

## Not Your Mother's Library Transcript

### Episode 28: 3D Printing

(Brief intro music)

Rachel: Hello, and welcome to Not Your Mother's Library, a readers' advisory podcast from the Oak Creek Public Library. I am Rachel. Due to some scheduling issues, Leah won't be joining us for this episode of the podcast, and while we miss her dearly, she should be back for the next one! As you can guess from the title of the episode, today we are going to learn about 3D printing. You might not know this, but the library actually has a 3D printer of its own, and you can send us print requests! Before I get ahead of myself, though, I am super excited to welcome a special guest. She is the Technical Services Librarian at OCPL, and therefore our resident 3D printing expert. Welcome, Joanne Seward!

Joanne: Hello, listeners!

Rachel: (laughs) If you've been tuning in to Not Your Mother's Library for a while, you may recognize Joanne's voice from an episode that aired in early 2020. She was our special guest for 'Mamma Mia! and More Musicals', wherein we recommended some of our favorite movie musicals to promote the Musical Sing-along Nights program that is unfortunately on hiatus right now due to current COVID-19 health and safety restrictions.

Joanne: Super bummer.

Rachel: It really is. The pandemic has brought on a temporary halt to all of the library's in-person programs, but there are plans in the works to see at least some of them resurrected this fall season. So, keep an eye out for those. In between, the library does offer plenty of Virtual and Take Out programs, not to mention all of the cool services that you can utilize on a regular basis. Which is my terribly smooth transition into—da da da daaaa!—the world of printing! 3D style.

Joanne: (snorts) That's fantastic. I love it.

Rachel: The more cornball, the better.

Joanne: (laughs) Okay, so, as Rachel said, um...I'm the Technical Services Librarian here at OCPL. Um, and I have had to teach myself how to use a 3D printer. Before this, I knew that it existed.

Rachel: (laughs)

Joanne: But that's about it! Um, so, it really was a bit of a learning curve. So, we actually got the printer, uh, in May of 2019, which feels like eight million years ago.

Rachel: It really does.

Joanne: (laughs) Um, and it actually took us until January of 2020 to make it available to the public. Um, so, I had to kind of test things out and make sure that I understood how the machine worked, um, and the kind of basics, and then also we had to figure out how you guys, um, were going to actually request things. Um, so, it just took, um...more time than I realized.

Rachel and Joanne: (laugh)

Joanne: So, um, and then I also wanted to make sure that we had a good, uh, kind of, uh, what I like to call the '3D Printing Library'. Um, so, a selection of various 3D-printed items that you can kind of choose from. So, giving you some kind of different ideas of things, um, that the 3D printer can actually do. So, um, in July of 2021—so, this year—um, we had our busiest time so far, um, for requests. Um, so, we actually had twenty requests in one month.

Rachel: Wow.

Joanne: Which maybe doesn't seem like a lot, but it felt like a lot.

Rachel and Joanne: (laugh)

Rachel: It most certainly did, yes.

Joanne: So...and we also...we get custom requests, and sometimes those requests can be one piece, it can be two pieces, it can be five, it can be ten, it can be thirty. Um, so...

Rachel and Joanne: (laugh)

Rachel: Quite the jump between those numbers. (laughs)

Joanne: Yes! (laughs) So...so that also makes things kind of...a little bit, uh, more interesting.

Rachel: It's a good word for it. 'Interesting'. A kind word. (laughs)

Joanne: Yes. (laughs) So.

Rachel: (laughs) Joanne is actually the person who put together the 3D Printer page on the Oak Creek Public Library's website. This includes all sorts of useful information, from which filaments we currently have available to full-color examples of every item that can be requested through that 3D Printer Library that Joanne just mentioned. Those include size measurements as well as gram totals, if you would prefer to know that sort of thing before making a selection. So, visit [oakcreeklibrary.org/3d-printer](http://oakcreeklibrary.org/3d-printer), or navigate to the same page from the main 'Services' drop-down menu. This page also contains a link where you can 'Request a 3D print' via an online request form. Just fill in the required information, and you will be able to pick out an item from the library or request one of those very super-special, ultra-awesome custom requests.

Joanne and Rachel: (laugh)

Joanne: So, at this point I like to point out, uh, Rachel is being very modest.

Rachel: (scoffs) Oh...

Joanne: And she actually put all of this information on the website. Yes, I created the content...?

Rachel and Joanne: (laugh)

Joanne: But Rachel had to, you know, get it all formatted.

Rachel: Yeah, that is true. Although it feels like so long ago now. (laughs)

Joanne: And then Rachel also created the very awesome request form, which is a lot of work. (laughs)

Rachel: It...it...it was quite a bit. We run that one off of the City website, and it is very formulaic, I'll have you know. (laughs)

Joanne: Yes, so that...that in its own, uh, thing is...is a skill of its own, basically. (laughs) So...

Rachel: (laughs) Well, thank you.

Joanne: You're welcome. Um, so, as far as requests. Like, who can request things, et cetera. Um, so, for Oak Creek residents, you can request one free request per month as long as it's under one hundred grams. Um, so if you request somethings that's over a hundred grams, sorry—you have to pay for it. (laughs)

Rachel: That seems fair.

Joanne: Yeah.

Rachel and Joanne: (laugh)

Joanne: And then, if you are not an Oak Creek resident...so, if you live in, like, Franklin, or South Milwaukee, or one of our neighboring friends...um, counties and et cetera...um, then it would be five cents per gram. Which is really not that much, if you think about it.

Rachel: No, I think that's really inexpensive, considering what other places sell it for.

Joanne: Yes, yeah. You can go online and request somebody to print something, uh, like, 3D print something through these...y'know, various different websites, and some of the requests, um, can get very, very pricey.

Rachel: Mhm.

Joanne: So, I think ours is definitely a...a bit more reasonable than...than others. (laughs)

Rachel: Yeah.

Joanne: So, we've actually had people come to us specifically for that reason. That they were going to get something printed elsewhere, but then they found our site and, found, "Oh, it's

five cents per gram! Well, that's, you know, great," and so we've gotten quite a few requests, actually, in that manner, as well. Where it's cheaper to have us do it, so.

Rachel: There's a good promotion if every I've heard one. (laughs)

Joanne: There you go! (laughs) Um, what's kind of cool is that 3D Printing Library...I've spent a lot of time... (laughs)

Rachel: Yes, she has. She's very dedicated!

