

# **Math Magic:**

**Motivating and Outcome-Based Activities to Inspire Learners**

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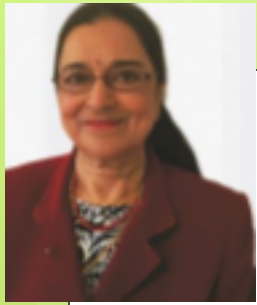
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**AbleNet Webinar**

**October 21, 2015**

# Session Outcomes

- **Gain skills in planning and delivering Math activities to learners with severe and multiple disabilities. The webinar will demonstrate how to:**
  - Integrate academic content with functional to advance student learning outcomes
  - Ensure accessibility, adjust the task complexity level and foster active learner participation with a diversity of teaching tools and resources applying Universal Design for Learning (UDL)
  - Use technology devices to assist with instruction to promote learner participation and communication.



## Author - Educational Consultant

Author of multiple books and products  
(Website: [www.infinitepossibilities-sped.com](http://www.infinitepossibilities-sped.com))

- Books - Autism Spectrum Disorders, Significant Disabilities, Severe and Multiple Disabilities, Paraeducator Training DVD and Early Childhood Education and Transition
- Magical Musical Transitions (a Music CD) and curriculum toolkits
- International presenter and educational consultant
- Founder and President of a Nonprofit Organization –Parent Engagement for Active Child Enrichment (PEACE) to enhance family-child engagement
- Recipient of ‘Promising Practice’ & grant awards.

# Books

Serving Students With  
Severe and Multiple  
Disabilities:

*A Guide to strategies for  
Successful Learning  
Second Edition*

**Published by LRP  
Publications**

**Striking A Balance Between  
IDEA and NCLB for Students  
with Significant Disabilities  
Techniques and Tools for Aligning  
Standards-Based Instruction,  
Alternate Assessment and IEPs**

*Published by LRP Publications*

**From Early Intervention...  
to Preschool Programs...  
School Age Services**

*A Parent's Guide to  
Transitioning Young Children  
with Special needs*

**Published by LRP  
Publications**

**All the books listed  
on this page are  
available from  
[www.shoplrp.com](http://www.shoplrp.com).**

**Together We Succeed  
Building A Better  
System for Transitioning  
Preschoolers with  
Disabilities**

**Published by LRP  
Publications**

# Accessing The Curriculum Toolkit



Developed by Padmaja Sarathy  
A Treasure Chest of Tools to Promote Active Engagement and  
Participation of Learners with Significant Disabilities

From TFH USA - : <http://www.specialneedstoys.com/>

# Understanding Learner's Needs

**Learners with severe cognitive and/or multiple disabilities may exhibit the following needs:**

- **Communication and cognitive needs**
- **Difficulties in generalizing concepts and skills and transferring information from one situation to another**
  - **With most severe/profound cognitive impairment, the learner may have difficulty separating self from the environment**
- **Decreased attention span and high degree of distractibility**
- **Presence of visual, auditory and/or medical problems and physical mobility issues**

# Instructional Framework

## Overarching Goal:

**Planning Instruction and Delivery  
to Actively Engage Students in Learning and  
Attain Desirable Educational and Life Outcomes**

**Understanding  
Learner Strengths and Needs**

**Developing Student-  
specific Supports,  
Adaptations and  
Materials**

**Planning and  
Implementing  
Academic  
Curriculum  
Activities**

**Planning and  
Implementing  
Functional  
Curriculum  
Activities**

**Monitoring  
Student  
Performance  
and Progress**

# Instructional Framework: The Essentials

**Serving  
Students with  
Significant  
Cognitive,  
Communication  
and Motor  
Needs to  
Access and Attain  
Academic  
and  
Functional  
Outcomes**

**Universal Design for Learning (UDL)  
To Make Learning Accessible to Meet  
Needs of Diverse Learners**

**Partial Participation  
to Promote Learner Independence**

**Engaging and Interactive  
Instructional Delivery  
for Active Engagement and Learning**

**Technology Aids  
(both Mainstream and Assistive  
Technology (AT) to Support Learners**

**Age-Appropriateness  
in Activities and Materials**



## Reaching all learner applying principles of UDL

### ➤ Flexible methods of presentation

- Information is presented in various formats, at different levels of complexity and to address different learning styles.

