Fixer-Uppers

PBS Accessibility in Kids Game Design Intern Project 2019

Introduction

A puzzle game where the player helps characters in need by selecting an item in the area which can be used in an unconventional way to solve their problem.

Puzzles will feature multiple solutions to reinforce the message that there is often more than one solution to problems.

Target audience is kids aged 5 - 6 (kindergarteners and first graders).

Game might include a sandbox/exploratory mode in which kids can learn about properties of items.

Pitch Presentation:
https://docs.google.com/presentation/d/1t7ZEArWrpVr7BXr05LjBTmZa8E71CWDHcP2yqddSQZI/edit?usp=sharing

July 10th Progress Update Presentation:
https://docs.google.com/presentation/d/10_6C8N-ZdQ1Ahg9jqivfi355A8vlgg-Rp-fYmMrglDM/edit?usp=sharing

Table of Contents

Goals

Communicate Accessibility-related Themes / Messages:
- It's okay to ask for help
- There's no one right answer; multiple ways to solve the same problem (Can use one item for more than just the qualities we normally associate with the item [overcoming [Functional Fixedness](#)])
- Different people need different tools to succeed

Teach:
- RTL Engineering Concepts (See [RTL Section](#))
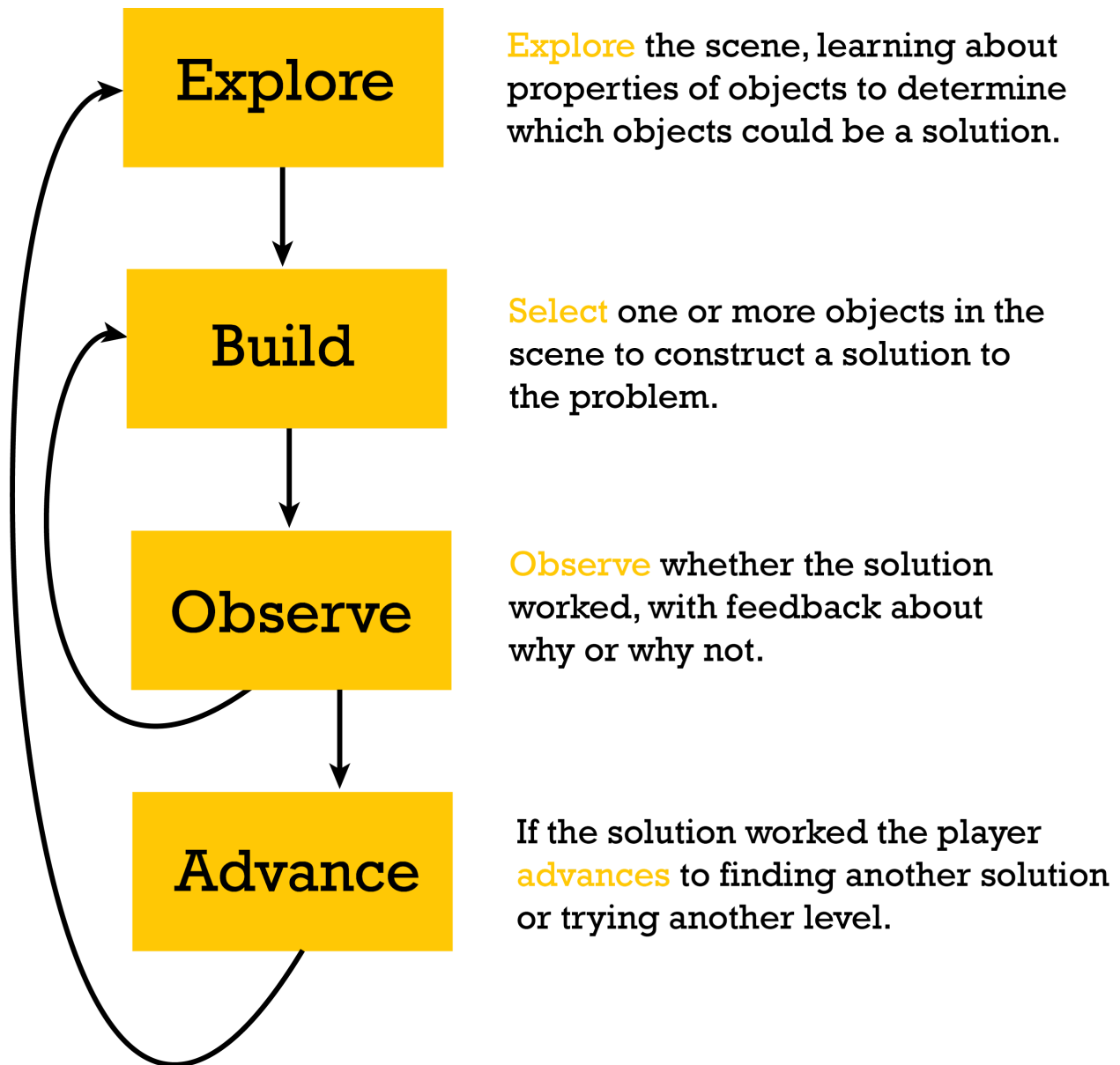- SEL Concepts (See [SEL Section](#))