Joanne: ...um, coming up with the different kind of categories of items, um, and then finding these free, um, designs. Um, and so they were on open-source websites, which we'll talk about in a little bit.

Rachel: Mhm.

Joanne: Um, and...and so I found these designs, and I was trying to find ones that had kind of a good range, so they could really see what a 3D printer is capable of. Um, yes it can make toys and bookmarks and, you know, that's really cool, uh, but it can also do, uh, more functional things. Um, we have a person who puts in regular requests—customs requests—and they're things that he designs. Uh, and they're actually for his car. So, he's made, like, a tire pressure valve gauge thing. I...I don't...don't ask me about cars, because I have no idea. (laughs)

Rachel: (laughs) Really? Couldn't tell!

Joanne: Shoosh! (laughs) So...but it's actually really cool it see it utilized in that way. That's what I feel like a 3D printer really is.

Rachel: Mhm.

Joanne: Is to make these things that don't really exist.

Rachel: Yeah.

Joanne: So that...so that's really, like, a cool concept that has, um, come about with this that I didn't originally kind of think of.

Rachel: Very cool.

Joanne: I forgot to mention—

Rachel: Whoo...!

Joanne: We'll throw it...one right in there. So, for the 3D Printing Library, there's actually eighty-six different requestable items.

Rachel: Oh, wow. We've already got that many?

Joanne: Yes.

Rachel: Oh, I had no idea it was that many! (laughs) That's crazy!

Joanne: (laughs) Yes, so I went through and I counted, you know, there's six categories of items.

Rachel: Mmhm.

Joanne: And I tried to do a dozen or so in every...every category. So...

Rachel: Sure. That's a lot of variety.

Joanne: Yes. So, I had to test every single one of those and print them and make sure that it worked, um, and then create the files for them and then, you know, it's just...it was a process unto it...itself. So.

Rachel: Well, one that you were very good at completing, if I might say so.

Joanne: Well, thank you.

Rachel and Joanne: (laugh)

Rachel: Um, I actually thought it'd be kind of cool to talk about what some of our favorite 3D print requests have been over the last couple years. Um, I actually really like the pink PETG filament color. One of the cutest prints that you can request through the library is called 'Balloon Anime Character Statue', and it looks phenomenal in pink.

Joanne: (laughs) Which...we all know what that really is.

Rachel: Yes. (laughs)

Joanne: If you go on our website and look at it you'll...you'll figure out what we're talking about. (laughs)

Rachel: Yes, please look at the picture reference on the website. We...we have to rename certain things due to, uh, (coughs) legal reasons.

Joanne: (laughs)

Rachel: But, um... (laughs) It's very obvious what it is when you see it.

Joanne: Yes.

Rachel: And be prepared for your eyes to start sparkling, because it is so adorable.

Joanne: (laughs)

Rachel: I also recommend the 'Butterfly Bookmark' and the 'Cat Ring' because they, too, are delightful.

Joanne: Yes, they are. Um, and I'll point out, um, when we were talking about the grams...so, for the Cat Ring, for example, that is, like, literally one gram.

Rachel: Yeah, it's tiny,

Joanne: So, you know, if you are non-Oak Creek resident requesting that, then it would be five cents.

Rachel: Mmhm.

Joanne: (laughs) And, like, the Unicorn Bookmark that Rachel mentioned I think is maybe, like, twenty grams?

Rachel: It's not very many, 'cause it's so thin.

Joanne: Yes.

Rachel: Yeah.

Joanne: Yeah, so—and probably even less than that, honestly. So, a lot of these are really, you know, even if you have to pay for them, they are really, you know, reasonable. So.

Rachel: Mmhm, definitely.

Joanne: Um, I would say one of my favorites is actually one that I just, uh, finished printing. So, I added it to the 3D printing Library. I had to swap it out...um, that was a trial and error thing. (laughs) So, we had a piggy bank of sorts that was, like, a little block with a question mark on it. You'll, you know...that's what it was.

Rachel: (laughs)

Joanne: Um, and it was very tricky to print. Um, and it was very large and it took, like, fifteen hours for it to print fully, and et cetera.

Rachel: Mmhm.

Joanne: Um, so I went looking for another piggy bank, and so I found a piggy bank that is actually a pig!

Rachel: (laughs)

Joanne: And it's in that pink filament that...that Rachel likes so much. (laughs)

Rachel: Mmhm.

Joanne: But it's super, super adorable. Um, and it's kind of cool because the body of the pig prints, um, in two halves. So, the left side and the right side, and then they kind of snap together after it's done printing. And then the head is a separate piece, and it actually kind of slides onto the body. Um, so that's how you actually get the money out! So, you just slide off the little pig's head, and then you can dump out the money. (laughs)

Rachel: And then you can put his head back, and he's okay! (laughs)

Joanne: Yes, you don't have to break him with a hammer. Please don't!

Rachel and Joanne: (laugh)

Joanne: Um, so, I really...I really like that one.

Rachel: Nice.

Joanne: Um, one that I've printed in the past, uh, for a staff member. Because that was also something that I...that I did before we made public the 3D printer, is I asked, um, various staff members if they wanted something 3D printed. So, everybody could request one 3D-printed item. Um, and so one of our coworkers—Amanda, who works in the Children's Department—um, she wanted, uh, I'm going to say the name, don't sue me please: Groot.

Rachel and Joanne: (laugh)

Joanne: Uh, from the Marvel franchise. Um, so it was, like, little Baby Groot, and he was sitting down and he had his arm up. Um...

Rachel: Adorable.

Joanne: It was super adorable! And, you know, we got this perfect brown filament that, you know, just matched what he looks like in the movie, I think, and...

Rachel: Mhm. Nice.

Joanne: it was so, you know, it was such an adorable little thing. Um, so, and then I've personally printed, um, from "Bob's Burgers"—once again, please don't sue us—the Kuchi Kopi nightlight?

Rachel: (laughs) Yes!

Joanne: 'cause that's...everybody here knows my obsession with "Bob's Burgers."

Rachel: (laughs) Yes.

Joanne: (laughs) So, of course I had to personally print one of them myself, and I used the glow-in-the-dark filament, um...

Rachel: Very cool.

Joanne: ...'cause I had to keep it true to the actual thing.

Rachel and Joanne: (laugh)

Joanne: So, um, so those, I think, are some of my favorites. Um. Oh, and another thing from the 3D Printing Library that I really like are the...is the Flexi T-Rex.

