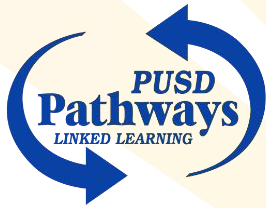


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# STEAM

## *Making Connections*





**Rob Atterbury**  
Director of  
District Support



**Cynthia Brown**  
Director of  
Student Pathways



**Erik Santos**  
Pathways  
Learning Director



**Germaine Kaufman**  
Vice President of  
Development



# *Opening Activity*



**STEAM** *Making Connections*



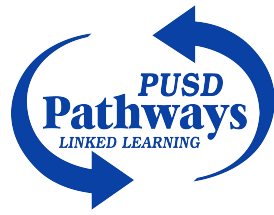


# Brushtronic Bug Challenge



**GARNER HOLT**  
**EDUCATION**  
THROUGH  
**IMAGINATION**

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## The Challenge:

Construct your Brushtronic Bug to move in random or circular patterns on a flat surface to knock down all of your pegs in less than 30 seconds.

## Bonus Challenge:

Construct your Brushtronic Bug to move as quickly as possible in a straight line for a distance of 24 inches.

6-12  
GRADES



## **BRUSHTRONIC BUG** *Engineering Design Challenge*

Get a glimpse into the career of a Garner Holt Productions animatronics fabricator. Design and construct your own animatronic bug to make it move in lifelike ways. There are many correct ways to construct your Brushtronic Bug. Get creative and determine the best way to design and construct your Brushtronic Bug to get it to move in unique ways!

SHARE YOUR WORK WITH US ON OUR SOCIAL NETWORKS



**WARNING: CHOKING HAZARD  
CONTAINS SMALL OBJECTS**

@garnerholtada

@garnerholtheaducator

www.garnerholtheaducationthroughimagination.com



## **THREE QUESTIONS TO CONSIDER:**

1. Would trimming or spreading out the brush bristles help or hurt in succeeding in your challenge?
2. Does it matter if the motor is in the front or in the back of your Brushtronic Bug?
3. Does the weight of the different parts and their location affect the movement of the Brushtronic Bug?

## Requirements:

Your finished Brushtronic Bug must contain a mini-brush, battery, motor, antennae and two eyes. The remaining materials are optional. Use as much or as little of the remaining materials as you would like to achieve the best results.

## Constraints:

Your Brushtronic Bug must not be more than 6 centimeters wide. The wooden pegs must not be used in the build of your bug.



