

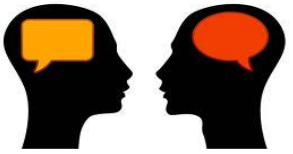
# How's a Picture Worth 1,000 Words in Math and Science?



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Intercultural Development Research Association



# Talk About It

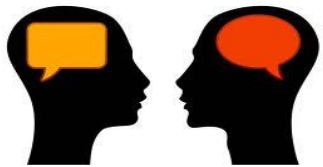


Discuss with someone...  
*What do you see?*



# In a minute, but not yet...

Physically turn to your partner and discuss the following question.



*How has the evolution of this utensil affected humanity?*



# Observe and Report

At your table, discuss some noteworthy aspects of any similarities and differences that you noticed between the two conversations.

Select a member to share your observations regarding the activity.

# Rules of Engagement

- Face your partner(s)
- Use eye contact
- Listen attentively
- Disagree politely
- Share connections
- Express reactions/emotions
- Ask follow-up questions



# Session Objectives

Today's session will demonstrate strategies for increasing student engagement through the integrated use of:

- **Substantive Student Conversations**
- **Visual Literacy**
- **Higher-Order Questioning**

# Turn and Talk

Purpose: Use physical position to facilitate **academic** collaboration among students.

Length: Varies according to task



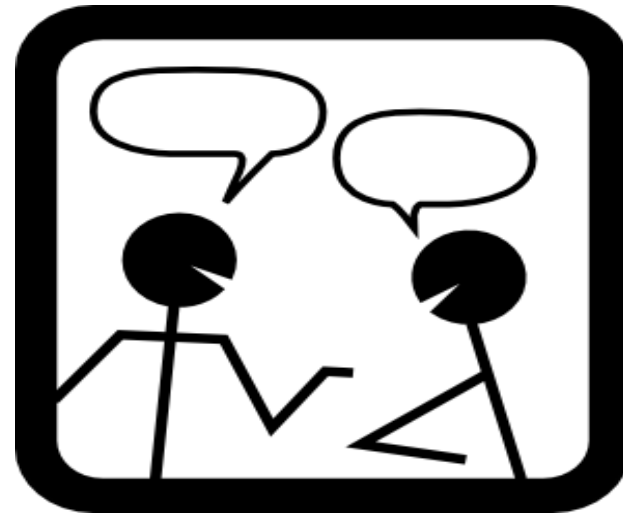
# Turn and Talk: Reflection

- How does establishing rules for engagement encourage on-task behaviors?
- How does this strategy help students become better at expressing their understanding?



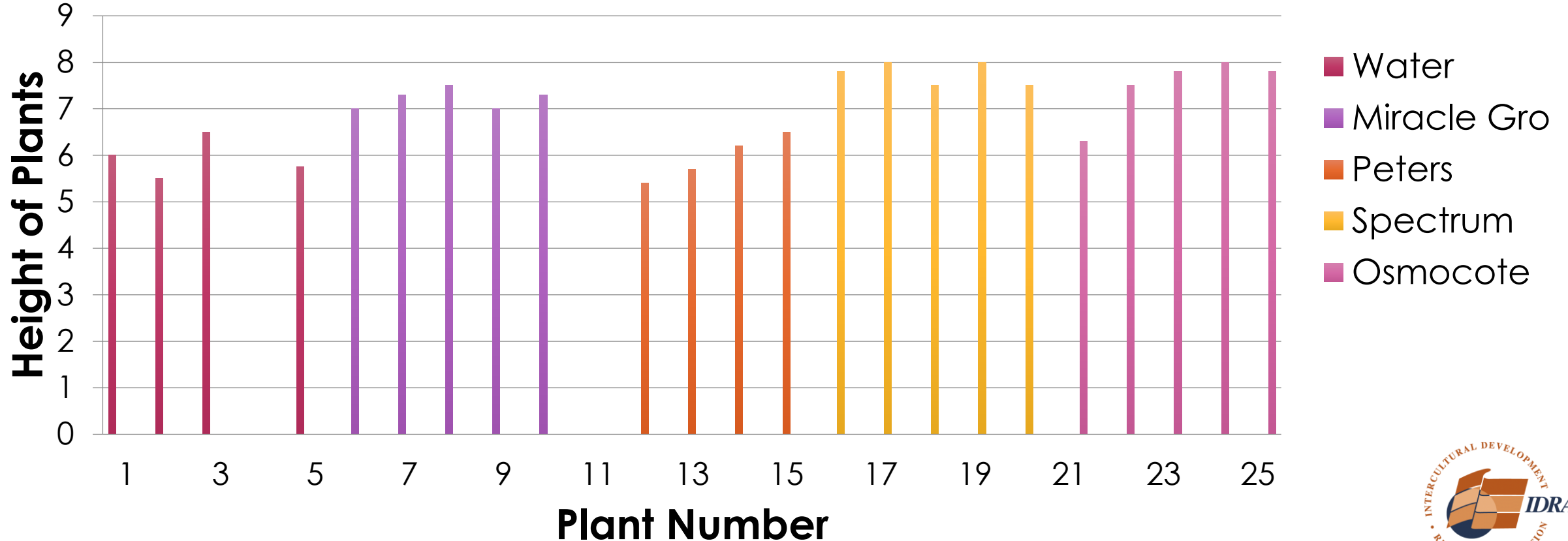
# Types of Turn and Talk

- Think-Pair-Share
- Round Table Discussion
- Round Robin
- Meaningful Mingle
- Chat n Check



# Talk to your neighbor about ...

## Fertilizer Comparison Chart



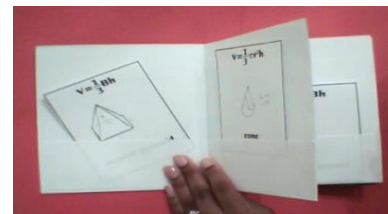
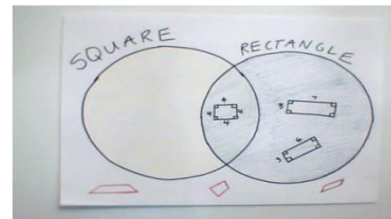
# Visual Literacy

Visual representations of text help a reader see the information again.