Rachel: (gasps) Yes! And we have a Flex Fish, as well, I think?

Joanne: Yes, of...

Rachel: Yes!

Joanne: It's the, like the fish bones is the fossil, or whatever. (laughs) Yeah, the Flexi T-rex is actually a really, really cool thing. So, it's basically separate, individual pieces. Like, his body is maybe, I don't know, eight pieces? But they're all connected.

Rachel: It looks a bit like vertebrae.

Joanne: Yes. Good...good way of describing it.

Rachel: Mhm.

Joanne: Um, so, it prints all as one thing flat on the bed, and then when you...you have to kind of scrape it off with a little, like, you know, scraper, basically.

Rachel: Mhm.

Joanne: Um, once you scrape it off it actually...it kind of disconnects a little bit and then you can flex at the different points, um, on the vertebrae, so to speak.

Rachel: Yeah.

Joanne: It's actually very, very cool and very interesting to see how it does that and how it can still be kind of flexible. Um, so have a couple things...so, the flexible ones are really cool, and you can search for them—they're, like, a ton of them on different custom...on different, uh, open-source and custom websites.

Rachel: Sure, yeah.

Joanne: Uh, if you search for the word "flexi"—f-l-e-x-i—then you will find there's a ton of them. (laughs) I did a flexible shark, also, for Leah who is not here right now.

Rachel: Oh, yes!

Joanne: (laughs) So, there's a ton of different ones. But the ones yeah, that can kind of move are really cool. Um, there's a "Harry Potter" pendant that I made, um, with the...like, the triangle and the circle.

Rachel: Oh, like the Deathly Hallows.

Joanne: Yes.

Rachel: Yes.

Joanne: Thank you. I couldn't think of the word for a second.

Rachel: I was enough of a nerd for both of us.

Joanne and Rachel: (laugh)

Joanne: There you go! Um, so, what's cool is, once again, that prints as all one piece, and then you pop it off the bed and the ring in the middle actually rotates.

Rachel: Oh, very cool.

Joanne: So, I think it's...yeah, it's very interesting.

Rachel: We have something similar in the library, don't we? The Gyro Keychain?

Joanne: Yes. Yeah, so that, um, is three separate rings. So, the rings...it prints all of the rings, um, once again, and then you pop it off, and then you can move the rings kind of within each other.

Rachel: Mmhm, yeah.

Joanne: I also have a star one that's like that. Where it's, uh, basically the same idea. It's a bunch of different—like, four stars, I think? That...so, like, a big star and then one inside of it and then one inside of it—you know, like that? Um, and then once you pop it off, you can rotate the stars, so...

Rachel: Yeah.

Joanne: So, yeah. Those...those kind of things always kind of amaze me a little bit.

Rachel: They're really fun fidget toys, yeah.

Joanne: Yes. So, those are, um...those are probably, you know, my...my favorite.

Rachel: Very cool. All right. (thumping sound) I was slamming my fists down on the table. I don't know if that carried over into the recording. We'll see! Let's get specific!

Joanne: (laughs)

Rachel: We thought it might be helpful to discuss some of the more technical aspects of the 3D printer. For instance, the kind of machine that the library has and some of its capabilities. This is especially important when it comes to requesting custom prints, because those are limited by size, support types, and so on. We have a Lulzbot Taz6 which, when we purchased it, was lauded as being "the most reliable, easiest-to-use desktop 3D printer ever, featuring innovative self-leveling and self-cleaning."

Joanne: Ooo, so fancy.

Rachel: (laughs) You'd think but, uh...listeners, if you are interested in obtaining your own 3D printer, I don't think that either of us would recommend this one, per se.

Joanne: (laughs)

Rachel: Not because it's bad, but because of the huge price tag.

Joanne: Yeah, I...there are definitely other 3D printers on the market, um, that are much cheaper.

Rachel: Yes.

Joanne: Um, so you can get, you know, a 3D printer for, like, two hundred dollars that's not horrible. Um, and even, like, the Lulzbot, um, Taz6...there's a Lulzbot Mini. So, the difference is the printer, um, bed size.

Rachel: Mmhm.

Joanne: So, you know, imagine, like, a chessboard. Not quite as big as that.

Rachel: Right.

Joanne: Is what we can print right now. Um, and then, you know, imagine, like, a square baking pan. You know it's...it's just, a very, you know...the size of it is just smaller. That's how it works.

Rachel: Yeah, and if you're just starting out and you don't plan to print a lot, I definitely recommend a smaller model. (laughs)

Joanne: Yes.

Rachel: For sure. (sighs) Um, it'd be kinder to a smaller budget, anyway.

Joanne: (laughs)

Rachel: Keep in mind, too, that at the library we receive a lot of requests—more than what an average user would handle. The Taz6 itself is hardcore in that regard. If you are looking for something on that level, like Joanne said there are newer models anyway, so you'd be better off. Regardless, be aware that the library's machine has a maximum print area of two-eighty by two eighty by two-fifty millimeters, which is eleven by eleven by nine point eight inches. That is fairly large for a space to work with, but by no means is this the biggest model on the market.

Joanne: No, um, there's...when I was looking up pictures of 3D prints, um, 'cause I wanted to put one on our website, um, so that you could see the Lulzbot Taz6 and et cetera, um, there was one where it was a different printer model, um, and it had a chess piece that I swear was probably knee-high.

Rachel: Oh, my lord. (laughs)

Joanne: So, that's not...that's not our printer, folks. (laughs) That's not what we're able to do, by any means. Um, and you can only imagine if, you know...that chess piece probably took somewhere in the range of, like, five days to print, would be my guess.

Rachel: Oh, yeah. Mmhm.

Joanne: I mean, it's just crazy. (laughs) So...so yeah, ours is definitely, um, a...a more mid-range, is what I would call it.

Rachel: Absolutely, yes. As far as other specifics go, uh, keep in mind your filament type. At OCPL we have PLA and PETG.

Joanne: Um, and all of the filament types have kind of plusses and minuses.

Rachel: Mhm.

Joanne: Um, as far as use, and...it kind of depends on what you use them for. Um, so, I...I know our recent...one of our most recent requests, um, the person really wanted it to be PLA, and I think the reason behind that is because it's easier to sand and therefore paint.

Rachel: Sure.

