

# VISUAL THINKING WHOLE CLASS LESSON 3



## PURPOSE

The purpose of this lesson is to reinforce the concepts of critical thinking using visual and convergent thinking skills to decode messages.

## MATERIALS

### For duplication:

- the story *The Puzzlers' Club* to read aloud
- *Hexagon Hieroglyphics*
- *Creative Cryptography*
- *Sybil's Cipher*
- *PETS™ Behavioral Checklist - Visual Thinking*

### For projection:

- *Max's Mystery Message*

## LESSON PLAN

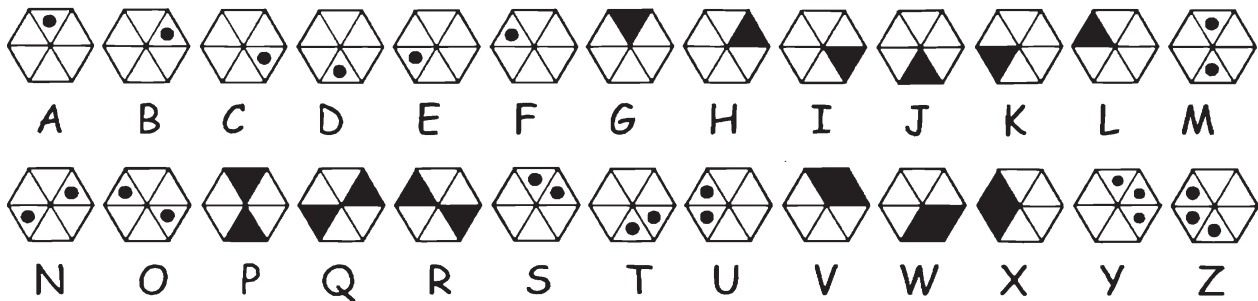
1. Review with students the characteristics of visual thinking emphasized in earlier lessons. Include in the discussion how visual thinking is related to convergent and divergent thinking. The following points about visual thinking need to be made:
  - Visual thinking combines analysis of visual clues, logical deduction, flexibility of perspective, and fluency of thought.
  - Shapes can be manipulated mentally, without concrete devices.
  - The eyes and brain must work together to think about given information.
2. Read the story *The Puzzlers' Club* aloud to students. The object of the story is to have students use what they have learned about visual and convergent thinking while working with codes.
3. In the story, some strategies for decoding are provided. Students may be able to decode *Max's Mystery Message* faster than it is decoded by the characters in the story. If so, have them verbalize their methods to use as strategies for future codes. Some strategies for solving codes are:
  - Letters that follow apostrophes are usually **S** or **T**.
  - Single letter words are usually **A** or **I**.
  - Write the same letter below all identical symbols.
  - Look for doubled symbols. Not all letters can be doubled.
  - Nearly all two-letter words consist of a vowel and a consonant.
  - The most common three-letter words are **THE** and **AND**.
  - Some codes are not random and can be deciphered by determining the pattern.



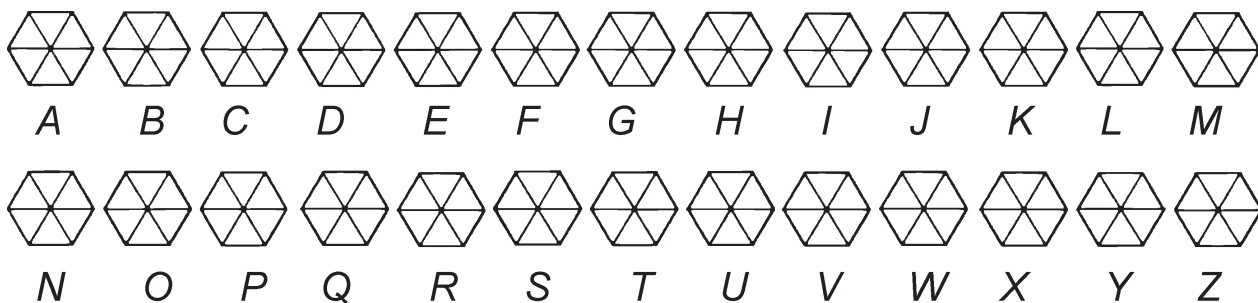
4. Distribute *Sybil's Cipher* to students. *Sybil's Cipher* is a picture code. To decode the message, students need to write the first letter of each animal picture. After decoding the message, be sure to discuss with students the pattern to this system. The message is: **The password to the club is cipher.**

5. Distribute *Hexagon Hieroglyphics* to students. *Hexagon Hieroglyphics* is a shape code that is more challenging than the previous codes. There is a pattern to the designs assigned to each letter of the alphabet, and using this pattern may help students decode the message. Three of the letters have been supplied. Teachers may choose to block out these letters prior to copying if a more challenging code is desired. The message is: **Bring a great puzzle to the first club meeting at Sybil's lab.** The correct code key is:

## Hexagon Hieroglyphics



Some students will find it easier to discern the code's pattern if they have 26 blank hexagons which they can fill in as they determine different letters. Put these blank hexagons, each matched with a letter of the alphabet, on the back of *Hexagons Hieroglyphics*.



