



BREAK: Art Tools Project

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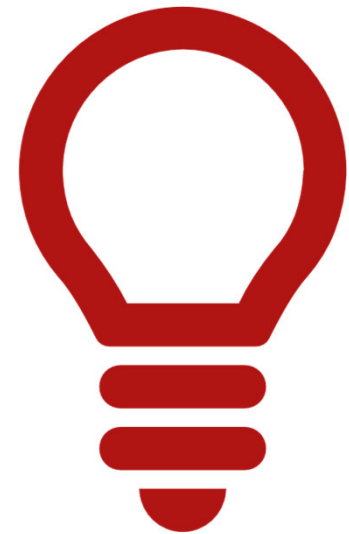
ME 643

05/14/2021



PROJECT DESCRIPTION

- ▶ Work with Johnson County Developmental Supports (JCDS)
- ▶ Design, engineer, build and test an assistive device for an individual that is visually impaired to increase independence when painting
- ▶ Mechanical yet simple device
- ▶ Offer more independence for user



What is JCDS?

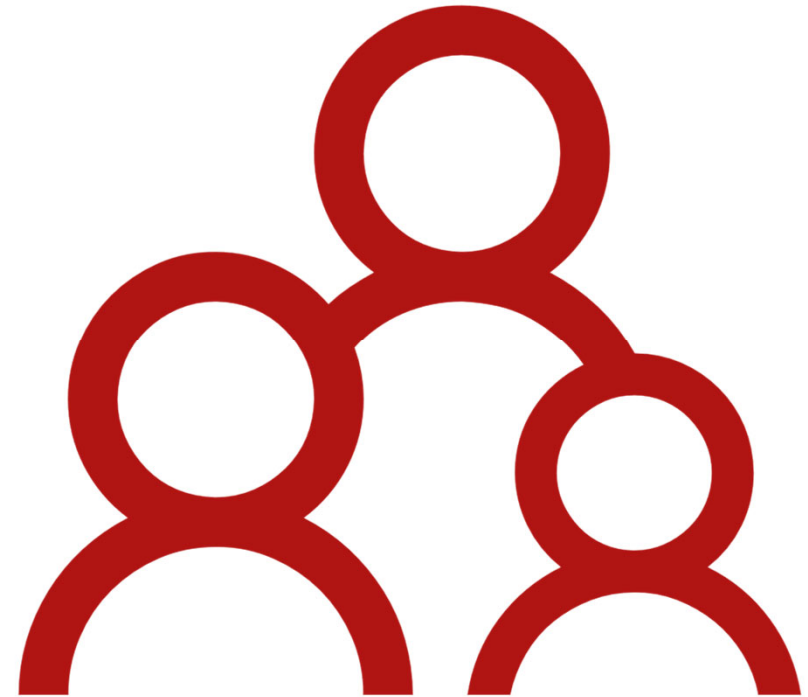
- ▶ Johnson County Developmental Supports
- ▶ Established in 1972
- ▶ Facilitates career and personal development
- ▶ Serves over 500 people daily



Meet Ryan

For team and sponsor use only

- ▶ Paints Occasionally
- ▶ Visually Impaired
- ▶ Chooses between 2 – 3 colors
- ▶ Uses a variety of brushes and rollers
- ▶ Typical session lasts 20-30 minutes



Needs and Wants

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Needs to paint, create art



Choose paint color



Where to paint



When to paint



Adaptable for other uses

Early Research & Concepts

▶ What is already out there?