Joanne: So, she wanted to make, you know, custom—you know—make this thing and then be able to, you know, paint it how she wanted and et cetera. Um, and then the other person who does many custom requests from us, um... (laughs) He always requests PETG, and, um, I believe that's because it has, like, a higher, um...it's more durable, I believe. So, if it, you know...can handle being, you know, by extreme heat, et cetera. And...and still be able to, you know, handle it.

Rachel: Interesting. Yeah.

Joanne: So...and I know that some are more, like, flexible, and some are more rigid. Um, for a time we had ABS filament, um, which is much more rigid. So, if you, you know, took something off of the, um, you know...something printed in ABS on the plate, um, then you popped it off with your little spatula. Um, if you han—took your print in hand and you kind of wobbled it a little bit, it almost would crack, even at that point.

Rachel: Yeah.

Joanne: And that's not what you want! You don't want your piece to...to completely crack apart!

Rachel: No.

Rachel and Joanne: (laugh)

Joanne: Um, so we no longer have any ABS.

Rachel: We...we phased it out!

Joanne: Yes. Thank goodness.

Rachel and Joanne: (laugh)

Joanne: So, um, we do have some cool filaments. Um, so we do have a glow-in-the-dark green right now, um, and we have...um, they're called 'edge glow'. Um, so, we get all of our filament from this company now called Village Plastics, um, and so they have some really cool, different filament types. And the edge glow is supposed to be, like...when you have natural light hitting it, it's supposed to kind of give a little bit of a glow to it.

Rachel: Hmm. Mmhm.

Joanne: Which is kind of cool. Um, so we have that, and we have one that has kind of a shimmer to it. The...we have, like, a white that has, like, a little bit of a shimmer, like a...opalescent kind of shimmer going on.

Rachel: It's very pretty.

Joanne: (laughs) So, um, and then we have one, uh, that Leah in particular, um, thinks looks like the old Coke bottles? So, that kind of bluish green, kind of transparent-looking.

Rachel: Oh, yeah. Yeah.

Joanne: Um, so...so we do have a couple really cool filaments. Um, I wish we were at the point that we could have different filament types, um, even further than that, because there are wood filaments out there.

Rachel: Yes!

Joanne: Um, so they actually have wood shavings in the actual plastic. Um, so you can—once something is printed—you can actually sand it like...as if it was wood.

Rachel: Mmhm. Mmhm.

Joanne: Um, and it even smells like...so, if you get the cedar one it smells like cedar when it's, you know, printing.

Rachel: Oh, I didn't realize that! Very cool.

Joanne: Yes. They even have coffee-scented filament.

Rachel: (laughs) Right.

Joanne: I mean, we're not going that crazy with this, but... (laughs)

Rachel: I've heard...don't they have magnet filament, as well?

Joanne: Yes. Yeah, they have—yep. It's a...

Rachel: Or, a magnetic? Mmhm.

Joanne: Magnetic! Mmhm. Yep. So, uh, you can print something magnetic and then, you know, have it stick to whatever. Um, there are other metal kind of, uh, ones as well.

Rachel: Mmhm.

Joanne: Um, the one that I think is really kind of awesome is a water-soluble filament. Um, and the main reason that you use water-soluble filament, um, is when you are printing something with supports. So, supports are meant to be removed.

Rachel: Mmhm.

Joanne: That's the whole point of them. So, like the little...the Groot statue that I was talking about where his hand is kind of sticking out?

Rachel: Mmhm.

Joanne: Just imagine, like, a kid with his hand sticking completely out. Um, there's nothing underneath that hand, so the 3D printer prints layer by layer by layer by layer.

Rachel: Mmhm.

Joanne: It can't just go across to where the hand is and print in midair.

Rachel: Right. Gravity does have some sway over this. (laughs)

Joanne: Correct! It just doesn't work. So, what you need to do then is have supports. Luckily, the 3D printing software that we have can automatically put in supports, so it's not like we really have to think about it too much, thank goodness.

Rachel: It's hard enough as it is.

Joanne: Yes. (laughs) Um, so it prints what's called 'supports', which is basically...just imagine kind of, like, a little pillar underneath that hand.

Rachel: And they're fairly thin so that they can break away pretty easily once you're done with them.

Joanne: Correct, yes. And that's when you need, like, a little scissor—or, like, a little clippers kind of tool, um, or something like that. A file in order to take those pieces off. Um, so, the water-soluble filament, though, is really cool because if you have, um...there are 3D printers that have dual, um, nozzles?

Rachel: Mmhm.

Joanne: So, that means two filaments. So, you could have, like...let's say you want to print a rose with a stem. The stem could be green, and then the rose could be red.

Rachel: Very cool.

Joanne: So, you can actually have multiple colors going and...you know, really at this point it's two colors. (laughs)

Rachel: Right.

Joanne: Rather than just one. (laughs)

Rachel: Two is better than one! (laughs)

Joanne: Exactly. (laughs) Um, but, if you do the water-soluble filament...so, like, for the Baby Groot statue, you could do the supports in this water-soluble filament, and then when it comes to the Baby Groot you could print in a normal PETG or PLA or whatever you want to print it in, and then once it's done you pop it off, and then you dip him in some water, and then it's gone. The support is completely gone.

Rachel: Oh, that is awesome.

Joanne: So, you don't have to do any cutting...

Rachel: Yeah!

Joanne: You don't have to worry about how it's going to look after it's removed and, you know, worry about sanding it or whatever or...or worry about breaking things. Um, I've had supports... (laughs) ...from people that, you know, they requested things, um, and...and when I went to take off the supports, I actually snapped the entire piece in half. (laughs)

Rachel: It is a hazard. (laughs)

Joanne: So...which is why—just so you know, listeners—when you request something, if it has supports, you are responsible for taking off those supports.

Rachel: For a good reason.

Joanne: Yes.

Rachel: We don't want to damage your goods!

Joanne and Rachel: (laugh)

Joanne: Correct. And if you damage it, then it's on you and it's not on... (laughs) ...not on us, and we have to reprint it or try it again, et cetera.

Rachel: Yes. And chances are, too, we're not as intimately familiar with the print you've sent us as you are. So, we're not sure what parts may be support and other parts are actually the print itself, in some cases. Um, so th...that's why we leave it to you.

Joanne: Yes, and that's actually...the one that I was talking about, um, was from our boss, the Library Director Jill. Um...

Rachel: Dun dun duuun!

Joanne: (laughs) She requested a, um, "Plants vs. Zombies," like, a little plant, uh, guy. Um, and so it was, you know, a little plant head on a little, tiny neck to...connected to a little, tiny leaf-body.