Mechanics & Gameplay

Design Pillars:
- Puzzles that have **multiple solutions**
- Combining items to invent innovative solutions
- Ability to ask others for help in lieu of completing activity yourself (activities small motions like cutting sheet by dragging finger across screen)
- Offering new perspectives on common objects by breaking them down in terms of physical qualities
- Tutorials aren't text-heavy, and instead use icons and characters demonstrating actions to teach player. Context is provided to sample goal (e.g. characters in costume in background during costume puzzle).
- Options made clear to child
- Hints to how the object could be used (e.g. "This cloth is so thin. Maybe it could be cut?")

Controls
- Single tap to select item, tap again to deselect
- Checkmark button to submit answer (if multiple items selected, they might be combined)
- Hint button OR can click adult / older character for help after certain time (need to make sure hint not used as crutch)

Gameplay Loop

Explore

Explore the scene, learning about properties of objects to determine which objects could be a solution.

Build

Select one or more objects in the scene to construct a solution to the problem.

Observe

Observe whether the solution worked, with feedback about why or why not.

Advance

If the solution worked the player advances to finding another solution or trying another level.

Win Conditions
- Choose one of multiple sets of items that solves characters' problem.

Mechanics/Feature Wishlist / Other Possibilities
- Some way to make this local multiplayer?
- Focus on player interpreting feedback from the people you help (adjust design based on how they feel)

- Creation mode (think Little Alchemy but for costuming) (so total two modes "help your friends!"[main puzzle game] & "free play") → is there an issue in which kids are going to be upset because a witch hat is not what they expected when mixing black paint and traffic cone
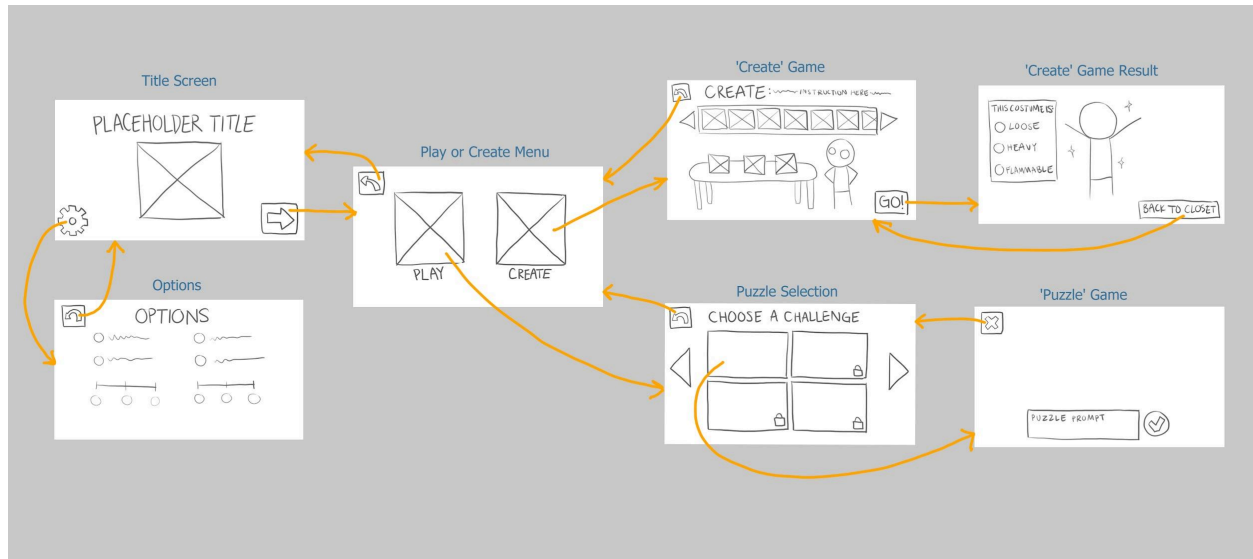
Puzzle Brainstorm
- Sheet + Scissors = Ghost Costume
- Clothesline + Paper Plate + Scissors + Marker = Mask
- Traffic Cone + Black Paint = Witch Hat
- Pillow case = candy sack
- Make sound using windchimes or pots/pans to scare something away