- ▶ Textured handles to differentiate colors

▶ Ideas

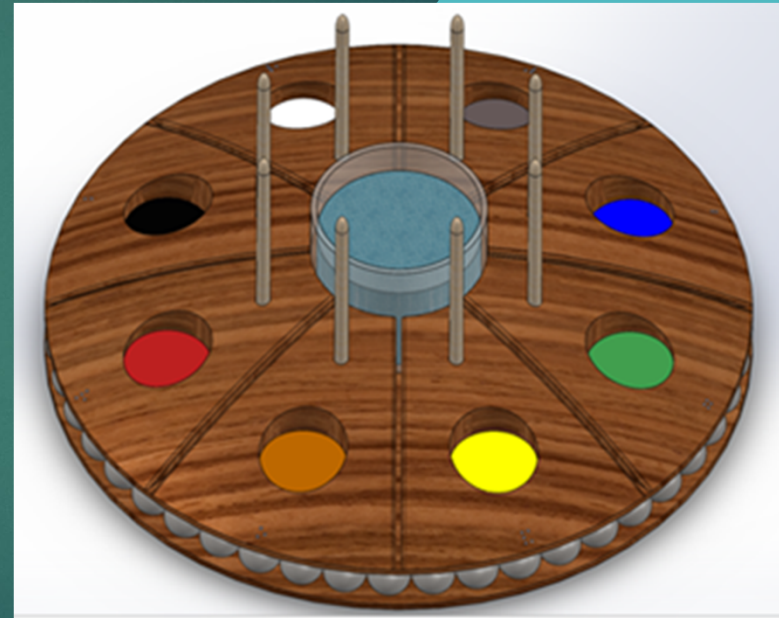
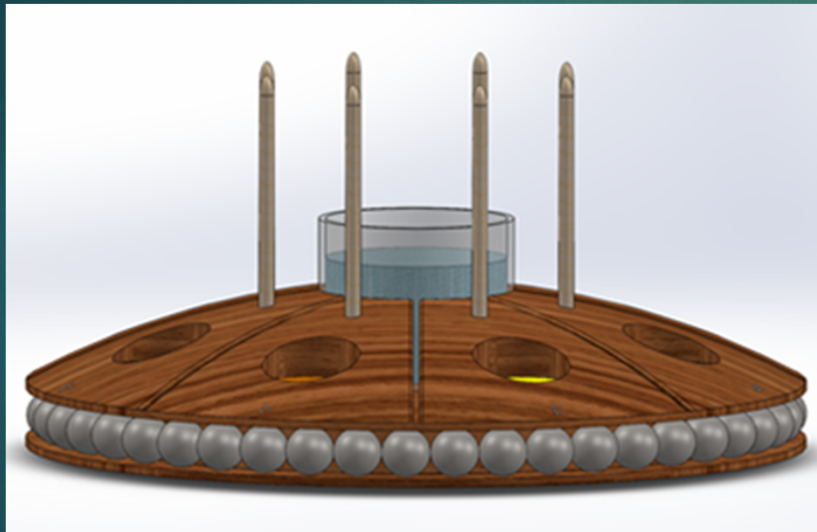
- ▶ Incorporating sounds
- ▶ Voice prompts
- ▶ Textured handles that can be used on other utensils or tools



Coleman, Mari and Elizabeth Cramer. "Creating Meaningful Art Experiences with Assistive Technology for Students with Physical, Visual, Severe, and Multiple Disabilities." 16 Nov. 2015. PDF.