Rachel: (laughs)

Joanne: Um, and when I was cutting away the supports I almost couldn't tell where the body began...

Rachel: Right.

Joanne: ...and where the supports ended. So, I spent multiple, like...at least over an hour trying to cut away all of those supports, and then I snapped off the head, and then I accidentally snapped off one of the leaves!

Rachel: (laughs) Oh, no...

Joanne: So... (laughs)

Rachel: Well, and again, our printer only has a...a single extruder, so it's all one filament color which makes it even more difficult to tell.

Joanne: Correct.

Rachel: But the nice thing with the filaments is that they are customizable to the point where you can sand them if you need to, you can paint them whatever colors you need to. So...sky's the limit.

Joanne: Mhm. Yes, and there's a lot of different finishing options out there. So, if you, you know, go on Google and search for, you know, "finishing for PETG" or "PLA," you know, depending on what you want printed. Um, there's lots of different, you know, people's recommendations about different...there's chemicals that you can use to, like, dip it in to get it to, like, be really smooth rather than kind of the layered texture that it ends up being?

Rachel: Mhm.

Joanne: Um, so there's a lot of different, uh, kind of things that you can look into with that.

Rachel: And I think it's worth mentioning that you do have the option of designing something from scratch, or you can download files from an open-source website, which we'll talk about in a little bit. Uh, or in some cases you can purchase files from a professional designer. Uh, the...that might get a little out of your budget, depending, but it is an option.

Joanne: They...they are not cheap. (laughs)

Rachel: (laughs) Yes.

Joanne: I tried looking for one for, um...for one of our, um...one of the Musical Sing-along Nights I wanted a little printed koala, because I thought that would be so adorable as, like, a giveaway.

Rachel: Mhm.

Joanne: Um, 'cause I did giveaway baskets at the end, like raffle baskets at the end.

Rachel: Oh, Musical Sing-along Nights. We do miss you so.

Joanne: Oh, yeah we do. (laughs) So...but when I looked it up and I...and I didn't want a huge one. Like, maybe two inches high. Um, I think, like, two hundred-something dollars.

Rachel: Whaaat!

Joanne: Was one of the, you know, quotes that I got and whatever. Like...

Rachel: That is insanity.

Joanne: No, I'm good. So, I found a knock-off koala that I could live with.

Rachel and Joanne: (laugh)

Rachel: Non-name brand koala.

Joanne: (laughs) That was cute enough. I was like, okay, this is fine!

Rachel: (laughs)

Joanne: I don't need to spend two hundred dollars on this. That's...that's, like, my entire budget for a year.

Rachel: Right.

Joanne and Rachel: (laugh)

Rachel: Um, do keep in mind though, listeners, that we can only accept 'stl' or 'gcode' files. We don't have a lot of flexibility outside of those. Um, we have that information on our website and the request form, but if you forget we will contact you and remind you.

Joanne and Rachel: (laugh)

Rachel: Because we...there's simply no way around it if you send us a separate file type. It won't work with our software.

Joanne: Correct. Yes, yeah. So, we use Cura which is the software from...you know, it gets downloaded through the, you know, from the Lulzbot, um, people, and, uh, it only will take those two file types. The .stl and .gcode.

Rachel: Mhm.

Joanne: So, no matter, you know, if you send us, like, a .vsg which is really more for, um...because those are meant for more, like, die-cuts and, you know, like, the Cricut machines and things like that. So, we've had people actually try to send us those files in the past, and it's just not compatible. It just gives us that red, angry error message.

Rachel: (laughs)

Joanne: And that's it!

Rachel: The one that I have nightmares about.

Joanne: (laughs) So, it has to be .stl or .gcode. Sorry.

Rachel: If you are looking for some file types that will work, uh, we have a few open-source websites to recommend. Joanne, did you want to talk about these?

Joanne: Sure. Um, so the two that I used pretty much exclusively for the 3D Printing Library items, um...the big one is thingiverse.com. So, it's 'thing' 'i' 'verse' 'dot com'.

Rachel: I will add a link to the show notes.

Joanne: There we go. Um, I will say that the website is not the best website I've ever used in my life.

Rachel: It can be kind of slow.

Joanne: Yes. Yeah, it has ve...I...it has very commonly, uh...some loading errors.

Rachel and Joanne: (laugh)

Joanne: So, there are times where I go on there and it will just simply not work!

Rachel: (laughs)

Joanne: Um, and I don't know if it's just because so many people post their things to this website that it just can't handle the kind of traffic that it's getting?

Rachel: Sure.

Joanne: I...I don't...I don't know, honestly. But I'm not going to bash it because, like I said, I've gotten some awesome, awesome files off of there.

Rachel: Yes, it is an excellent resource.

Joanne: So, I would say for the 3D Printing Library about eighty-five percent of those items are from thingiverse.com. So, these open-source websites. So, you can download...so, you can actually...when you send us a request, you can just put a link in that...in the request form, um, and then we can go to that specific page, and then actually download the files from there.

Rachel: Yeah.

Joanne: So, um, the other website that I've used, uh, for the 3D Printing Library is called 3dupndown.com. So, it's '3D', 'up', the letter 'n', 'down' 'dot com'.

Rachel: I will also add that one to the show notes.

Joanne and Rachel: (laugh)

Joanne: Yes, um, so that one also is, like, a little bit hard to search for things on. Thingiverse is a little bit easier to actually type in a search term, you know, like 'koala' and be able to find it.

Rachel: The fated koala!

Joanne: (laughs) Yeah, I know, I can't...can't let it go.

Rachel and Joanne: (laugh)

Joanne: Um, whereas, uh, the 3dupndown is...is not as great of a, you know...in that regard.

Rachel: Sure.

Joanne: (clears throat) But there were a couple of things, um...I think I actually found some things on Thingiverse and it...the creator was like, "Oh, find my stuff on 3dupndown." So, I had to go to that website in order to actually download the files for that.

Rachel: Interesting.

Joanne: Um, which, you know, each...each their own. Sure, cool, you know, and then I could see they had a ton of other cool things that they had posted.

Rachel: Yeah.

Joanne: Awesome. But...but, so those two in particular are great open-source websites that you can use, um, people's files. There are other places. There are other websites. Um, there are some websites that have, like, a mixture where some of them will be free, and then some of them you have to pay for. So, it just kind of depends, you know, what your budget is and, you know, what you're looking for.