A graphic “re-presentation” allows readers to see relationships, understand organization, connect ideas, and make abstract ideas concrete.

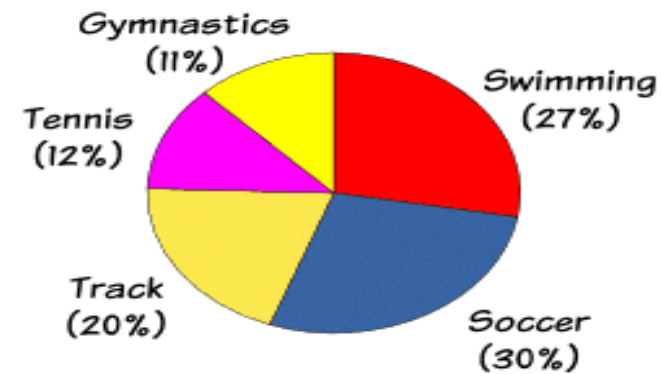
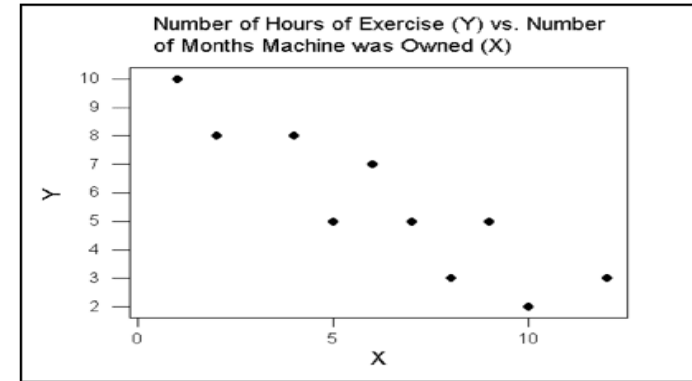
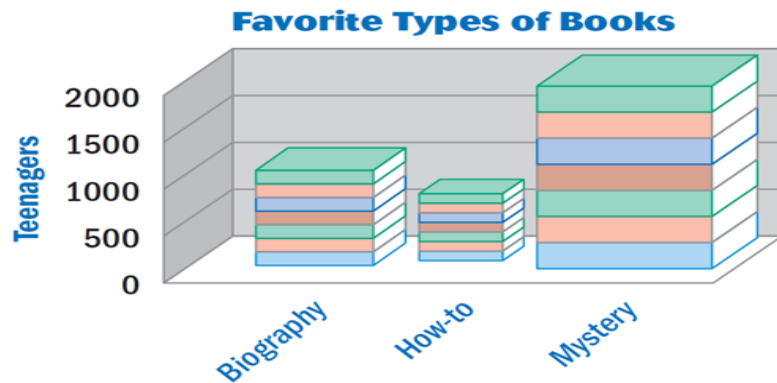
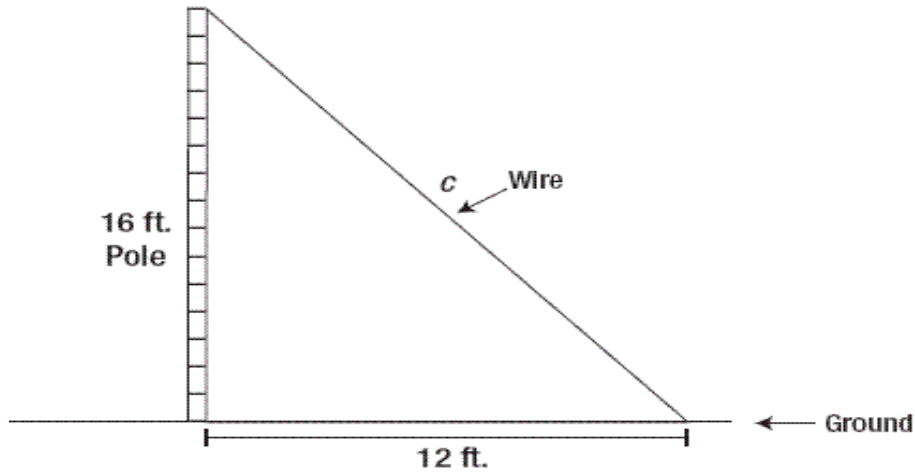
# Create Meaning with Visuals

- Interactive Notebooks
- Graphs, charts, diagrams, photos
- Graphic Organizers
- Folding Organizers





# Pictorial Representations, Charts and Graphs



# Visual Literacy

Visual information absorbed while simultaneously listening can improve understanding of spoken words by as much as *six fold*.  
(Science Daily, 2009)

# Advance Organizers

- An advance organizer is information presented by an instructor that helps the student organize new incoming information.
- This is achieved by directing attention to what is important in the coming material, highlighting relationships, and providing a reminder about relevant prior knowledge.

# Advance Organizers

Advance organizers make it easier to learn new material of a complex or otherwise difficult nature, provided the following two conditions are met:

1. The student must process and understand the information presented in the organizer—this increases the effectiveness of the organizer itself.
2. The organizer must indicate the relationship among the basic concepts and terms that will be used.