### ➤ Multiple, flexible methods of expression and apprenticeship

- A variety of formats are offered for responding, and demonstrating what student knows.

### ➤ Provide multiple, flexible options for engagement.

- Various opportunities are provided to engage student's interest, offer appropriate challenges, and to increase motivation.

(UDL Principles update in 2011 downloaded on 2/12/2012 from: [http://www.cast.org/teachingeverystudent/ideas/tes/chapter4\\_3.cfm](http://www.cast.org/teachingeverystudent/ideas/tes/chapter4_3.cfm))

# Instructional Framework Tool

Instructional Organizer: \_\_\_\_\_ Core Content (Key Concepts and Access Skills): Functional Skill Areas:

Focus:  
Academic and Functional Outcomes

Age/Grade

Instructional Setting

## Description of Activity

Materials:

Steps Involved-What to do?

Learning Objectives

Ideas/Resources

Adaptations

Support Tools

Progress Monitoring

# Designing Delivery

- **Begin with a clear vision of your learning objective for the student.** Focus on the key concept.
- **Break individual steps into sub-steps as needed.**
  - Some steps in an activity may have to be partially performed. Use hand-over-hand prompting minimally.
- **Discuss briefly what is happening and why something is happening.** Pair verbal directions with visual and physical cues.
- **Encourage students to communicate** their thoughts, feelings and experiences through exploring objects, making facial expressions and using gestures.
- **Practice, practice and practice more!** Vary the environment/setting for the activities to promote generalization and novelty.

# Engage Learners

- **Plan ahead to maximize participation:**
  - Connect with prior knowledge.
  - Use student preferred items.
  - Provoke curiosity with novel items.
  - Ensure relevance to student's daily lives.
  - Offer multi-sensory materials –things to touch and feel, things to smell and hear, etc.
  - Place materials in the optimal position (within the field of vision of students); stabilizing materials.

# Invigorative Instructional Delivery with **Number Sense:**

- Number Sense: To gain awareness of mathematical process and to use numbers to solve problems in a variety of ways in daily life
- Embed opportunities to count in a variety of real –life situations in and out of the classroom.
- Move from concrete to representational to abstract.
- **Attach a number list** (1-5) to student desk matched with objects or a number line. Make a Counting Wall.
  - Have students touch, feel and count placing items strategically. Shine flashlight on item to gain attention.
- Use role play - act out story problems.
- Make use of a Giant Display Calculator and a Talking Calculator (to assist students who are visually impaired)

# Number Sense –Adapted Materials

Present concrete materials in a variety of ways to reach learners with diverse needs.



Use a sorting tray to teach counting and numeral identification.



Numeral and object matching bells in mini-bags (specially for students who may put objects in their mouth) for math activity providing both visual and auditory input

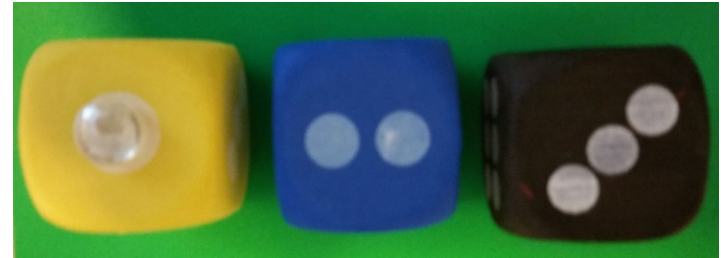
# A Counting Wall



# Number Sense

## To Engage Diverse Learners

ITalk2 Communicator (AbleNet)  
Use assistive technology aid  
to provide auditory support in  
addition to visual. Numerals  
written with Wikki-Stix.



