differ from the more traditional ones that many people visualise, which are black with white spots?

Lily Hevesh

My brand of dominoes, H5 Domino Creations, is specifically designed for setting up and knocking down, so they don't have dots, they have very square corners. And they're an exact 2:1 ratio, which makes it really great for stacking and making different types of structures. There's an added surface texture as well that we've developed so that the dominoes don't slide too much. So, when you knock down a domino, it'll hit the next one really clearly and sort of grip it as well as the floor, which makes a more controlled motion, and then it actually increases the chances of your domino topple toppling all the way through. And we've even improved the whole shape of the domino in the sense that, a lot of dominoes that I've used in the past, they actually have manufacturing defects in that some of the faces might be concave or convex very slightly. So, we've made a perfectly flat rectangular prism. And that actually helps with the consistency of the domino because you want to make sure when you're building dominoes, every domino is the same because if there are small differences that does affect how they topple and you know even how they are set up.

Sue Nelson

Now is there a favourite project or viral video of yours that you know stands out above all others for whatever reason? You can decide the reason why it's your favourite.

Lily Hevesh

I think my favourite domino video is called "New domino record + most insane spiral ever 32,000 dominoes". And that one was my largest solo project. So that's the most dominoes I've ever set up. On my own. It took me 82 days, which I did during the beginning of the pandemic. And I kind of just went all out with it in terms of all the tricks that I made, were like nothing that I've done before, I tried to be as innovative as possible, doing things that I knew the community would have their mind blown by.

Sue Nelson

I can't wait to see that one. That's one of the ones I've not seen yet. So, I'm looking forward to that. Now, obviously, you said that was you know, when your record your solo record, and you like doing world records with dominoes. Is there a world record left that you'd still like to achieve or yet to achieve?

Lily Hevesh

Absolutely. I think at some point, I don't know when. But I would love to attempt the domino world record with a giant team. And I know this is very ambitious, but the current record is that four and a half million dominoes. So

we would need to set up 5 million dominoes. And yeah, I'm not sure how it's gonna happen. But I know for sure it will happen at some point.

Sue Nelson

That's insane.

Lily Hevesh

Yeah, it's huge.

Sue Nelson

Well, best of luck. I expect it won't be long before we hear about you getting this record and we look forward to seeing the sort of wonderful design and combination of art and engineering and 3D spatial awareness in your projects, and I'm sure whatever it will be it will be fab. Lily Hevesh, thank you so much for joining me on the Create the Future podcast.

Lily Hevesh

Thank you so much. I really enjoyed this. I appreciate you having me.

Sue Nelson

You're welcome.

Find out more about the Queen Elizabeth Prize for Engineering by following @qeprize on Twitter and Instagram or visit qeprize.org. Thanks for listening and join me again next time.