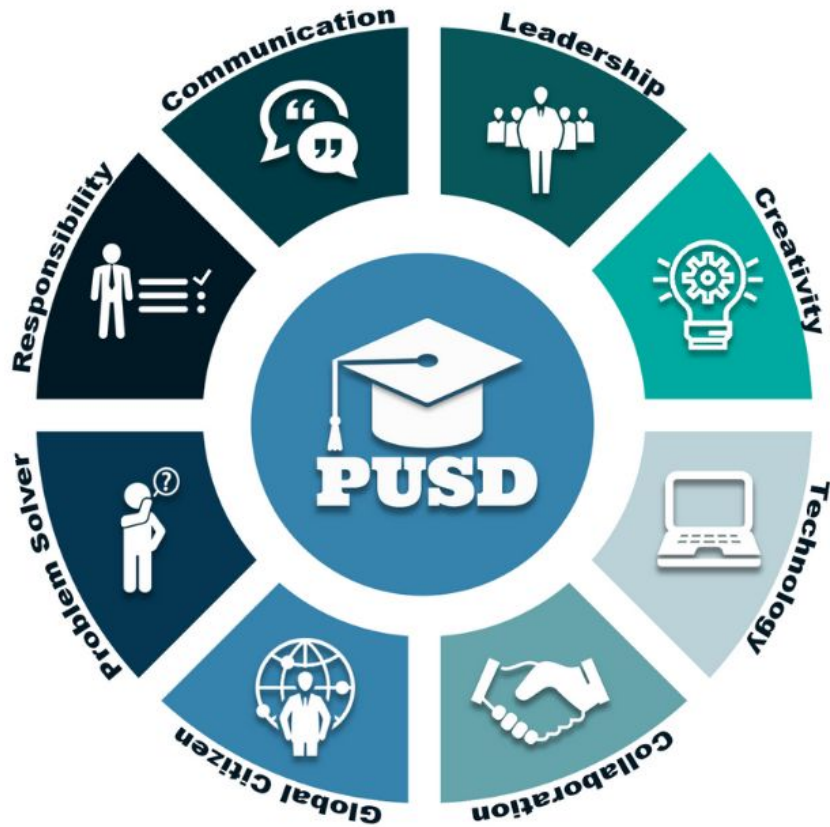
*Making Connections*



# Reflections

- *Table Dynamics*
- *Graduate Outcomes Applied*





*PUSD Students are*  
**EMPOWERED**

Porterville Unified School District Graduate Profile  
*"Creating Opportunities, Changing Lives"*

**STEAM** *Making Connections*



# Reflections

- *Team Dynamics*
- *Graduate Outcomes Applied*
- *Academic Connections that can be made*

**STEAM** *Making Connections*



# *Academic Connections*

- Physical Science (California State Standards for Physical Sciences, Grades K-5): Forces and Interactions: Students can explore the concepts of force, motion, and interactions by designing and launching paper rockets.
- Measurement and Data: Represent and interpret data using bar graphs and line plots. (Grade 3)
- Informative/Explanatory Writing
- Vocabulary Acquisition





## ***Purpose For Today:***

- Refresh the vision for providing career awareness and exploration activities at the elementary and middle school
- Review and identify elements of high quality to be implemented at our school
- Determine ways to incorporate exposure to pathways at the high schools

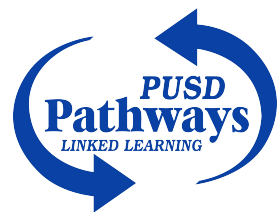


# Brushtronic Bug Build Guide



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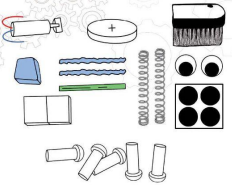
## Brushtronic Bug Build Guide

### 1 Objectives & Materials

Get a glimpse into the career of a Garner Holt Productions engineer. Get creative & determine the best way to design and construct your bug to move in life-like ways and knock down all five wooden pegs. There are hundreds of right ways - find the best one!

#### Explore Your Materials:

- 1 Vibration Motor
- 1 Coin Cell Battery
- 1 Toothbrush Head
- 1 Square Sticky Tack
- 2 Pipe Cleaners
- 2 Metal Springs
- 1 Twist-Tie
- 2 Squares Double-Sided Tape
- 4 Black Circle Tapes
- 2 Googly Eyes
- 5 Wooden Pegs (For Challenge)



### 2 Test your battery

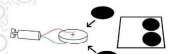
Touch the bare metal end of the blue wire to one side of the battery and the bare metal end of the red wire to the other side of the battery. The rotating head of the motor should spin.  
 Note: Reversing the wires will cause the motor to turn in the opposite direction.



**WARNING:** Keep battery away from younger children and pets

### 3 Create an on and off switch

Use two pieces of the black circle tape to secure the bare metal wire ends to each side of the battery. Pull one of the tapes off and on to make a power switch.



### 4 Attach your motor and battery to the brush head

There are many ways to attach the motor and battery to the toothbrush head. Experiment and see what works best.



### 5 Start Building!

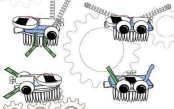
There are hundreds of ways to build your bug. Be creative and consider all of your materials.



### 6 Tips & Troubleshooting

#### Motor not working?

- Make sure the weight of the motor is able to spin freely.
  - Your battery may have drained; switch out the battery with the spare.
- Note: The energy in a battery will drain overtime. Replacement batteries (3V-CR2032) can be found in many stores and on-line.



#### Bug falling over?

- Refer to the seven questions in the enclosed pamphlet for important considerations.
- Hint: Try adding legs, arms or adjusting the bristles on the brush head.

#### Bug not moving in the desired direction?

- Refer to the seven questions in the enclosed pamphlet for important considerations.
- Hint: Think about balance, the location of your motor and how your bristles or legs are positioned.