Count the dots (foam dice) or  
Sequence numbers in order



Students Make their Number (sets) Book  
(attaching concrete items).





# Matching



**Play a Matching Game (texture-matching or shape matching). Strengthen matching skills through tactile features of the game.**

# Math Games

Play Bingo Game.



# Assistive Technology Support

Use an All-turn-it Spinner (from AbleNet) to play games and to take turns in a game.



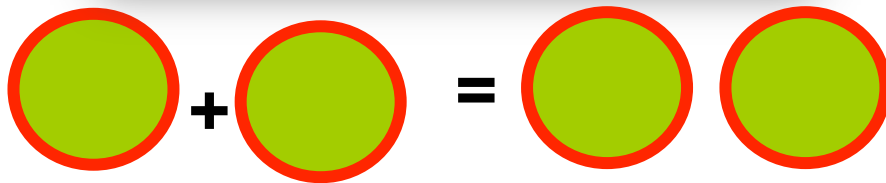
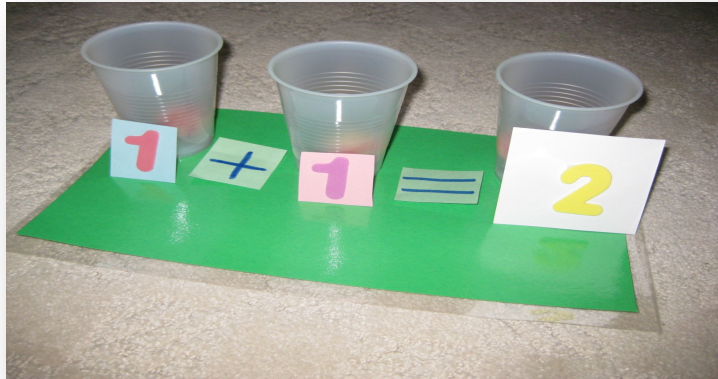
Provide a voice with the Super Talker to students with communication difficulties (AT device from AbleNet).



Use a Super Talker

To sequence numbers: 1 2 3 4  
Match numbers to corresponding items  
Use for group participation and games.

## Making Adaptations to Reach All learners



$$1 + 1 = 2$$

Concrete



Representational

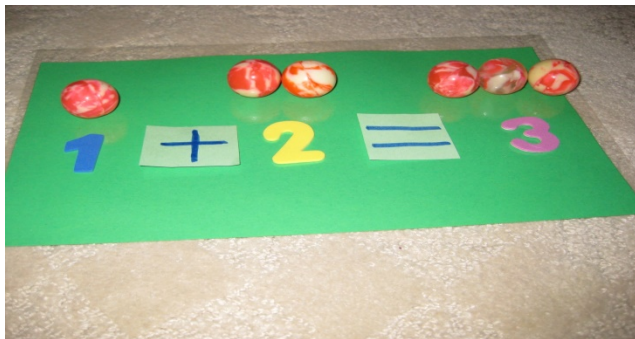


Abstract

- Move from Concrete to Representational to Abstract.

# Math Operations

Set up for materials for instruction in addition skills.