### CHALLENGE PAGE

#### *Creative Cryptography*

6. *Creative Cryptography* is an opportunity for students to design an original code key. Encourage students to develop a code with a pattern in the same way that *Sybil's Cipher* and *Hexagon Hieroglyphics* followed a pattern. The goal of *Creative Cryptography* is to create a code that can be decoded using logical reasoning rather than having to refer to the code key. Coded messages should be written on a separate sheet of paper. These can then be given as puzzles for other students to decode.

## DIAGNOSTIC NOTES



The following is a short summary of what to look for in student behaviors and responses for Visual Thinking, Whole Class 3:

**GRASPS CONCEPTS QUICKLY** — Look for students who quickly decode and encode. These are students who are more able to differentiate symbols and associate them with the correct letter.

**SEES INTERRELATIONSHIP OF CLUES** — Look for students who use all available clues or ideas to try and figure out the pattern. In addition, look for students who recognize they have made errors in either decoding or encoding and correct their mistakes.

**MANIPULATES/INTERPRETS SHAPES MENTALLY** — There are many ways to solve codes. Look for students who forego the strategies and easily associate shapes with letters.

**DEMONSTRATES FLEXIBILITY OF PERSPECTIVE** — Look for students who think flexibly about the shapes and who try many approaches.

**SEES ANSWERS INTUITIVELY** — Look for students who seem to understand intuitively the codes presented. They often have the correct answer without being able to explain their methods.

**IS TENACIOUS** — Some students will especially enjoy this activity. An enthusiasm towards codes may indicate talent in this area.

**RETAINS INFORMATION** — When reviewing ideas from earlier lessons, look for students who clearly recall the concepts and then effectively apply them to the current lesson's activities. While many children may grasp concepts "in the moment" of the instructional lesson, these students exhibit the significant ability to retain and apply new learning across time.

### ***Sybil's Cipher* and *Hexagon Hieroglyphics***

Most important in the identification portion of this lesson will be those students who complete these activities correctly and independently. By discovering the patterns to the codes and using them, along with deductive logic, to decode the messages. Note these students in the appropriate box at the bottom of the *PETS™ Behavioral Checklist - Visual Thinking*.

### ***Creative Cryptography***

Students will generally develop three types of codes. A code that is completely random and generally solved by using the code key is the most common type devised by students. Students working at a higher level will develop a code with a system or pattern such as assigning each letter of the alphabet a number. This code has a definite pattern but may not be unique. Note especially those students who design a code with a system or pattern that works and is unique or subtle.



## THE PUZZLERS' CLUB

Dudley the Detective, Sybil the Scientist, and Max the Magician are known throughout Crystal Pond Woods for their convergent thinking abilities. One afternoon, as they sat studying the clouds in the sky, Max had a great idea.

"Dudley! Sybil!" Max said with growing excitement. "Let's start a club for those who are visual as well as convergent thinkers. We could have a special club name and hold meetings! We could share our favorite puzzles with each other."

"That's a great idea!" exclaimed Sybil. "The members could also take turns trying to find the most challenging puzzles to bring to the club meetings."

"Yes!" joined in Dudley. "I can't think of anything more fun than trying to solve challenging puzzles. Let's call our club **THE PUZZLERS' CLUB.**"

"That's a great name, Dudley. How should we let the others in the Woods know about our new club?" asked Sybil.

As the three friends thought about it, Max the Magician had a wonderful idea. "Why don't we devise a code? We could use it to write an invitation to the first club meeting! We can use shapes and lines to write the code," he suggested. "Then we know that those who come to the first meeting have already found the answer to the first puzzle."

"I think that's a great idea," enthused Sybil. "Did you know that a code itself is called a **cipher**?" Sybil the Scientist knew lots of scientific words.

"That's a very interesting word," interrupted Dudley.

"I have more words," continued Sybil. "When you rewrite a message in code it is called **encoding**. First, we have to decide what to write for our invitation to the first meeting, then we will have to create a code, and finally, we will write our invitation using the code we created."

"So we will **encode** our invitation," clarified Max. "What is it called when our friends are able to solve the code and read the message?"

“That’s called **decoding**. Our friends who come to the first club meeting will have already decoded our first puzzle!” exclaimed Sybil.