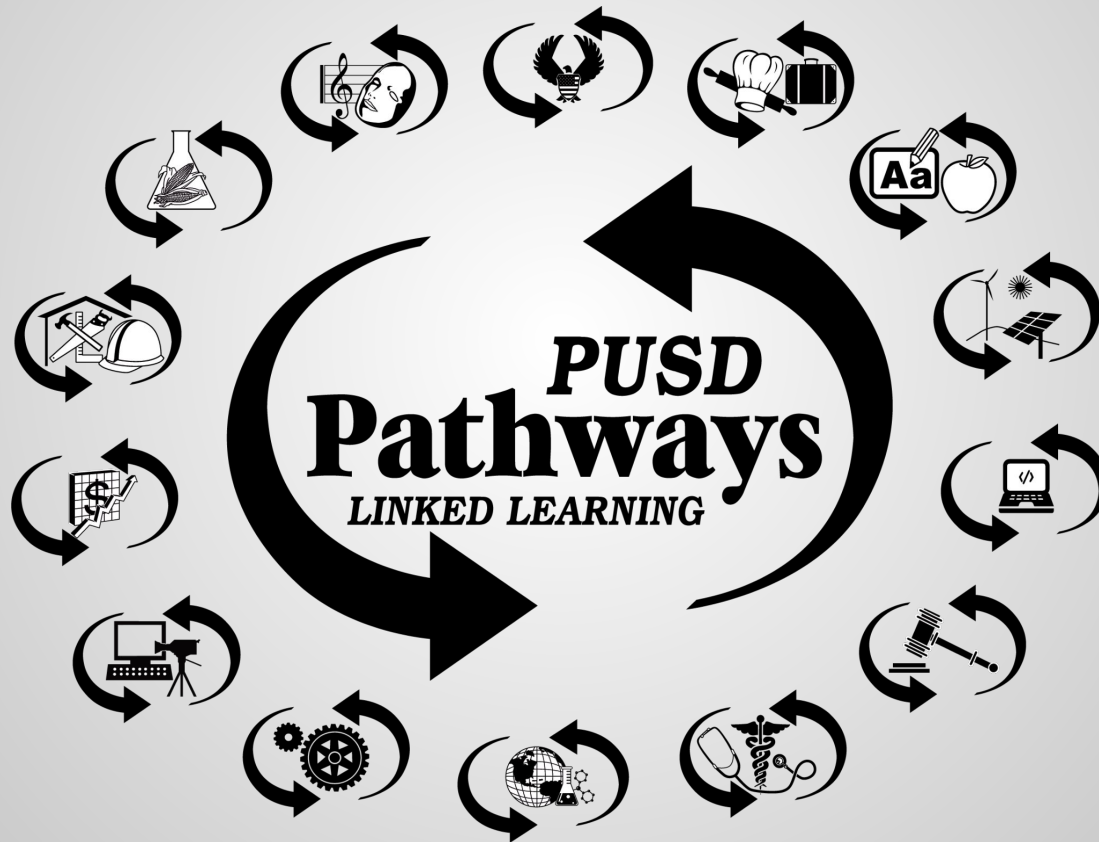
GarnerHoltEducationThroughImagination.com