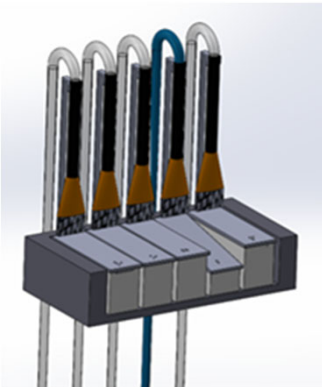
Early Concepts

➤ The Spinning Paint Wheel



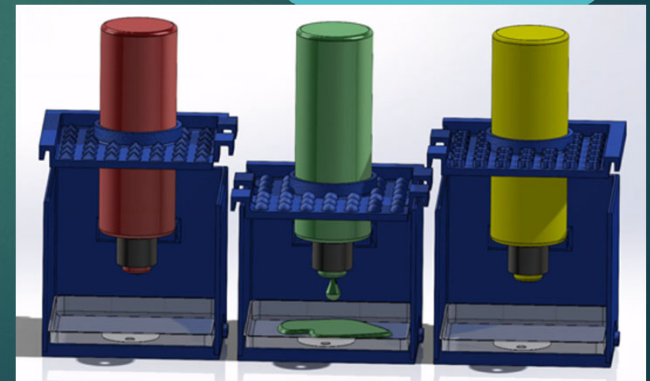
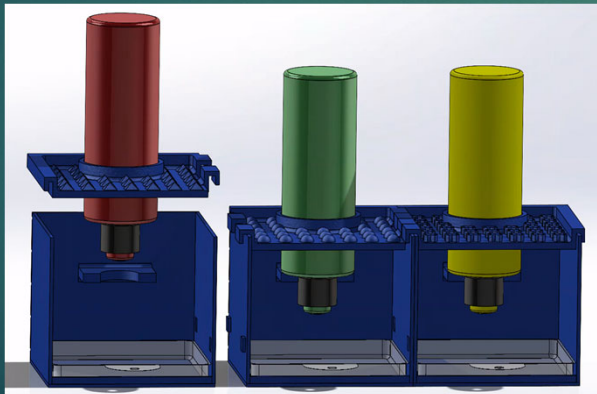
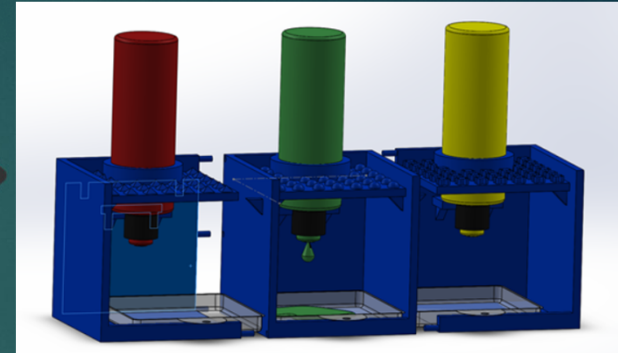
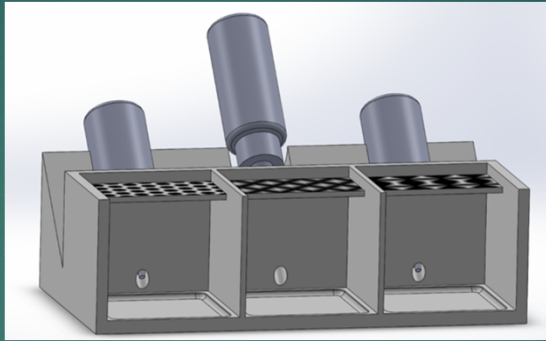
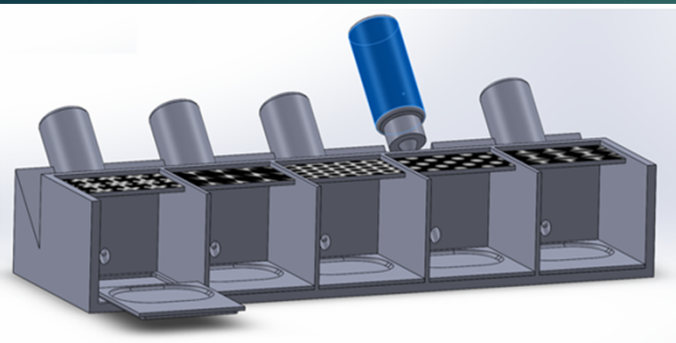
Early Concepts