# Advance Organizer Examples

Story Map

Name: \_\_\_\_\_ Title: \_\_\_\_\_

Characters

Setting

Beginning Middle End

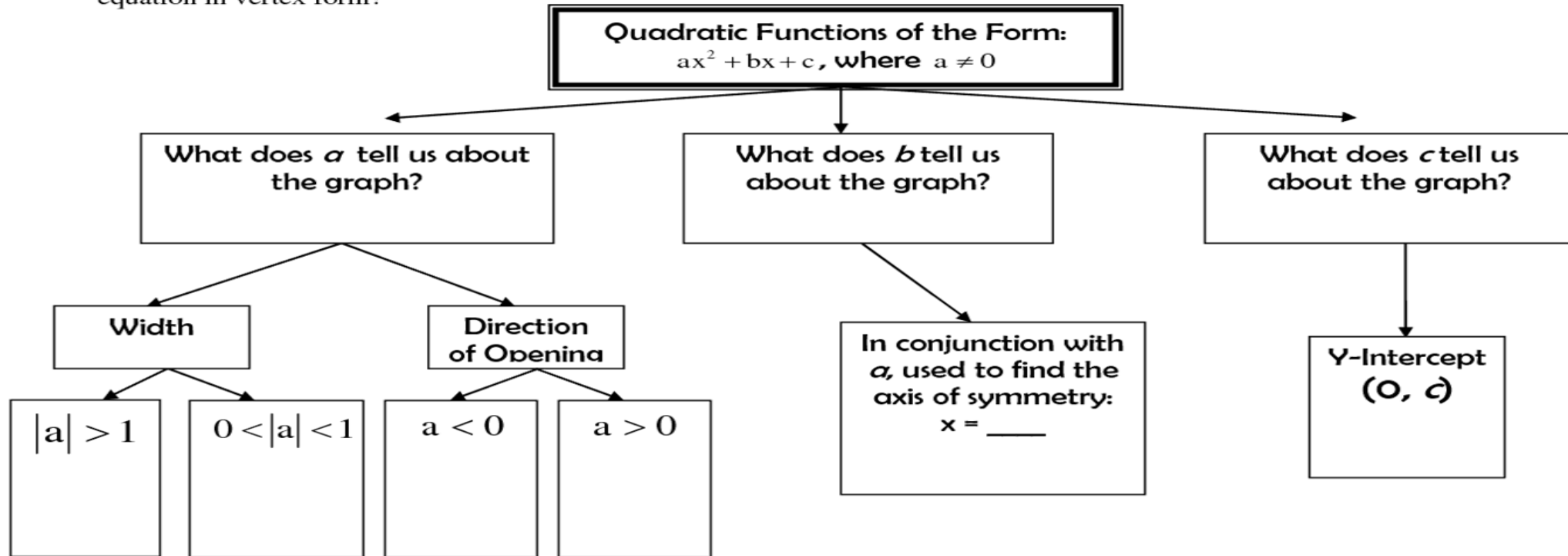
Name: \_\_\_\_\_

Owls

Are Have Can

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EQ: What does the standard form of a quadratic equation tell me about its graph? Given standard form, how do I write a quadratic equation in vertex form?



Vertex Form	ODE TO VERTEX FORM	1. $y = x^2 + 6x + 5$	2. $y = x^2 + 10x - 4$
Where the vertex is ( <u>    </u> , <u>    </u> )	$ax^2 + bx$ leave a blank Close it up Make $c$ slide To the side  Opposite A Then multiply $\frac{1}{2} b$ , squared <b>YOU KNOW WHY!!!</b>	3. $y = 2x^2 + 8x - 3$	4. $y = -3x^2 + 6x + 2$

If  $a \neq 1$ , then you have to divide  $ax^2$  and  $bx$  by  $a$ !!