Rachel: So, while downloading files might be easy, the printing process can be somewhat difficult!

Joanne: (laughs)

Rachel: I thought it would be interesting for you, listeners, to hear about some of the most difficult prints we have handled to date at Oak Creek Public Library. (exhales sharply) You might not expect this, but I think that some of the toughest custom prints we receive are for mini-figures, also known as 'miniatures'. Think along the lines of an action figure, but smaller and a lot more detailed. People often paint these for use in tabletop games such as "Dungeons & Dragons" or "Warhammer." The issue doesn't necessarily have to do with the printing process

itself so much as cleanup. Because these miniatures often stand upright and hold teeny-tiny instruments like swords or shields, they tend to require a lot of supports, which we talked about earlier. Again, these print just fine but, when it comes time to break off the supports, things can get precarious.

Joanne: Which is why we don't do it.

Rachel: (laughs) Exactly.

Joanne: We leave it to you.

Rachel: They are extremely fragile, so if you just go in and try to snap off a cluster of supports, you might take an arm or a leg with it—literally. (laughs) Um, because of that risk, again, we usually recommend using tools like jewelry clippers, files, sandpaper, or even a Dremel to remove pieces a little bit at a time and fine-tune your creations.

Joanne: So, um, I think this is really forefront in Rachel's mind right now because we did get a print request for a miniature.

Rachel: (strained voice) Yes.

Joanne: And it was a lot of work on her part.

Rachel and Joanne: (laugh)

Joanne: There were issues with the file itself.

Rachel: Yeah.

Joanne: Um, and...and the problem is, with 3D printing, it's not as fine-tuned as it's going to be. I mean, in ten years it's gonna be nothing like what it is right now.

Rachel: Think of regular printers and how those have evolved over time, and how amazing they are nowadays compared to when they first came out in the—what—eighties? Nineties?

Joanne: I don't...[unintelligible]. Probably even earlier than that. (laughs)

Rachel: Yeah. They were slow, and they couldn't do a lot.

Joanne: Yes, and the, you know...only black and white.

Rachel: Mhm.

Joanne: And, you know...were dots, so you could literally see how dots made up the actual letters and everything else like that.

Rachel: Right? (laughs)

Joanne: Um, and so, you know, imagine now where we're at with printing. You know, multi-colors and all of this, you know, awesomeness. And so it's the same kind of concept with 3D

printers. And just like how we were talking about how right now we only have one nozzle, so you can only do one color. In time there's gonna be a variety of nozzles and you can do a variety of colors, and you can have a mixture of colors to 3D print.

Rachel: Right, mmhm.

Joanne: So that's definitely, you know, something I think, you know, once again...ten, fifteen years down the line how it's gonna evolve.

Rachel: Mmhm.

Joanne: Um, so yes. The...the, um, the miniatures are definitely trickier. (laughs)

Rachel: Yeah. They look good, um, if you go to an open...open-source website and find them, like on Thingiverse. They look good in the pictures. But keep in mind that you're looking at the file image as it would be on a digital display—not the actual print! (laughs) It's quite different!

Joanne: Yes, and...and that's actually a very good point, is that the Thingiverse files...you want to look at the file, like, look at the actual page, um, and see the pictures that they have. If they only have pictures of the file, like it looks very obviously...kind of softened edges, and it looks like it's in a 3D modeling software, then you might want to be wary of this.

Rachel: Mmhm.

Joanne: Because sometimes people just create these designs and throw them on there, and it's not necessarily really made for a 3D printer.

Rachel: Mmhm.

Joanne: Um, it might be made for more, like, a resin printer, you know, that can do kind of those finer details and look softer. Um, so sometimes if you can get things that are miniatures, and because of the layers—because everything is printed as a layer—it just doesn't look as good. I'm...I'm not gonna lie.

Rachel: Yeah.

Joanne: So, it's just...

Rachel: It's helpful, too, that—especially on sites like Thingiverse—sometimes users who make, or end up printing those files will add on their own images to that post so that you can see examples.

Joanne: Yes.

Rachel: But keep in mind, too, that everyone's printers are different, and they use different filaments, different infills...so, what you see in an example might not be what comes out.

Joanne: Mmhm, and it's also worth it to look at the comments. So, the Thingiverse has, uh, multiple pages and it, you know, has information about the file and, you know, the creator's comments that they made, you know...and they might say, like, "Oh, do such-and-such support, and do this and, you know, do that, and do infill however much," you know, et cetera. All this kind of detailed information.

Rachel: Mmhm.

Joanne: Um, but then there's another tab for comments, and that's other users. So, people that may have tried to print these items and then have had issues with them. So, if you go and look at the comments and you see, you know, there's thirteen comments and all of them are pretty much bashing whatever this person made...

Rachel and Joanne: (laugh)

Joanne: Then maybe you don't want to send that file to us. AKA please don't.

Rachel: (laughs)

Joanne: Because the odds of it failing are high, then.

Rachel: Yeah, but we'll still try.

Joanne: Correct.

Rachel: You know, in the end, you're the one paying for it. (laughs)

Joanne: Yes, and...and we're not miracle workers.

Rachel: Right.

Joanne: A lot of this is, you know, we just load it into the software. We...we do a little bit of, you know, finagling sometimes, um, with, like, what we were talking about the infill? Which is how, um—

Rachel: Dense?

Joanne: Yeah, dense is a good word—um, the inside is. So, imagine the inside is all, um...so, let's say you're printing a round circle. On the inside of it, there has to be something on the inside. Sometimes an object can be hollow, and that's fine as long as it's not, you know, in the middle of nowhere kind of hollow!

Rachel and Joanne: (laugh)

Joanne: Because then everything will kind of collapse in onto itself.

Rachel: Right.

Joanne: But, with a circle it's rounded, so the edges are gentle, so you don't have to worry about doing supports in this case.

Rachel: A gradual slope.

Joanne: Exactly. Um, yes, if it's, like, a fifty-five degree angle, then it can print without supports. But if it gets past fifty-five degrees, then you need supports because otherwise it's going to start to have issues and ultimately fail.

Rachel: Right.

Joanne: So, let's say I was doing a circle, um, that was filled on the inside. Typically, it's not completely solid. So, the...if it's a hundred percent infill, then it's completely solid, like a softball. You could throw that thing and you would hurt somebody real bad if you threw that.

Rachel: (laughs)

Joanne: It's solid!

