Outline:

Use selected on-line articles to explore current issues related to crypto currencies such as BitCoin. A focus for learning is: the underlying technologies, impacts on society, and impacts on the environment.

Objectives:

* C1.4 describe how electronic access to information influences our everyday lives.
* C2.1 describe the negative effects of computers and computer use on the environment.
* C3.1 describe legal and ethical issues related to the use of computers.

**Level 1: Cryptocurrencies & Blockchains**

Read the following resources before answering the questions below:

* <https://www.investopedia.com/tech/most-important-cryptocurrencies-other-than-bitcoin/>
* <https://www.investopedia.com/terms/b/blockchain.asp>
* <https://www.cryptoandgamers.com/>

1. What is a “cryptocurrency” and how are “cryptocurrencies” different from traditional currencies (money)?

Cryptocurrency is virtual money that takes the form of a token or coin such as Bitcoin.

|  |  |
| --- | --- |
| **Difference** | |
| **Cryptocurrencies** | **Traditional Currencies** |
| **Virtual Money** | **Real Money that can be touched** |
| **Allows you to control your finances** | **Your finances are controlled by the bank** |
| **No one knows the amount or location of your wallet** | **The bank and the government knows the amount or location of your wallet** |

1. BitCoin is the leading cryptocurrency that most people know. What are some other cryptocurrencies and what are their unique features?

Ethereum

- Uses blockchain technology to enable the creation of smart contracts

Ripple

- Has its own cryptocurrency

- Can transfer money between countries

Bitcoin Cash

- Fix the scalability

Litecoin

- Improve speed and scalability of peer-to-peer transfers

- Uses memory-intensive proof-of-work system

EOS

- Allows a 5% inflation to develop the network further

Cardano

- Allows token holders to take part in the governance of the blockchain

- A highly secure platform that uses advanced cryptography to keep the tokens safe

Stellar

- An open source, distributed, and community-owned network

- Facilitate cross-asset transfers of value

NEO

- Will enable forming of identity information of organizations, people, and institutions in the electronic form

- Identities can be used via multifactor authentication such as fingerprint

Monero

- Encrypts data about the sender, receiver, and the amount sent

- Nobody can actively trace the currency back to its source

1. “Blockchains” are the basic technology behind cryptocurrencies and other emerging technologies. Explain blockchains work with respect to:
   1. What they store

Blockchains store data such as the transaction date, time, and amount of money used, sent or received. They also store data about who was involved in the transaction through a unique “digital signature” of the person.

* 1. How they work

Every new data stored is added to the blockchain. However, it only occurs when:

First, a transaction must happen.

Secondly, the transaction must be verified.

Thirdly, the transaction must be stored in a block.

Lastly, the block will be given a unique, identifying code called hash

* 1. How they are secure and private

The participants have their own private keys that are assigned to the transactions they make and these keys acts as a personal digital signature. Blockchains cannot be changed with one computer power. Also, altering the information of one block requires the change of all blocks from the blockchain as all blocks are linked together.

* 1. How they use public and private encryption keys

The public encryption keys are used to create public addresses that the participants use to send and receive funds. Private encryption keys are kept secret and are used to sign a digital transaction to make sure the origin of the transaction is legitimate.

1. How does BitCoin use blockchains?

Bitcoin uses blockchains to buy, sell, exchange and transact their currency.

1. What are some other real-world applications of blockchains?

Digital Voting

Data Sharing

Real Estate

Food Safety

Electronic Health Records

1. What are some advantages and disadvantages of blockchains?

|  |  |
| --- | --- |
| **Pros** | **Cons** |
| **Criminal activity such as fraud is very difficult to attempt on the blockchain.** | **Criminal acts are still possible on the blockchain as long as the flaws of the blockchain security are known.** |
| **Data stored on blockchain can neither be erased nor undone.** | **All data stored are accessible by every participant who wants to see. That means that there is almost no privacy to these data.** |
| **Funds can be transferred across the globe. This transaction is done fast, securely and cheap.** | **The consumption of power in Blockchain is very high** |

1. Blockchain-based games are the latest development in the gaming industry. Research the topic “Crypto Games” (google) to answer the following questions.
   1. What are some interesting Crypto Games available for Android or iPhone?

Bitcoin BIllionaire

SaruTobi

BitJoy Games

Spark Profit

Cryptocoin Drop

* 1. How are they different from conventional games?

Crypto Games help you earn virtual money as you play these games.

**Level 2: Bitcoin & Society**

Read the following resources before answering the questions below:

* <https://www.cnet.com/how-to/what-is-bitcoin/>
* <https://www.independent.co.uk/life-style/gadgets-and-tech/news/bitcoin-price-fall-criminals-blockchain-anonymous-cryptocurrency-zcash-monero-dash-a8174716.html>
* <https://coincenter.org/link/why-ransomware-criminals-use-bitcoin-and-why-that-could-be-their-undoing>

1. Who created BitCoin and who owns BitCoin now?  
   Satoshi Nakamoto created BitCoin. He and Martti Malmi own BitCoin now as they are both the first two developers of BitCoin.
2. How is BitCoin created and what is "BitCoin Mining"?  
   BitCoin is created by a competitive and decentralized process called mining. Individuals are rewarded by the network for their services. BitCoin Mining is a process that allows participants to receive BitCoin.
3. Can you buy BitCoin and what does it cost?  
   You can buy BitCoin as long as you have connected your bank account to pay for BitCoin purchases. One BitCoin costs 5042.05 Canadian dollars.
4. Why would you want to buy BitCoin and what can you use it for?  
   I would want to buy BitCoin as there is a limited amount of BitCoin in this world and this currency is considered as the new gold. BitCoin can be used for buying gifts, booking flights or hotels, and many other things.
5. What are the risks of using BitCoin?