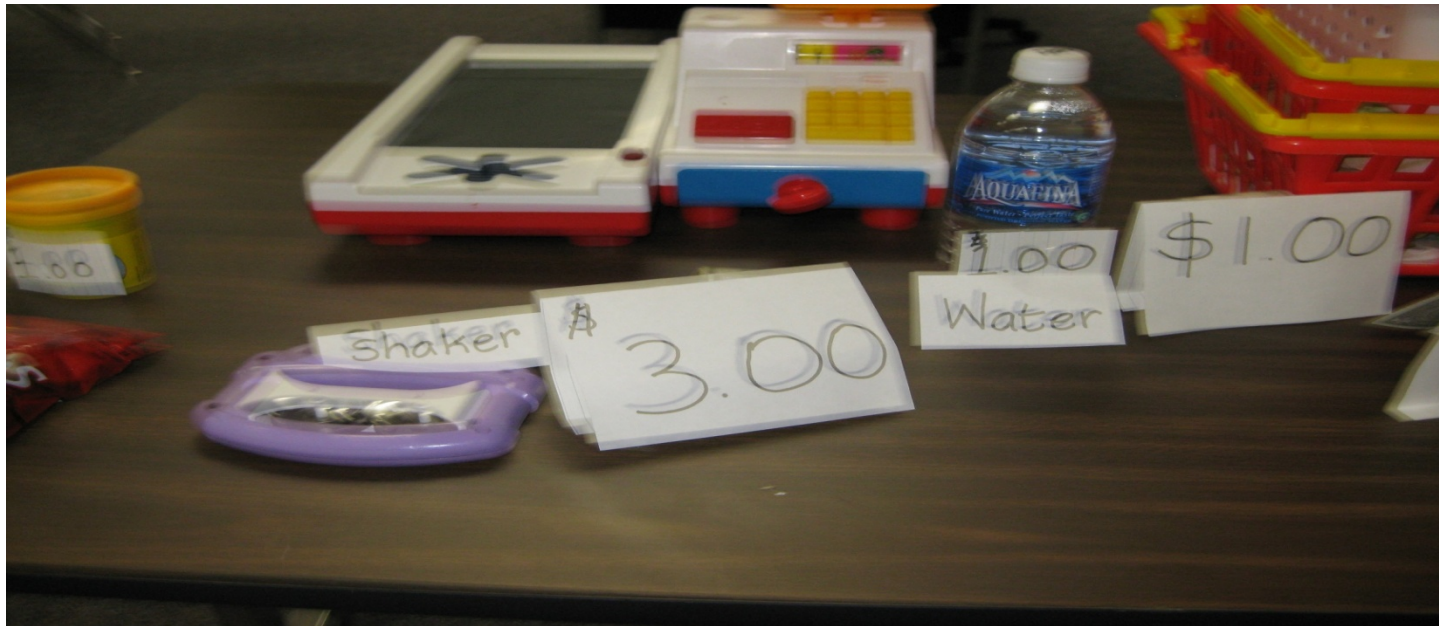


Students build the number sentence .

# Money Skills

## Learning Objectives:

- Solve problems using money skills (using combinations of coins and bills).
- Use (exchange) money in real world situations.
- Develop personal living skills and engage in social communication.



- Teach use of money and simple money handling situations in the context of a classroom (mock) store.
- Set up the **store** with a few items to introduce money concepts.

# A Mock Store

## Learning Objectives:

- Understand that money is used to pay for an item.
- Buy an item and pay for it. (identify \$ bill and coins).
- Exchange right amount for item purchased
- Associate items on the shopping list for a cooking activity with store items (during a CBI trip).



# Money (Simulated Store)

## **Objectives** (at the simulated store):

- Identify a dollar bill/quarter to pay for 1-2 items.
- Make a choice between two items to be purchased at the store
- Identify money is used to pay for an item.

## **Adjust Task Complexity Level to Match Student Needs**

- Most will buy couple of items and figure out the (total) right amount to pay.
- Some will buy one item and pay a \$ 1.00 for item.
- Some students buy an item and figure out that they have to give something (money) to the cashier.
- One or two students may just choose an item from the store to buy when presented with a choice of 2 items.



# Measurement

## Academic Blended with Functional and Life Outcomes

### Active Engagement at Diverse Complexity Levels

- Size: Order items by size
- Quantity: (Less and More): identify quantities of less/more
- Weigh objects and compare the weight of two objects.
  - Note and record the weight.
  - Identify which is heavier: A book or a feather? A bag of cotton balls or bag of pennies or chips?
  - Sort items by weight
  - Place objects to be weighed on the scale.
- Temperature:
  - Go outside to check the temperature.
  - Observe changes in thermometer reading.
  - Mark the thermometer with colored dots.

