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)?

* A cryptocurrency is a form of currency that is virtual or digital in the form of tokens and most commonly referred as coins. The value of cryptocurrency depends on the amount mined by people and how much of that currency people have. Cryptocurrency is not that different from traditional currency. One difference is that cryptocurrency is not controlled by a government, it is run by people who program. This means cryptocurrency is free of any government manipulation and impact. Another difference is that all of the cryptocurrency is digital and no physical object exists to give value and for traditional currency, most of the currency is physical and some is on credit cards as digital currency.
* BitCoin is the leading cryptocurrency that most people know. What are some other cryptocurrencies and what are their unique features?
* Cryptocurrency made after BitCoin are called AltCoin, they are marketed as improved and safer versions of BitCoin. Some of these are easier to mine than BitCoin but their value is also less. One AltCoin is LiteCoin, this AltCoin is very similar to BitCoin but the main feature is that LiteCoin is really fast and offers fast transaction and block generation. One LiteCoin was worth $43.41 on February 9th, 2019. Another AltCoin is the Ethereum, the main feature of this coin is that –you can codify, decentralize and trade just about anything with this AltCoin. One coin of Ethereum was worth $118.71 on February 9th, 2019. Zcash is another AltCoin, its main feature is security and privacy. Zcash provides security for transactions because they are recorded and published on a Blockchain, and the details of the user of the coin remain private. One Zcash coin was worth $49.84 on February 9th, 2019. Dash coin is another Altcoin, the main feature is that transaction of this coin are very secretive, most transaction are untraceable. As of 9th February, 2019, the price of one Dash coin is $74.32. Another type of AltCoin is the Ripple coin, the main feature is that this coin does not require mining and the transaction happen in real-time with instant speed. The price of one Ripple coin on February 9th, 2019 was $0.308. All of the prices of the coins were is USD. These were the 5 of the most important AltCoins.

1. “Blockchains” are the basic technology behind cryptocurrencies and other emerging technologies. Explain blockchains work with respect to:
   * What they store
   * Blockchains are made up of blocks that store information. Blocks store transaction information like the amount you transfer/purchase, date and time. They also store information of people involved in the transaction, Real names are not used instead digital signatures are used. All blocks are not the same, a way they distinguish different blocks is by storing information only for in one block. Each block stores a unique code called a hash, this a way to distinguish different blocks. One block on a block chain can store up to 1MB.
   1. How they work

* The blocks on a Blockchain store data about transactions. For a Blockchain to work, a transaction must happen. The transaction must go through steps of verification. When the transactions verified the transaction is stored in a Block, information regarding the transaction is also stored. Other things stored by a block are the transaction’s dollar amount, your digital signature, and the receiver’s digital signature. Then the block is given a hash to distinguish it from other blocks. When the block is hashed, it can be added to a Blockchain. From here the information will stay in the Block, in a Blockchain and it will be hard to view this information.
  1. How they are secure and private
* Anyone can view the contents of the blockchain. People do not have access to identifying information about the users making transactions. Although transactions on blockchain are not completely anonymous, personal information about users is limited to their digital signature, or username. New blocks are added to the end of the blockchain and this it very difficult to go back and alter the contents of the block. If a hacker tries to change a block in the block chain, he will be forced to change the hash of every single block after it in the chain. Once a block is added to a blockchain, it is near impossible and very difficult to change or edit a block. If a computer wants to dd a block to the blockchain, they must go through the proof-work system. Computer must prove that they have done the work of adding the block.
  1. How they use public and private encryption keys
* “Here’s the ELI5 (“Explain it Like I’m 5”) version. You can think of a public key as a school locker and the private key as the locker combination. Teachers, students, and even your crush can insert letters and notes through the opening in your locker. However, the only person that can retrieve the contents of the mailbox is the one that has the unique key. It should be noted, however, that while school locker combinations are kept in the principal’s office, there is no central database that keeps track of a blockchain network’s private keys. If a user misplaces their private key, they will lose access to their Bitcoin wallet, as was the case with [this man](https://www.cnbc.com/2017/12/20/man-lost-127-million-worth-of-bitcoins-and-city-wont-let-him-look.html) who made national headlines in December of 2017.”
* Info retrieved from

<https://www.investopedia.com/terms/b/blockchain.asp>

1. How does BitCoin use blockchains?

* BitCoin uses blockchains to keep track of transactions. The blockchain BitCoin uses is decentralized, so no one user/organization controls the blockchain. The transactions of BitCoin are very secure because of Blockchains.

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

* Banks can use blockchains to keep transactions, this will ensure that the data of the bank and the users is safe and secure. Health care and insurances can use blockchains to keep medical records about patients safe and secure. Supply chains can use blockchains to keep things organized and uniform. Government can use blockchains during election to keep voter’s data safe.

1. What are some advantages and disadvantages of blockchains?

* A disadvantage is the cost it takes to run Blockchains and proof of work. Another disadvantage is the time it takes for the blocks to go through proof of work. This means blockchains are slow and inefficient. An advantage is that blockchains are incredibly secure and private. Another advantage is that blockchains are decentralized, meaning no one person/organization controls the blockchain.