*Making Connections*

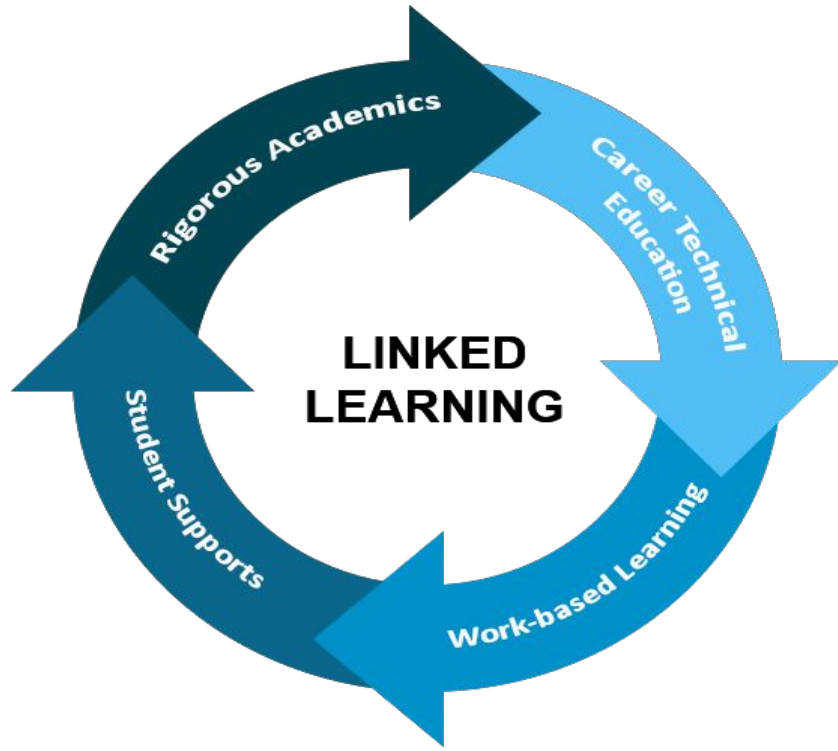


# 14 High School Pathways

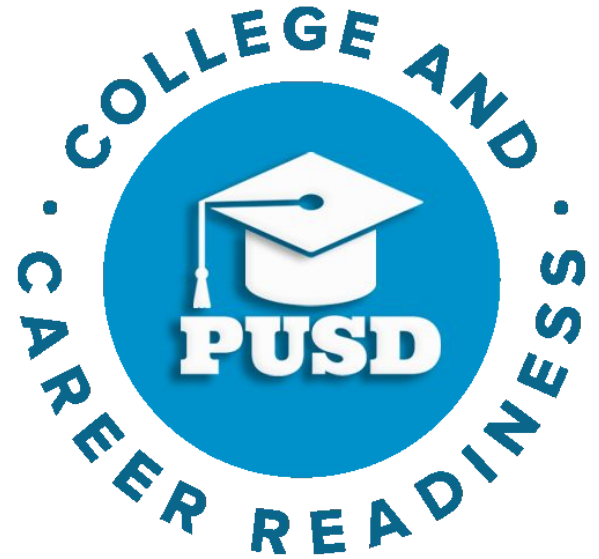




**Ivan**  
Pathway Ambassador



=



**STEAM**

*Making Connections*





# *Why is STEAM and College/Career Awareness and Exploration so important?*

**STEAM** *Making Connections*



**K-2**



**3-5**



**6-8**

## **Introduction**

Early Awareness

## **Inquiry**

Exploratory  
Awareness

## **Planning**

Personal Awareness  
& Exploration

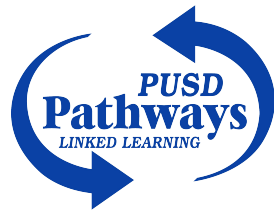
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***STEAM Emphasis***

**STEAM** *Making Connections*



# K-8 College & Career Exploration District-wide



- **K-6th** - Expanded Learning After School Mentoring
- **2nd** - Farm Day @ Porterville Fair
- **3rd** - “Career Kids” Performance
- **4th** - AniMakerspace Lab (2 day visit)
- **5th** - Starbase Lab (4 day visit)
- **6th** - Pathways Exhibition
- **7th** - Future Ready Lab (1 day visit)
- **8th** - Pathways Showcase and Tours



**STEAM** *Making Connections*



# Elementary STEAM Labs

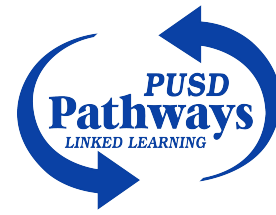
- STEAM Lab located on all Elementary Sites in PUSD
- Customized by site with key elements that tie them together

## Lessons Learned:

- Introduce new stations to teachers during meetings
- Comfortable teachers = confident teachers

## Successes:

- Collaboration, Perseverance, Accountability



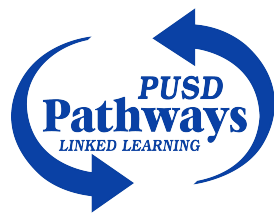
# College Week & Career Week

## Successes:

- Community Involvement
- Exposure to different careers/jobs
- Student Engagement

## Lessons Learned:

- Connection to curriculum
- Involving Pathways at different levels
- Exposure to vocational / community college / military / career / university





