STEM Activity

Decoding Secret Messages

Name: ______________________

1.

A O B X J F Q, Z L A B F Q, Y R F I A F Q

2.

M F D G U C A F Y L Z W O G J D V L Z J G M Y Z

K L W E

3.

J Y L H A P U N A V T V Y Y V P'Z Z V S B A P V U Z

4.

O A X V R V J P R W J C R X W C X

R W W X E J C R X W

5.

P D A O G U E O J K P P D A H E I E P,

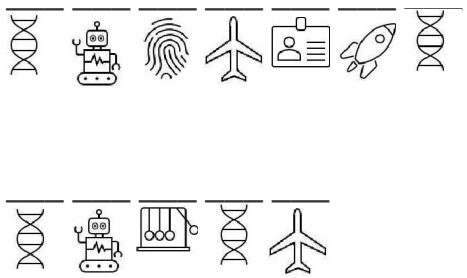
E P'O P D A O P W N P E J C L K E J P

STEM Activity

Decoding Secret Messages

Name:

1.



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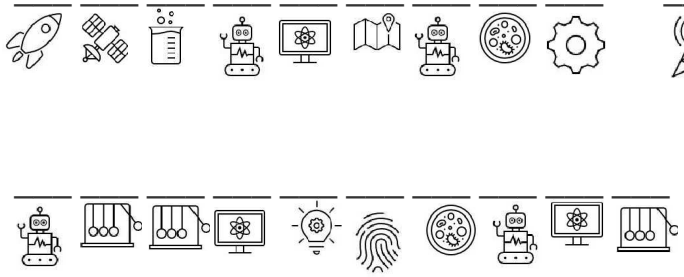
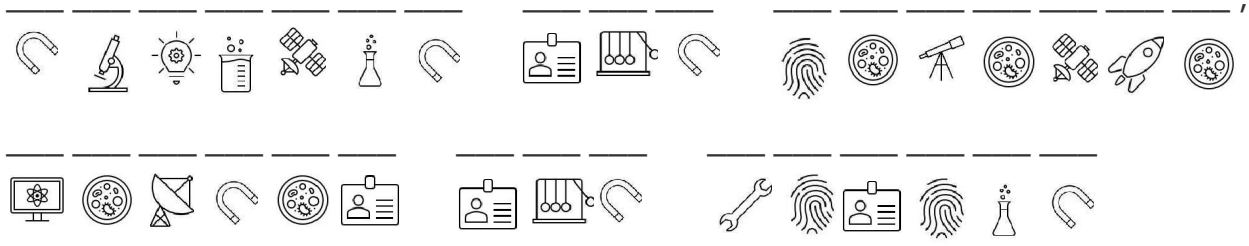


3.



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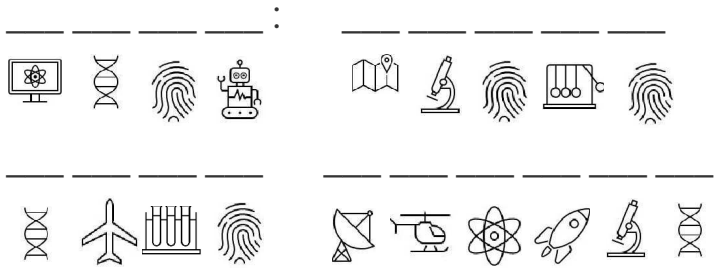
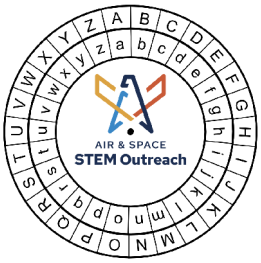


