

# Reflections, Rotations, and Symmetry

## Letters of the Alphabet

1. Many of the letters in our alphabet have symmetry.

**A B C D E F G H I J K L M**  
**N O P Q R S T U V W X Y Z**

- a. Identify the capital letters that have reflectional symmetry.  
Sketch each letter you find and show all lines of symmetry.
- b. What state has reflectional symmetry when written horizontally?
- c. What four state names have reflectional symmetry when written vertically in capital letters?
- d. Write **at least** one word, name, or phrase that has reflectional symmetry when written horizontally.
- e. Write **at least** one word, name, or phrase that has reflectional symmetry when written vertically.

- f. **Identify** the **capital letters** that have **rotational symmetry**. Sketch each letter you find, and give its **angle of rotation**.
- g. Write **at least** one word, name, or phrase that has rotational symmetry.
- h. Do you see any relationship between the reflectional symmetry and the rotational symmetry of each letter that has both reflectional and rotational symmetry?
- i. What did you learn from exploring this task?

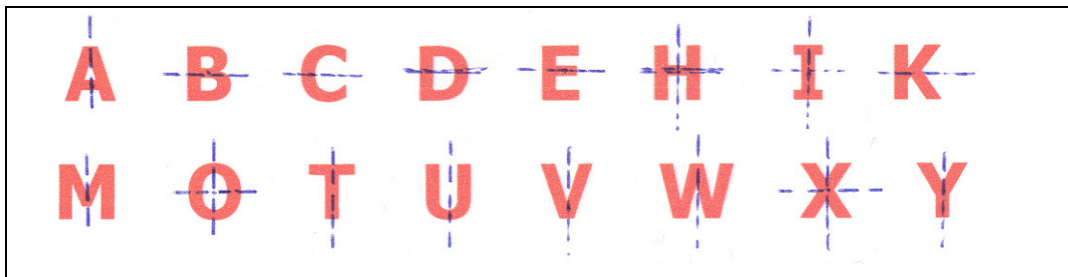
## ANSWER KEY

### Reflections, Rotations, and Symmetry Letters of the Alphabet

2. Many of the letters in our alphabet have symmetry.

**A B C D E F G H I J K L M**  
**N O P Q R S T U V W X Y Z**

- j. Identify the capital letters that have reflectional symmetry.  
Sketch each letter you find and show all lines of symmetry.



- k. What state has reflectional symmetry when written horizontally?

**OHIO**

- l. What four state names have reflectional symmetry when written vertically  
in capital letters?

<b>H</b>	<b>O</b>	<b>U</b>	<b>I</b>
<b>A</b>	<b>H</b>	<b>T</b>	<b>O</b>
<b>W</b>	<b>I</b>	<b>A</b>	<b>W</b>
<b>A</b>	<b>O</b>	<b>H</b>	<b>A</b>
<b>I</b>			
<b>I</b>			

- m. Write **at least** one word, name, or phrase that has reflectional symmetry when written horizontally.

**KICK, HIKE, BOX, COD, CODIE, COOKIE, HE, CODIE DID  
DIE, BED, HIDE, I, A, DID, BID, BOB, BE, HO, HO, HO,  
CODE, COKE, CHICK, DO, OH, I KICKED EDDIE,**

- n. Write **at least** one word, name, or phrase that has reflectional symmetry when written vertically.

WHAT MUMMY	WHAT MOMMY	ANTHONY	WHAT HAM	HIHOHO	MATH	HOHOHO	WHAT	WHAT MOM	WHAT TODOMATH	YOYO	WHAM
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HAY WAXY TOMMY HAT WOW MY WHAMMY MOM WHY AT MAMA HI

H	H	H	T
A	I	U	I
M	M	M	M

Some students wanted to write phrases that had some words with horizontal symmetry and some words with vertical symmetry. Here are some examples:

H      Y      T      W      Y      H  
 O   DID   O   DO   H ?   H   DID   O   KICK   I   CODIE ?  
 W      U      A      Y      U      M  
                  T

- o. Identify the **capital letters** that have **rotational symmetry**. Sketch each letter you find, and give its **angle of rotation**.

H I N O S X Z

The angle of rotation for each of the above letters is  $180^\circ$  (You just turn each letter upside down.).

- p. Write **at least** one word, name, or phrase that has rotational symmetry.

SOS, MOW, NOON, ZOOZ, SIS, I, XOXOX,  
 NOXON, SHOHS, SHIHS, OZZO, IZZI,  
 NON,

- q. Do you see any relationship between the reflectional symmetry and the rotational symmetry of each letter that has both reflectional and rotational symmetry?

The number of lines of symmetry multiplied by the angle of rotation is equal to  $360^\circ$ .

- r. What did you learn from exploring this task?