Halloween Tasks:
- Clean up leaves (single item solution: electric fan or broom from friend's witch costume)
- Costume (ghost[2 items], cat mask [2 or 3 items])
- Something to carry candy in
- Decorate pumpkin
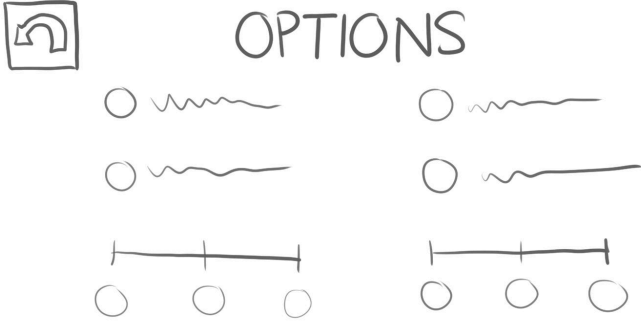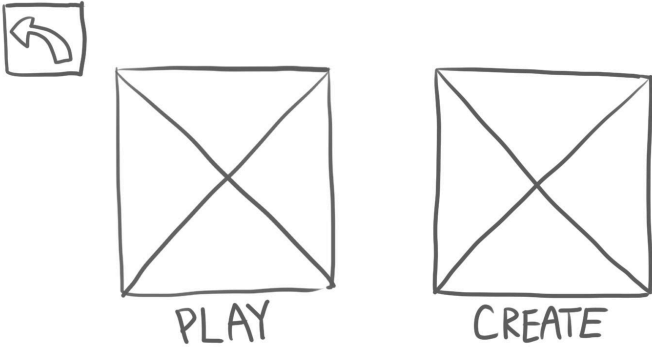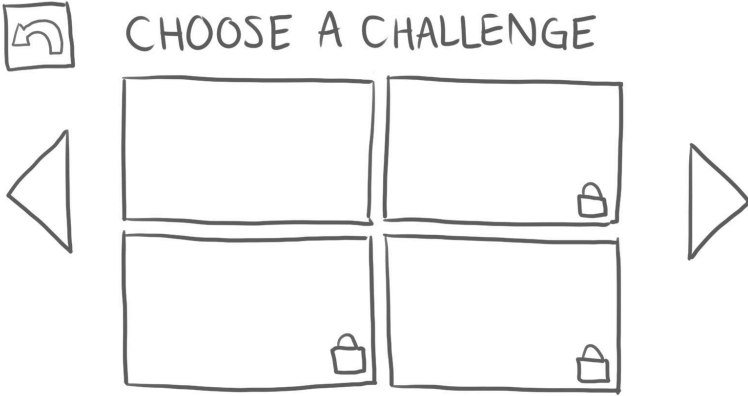- Dry something that fell in puddle (fan or clothesline?)