AIR & SPACE
STEM Outreach

ANSWER KEYS

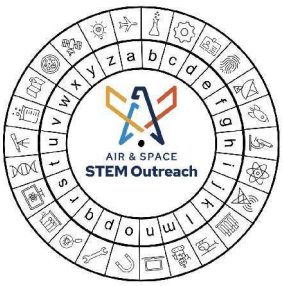
Decoding Secret Messages

LETTER CIPHER



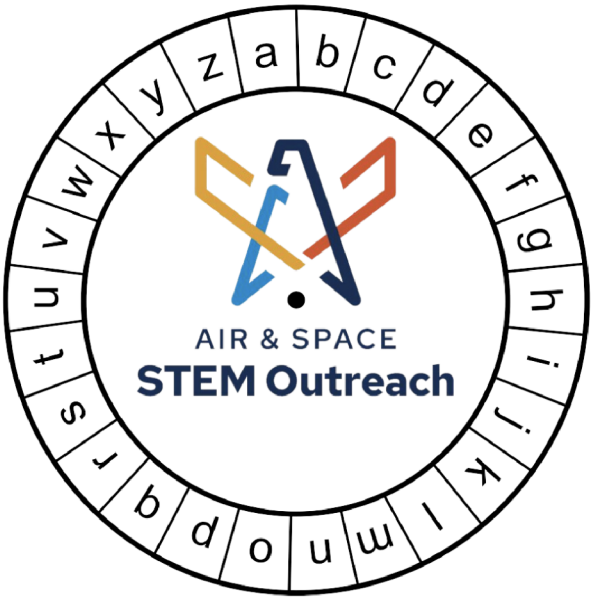
1. DREAM IT, CODE IT, BUILD IT
   - Hint: a = D
2. UNLOCKING THE WORLD THROUGH STEM
   - Hint: a = I
3. CREATING TOMORROW'S SOLUTIONS
   - Hint: a = T
4. FROM IMAGINATION TO INNOVATION
   - Hint: a = R
5. THE SKY IS NOT THE LIMIT, IT'S THE STARTING POINT
   - Hint: a = E