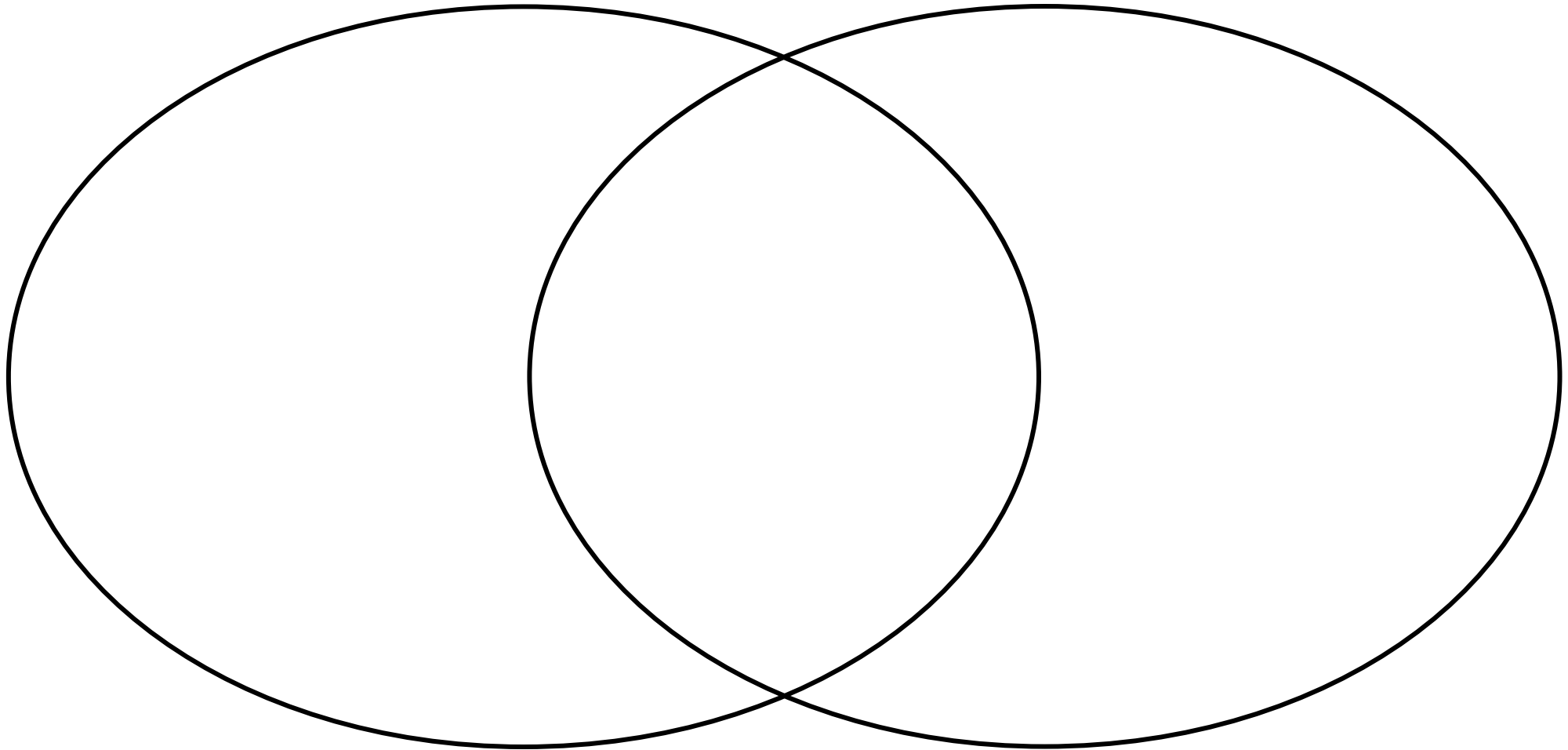
# Graphic Organizers

Graphic organizers are illustrations used to organize and highlight key content information and vocabulary

Critical elements:

- Teacher provides direct instruction on how to develop various graphic organizers
- Organizers are student created

# Venn Diagrams





# Frayer Model

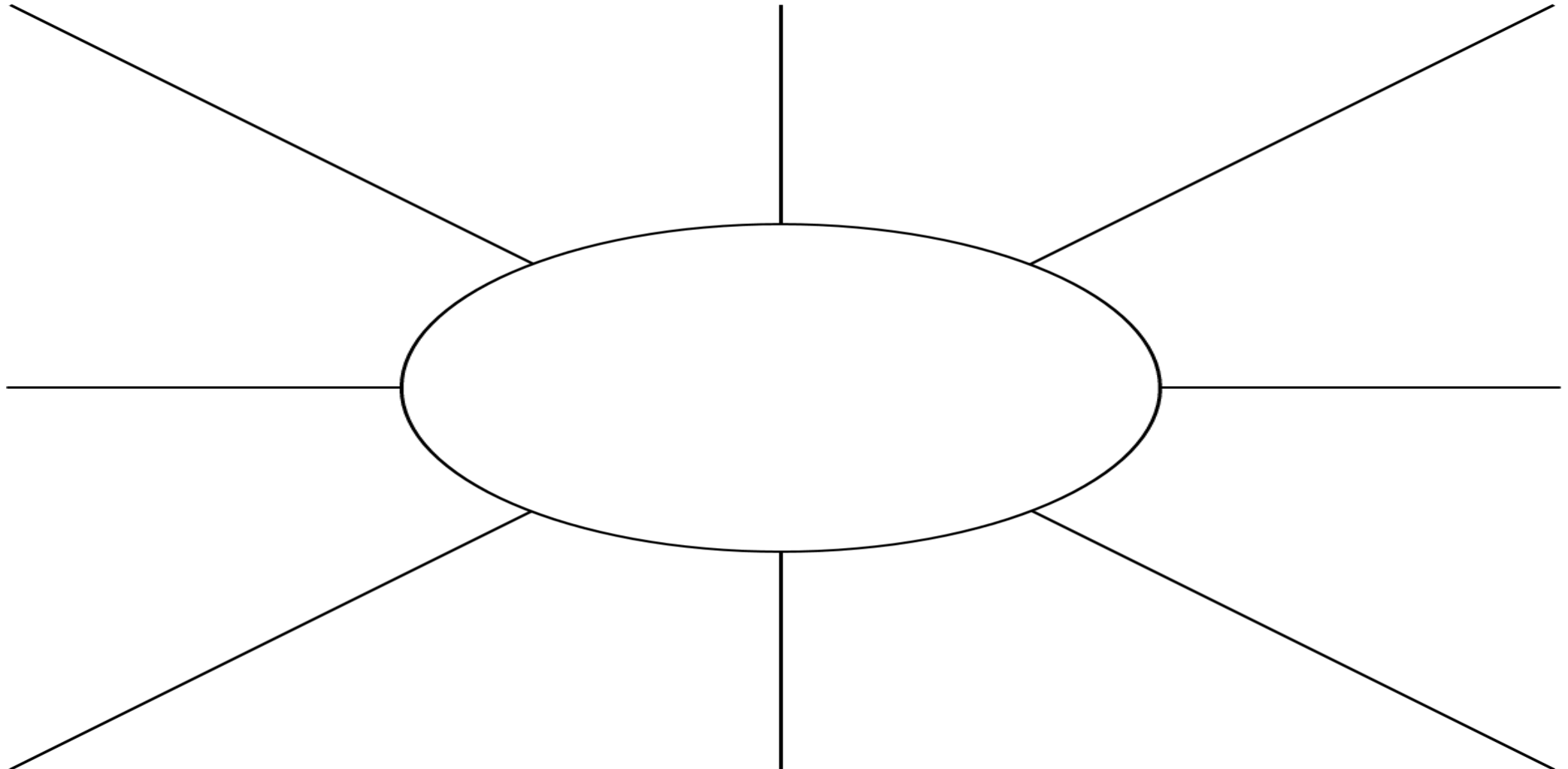
<b>My Definition</b>	<b>Characteristics &amp; Attributes</b>
<b>Example</b>	<b>Non-Examples</b>