Gameplay & UI

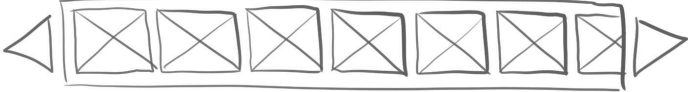Wireframe Flow (Depicts Create Mode, a stretch goal in this 9-week project)
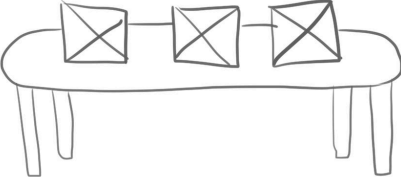
Game Flow & UI

Screen	Visual	Notes
Title Screen		

Options	OPTIONS	
Intro / Play or Create Menu	PLAY CREATE	Character will briefly introduce the game and two play modes. Play launches the Puzzle Selection Screen, and Create starts the free play / experimental mode.
Puzzle Selection	CHOOSE A CHALLENGE	Levels are unlocked as previous levels are completed.

Puzzle		Option to exit puzzle and return to puzzle selection will always be present in puzzle screen, with "Are you sure you want to quit this puzzle?"
"Create" Game		
"Create" Game Result Screen		Qualities of the costume will be determined based on item and shown to teach about materials / physical qualities of objects.

Narrative

Overarching Story / Setting
- Help three siblings get ready for Halloween
- Fall Theme
- Home / Backyard Setting → items in one room can be used for multiple puzzles

Puzzles (green = correct answer, red = wrong)
- 1. Something to carry candy in (pillow case, oven mitt, bucket, plate)
    - Map Section 1
    - Main Character Dot
- 2. Dry something that fell in puddle (Dee's cape) (electric fan, paper plate, sheet)
    - Map Section 2
    - Main Character Dee
- 3. Clean up leaves (electric fan, broom from Dot's witch costume)
    - Map Section 3
    - Main Character Dee
- 4. Racoons eating candy - (sound w/ bucket to scare, blow away with fan, dump water using bucket + puddle)
    - Map Section 2
    - Main Character Dot
- 5. Costume (ghost [2 items: sheet + scissors], cat mask [plate + scissors])
    - Map Section 2
    - Main Character Del
- 6. Check reflection of self (puddle, window on house)
    - Map Section 3
    - Main Character Del

Level 1: Need something to carry candy (show character with example pumpkin bag)
Possible Solutions: Pillow Case from pillow on chair, Oven Mitt from table, Bucket

Leftmost third of backyard: chair w/ pillow, table w/ oven mitt + plate, bucket
Center third: puddle, bucket, plate, clothesline, electric fan
Rightmost third: puddle, house, broom, electric fan, leaves in front of house

Inventory / Key Items that can be submitted as part of an answer:
- Pillow w/ pillowcase

- Oven mitt
- Paper plate
- Bucket
- Clothesline
- Scissors
- Electric fan
- Puddle
- Broom (part of Dee's witch costume)
- House w/ reflective windows

Other ideas: Decorate house (use clothesline to hang something??, table decorations??), make music

If use kitchen setting, there's potential for cold from fridge + magnetic properties of magnets utensils??

Lighting to see? Straw to blow air

Some tool to reach?

Costume level result screen checklist

Plate

Fan

Cloth

Scissors

Puddle

Cloth + Scissors

Puddle + Scissors

Fan + Scissors

Plate + Scissors

Puddle + Cloth

Puddle + Fan

Puddle + Plate

Cloth + Fan

Cloth + Plate

Plate + Fan

Map of Backyard:

Section 2

Section 1

Section 3

| table |
| oven mitt | paper plate |

| clothesline |

| side of house |

| fan |

| raccoon |

| bucket |

| broom |

| scissors |

| chair with pillow |

| puddle |

| leaves |

(camera here)

