

Innovate With Tech!



1. Do the activities listed in the Assignments box.
2. Type in your work at the bottom of each assignment.

Assignments	Due Date

Assignment 1: Read Coded Messages

1. Challenge a family member to work with you to predict the definition of **cryptologist**.

HINT: A cryptologist is a bit like a security guard. What does a security guard do?

2. Discuss the following definition of a cryptologist’s job with your family member.

- A **cryptologist** protects private information by *encrypting* it, or using a secret code to change how it looks (like changing information from actual words into nonsense words). Only someone who knows the rules of the secret code (or has secret information like a password) can change the information back into its readable form.

Nowadays, a cryptologist usually uses technology for encryption.

Describe what the word **encrypting** might mean using your own words. Then look up the words and type the definition below.

- **encrypting:**

3. Look at the code in section one of the **Crack the Code!** activity sheet. This message was encrypted using a code called ROT1, where each letter in the alphabet has been shifted or “rotated” backward **one** place. (This kind of code involves math because you have to know what “one” means!)

Page 8

ROT1 is an example of **symmetric encryption**—a method that uses the same mathematical key to code and decode a message. The key applies to the entire message, not just part of it.

4. Look at section two of the **Crack the Code!** activity sheet. These emojis can be used in another type of encryption called tokenization.

Tokenization is an approach to protecting data that doesn't use math or a key. Tokenization randomly assigns one letter of the alphabet (or punctuation) as a token that stands in for sensitive data.

5. Complete the chart below.

TYPE OF ENCRYPTION	DOES IT FOLLOW A KEY OR IS IT RANDOM?	DOES IT USE MATH OR NOT?
Tokenization		
Symmetric encryption		

In **symmetric encryption**, you can break the code by finding the key or learning the rule. **Tokenization** provides stronger protection since each letter's token is randomly assigned and cannot be deciphered through logic.

6. Use section two of the **Crack the Code!** activity sheet to create a code using emojis and write your own message.

Exit Slip: Answer the three questions below.

- 1. Describe** some of the uses of encryption. How might a bank or a hospital use encryption?
- 2. Explain:** Which one is safer: symmetric encryption or tokenization? Explain your reasoning.

3. **Write** your name using symmetric encryption or tokenization. Then, explain your method.

Assignment 2: Finding Fraud With Patterns

1. **Challenge** a family member to work with you to define **fraud detective**.

HINTS:

- Someone who commits **fraud** tricks someone, usually to take their money in a way that breaks the law. Fraud may involve someone pretending to be someone they aren't. Some frauds are committed online.
- A fraud detective is a type of detective. What do detectives do?

2. **Discuss** the following definition of a fraud detective with your family member.

- A **fraud detective** uses technology to collect data and look for patterns. If they see something that doesn't fit the pattern, it could mean someone is making purchases with money or credit cards that don't belong to them.

3. **Complete** the **Find the Fraud** activity sheet.

Page 9

List the charts that show data that does not fit the pattern.
Which points suggest there may be fraudulent behavior?

Project:

1. **Select** a STEM career (see examples below) and **do research** to find out:

- What are the job **tasks** of the STEM career you are researching?
- What are the skills and strengths required in this career?

NOTE: You can research one of the career examples below or choose your own.

STEM career examples: data scientist, tech innovator, gaming engineer, software developer, architect, User Experience (UX) designer, quality assurance analyst, information technologist.

2. **Read** the skills and strengths on the **STEM skills sheet**. Choose the qualities that you think would be important to the STEM career you researched. **Create** your own word cloud with those qualities.

Page 10

Assignment 3: Staying Safe Online

1. **Think about** the last four activities you did and where you did them. Imagine you left a cookie in each of those places. If someone found the cookies, would that give them a clue as to where you were and what you were doing?

2. **Read** the passage below to learn about online cookies and ways to stay safe online.