# IF WE HAVE A DOC RESOURCE FOLDER, THESE ARE GOOD RESOURCES

Examples:

- [College Celebration Week](#)
- [Career Day Schedule](#)

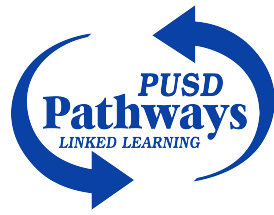


# 4th Grade AniMakerspace Lab

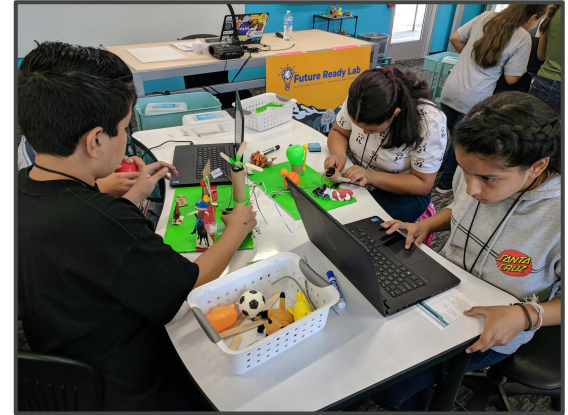


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THROUGH  
**IMAGINATION**

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- Inquiry / “Exploratory Awareness” level
- Small standalone campus 10 minutes out of town
- In collaboration with Garner Holt ETI
- Free field trip experience for **all** 4th grade students in PUSD and all our feeder schools
  - *2 full school days (6 weeks apart)*



**STEAM** Making Connections

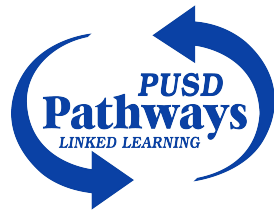


# 4th Grade AniMakerspace Lab



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THROUGH  
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## Learning in Action

- Engagement is key
- Allows students to see different career opportunities
- Ties into FRL and Pathways
- Brings in Science, ELA, Social Studies & Art

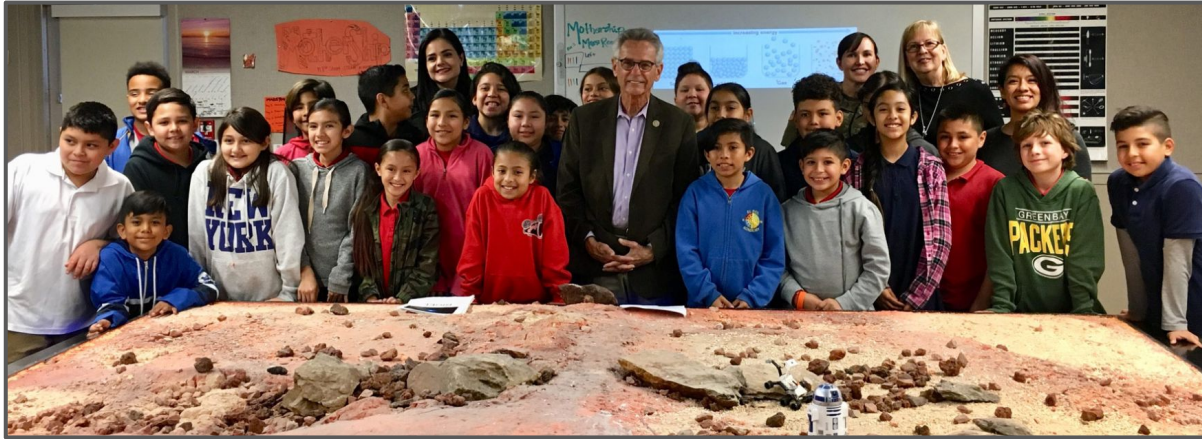


**STEAM** *Making Connections*









*Just opened  
for 5th grade!*

**STEAM** *Making Connections*





# 6th Grade Pathways Exhibition

- Planning / “Personal Awareness & Exploration” level
- Small standalone campus 10 minutes out of town
- One central location, students bussed in
- 1,800 students in a day! (4 main rotations)
- Interactive booth with activities for each Pathway
- Booth ran by HS Pathway students