= can be selected   = cannot be selected
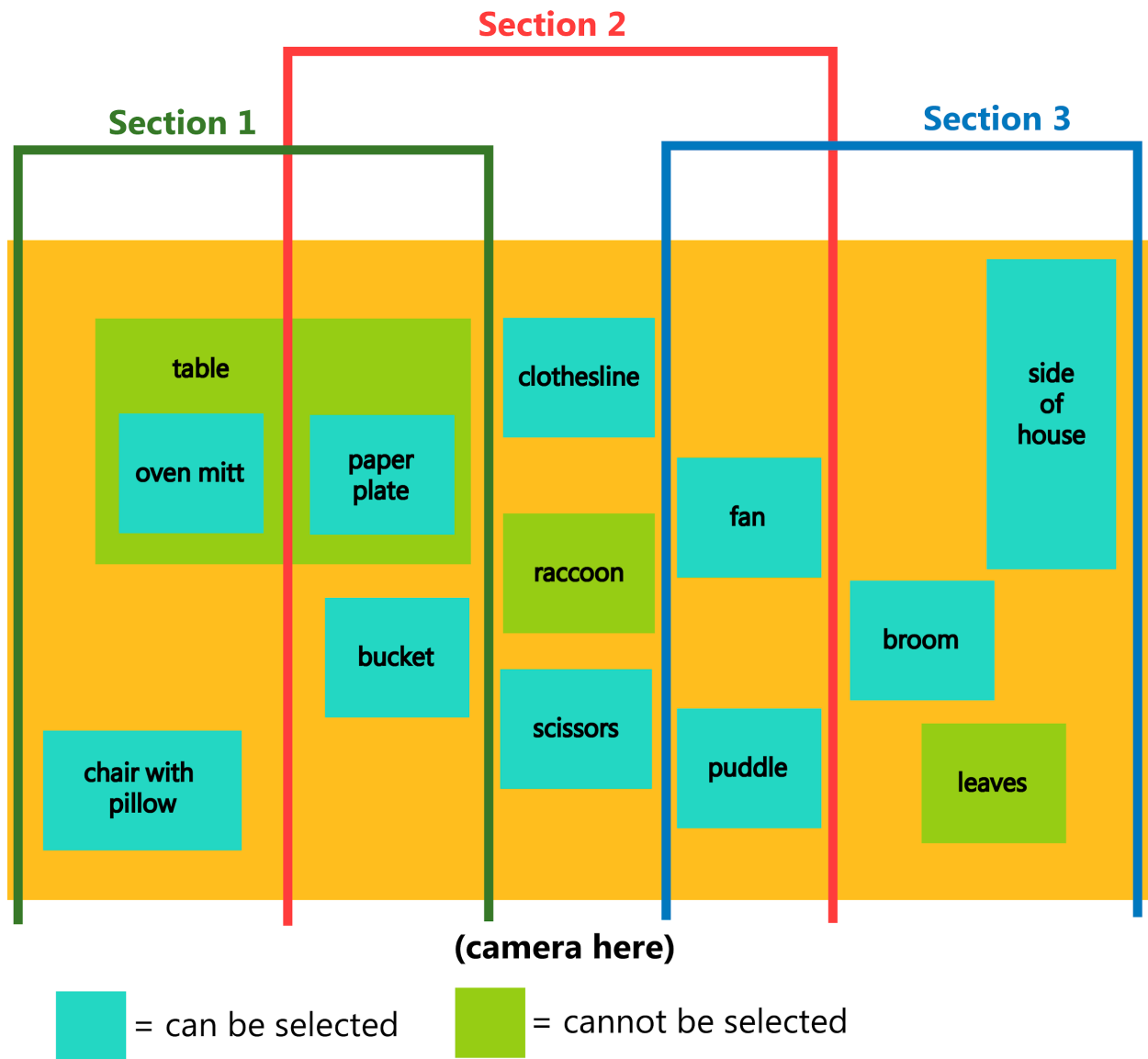
RTL Engineering

Ready to Learn Initiative: This game will focus on the Engineering Curriculum, addressing the following aspects of the curriculum

- Designing Solutions
    - Combining items to create something new
    - "Thinking outside the box"
    - Maybe taking items apart (e.g. using feathers from inside pillow)
- Defining Problems
    - Ask questions about observable phenomena (objects, materials)
        - Click on objects to see a description like "Tape: A **sticky** material used to **connect** two items." → bold words indicate possible uses
- Obtaining & Evaluating Information
    - Children introduced to objects for the first time must use what they've just learned about the object to solve the problem
- Asking Questions
    - What's wrong? Inferences from situation / emotion of characters
- Sort and categorize observable phenomena based on attributes (weight, function, ability, texture, odor, sound)
- Cause & Effect
- Structure & Function