# Measurement (continued)

## Academic Blended with Functional and Life Outcomes

### Active Engagement at Diverse Complexity Levels

#### ○ Time-Clock:

- Associate clock/time with a routine activity (lunch, dismissal, etc.)
- Set a timer (or assist in moving the knob) for a specific number of minutes.
- Assist in measuring time taken for an activity using a stop watch.

#### ○ Measure 3 different lengths of yarn (longer/shorter?)

#### ○ Match different measurement tools and objects that go with them. (thermometer, scale, ruler, clock, etc.)

# Patterns

**Key Concepts:** To develop basic understanding of patterns , relationships and algebraic thinking

- **To gain awareness of patterns around them (nature, art) and how it relates to their daily life.** (Blend academic with Functional)
- **To stimulate and advance cognitive thinking skills**

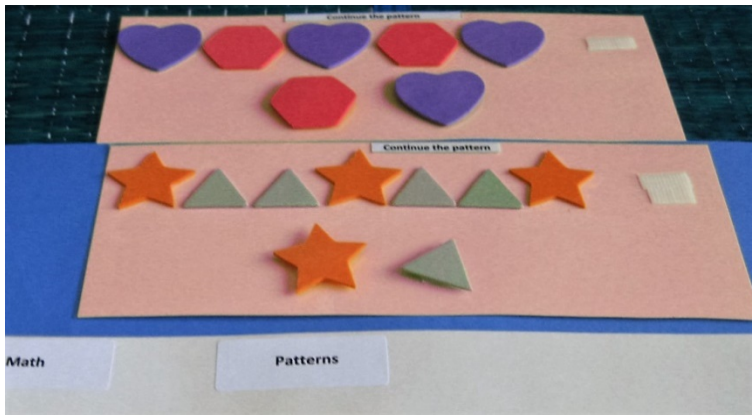
## **Sample Learning Objectives:**

- Explore and feel patterns.
  - Predict what activity will come next in the activity schedule.
  - Assist in completing a pattern for school and home days on a calendar with tactile items/pictures.
  - Create a pattern with 3 repetitions (e.g., art-make a bracelet)
- **Match learning objectives and the specific task the student has to performs in the activity to the skill level and needs of the student.**
  - **Always target desired functional and life outcomes.**

# Presenting Patterns

- Present number patterns using concrete items:

A number line attached with objects:



Use art to make a product -  
teach and make patterns using  
foam shapes, beads, paper  
squares.