Rachel: And it would take forever to print.

Joanne: That is true, because it's doing layer by layer by layer by layer, and it's a hundred percent solid.

Rachel: Mmhm, with no gaps in between. Yeah.

Joanne: Exactly. So, you can do all the way down to...you can technically down...do down to zero percent infill, but typically...normally our, um, normal is twenty percent infill.

Rachel: Mmhm.

Joanne: And so, what'll happen is it make...it prints, basically, these x's. Imagine just a bunch of x's that are all connected to each other. So, at twenty percent, the x's are bigger. So, there's not as many x's in your little circle.

Rachel: Mmhm.

Joanne: But, if you print it at forty percent, then the x's get smaller, and there's more of them. And then you print it at seventy percent, and then there's a ton more x's and they're even smaller. So, that's what infill is. So, everybody kind of has their own recommendations for infill, um, and based on their, um...so, if you, like...you go to Thingiverse and look at a file, it'll probably give you recommendations saying, like, "Oh, this should probably be printed at, like, twenty percent infill, or forty percent."

Rachel: Mmhm.

Joanne: Um, a good example of why you might want to do a higher infill? I printed a doorstep, and it was a little cat. (laughs)

Rachel: Yes. (laughs)

Joanne: And I printed it at our usual twenty percent infill. So, it printed the inside with those little x's but, you know, they were kind of bigger x's so that it wasn't taking up as much space and filling it all in.

Rachel: Or taking as much time to print.

Joanne: Correct. And so I printed that, and I used it for a door, and the door immediately closed shut.

Rachel: (laughs)

Joanne: Because it was so light!

Rachel: Mmhm.

Joanne: It couldn't hold the weight of the door, actually. Even with me wedging it—for all that I could wedge it—it still would just swing right back closed.

Rachel: (laughs) Mmhm.

Joanne: So, in the end I had to up that cat doorstep. I think I ended up doing seventy percent.

Rachel: Oh wow, yeah.

Joanne: So, it took quite a bit longer. I think it added maybe, like, two hours? Two, three hours to the print time?

Rachel: But it needed it, right?

Joanne: Yes, but that was kind of the magic number for us, um, that was able to actually hold a door! (laughs)

Rachel: Yeah.

Joanne: Because the weight of it was heavy enough. So, that's a good...um, example, I think, of the...of the infill and, you know, why the...those things are important.

Rachel: Absolutely.

Joanne: And these are all things that I never knew about before, at all. I never thought about it.

Rachel: Well, why would you? Yeah. (laughs)

Joanne: Correct! (laughs) Um, and these are just various things that I've learned, with now having had this 3D printer for two years, and trying to...it...it's just trial and error.

Rachel: It really is.

Joanne: So, there's various things that you never know about until it happens.

Rachel: Mmhm.

Joanne: And then you have to research, like, okay well, why is it stringing across weird? And why are there gaps in between the lines? And why is it doing this? And why is it doing that? And Rachel, why is it doing this again?! (laughs)

Rachel: I don't know, Joanne! (laughs)

Joanne: So, it's just a constant...it's a constant battle.

Rachel: (sighs) Yeah.

Joanne: Some things are definitely easier than others. That's for sure. Um, but there have definitely been, um, more difficult ones. And I feel like, um, I don't...I don't know if the more difficult ones are necessarily the miniatures. I...I think things with more supports, though, are definitely, you know...

Rachel: Tricky?

Joanne: Tricky, yes. So...but what scares me the most, I guess? (exhales nervously) So, please don't submit something like this.

Rachel: Not even as a joke, listeners!

Joanne: (laughs)

Rachel: Seriously.

Joanne: Yes, in all seriousness. Um...

Rachel: We will deny your request!

Joanne: (laughs) Well...we won't.

Rachel: We'll try it. But then we'll deny it!

Joanne: Yeah, exactly.

Rachel and Joanne: (laugh)

Joanne: Um, are the very large things.

Rachel: Mm, yeah.

Joanne: So, you know, I had, um...I've had one or two people actually ask me, like, "Oh, what's the size of the print bed? Like, what are the, you know, max dimensions?" And when they say that, I practically wanna weep!

Rachel and Joanne: (laugh)

Joanne: Because that means that they're thinking of some print that they want the max dimensions of! (laughs)

Rachel: Yes.

Joanne: And I...I just can't. I can't handle it.

Rachel: Well, and...and we have had prints that people have submitted that surpass the size of the print bed that we've had to say either, "Do you want this smaller?" or "Sorry, we can't do it." (laughs)

Joanne: Yes, and keep in mind that if it is the size of the print bed, then that means that you're paying for it. Like, no offense, but you're paying for it because that's gonna be over a hundred grams if you're an Oak Creek resident.

Rachel: No matter how little infill you use with it, just by way of being it's gonna...you're gonna end up paying.

Joanne: Yeah, and...and the print...one of the print requests that we're working on currently...it is a total of thirty pieces. Which, okay, fine. You're, you know, testing our, you know, knowledge a little bit, here. (laughs)

Rachel: And our mettle!

Joanne and Rachel: (laughs)

Joanne: Yes. But once we've had a...got some of the errors and kinks out of the way, now we're really rolling around, um, and we have, I think, three pieces left right now.

Rachel: Mmhm.

Joanne: Um, and it's been less than two weeks. You know, so, we always try to get everything to you guys...I mean, sometimes we can do it the next day. I'm not gonna promise that.

Rachel: Right.

Joanne: Um, we did that within two weeks...is usually, you know, when we'll get it to you by. And if it's going to take longer than that we would let you know, um, when you submit the request.

Rachel: Mmhm.

Joanne: Um, but having to do...so, this print that, uh, this patron requested with these thirty pieces, well, that ended up being forty-two dollars, I think, total. Which is the largest print request—single print request that we have ever gotten. (laughs)

Rachel: We're reaching all these milestones lately!

Joanne: Yes! That was a big, you know...these...the...July and August have been big months for us.

Rachel and Joanne: (laugh)

Joanne: So...so that's, um, been, you know, kind of...yeah, scary but interesting.

Rachel: (laughs) And there's been a lot of, um, playing around with the files, because our filaments were giving us issues, and the humidity has an impact on filaments, as well. And even though we store them with...what is that, silicate packets?

Joanne: Yes, yeah.

Rachel: —to keep the bubbles out of the filament, they still get exposed to air, and apparently now they expire, as well. Which is great!