The three friends decided that Max the Magician would create the code. The next day, they met at Sybil’s laboratory and Max the Magician proudly displayed his encoded invitation.

*(Place **Max’s Mystery Message** on the projector. The decoded message is:*

**You are invited to the very first meeting of the Puzzlers’ Club. Meet at Sybil’s lab tomorrow. Puzzle lovers only! )**

“Let’s see if we can figure out the message, Sybil,” challenged Dudley.

“Wow,” worried Sybil, “it all looks like gibberish to me. I don’t know where to start.”

Dudley’s eyes lit up. “I have an idea,” he said thoughtfully. “Notice this apostrophe at the end of a word. It is unusual to have an apostrophe without a letter after it. Usually that happens after an **S**. I’m going to see what happens if I assign an **S** to that symbol.”

*(Demonstrate by pointing out the apostrophe in line 4 of **Max’s Mystery Message**.)*

“If you are correct,” replied Max, “then every symbol like that in the code stands for the letter **S**.” Max proceeded to write the letter **S** below each of those symbols.

*(Below each of the **S** symbols, write the letter **S**. The remainder of the story is designed to give students strategies to use when decoding puzzles. The story does not have to be completed; however, the strategies described should be presented to the class.)*

“That makes sense because that means there’s an **S** after the second apostrophe which is fairly common,” added Sybil.

Sybil and Dudley continued to stare at the coded message. “Oh, look!” exclaimed Sybil. “I recognize my name in the message! See — this word begins with an **S** and it only has five letters in it like my name.”

Sybil was correct and Max wrote her name below the symbols.



*(Fill in Sybil's name at the appropriate place.)*

“Don't you also have to fill in the symbols that we now know stand for **Y**, **B**, **I**, and **L** in the rest of the puzzle?” asked Dudley.

“Yes,” replied Max. “That is such an important part of the decoding process that I wanted to see if you would remember to do it!”

*(Write the appropriate letters below the symbols in the rest of the code.)*

“From one of my classifying activities, I know that **E** is the most commonly used letter of the alphabet. I wonder if the most commonly used symbol in this puzzle could be an **E**?” mused Sybil. “What do you think, Dudley?”

*(Ask students which symbol seems to be used most often. Point to the appropriate symbol.)*

Dudley looked carefully at the puzzle. “I think you may be right, Sybil,” answered Dudley. “I think it is an **E** because I see two places where that letter symbol is doubled, and **E** can be doubled.”

Max just smiled and wrote the letter **E** below each of the symbols Dudley had indicated.

Meanwhile, Sybil was working on the rest of the message. “Dudley, I think I recognize a system to this code. Don't you think each symbol sort of looks like the letter it is supposed to be?” Dudley listened to Sybil's logical reasoning and agreed with her. As Max filled in the letters below more symbols, the friends were able to decode the rest of the puzzle.

*(Ask students if they can think of a word that begins with the letter **I** and fits the context of the puzzle. As the puzzle is filled in on the projection copy, students will begin to guess the rest of the symbols quickly and correctly. Some students may even notice that the symbols may resemble the letters. After completing and reading the puzzle, finish the story.)*

Dudley and Sybil were so excited after decoding Max's puzzle, they decided to devise their own codes for the first meeting of **The Puzzlers' Club**. Can you decode their puzzles?

# Max's Mystery Message



\_From the desk of Max the Magician\_

1    ▽\*⊔    ΔΓΘ    ↑Δ▽↑⊥Θ

2    ⊥\*    ⊥∧Θ    ▽ΘΓ▽    (↑Γ∫⊥

3    ⊞ΘΘ⊥↑Δ-Θ    \*Γ    ⊥∧Θ

4    ●⊔▣▣|ΘΓ'    )|⊔3.

5    ⊞ΘΘ⊥    Δ⊥    √▽3↑|'√

6    | Δ3    ⊥\*⊞\*ΓΓ\*⊘.

7    ●⊔▣▣|Θ    |\*▽ΘΓ√

8            \*⊔|▽!



Name \_\_\_\_\_



# Sybil's Cipher

Can you decode this message from Sybil?

From the laboratory of Sybil the Scientist

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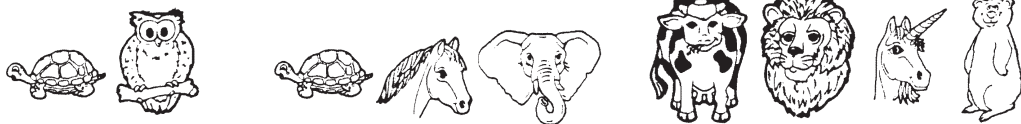


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