1. Blockchain based games are the latest development in the gaming industry. Research the topic “Crypto Games” (google) to answer the following questions.

* What are some interesting Crypto Games available for Android or iPhone?
* Some games available are MLB CRYPTO COLLECTIBLES, GODS UNCHAINED, CROPBYTES, EVERDRAGONS and many more.
  1. How are they different from conventional games?
* Crypto games are solely based on this principle and they focused on collecting unique assets and trading them, for fun, profit, or both. Conventional games focus on completing a task/goal.

**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?  
   BitCoin was created by Satoshi Nakamoto. BitCoin is currently owned by no one since the vanish of Satoshi Nakamoto.
2. How is BitCoin created and what is "BitCoin Mining"?  
   BitCoin can be mined by using computing power to do combination of advanced math and record keeping. Computing power is needed to build blocks to add to a blockchain and this creates BitCoin. Hashes are created through block chains and those hashes are used to mine/create BitCoin. This process is known as BitCoin Mining.
3. Can you buy BitCoin and what does it cost?  
   The cost of BitCoin depends on interpretation and price discovery, this means there is no true formula to determine the value of BitCoin. BitCoin can be bought through currency exchange. Just like currency exchange between different currencies, BitCoin has an exchange rate and currency of a government can be exchanged into BitCoin.
4. Why would you want to buy BitCoin and what can you use it for?  
   BitCoin can be used to buy over 100,000 things online. You can sell BitCoin and convert it into other Cryptocurrency or actual government currency. If you don’t sell it you can wait for the value to go up and then sell BitCoin for profit.
5. What are the risks of using BitCoin?  
   Since BitCoin is decentralized, there are some legal and regulatory hazard that go along with using BitCoin. BitCoin is also risky because the value could change rapidly and instantly.
6. How much of BitCoin business is related to criminal activity?  
   Half of BitCoin transactions are associated with criminal activity. One fourth of all user of BitCoin are criminals or hackers.
7. What are some of the reasons why criminals use BitCoin?  
   Criminals use BitCoin to trade drugs, illegal substances/things. They also trade illegal videos with BitCoin.
8. What are some of the disadvantages of BitCoin when used for criminal activity?  
   Investors are spectacle about BitCoin because of criminal activity and because of this they don’t invest in BitCoin. The disadvantage is that the value of BitCoin does not increase as fast as it can.
9. 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.

I think this is false because it could be used for making a passive income, to pay for real life things and for financial freedom. Everybody likes to make a little bit of money on the side of their actual job. With BitCoin mining you can mine BitCoin, and then convert it into real money. This is great for people who have a tight budge and they want to start saving money. Furthermore, you can use BitCoin to pay for everyday things like food, electronic and more. There are many online shopping websites that offer the choice for you to pay with BitCoin. This can be very helpful for people who only have less money on their credit card and more cash. Lastly, BitCoin offers you financial freedom, there is no authority controlling your BitCoin. Banks control how much you can store in your bank account and your transactions. With BitCoin there is no limit over how many BitCoin one can have, and you can transact BitCoin globally with full privacy. In conclusion, these were some uses of BitCoin other than criminal activity.

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 is someone who uses computer power to create BitCoin. People are concerned of BitCoin mining because mining uses a lot of electricity and energy. People think that energy should be used for something else more important.
2. Why does BitCoin mining use so much energy?  
   One BitCoin transfer uses more energy than a Canadian home uses in one month. Miners uses at least 2.5 gigawatts of power and its calculated that by the end of three year the number will be 3 times higher.
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?

They are located in Alberta because the location in Alberta is very close to natural and unnatural energy sources. This energy could be used to power Computer to mine BitCoin.

The city has many energy sources, from wind turbines to natural gas-fired power plants. There is plenty of energy to be used and BitCoin mining is a way to use that energy.

1. What benefits does the city of Medicine Hat expect to see from this BitCoin facility?

The city gets more employment from the BitCoin mining facility. This way the city gets a huge financial boost.

1. What concern does the city of Medicine Hat have about from this Bitcoin facility?

A concern they have is that in a case of a heat wave, they need to stop providing electricity to Hut 8 for a short period of time. With this the chances of blackouts decreases as there is enough energy to survive on.

1. 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?

Their concern is about all the carbon emission BitCoin mining is causing. The energy used by mining is mostly produced by burning fossil fuels. This increases carbon emission is dangerous for earth because of climate change.

1. If Hut-8 wanted to build a facility in Brampton, would be in favor of this proposal. Write a SOP to justify your position.

I would not be in favor of this proposal because Brampton has a rapidly growing use of electricity, Brampton is mostly suburbs and job demand for tech are low. Firstly, as the population of Brampton is growing, the use of electricity is growing. The city does not have enough electricity to spend on BitCoin mining. Brampton is most suburbs, this means Brampton does not have excess space to provide for Hut-8. Brampton has some industry, but it is mainly suburbs and a Hut-8 facility would not fit in. One benefit of a new facility is that it will create jobs but jobs for tech are not needed. The tech industry does not have many jobs in Brampton, and this means there won’t be enough people to work in the facility. In conclusion, I would not be in favor of a new Hut-8 facility.