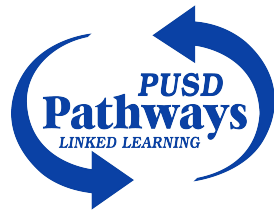


**STEAM** *Making Connections*

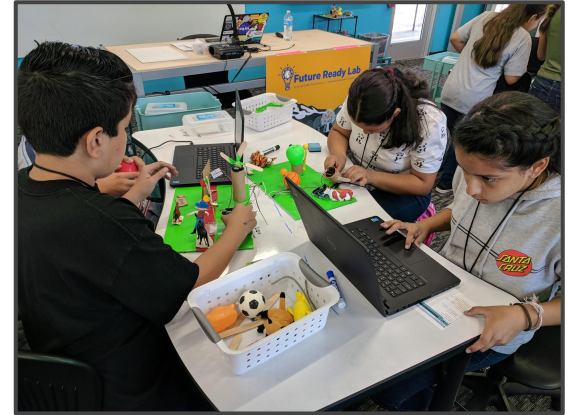


# 7th Grade Future Ready Lab

Qualcomm  
thinkabit lab



- Planning / “Personal Awareness & Exploration” level
- Small standalone campus 10 minutes out of town
- In collaboration with Qualcomm®
- Free field trip experience for **all** 7th grade students in PUSD and all our feeder schools
  - *RIASEC Inventory prior*
  - *Full school day*

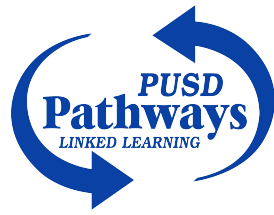


**STEAM** Making Connections



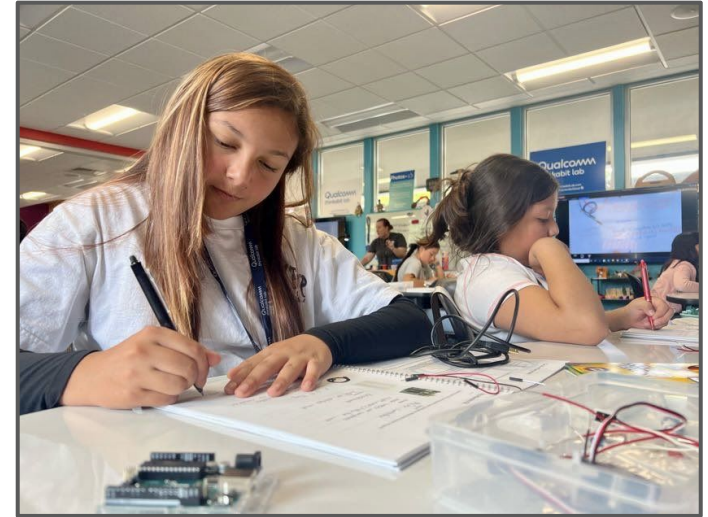
# 7th Grade Future Ready Lab

Qualcomm  
thinkabit lab



## Lessons Learned / Key Takeaways --

- Focus is on *engagement*
- This leads to deeper learning and future CTE/core subject/world connections
- It is okay for a child to fail when learning (and not always a right answer)



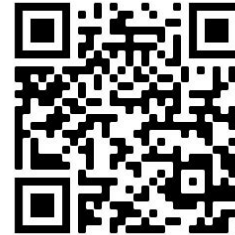
**STEAM** *Making Connections*



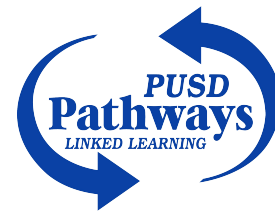
# QUESTIONS COMMENTS



*PUSD Pathways Website  
More info on HS Pathways and STEAM  
Labs / Career Inventory*







# *Reflections and Our Site Efforts*

*Debrief as a School Team or with other colleagues*

*Discussion of our current efforts related to:*

- STEAM
- College/Career Awareness
- Academic Connections

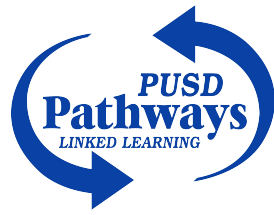
*Needs and assets*

- What do we need? What do we have in place?





# Closing



**STEAM** *Making Connections*