Online Cookies + Online Safety

When you look at a web page, the browser saves a piece of data from that page called a cookie. You can't see the cookies, but they form a trail of clues about you online. When you are online, it's easy to think about all the pictures, games, and information you can find, but the internet is not a one-way street. While you are browsing the internet, the computer is storing information about you. And there are other people online looking for ways to get to your private information. Here are five ways to stay safe:

- Create strong passwords (example: a long password with letters, numbers, and special characters).
- Don't use your real name as a screen name or username.
- Keep your social media posts clean and appropriate.
- Don't give out your full name, address, or phone number to anyone.
- Avoid public WiFi—if you have to use WiFi at a coffee shop, library, or other public place, don't enter passwords and other sensitive information.

3. **Complete** the Make Safe Decisions Online activity sheet to demonstrate what you know about online safety.

Page 11

4. **Read** the three actions below. Then fill in the chart explaining what the risk is and how to make the behavior safer.

Action	Risk	How to Make It Safer
I made my password my dog's name.		
I clicked on a pop-up ad to download a free catapult game.		
My sister posted a picture, tagged her friends, and "checked in" at their school.		

Exit Slip: Answer the three questions below.

1. **Why** do you think that passwords are important?
2. **How** can you keep your personal information safe?
3. **Why** should you avoid strangers online? What should you do if you're not sure if someone is a stranger or not?

Project:

- **Brainstorm** an innovation that can help keep kids safer online.
- **Draw** it on a sheet of paper or use the drawing tool in Google Docs (click the Insert menu, then click Drawing).
- **Describe** your innovation in writing below.

About my online safety innovation:

Assignment 4: How Artificial Intelligence Works

1. Review the **Explore the Artificial Intelligence** sheet with a family member. Read the AI Terms and definitions together. Then complete the activity sheet.

Page 12

2. Read the technology innovations in the chart below. Use the AI Terms on the **Explore the Artificial Intelligence** sheet to identify the types of AI technology that you think may be used in each innovation.

INNOVATION	AI TECHNOLOGY	HOW IT WORKS
Digital water bottle that tells you when you're dehydrated		
Seatbelt alert that lights up and flashes when you forget to buckle up		
App that blocks websites from tracking kids' activity online		
App that translates American Sign Language to help deaf and hearing people talk to each other		
Drone that delivers medical supplies to help wounded soldiers		

3. Read the definition of AI below:

Artificial Intelligence results when humans create algorithms (steps) that computers can follow to make “choices” in order to complete tasks, using large amounts of data to find patterns and get better at making choices over time.

Name three ways AI is similar to human intelligence and three ways that AI is different from human intelligence.

SIMILARITIES	DIFFERENCES

Project:

1. **Review** the innovations described in Step 2 above. These innovations use artificial intelligence to help humans.
2. **Brainstorm** your own idea for an AI innovation that can help humans.
3. **Write** your idea below. Then describe the AI technology it will use.

MY AI IDEA	AI TECHNOLOGY IT WILL USE

Bonus Activity: Meet a Real-Life Security Expert

Watch the **Meet a Real Life Cybersecurity Expert** video.

Go to: bit.ly/tech4innovation30

Write down three tips from the video. Explain why you think these three tips are important.

EXPERT TIP	WHY IT'S IMPORTANT

NAME _____

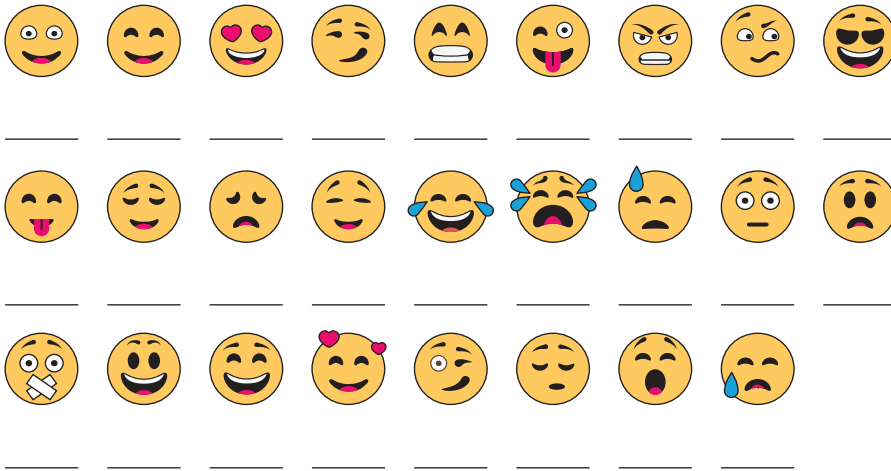
Crack the Code!