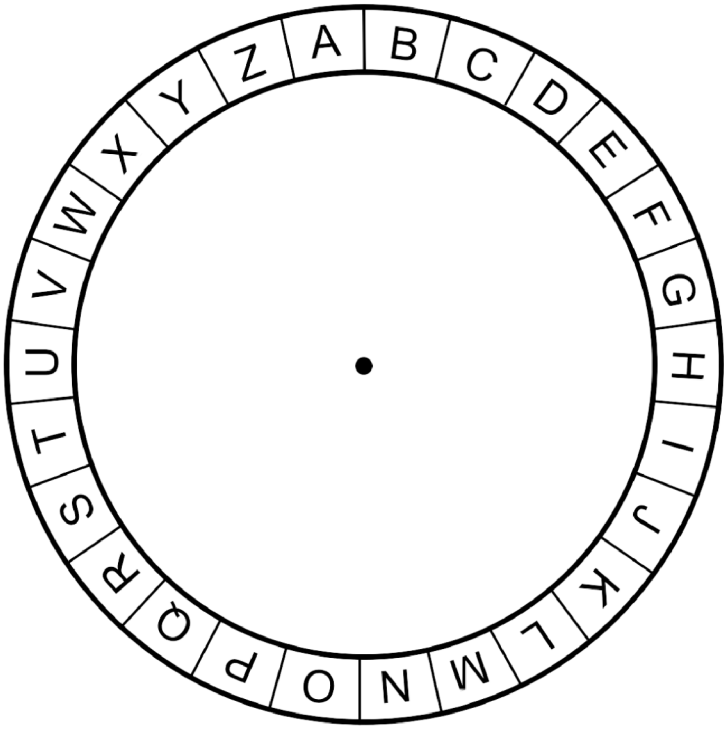
PICTURE CIPHER

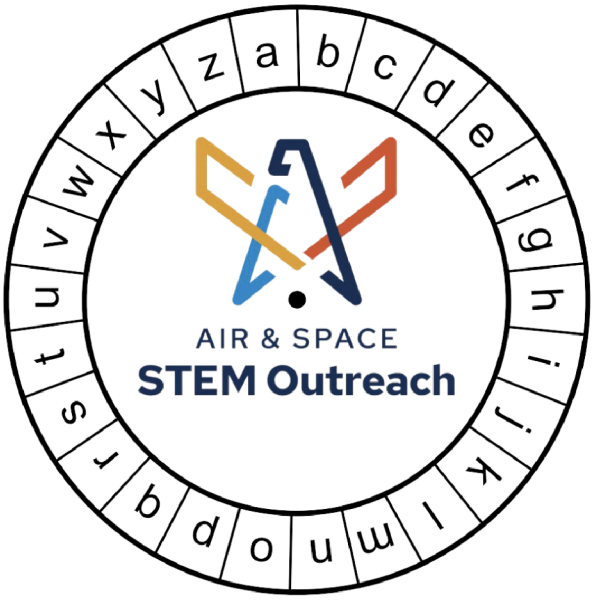


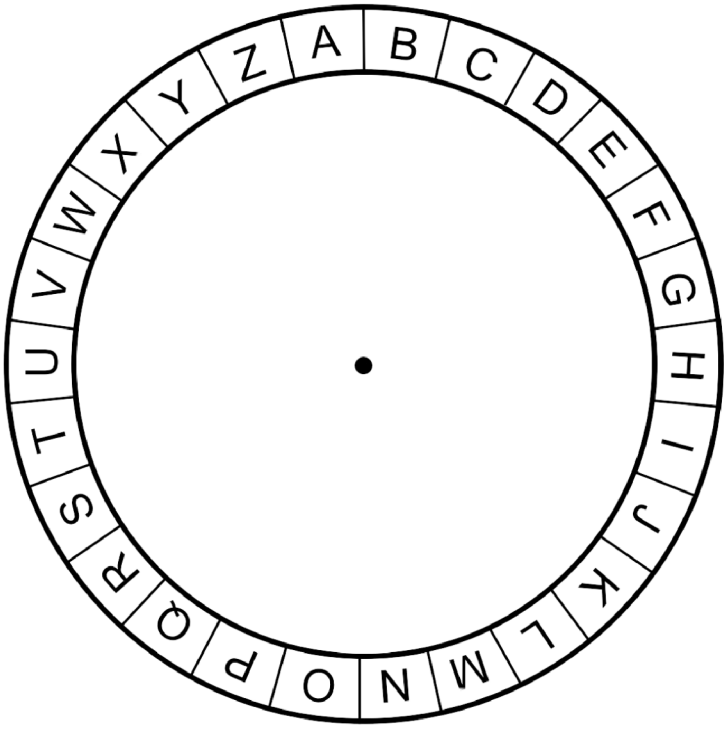
1. EXPLORE, EXPERIMENT, EXCEL
   - Hint: a = 
2. CURIOSITY FUELS INNOVATION
   - Hint: a = 
3. EXPLORE THE UNKNOWN, INVENT THE FUTURE
   - Hint: a = 
4. STEM: WHERE IDEAS TAKE FLIGHT
   - Hint: a = 