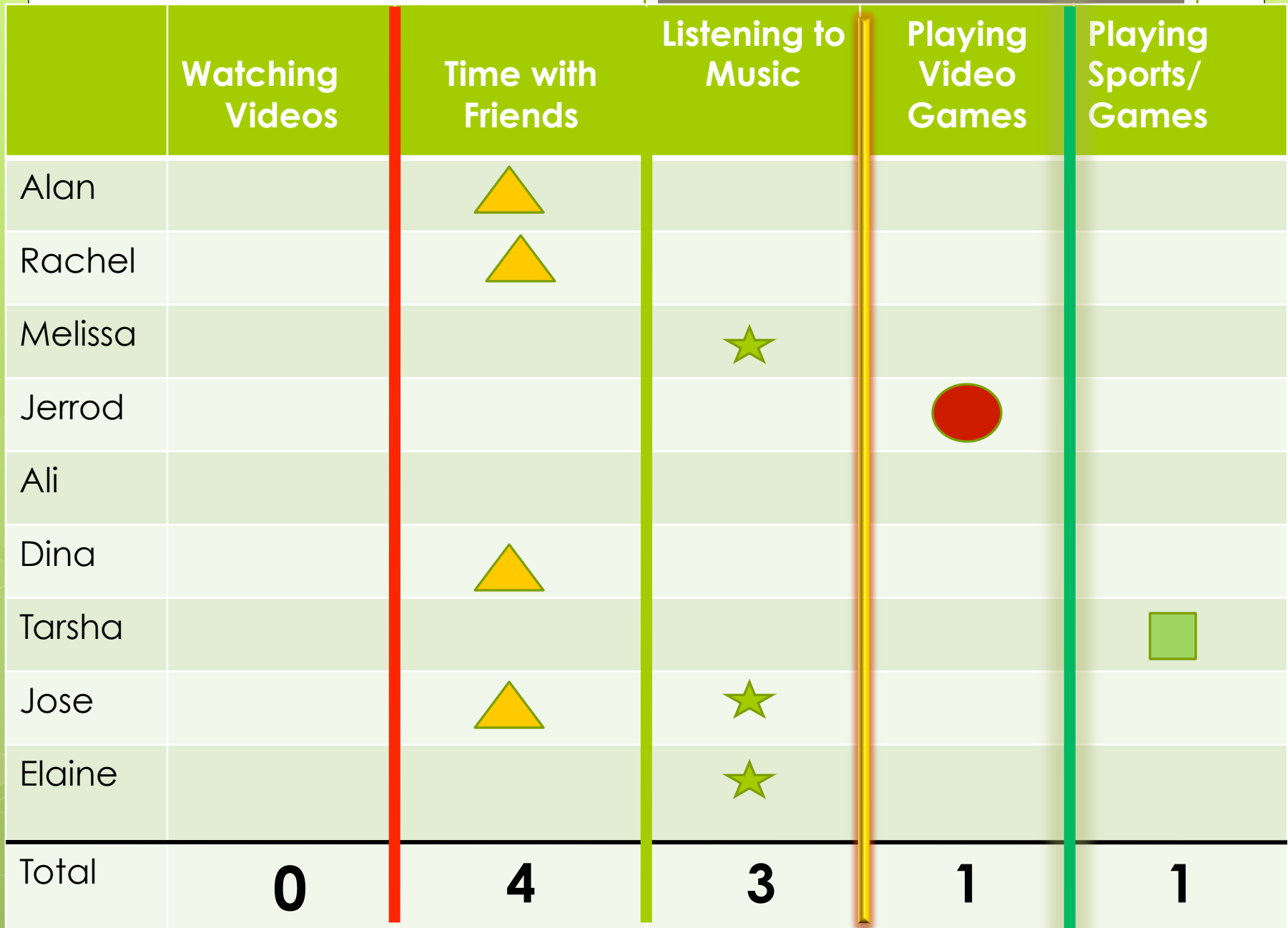
Present Product  
and Cost Pattern:



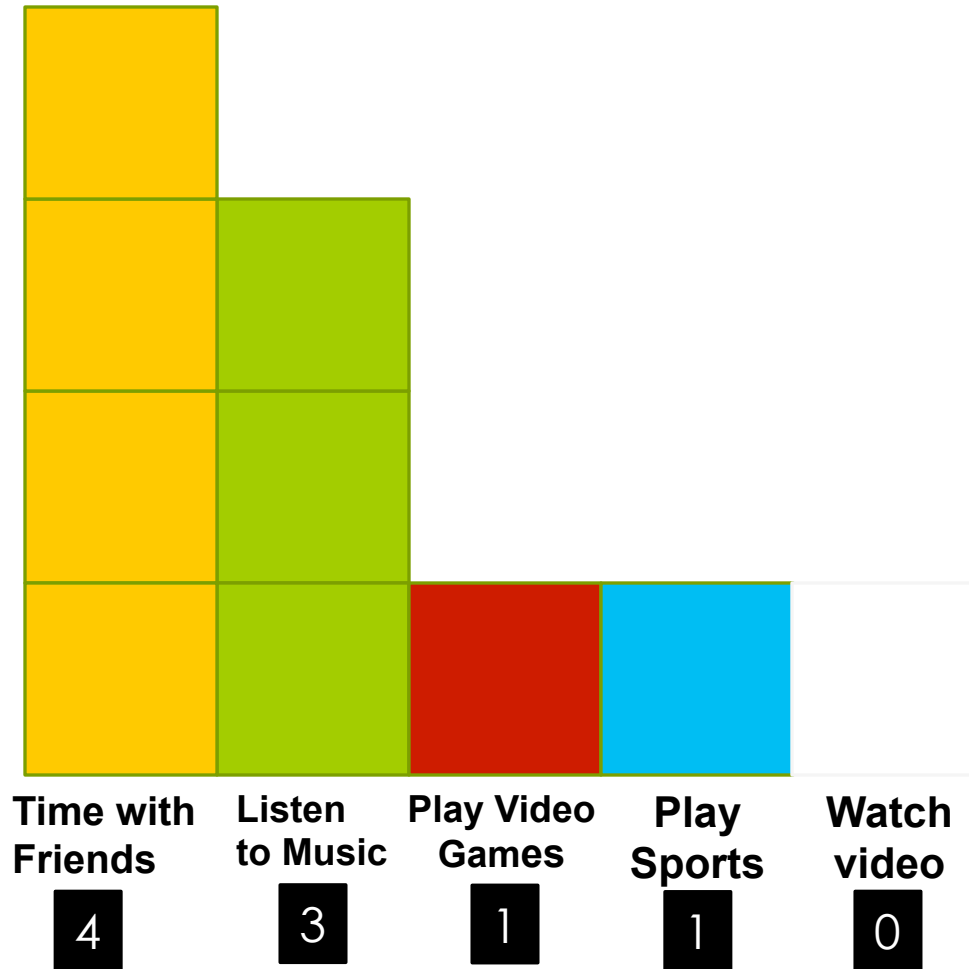
# Graphing – Selecting a Favorite Leisure Activity