***Vocabulary Term***

# Filmstrip



# Attribute Chart



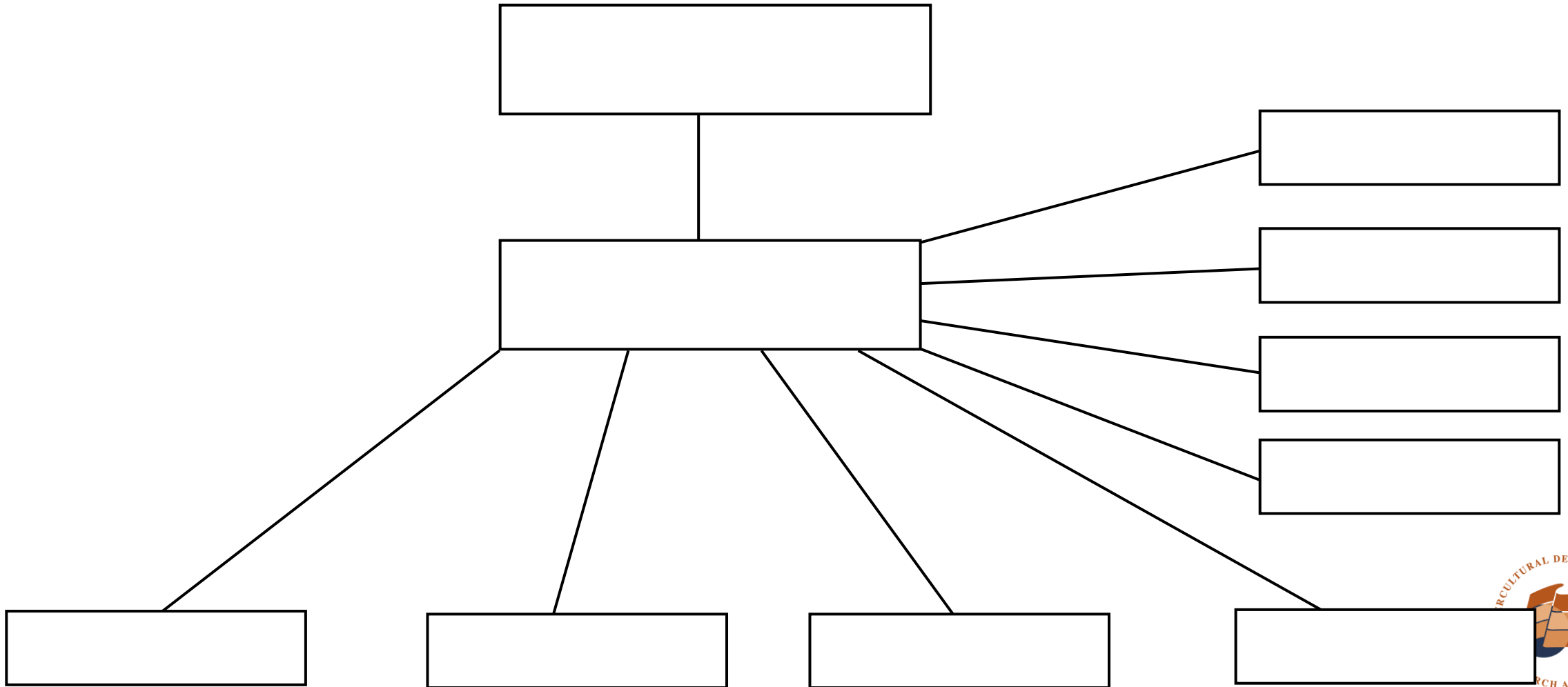
# Attribute Chart

your answer solution

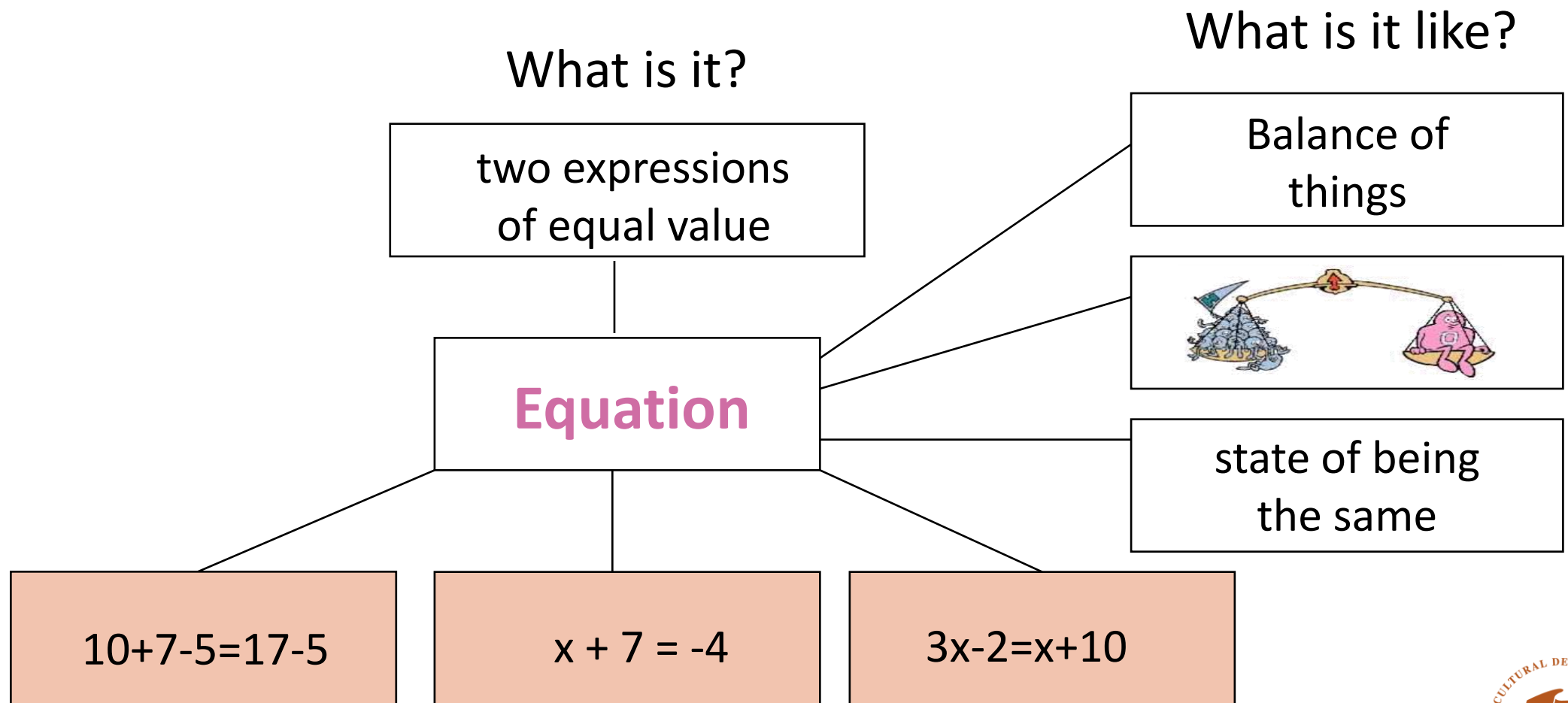




# Word or Concept Map



# Word or Concept Map



# Your Turn!

## What is it?

the ability to interpret, negotiate, and make meaning from information presented in the form of an image