Letter Cipher

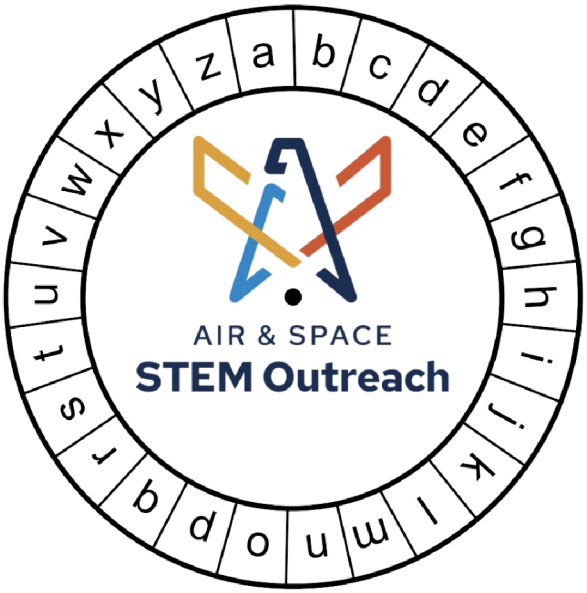


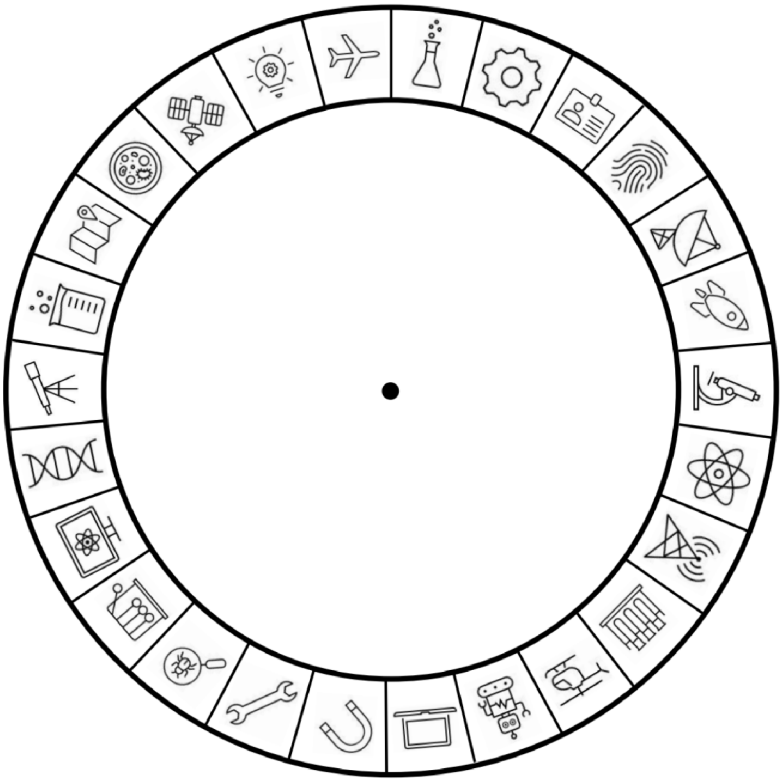


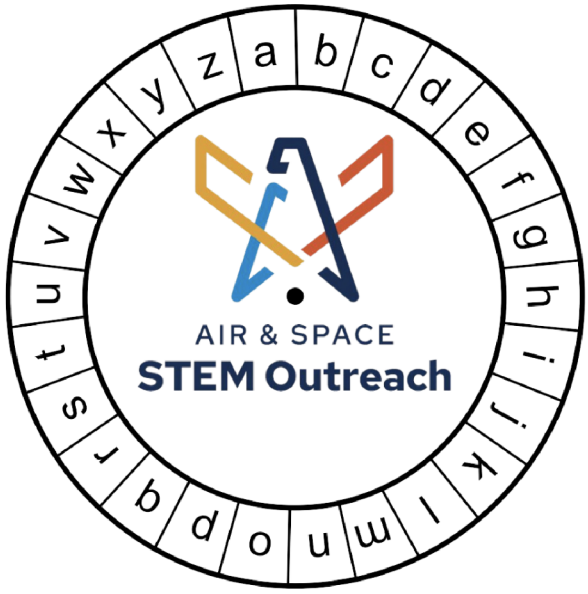


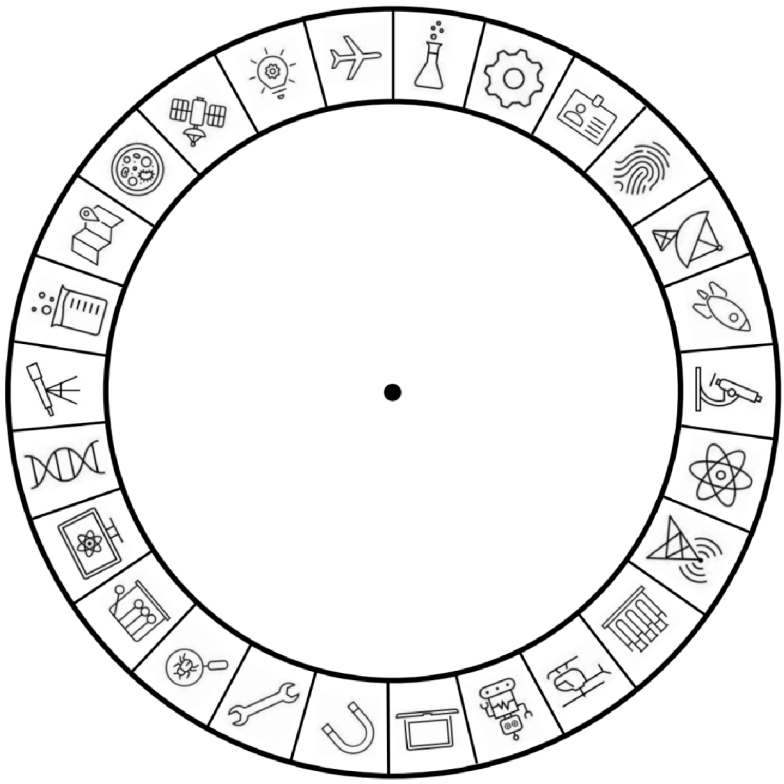


Picture Cipher









STEM Activity

Cipher Wheels

GRADES: 3-5

TIME: 30 Minutes

OBJECTIVE:

Students will learn how cipher wheels work to encode and decode secret messages, using basic concepts of cryptography and pattern recognition. They will create their own cipher wheels and use them to send messages with letters and/or pictures.

MATERIALS:

- Printed copies of cipher wheels
- Scissors
- Brass fasteners (split-pin fasteners)
- Hole puncher

OTHER RESOURCES:

- Crayons or colored pencils for decorating picture ciphers

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LITERACY CONNECTION:

- Code Breaker, Spy Hunter: How Elizabeth Friedman Changed the Course of Two World Wars by Laurie Wallmark (Most likely cataloged in libraries as B FRIEDMAN)

STANDARDS:

- 4-PS4-3 Generate and compare multiple solutions that use patterns to transfer information.

CRITICAL TECHNOLOGY ALIGNMENT:

- Cybersecurity
- Data Encryption

INSTRUCTIONS:

Introduction

- If possible, begin by reading aloud ***Code Breaker, Spy Hunter: How Elizabeth Friedman Changed the Course of Two World Wars*** by Laurie Wallmark to introduce the concept of cryptography and its historical significance. Afterward, explain how secret codes have been used throughout history to send messages. Highlight that cipher wheels were one method used to encode letters into secret messages.

Activity

- Provide students with paper copies of cipher templates, scissors, and a brass fastener.
- Ask students to cut out their cipher circles. Walk around with a hole puncher and allow students to puncture the center of their ciphers.
- Instruct students to stack their smaller cipher wheel on top of the larger one and connect them with the brass fastener.
- Once completed, pass out the secret message worksheet attached for students to decode.
- If students are struggling for a while offer them the hint given on the answer key. Try not to give them a hint for every code.

Conclusion

- After decoding their secret messages, ask students: "What challenges did you face when decoding the messages?" and "How do you think ciphers are used today to protect information?"
- Emphasize that ciphers are tools used to send secure messages.

Extension Activities

- Let students encode their own messages on the back of their worksheets for their peers to decode.
- Have students create their own cipher wheels using different symbols or a mixed up alphabet.