Student Names ↓	Watching Videos	Time with Friends	Listening to Music	Playing Video Games	Playing Sports/ Games
Total #:					

# Graphing -Leisure Activities



## An Adapted Graphing Chart with Representational Objects



**Favorite Leisure Activity: Time with Friends**

# Recommended Strategies

- ❑ **Diverse and complex learner needs are addressed to promote access, engagement and response.**
  - ❑ Instruction is complemented with multi-sensory materials (auditory, visual, kinesthetic & tactile)
  - ❑ Hands-on activities and real-life situations are used.
- ❑ **Paraeducator support is discreet and not intrusive.**
  - ❑ Understands and follows prompt hierarchy to avoid over-prompting the student.
- ❑ **Systematic and consistent use of progress monitoring** occurs in targeted learning objectives.
  - ❑ Re-teaching and re-assessing occurs with modified instructional strategies.
- ❑ **Learner independence is continuously fostered.**  
Allow and promote student to perform whatever skills are possible without adult assistance.



# Resources for Significant Disabilities (including severe and multiple Disabilities)

- **Serving Students with Severe and Multiple Disabilities: A Guide to Strategies for Successful Learning.** Sarathy, P. (Second Edition, 2014). LRP Publications, PA. ([www.lrp.com](http://www.lrp.com))
- **Striking a balance between NCLB and IDEA for Students with Significant Disabilities: Techniques and Tools for Aligning Standards-based Instruction, Alternate Assessment and IEP.** Sarathy, P. (2008). LRP Publications
- **Autism Spectrum Disorders: Seven Steps of Support,** - a laminated guide., Sarathy, P. (2015), NPR, Inc.

# Curriculum Kits and Other Resources

- **Accessing the Curriculum Toolkit**, Sarathy, P., (2013). Offers diverse tools to engage and enable students with most severe disabilities. Available from TFH USA Ltd:  
<http://www.specialneedstoys.com/usa/mse-kits/2272-accessing-curriculum-tool-kit.html>.
- **Equals Math Curriculum** from AbleNet, Inc.  
<https://www.ablenetinc.com/curriculum/mathematics/equals-mathematics>
- **Paraeducator Power Training.**, Sarathy, P. (2012). Legal Digest, Website: <http://www.ed311.com/>.
- **UDL website:** (Center for Applied Special Technology (CAST) <http://www.cast.org/research/udl/index.html>



**Thank You.**

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**The Next Webinar: November 3rd (11 AM to Noon – CDT)**

**Science Stimulates: Active Engagement to Arouse Learners**