You are a cryptologist and have been given the task of deciphering and encrypting messages. Go!

1. Fill in the key on the ROT1 Code at right and then use the key to unlock this message:

J BN B DSZQUPMPHJTU

2. Create a token vault by randomly assigning a letter of the alphabet to the emoji below. Then, use tokenization to create your own secure message using the emoji in place of letters. Can your classmates crack your code?



Write your secure message here using the emoji code you created.

ROT1 CODE

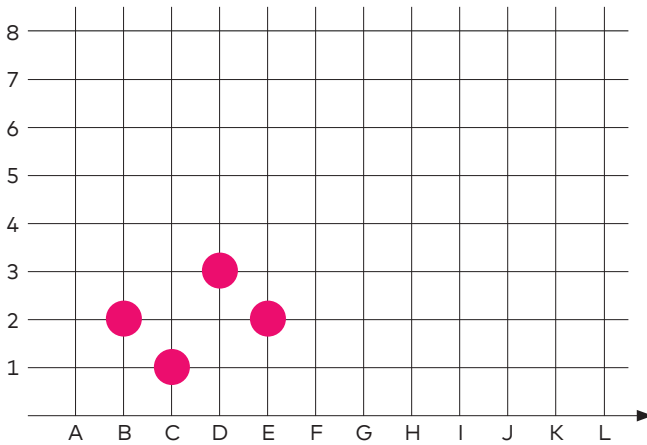
Code	Letter
A	Z
B	A
C	B
D	C
E	D
F	E
G	F
H	G
I	H
J	
K	
L	
M	
N	
O	
P	
Q	
R	
S	
T	
U	
V	
W	
X	
Y	
Z	

NAME _____

Find the Fraud!

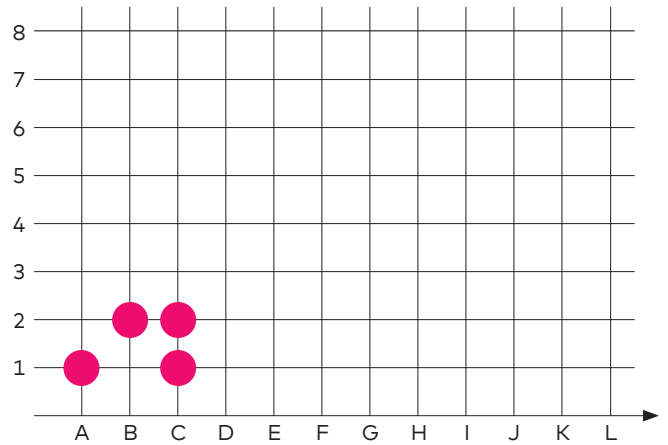
Finish plotting the data points on the graphs below. Then look for purchases among the four customers that don't fit the pattern. Make note of any red flags that point to signs of potential fraudulent behavior.