SEL

How this game might employ the RTL Social and Emotional Learning Framework
- Social awareness
  - Adopting another perspective (detecting qualities of individuals and groups)
  - Addressing interpersonal conflict
    - potentially, if puzzles solve interpersonal problems
  - Using context of "Person is sad, broken toy on ground" → sad because toy broke → I should offer to help!
- Responsible decision-making(?) (e.g. if kid tries to combine scissors & curtain: "Cutting the curtains is dangerous!")
- Resilience: encourage by reminding of previous successes when they face new, challenging task → make visible progress towards ultimate goal
  - e.g. if scenario is prepping for Halloween party, if player finishes task of decorating, future puzzles should show decorated room)
  - Transition between puzzles could be comic strip showing how far along player is
- Self management
  - Creative thinking,
  - Achieving goals
  - Ask questions of adults to address conflict
- Personal decision making
  - Reflect on the outcome of solutions → allow kids to evaluate if their solution was effective (???)
    - Could tie into reading emotions of others if game didn't give "great!" or "hmm... that didn't seem to work" feedback and instead asked player "Did that work?" which they are supposed to answer given the expression of the character they helped. If the character is still sad and player says "yes! It worked!" maybe a "But it looks like Character A is still upset... maybe try something else?"

Accessibility

Features that will help game be accessible to a wider audience
- Options Menu
    - Tap/click or arrow keys to select item
- Tap items → item name read aloud *OR* Objects have sounds when clicked that communicate texture/weight (UDL - provide multiple ways of learning [audio, visual, etc.])
- Single menu → game (avoid navigating through multiple levels of menus)
- In-game help / hint system (possibly framed as character you can ask after certain amount of time so hints not relied on as a crutch to play game and kids try for themselves first)
- If long narrative, provide summaries of progress
- Convey instructions with images
- Tutorial (with option to replay tutorial)
- Provide cultural context/descriptions
    - e.g. "Electric Fan- blows cold air to cool off things and people" for kids who don't have exposure to devices to understand what items are/do
- Select colors w/ high contrast (can use ColorOracle)
- Check Lexile of text to ensure vocab comprehensible
- introduce new vocab with CONTEXT (visual, auditory, descriptive, etc.)
- Variations in sound (e.g. more than one type of bird call → can mean a lot to people who rely on hearing)
- SVG color filters for color blindness (?)

UDL

- Multiple ways of Understanding (flexibility in ways information is presented through different senses, language options, and models)
    - Pictorial, written, audio info about items
- Multiple ways of Interacting (flexibility in ways kids take physical action and share what they learn)
    - Get help from other characters instead of completing actions like cutting yourself
- Multiple ways of engaging (flexibility in ways kids demonstrate independence and persistence)
    - Multiple solutions to puzzles
- provide reminder of goal of activity throughout level

- Can ask someone to help you with part of task, or complete it by yourself → help convey message that it's okay to ask for help (make sure to frame as teamwork so that the message isn't "other people will do everything for you if you ask")
- Provide information about how items might be used through sound (indicate physical qualities of object through sound, both when changing object [drawing, cutting] and when simply tapping object)
- Provide emotional feedback of characters through sounds AND visuals

Programming

Ended up tracking this in a separate spreadsheet.

Sound

Green = implemented

Each key item plays sound when clicked:
- Pillow w/ pillowcase
- Oven mitt (iceSkaterClothMove)
- Paper plate (Parched,paper,movement,linen,shake,crimp,wobble.wav)
- Bucket
- Cloth (rollover sound)
- Scissors (medflick.wav)
- Electric fan (whooshing sound)
- Puddle (aquatics FX)
- Broom (part of Dee's witch costume) (swoosh001.mp3)
- House w/ reflective windows (ping2)

Script

Help Del, Dot and Dee get ready for Halloween!

Art

Majority of the assets provided by PBS Kids. I made a couple of additional assets / edited existing assets in Adobe Illustrator.