## What is it like?

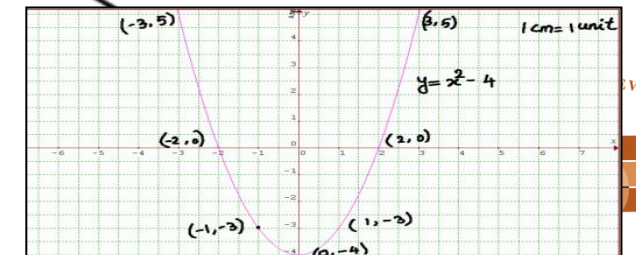
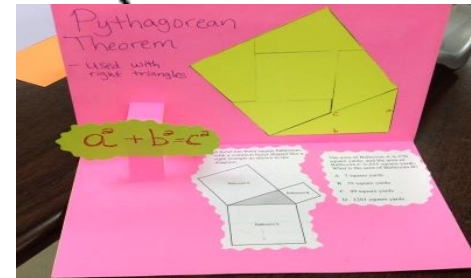
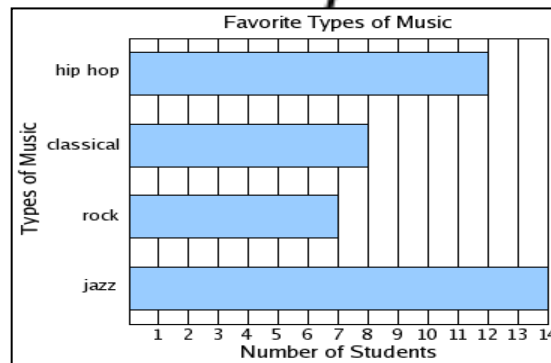
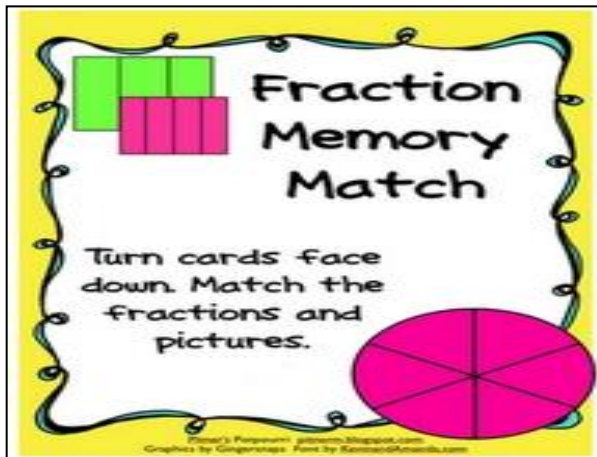
Graphic Organizers

Interpreting Graphs

Organizing Data

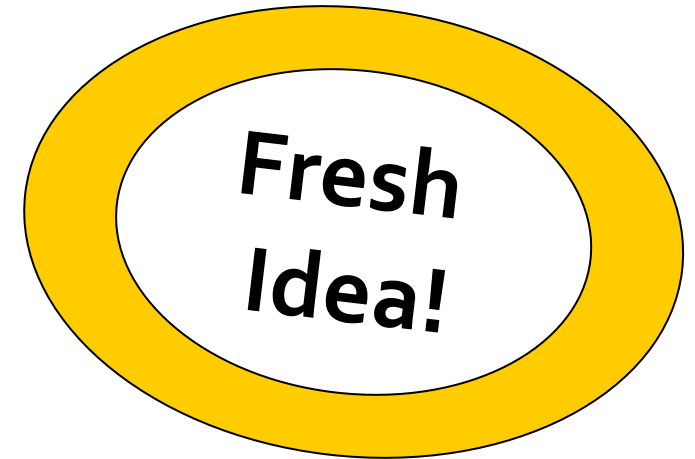
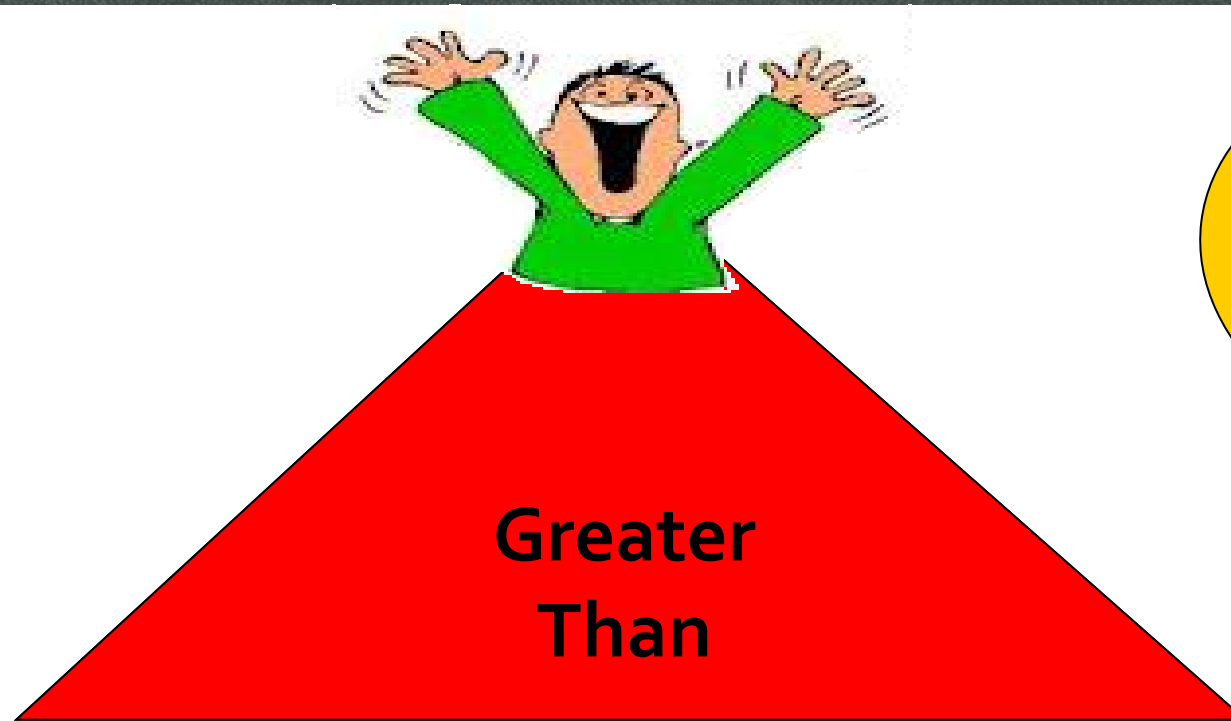
Hands-On Activities