How often Amela makes a purchase



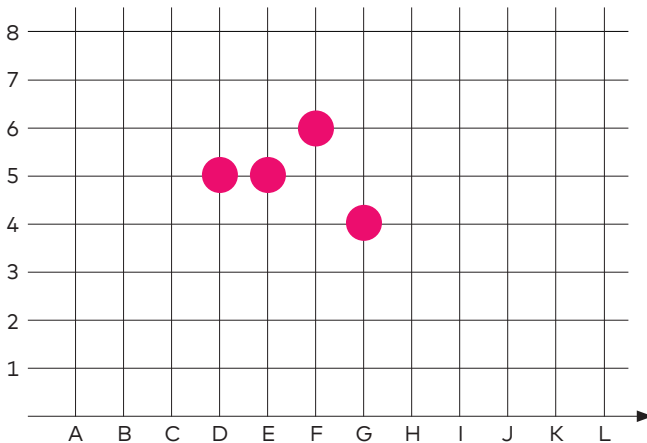
Plot the rest of the data:
E7, G1, G2, H3

How often Kwame makes a purchase online



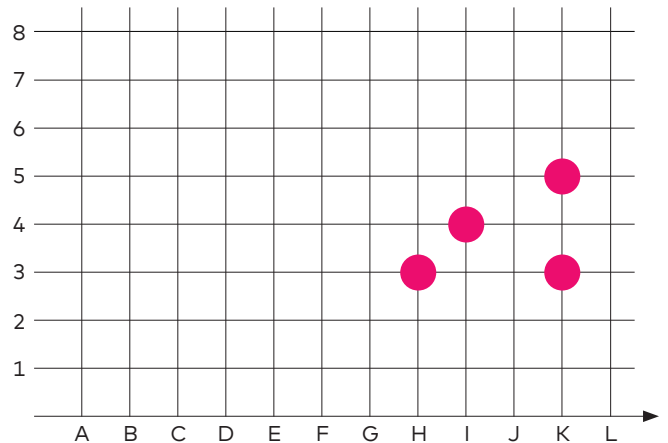
Plot the rest of the data:
C3, D1, D2, D3