* Financial loss
* Limited Use
* Fraud
* Little or no regulations

1. How much of BitCoin business is related to criminal activity?  
   Fraud, hacks, thefts and many other crimes are common criminal activity that is related to BitCoin business
2. What are some of the reasons why criminals use BitCoin?  
   Some reasons why criminals use BitCoin are due to tax evasion, extortion, money laundering and contraband transactions.
3. What are some of the disadvantages of BitCoin when used for criminal activity?  
   The transactions made for criminal activity will be forever recorded on the blockchain. Also using bitcoin can help the authorities to trace the criminal.
4. Many people dislike BitCoin because they think it is only good for criminal activity.   
   Is this true? Write a supported opinion paragraph (SOP) to explain your position.  
   Many people dislike BitCoin because they think it is only good for criminal activity. In my opinion, this statement is true as stolen bitcoin cannot be tracked, criminal activities such as fraud can happen and there are little or no regulations in bitcoin that allows criminal activities to happen. First, stolen bitcoin cannot be tracked as any payments done with bitcoin are seen as anonymous when one wants to see the online wallet of the owner. Second, criminal activities such as fraud can happen as Bitcoin is public to anyone. All transactions and balance of any address can be seen by anyone, thus allowing the criminal to hack the account and steal from the victim. Lastly, there are little or no regulations in bitcoin that allows criminal activities to happen. Bitcoin provides the participants with little regulations to give them more freedom to use cryptocurrencies to show the difference between real banks and the bitcoin system. This allows criminal activities to be very severe. It is, therefore, true due to stolen bitcoin being untraceable, criminal activities such as fraud happening and little or no regulations in bitcoin that allows criminal activities to happen.

Guidelines for writing a supported opinion paragraph (SOP)

* <http://schools.peelschools.org/sec/fletchersmeadow/studentlife/OSSLTprep/Documents/Sample_%20Writing%20a%20Supported%20opinion%20paragraph.pdf>

**Level 3: Bitcoin & The Environment**

Read the following resources before answering the questions below:

* <https://www.cbc.ca/news/business/bitcoin-electricity-1.4668768>
* <https://www.cbc.ca/news/business/hut8-medicine-hat-bitcoin-mining-1.4834027>

1. What is a BitCoin “miner” and why are people concerned about BitCoin mining?  
   A BitCoin miner uses special software to solve math problems and is issued a certain number of bitcoin in exchange. People are concerned about BitCoin mining as the faster the math problems are solved, the harder these problems become. Having harder math problems requires lots of energy to be used by the system.
2. Why does BitCoin mining use so much energy?  
   Because the math problems solved by BitCoin miners keep on getting harder. This causes lots of energy to be used while they are being solved.
3. Why has Hut-8 decided to locate its facility in Alberta when its head office is in Toronto? What does the city of Medicine Hat provide that is required for mining BitCoin?  
   Lots of energy is being produced which is beneficial in BitCoin mining.
4. What benefits does the city of Medicine Hat expect to see from this BitCoin facility?  
   Benefits that the city of Medicine Hat expect to see from Hut-8 are the rise in the economy, making the city more visible to the rest of the world, great demands of energy in Canada or outside, and many other benefits.
5. What concern does the city of Medicine Hat have about from this Bitcoin facility?  
   Hut-8 is becoming the cause of severe heat waves in the city and making the residents spend lots of electricity on air conditioning.
6. What concern do environmentalists have about the Medicine Hat facility and about BitCoin mining in general? E.g. how does BitCoin mining harm the environment?  
   Using a large amount of energy for bitcoin mining caused a severe rise in temperature at the location of Hut-8.
7. If Hut-8 wanted to build a facility in Brampton, would be in favor of this proposal. Write a SOP to justify your position.

Hut-8 is a facility that is in charge of mining bitcoin. If Hut-8 wanted to build a facility in Brampton, this proposal would not be in favour as it consumes a massive amount of energy, is a contributor to climate change and makes the residents of the city use more air conditioning. First Hut-8 consumes a massive amount of energy for bitcoin mining. Bitcoin mining requires bitcoin miners to solve math problems to acquire bitcoins. However the harder the math problems are, the more energy is consumed to solve them. Second Hut-8 is a contributor to climate change as it consumes a lot of energy and produces lots of waste at the same time. The wastes contribute to greenhouse gases that trap sunlight which raises the temperature and cause harm to the environment and human health. Third Hut-8 makes the residents of the city use more air conditioning as the wastes discharged by the facility causes a rise in temperature. As the residents use a large amount of air conditioning, their bill keeps on rising and get more expensive. Therefore, building a Hut-8 facility in Brampton would not be in favour as it consumes a massive amount of energy, is a contributor to climate change and makes the residents of the city use more air conditioning.