Joanne: (laughs) We think! We're not...we're not a hundred percent sure.

Rachel: Mmm, don't know what else it would be, but... (laughs)

Joanne: Well, my guess is...before we knew any better back in May of 2019, we were purchasing these filaments.

Rachel: We were so young!

Joanne: (laughs) Yeah.

Rachel: And not bitter!

Joanne: Yes. Um, we were purchasing these filaments and not storing them technically correctly. Now we have, like, individual, like, you know, little...

Rachel: Air-tight containers.

Joanne: Yes! Um, and we use the silicate gel, um...little packets in there to try to keep it, you know, completely dry.

Rachel: Moisture free.

Joanne: Yes, exactly. But I think one or two rolls of filament are still leftover from that May 2019, and the one that we're talking about, I think, is a leftover.

Rachel: Yes.

Joanne: So, it probably, you know, didn't do it any favors by being stored incorrectly, and then...and then trying to be able to be like, "Oh, just kidding! And now we're going to store you correctly."

Rachel and Joanne: (laugh)

Joanne: So...

Rachel: Whoops! Hope it's not too late.

Joanne: Yeah, I think it was too late, but... (laughs)

Rachel: So, that has been hellish to deal with. Um, but...

Joanne: Yes, but luckily at least with that one, that...so, every roll of filament is one kilogram, um, and it is definitely down...

Rachel: Mmhm.

Joanne: ...very, very much, so, you know, it's...

Rachel: Yeah. We get to replace it soon—yay!

Joanne: Correct. Yeah, so it's not like it's a complete waste of, you know...and one filament reel costs about thirty-ish dollars, give or take. Sometimes you can find it for a little bit cheaper, sometimes a little bit more expensive. Um, so at least we're not, you know, wasting thirty dollars, you know, on one who reel that we were not able to use.

Rachel: Right, mmhm.

Joanne: So, we used about ninety-five percent of it.

Rachel: Yeah.

Joanne: So...

Rachel: That is very true.

Joanne: So, that's been good. Um, I...I wanna point out, um, something before I forget. (laughs) Um, that one of the more interesting things that I've printed recently, uh, happened because of COVID, actually.

Rachel: Oh.

Joanne: So, I...I've never felt more of a sense of civic pride than when I was 3D printing face shield parts.

Rachel: That's right, yeah.

Joanne: And, um, ear protector pieces. So, on our website, if you look at the bottom of the page you'll see all the different things that you can request from the 3D printing library, and above that there's a little section for COVID items. Um, so, we have the ear protector which is, you know, for your mask so that it's not going completely around your ears.

Rachel: Mmhm.

Joanne: You know, all the nurses and everything were getting rubbed raw because of their masks being around their ears for, you know, days.

Rachel: Constantly, yes.

Joanne: Exactly. Um, so the ear protector kind of extends it a little bit farther out so that you're not putting the actual bands and pressure on your ears. Um, and then the face shield part is... Imagine, like, a little headband, sort of, except instead of going on the...uh, on the top of your head it goes around your forehead, basically, and back.

Rachel: Mmhm, like a visor.

Joanne: Like a visor. Thank you, Rachel.

Rachel and Joanne: (laugh)

Rachel: I studied English for a reason! (laughs)

Joanne: There you go. Um, so, what...and then all you need to do is, um, have...we actually used, uh, the binder protectors. So, those clear plastic sheets? You know, like, eight and a half by eleven clear plastic sheets, and then you hole-punch them, and then you can put it on this headband piece—the visor piece. (laughs) Um, to create a face shield. So, yeah, during the crazy times—the crazier times with COVID, um, in, like, July last year and, you know, around that time.

Rachel: Mmhm.

Joanne: When we were closed for the big bulk of time, everybody was working from home for the most part...that was, you know, working for the library, uh, when they could for the most part. And I was here! (laughs)

Rachel: That's right! Runnin' the 3D printer day and night! (laughs)

Joanne: Correct, yes. So, I was printing the face shields. I did probably, I think, four in a day, maybe? Those...the visor pieces.

Rachel: Mmhm.

Joanne: Um, and then they went to, like, local, um, like, nursing facilities and to the EMTs and firefighters and even the police, et cetera. Yes, so, like I said, I...I felt the most civic pride of my entire life.

Rachel: You should! (laughs)

Joanne: Even though I did not create the design.

Rachel: (laughs)

Joanne: I did not come up with the idea. (laughs) I literally just went to the printer, switched it on, and did the buttons to select it to print three times...four times a day.

Rachel: I was gonna say, you did it quite a few times, though. Quite a few!

Joanne: (laughs) Yeah, I think...I can't remember what the statistics are, um, but I probably printed—no lie—like two hundred face shields, I think.

Rachel: Wow. Yeah.

Joanne: So...and the ear protectors...not as many. Maybe a hundred? That was something that, you know, wasn't quite as needed as...as the face shields were, so...

Rachel: Mmhm.

Joanne: But that was a really kind of cool, um...

Rachel: Application.

Joanne: Correct.

Rachel: Yeah.

Joanne: Was, you know, for this...for the 3D printer, was to be able to print these, you know...in a very big time of need.

Rachel: Yes. We do like seeing the toys and the décor and stuff, but if you can find practical uses for the 3D printer, that's even better.

Joanne: Yes, and...and even, like, toys and stuff like that, but that are custom made.

Rachel: Mmhm!

Joanne: So, you know, things that...that's what I find the most fascinating now, are things that people actually created themselves. Um, so, like the custom print from the guy who was doing all of these modifications from his...for his car. He is going into modeling software—like CAD, actual modeling software—um, like, SketchUp or, you know, whatever source that he uses, and he's creating these files, and then sending them to us in order to print so that he can modify and improve his car, you know, et cetera.

Rachel: Yeah.

Joanne: So, I think that that's, you know, just a really, really cool feature of this, and really the fundamental, you know, basis of the 3D printer is being able to print something that you wouldn't have, you know, been able to get otherwise.

Rachel: That's so awesome, yes. And I think that is where we will come to the end of the episode. Please remember to visit the show notes section to find more information on everything we just talked about. You will find a link to the 3D Printer page on our website, too,

and also some of those open-source websites that Joanne mentioned. Subscribe and rate the podcast if you like what you hear. As usual, feel free to reach us through the Oak Creek Public Library website or Facebook page by sending a message to @OakCreekLibrary. Until next time, happy reading.

Joanne: Toodles!

(Brief outro music)