- Pressurized Paint Brushes



Roadmap to Final Idea

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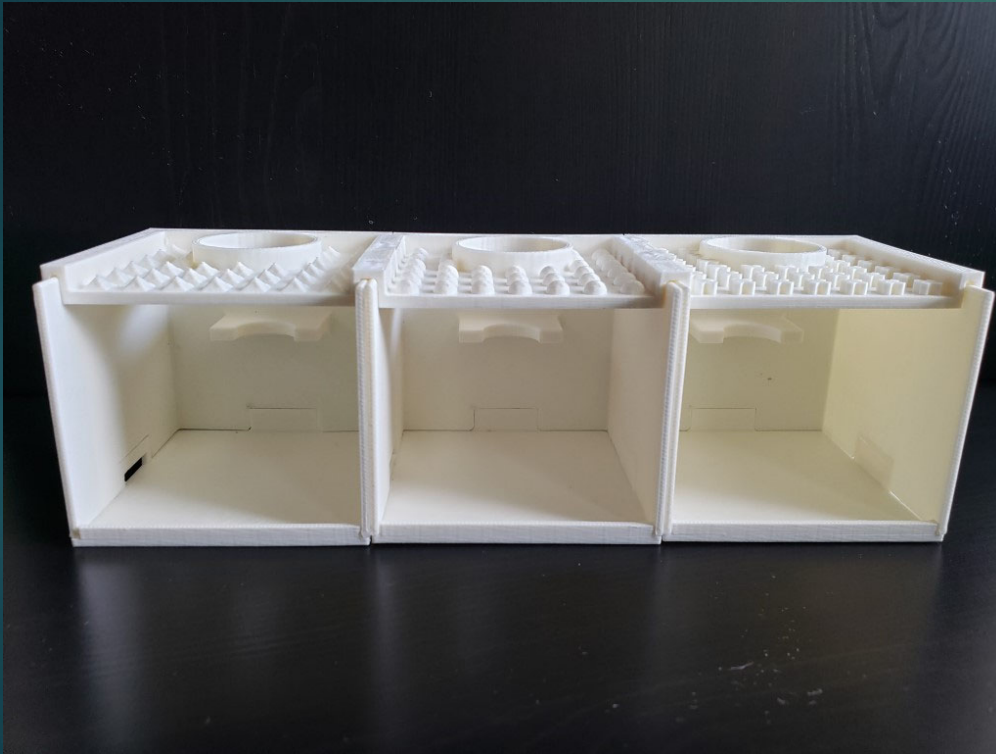
1st Prototype

- ▶ Constructed from cardboard
- ▶ Inexpensive design test



2nd Prototype

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- ▶ 3D print of Paint Caddy design
- ▶ Mojo Printer using ABS plastic
- ▶ Reduced 60% scale of full model