## Word Map



## What are some examples?

# Vocabulary Instruction through Total Physical Response



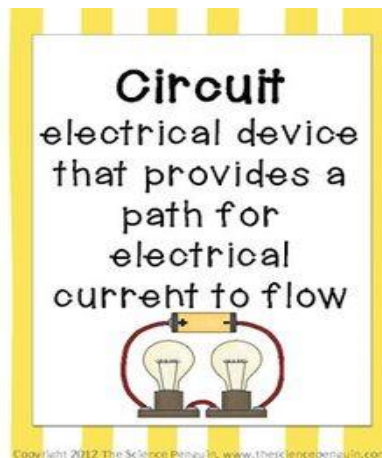
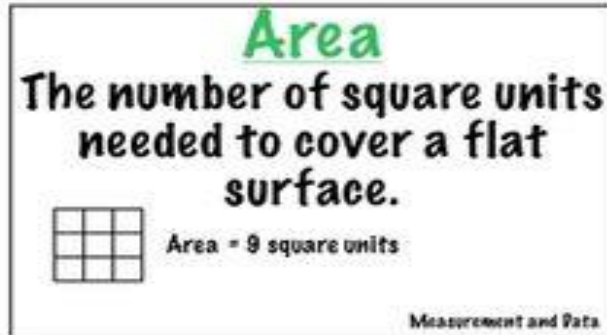
*"Raise the Roof..."*

Used to express a larger value;  
upwards; above

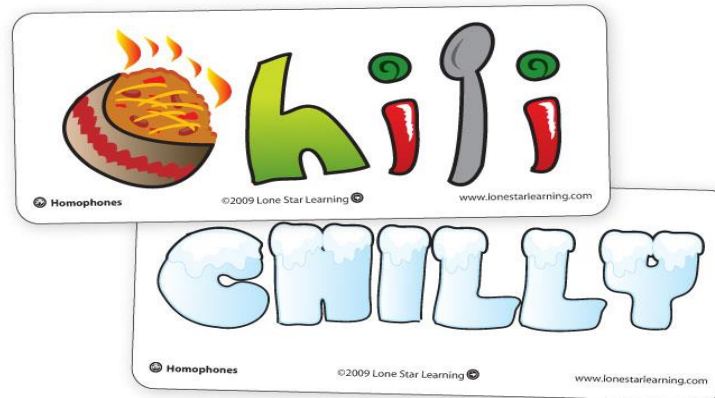
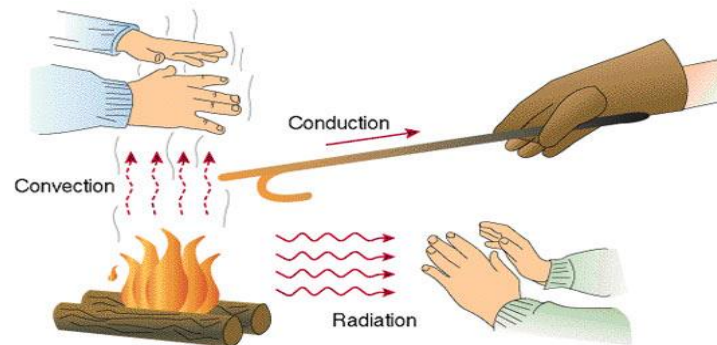