Types of things Nadeem purchases

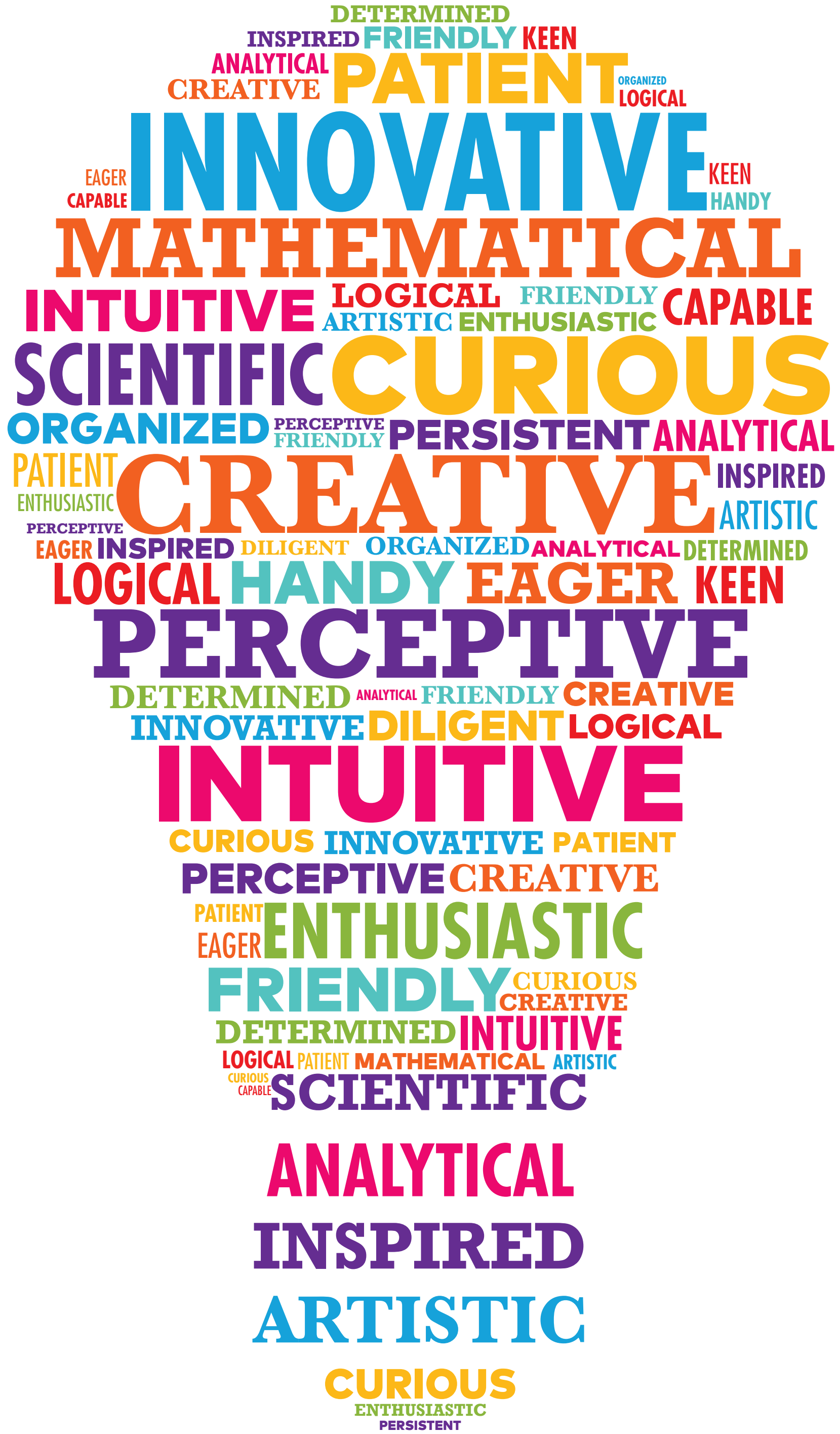


Plot the rest of the data:
E4, G5, H5, H6

Places Yumi makes purchases



Plot the rest of the data:
A1, F3, F4, G4



What are your skills?



Name _____

Make Safe Decisions Online!

Imagine this is *your* daily online diary. For each sentence about safety, fill in the blank space with the correct vocabulary word from the list below.

trusted | date | purchases | strong | virus | public

MY HOUSE 7:12 a.m.	I was watching a video before school. A pop-up told me I won a free tablet! I didn't click on it. Clicking the link might download a _____.
MY SCHOOL 9:35 a.m.	Our teacher had us create accounts for our classroom computers. I made a very _____ password that would be hard for someone to guess.
THE MUSEUM 1:30 p.m.	I took lots of pictures on our school trip to the museum. Each photo stored information about our location and the _____ it was taken.
THE LIBRARY 3:10 p.m.	I made sure to log out of my account at the library. It's super important not to leave yourself logged in on _____ computers!
FRIEND'S HOUSE 4:15 p.m.	My friend and I were playing an online game when someone in game chat asked me where I lived. I told a _____ adult right away. I know it's not OK to give personal information to a stranger online.
GAS STATION 5:37 p.m.	My grandfather and I refilled his car's gas tank. He forgot his credit card at the pump and saw that someone else used it when he reviewed his _____ online.



Reflection Questions

1. Why do you think that passwords are important?
2. How can you keep your personal information safe?
3. Why should you avoid strangers online? What if you're not sure if someone is a stranger or not?

Name _____

Explore Artificial Intelligence

AI is all around us! Complete this chart to organize your ideas.

	AI Term	Example	Another Example	Ways It Can Solve Problems and Help People
1	autonomous: something built to work on its own (without a human operating it)	robot vacuum		
2	chatbot: a program that has been set up with automated responses so it can have a "conversation" with a human	confirming a doctor's appointment through automatic text messages		
3	facial recognition: a program that can identify faces	using your face to unlock a smartphone		
4	machine learning: a program that processes large amounts of data in order to find patterns and get better (over time) at making choices	over time, a map app gets better at predicting traffic		
5	predictive algorithm: the steps a computer follows to make predictions	a search engine predicts what you want to search for before you finish typing		
6	speech recognition: computers that match sounds to words	voice typing		