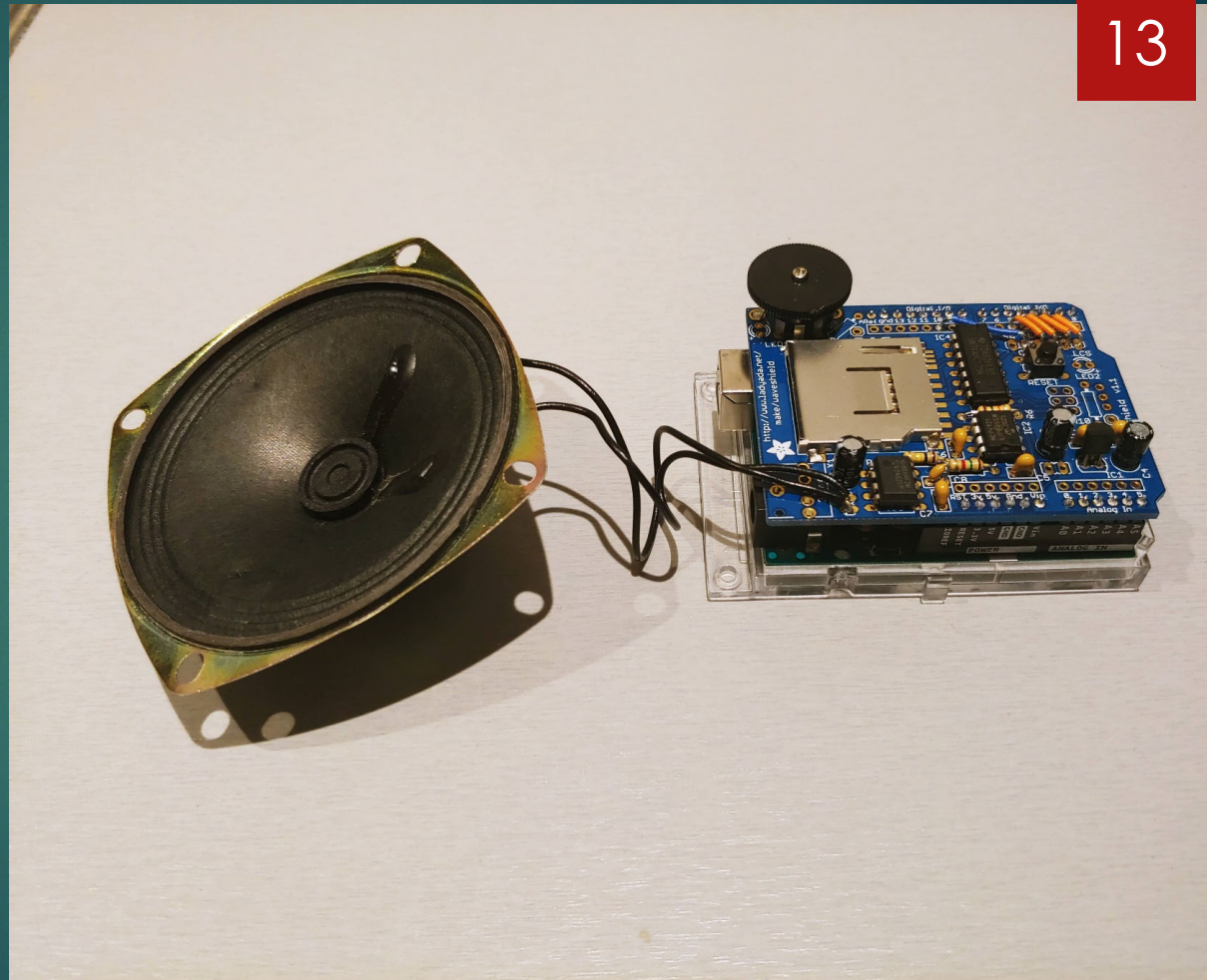
The Paint Caddy



- ▶ Walls and base made from Acrylic sheet
- ▶ Multiple textures for easy distinction of colors
- ▶ Textured tops printed on Objet30 Polyjet Printer
- ▶ Print material - VeroClear

Sound Prompt Kit

- ▶ Write and upload code to Arduino Uno
- ▶ Powered by 9V Battery
- ▶ Delays and issues ensued
- ▶ Decided that a backup was needed



Final MP3 Player and Speaker



- ▶ Decided on a small SanDisk MP3 Player with a small speaker in the AUX input
- ▶ Pro: Use Same SD Card
- ▶ Pro: Rechargeable
- ▶ Con: Two devices to charge rather than one battery

Bill of Materials

Item	Part Number	Description	Cost/Unit	Units	Shipping	Total Cost	Vendor	Notes
MP3 Player	SDMX26-008 G-G46K	SanDisk 8GB Clip Jam MP3 Player, Black - microSD card slot and FM Radio -	29.99	1		29.99	amazon.com	
Speaker	175	INTSUN Mini Portable Speaker	16.96	1		16.96	amazon.com	
USB Drive	SDCZ60-032 G-B35	SanDisk 32GB Cruzer Glide USB 2.0 Flash Drive	7.19	1		7.19	amazon.com	
Multi-Purpose Squeeze Bottle Lid	3592801905	FIFO Innovations Multi-Purpose Squeeze Bottle Lids	9.99	1		9.99	webrestaurantstore.com	
Acrylic Sheet	5- ACR24X18X	0.93" x 18" x 24" Clear Acrylic Sheet	14.14	1		14.14	Home Depot	
Gorilla Glue	52427453754	3.75 oz Clear Gorilla Glue	7.97	1		7.97	Home Depot	
Acrylic Paint	766218O4867 7	8oz Apple Tart Paint	2.99	1		2.99	Michael's	
Acrylic Paint	766218O4861 5	8oz Bright Red Paint	2.99	1		2.99	Michael's	
Acrylic Paint	766218O4874 5	8oz Dark Blue Paint	2.99	1		2.99	Michael's	
Paint Tray	1050000000	Clear Square Paint Tray	1.99	3		5.97	Hobby Lobby	
Plastic Squeeze Bottle Lids	1056000020	Plastic Squeeze Bottle Lids	3.49	1		3.49	Hobby Lobby	
3D Printed Textured Tops		VeroClear Plastic Textured Tops		3			Objet30 PolyJet 3D Printer	
					Total	104.67		

Installation



Thank You's

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- ▶ Professor DeAgostino
- ▶ Dr. Kenneth Fischer

- ▶ Sharon Holley
- ▶ Tina Stephan
- ▶ Marshall Bass
- ▶ Sarah Dean