# Building Vocabulary

Good



Better

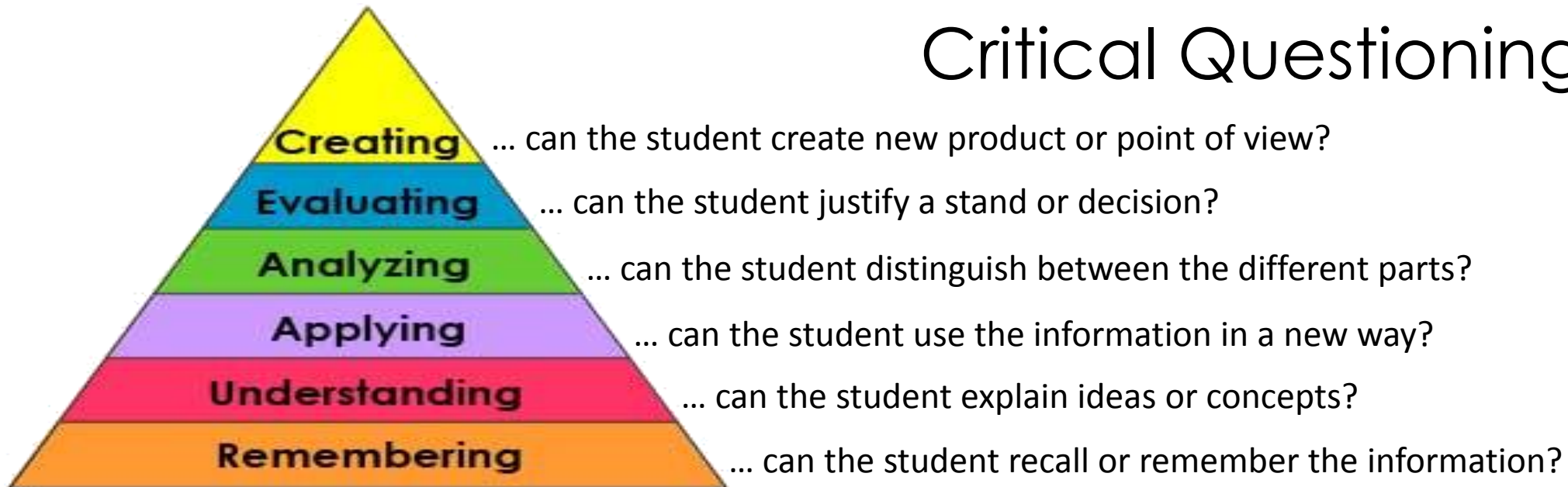


Best!



# Higher Order Thinking Skills

## Bloom's Revised Taxonomy & Critical Questioning



# Great Expectations?

Think of a question that you would pose to your students... write the question on the handout.

*Now review the Q-Chart and Critical Thinking Question Stems. Where would the question fall in terms of complexity and higher order thinking skills?*



# Q-Chart: Higher Order Questioning

	Is	Did	Can	Would	Will	Might
What	<i>Least Complex</i>					
Where						
When						
Which						
How						
Why						<i>Most Complex</i>



# Raising the Bar: Setting High(er) Expectations

- Reframe the question to offer a higher level of cognitive thinking for the student.
- When could this type of questioning be used to cognitively challenge students?
- Be prepared to share.

# Newsflash!





# Reflection

The purpose of today's session was demonstrating strategies for increasing student engagement through the integrated use of:

- **Substantive Student Discourse**
- **Visual Literacy**
- **Higher-Order Questioning**

# Recap: Newsflash!

- Imagine if you will that you are on the local evening news team.
- This just in... (blank) have been spotted in a classroom.
- You have only **1** minute before your anchor (*speaker for the group*) goes on the air.
- Oh no!! Viewer's have lost sound. What information can you share with them in under **one** minute in order for them to be successful using only visuals?

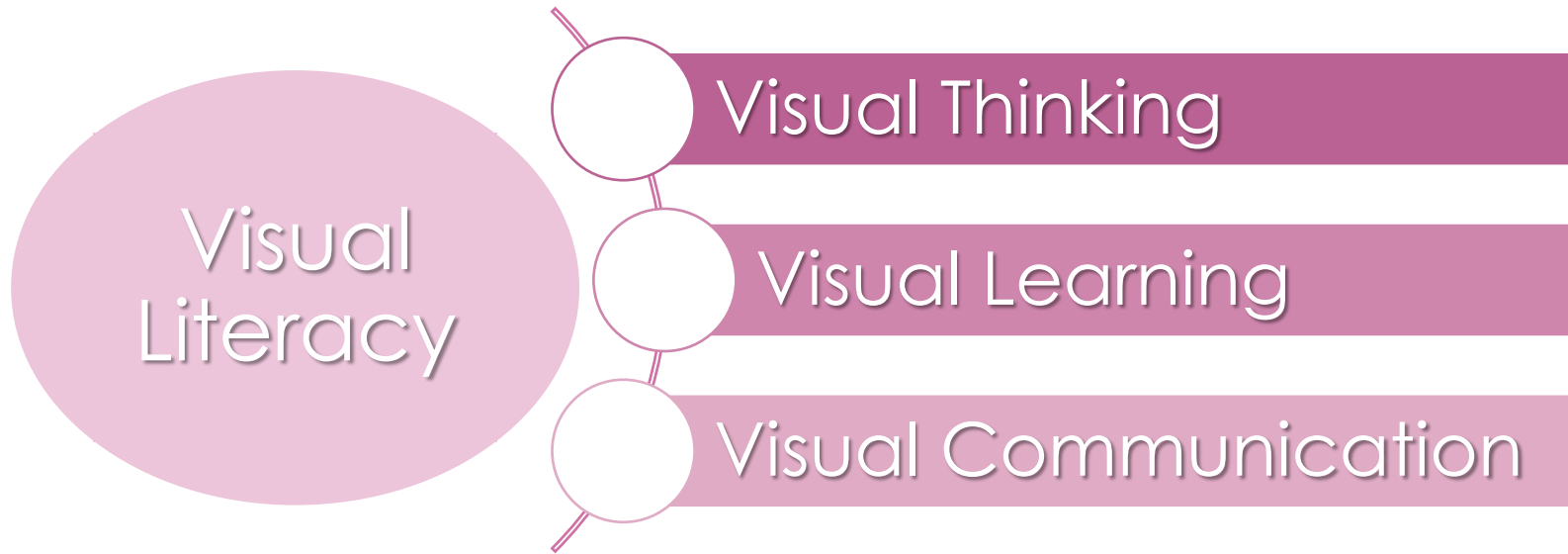


# Substantive Conversation

In classes with substantive conversation there is considerable teacher-student and student-student interaction about the ideas of a substantive topic.

The interaction should be reciprocal, utilize probing questions, and promote coherent shared understanding.

# Input vs. Output



## **Decoding (Receiving)**

Seeing, identifying, and deconstructing images for meaning

## **Encoding (Producing)**

Putting ideas together to create a visual representation of understanding

# Graphic Organizers

- Choose content that is difficult for students to organize or is poorly organized
- Develop an outline for the key ideas/concepts in the target information
- Select an appropriate format
- Construct both a completed teacher version and an incomplete copy of the student version to use during instruction



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