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 in a broad definition is virtual or digital money which takes the form of coins or tokens.

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

Some other examples are Litecoin (LTC), Ethereum (ETH), Zcash (ZEC), Dash (DASH) and Ripple (XRP) are some of the most popular cryptocurrencies. The unique features of Litecoin are that it is based on an open source global payment method. The unique features of Ethereum are that it can be run without any downtime, fraud, control or interference from a third party. The unique features of Zcash are that it offers privacy and selective transparency of transactions. The unique feature of Dash is that it works on a decentralized mastercode network that makes transactions almost untraceable. The unique feature of Ripple is that its method of conformation doesn’t require mining like many of the other cryptocurrencies.

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

Blockchains store information about transactions, such as the time, date, dollar amount. It also tells information about who is participating in the transaction. Each block stores different information and they can be distinguished because each block stores a unique code called a “hash” that allows us to differentiate it from other blocks.

* 1. How they work

Blockchains way of working is when a block stores new data, it is added to a blockchain. But for a block to be added to a blockchain, four things must occur. They are that a transaction must occur happen, the transaction must be verified, it must be stored in a block, and then that block must be given a hash. When a new block has been added to a blockchain, it becomes publicly available for anyone to view.

* 1. How they are secure and private

Blockchains can be viewed by anyone, and the users can also connect their computers to the blockchain network. This means that there can be millions of copies of the same blockchain. They are secure because it order for anyone to change a block, they will have to change the next block, and then every block after it. This making hacking blockchains very difficult. There is also a proof of work system and this makes hacking useless because it costs a lot.

* 1. How they use public and private encryption keys

Each user has a wallet and it consists of two unique keys, the pubic key and the private key. The public key is where the transactions are deposited to and withdrawn from. But the only person who can retrieve the contents from the public keys is the one who has the private key.

1. How does BitCoin use blockchains?

The BitCoin protocol is built on blockchain. Transactions made on Bitcoin are regulated by a network of computers, not a third party.

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

Blockchain technology can be used to store data about property exchanges, stops in supply chain, and voting for a candidate. Blockchains are being used in sectors such as banks, cryptocurrencies, healthcare, property records, small contracts, supply chains, and voting.

1. What are some advantages and disadvantages of blockchains?

Some advantages of blockchains are that it is very accurate, transactions cost no money, it is decentralized, processing the transactions is very efficient, the privacy is that it is confidential, and security is good because it is nearly impossible to change data. The disadvantages are that it costs a lot of money to mine bitcoins, the proof of work is very inefficient, the confidentiality results in illegal trade, there is a problem with security because there could be an attack any time.

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?

Some interesting, unique and popular games are “Cryptofights”, “Blockchain Cuties” and “Cryptokitties”.

* 1. How are they different from conventional games?

Crypto games are different because we have to use tokens to progress in the games. A popular example of this is Ethereum. The games can be played for fun or for profit because real money is involved. Conventional games are connected to the servers.

**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 first created by Satoshi Nakamoto but he turned over the source code and domains to others in the Bitcoin community, and then vanished.

1. How is BitCoin created and what is "BitCoin Mining"?

Bitcoin is created by conforming transactions and adding a block to a blockchain. The rewards for doing this difficult task is Bitcoins. BitCoin mining is when a person, group or compony verify a transaction and create a hash. This results in a block being added to the blockchain.

1. Can you buy BitCoin and what does it cost?

There are a number of digital currency exchanges where we can buy, store and sell bitcoins. It costs nothing to perform a transaction.

1. Why would you want to buy BitCoin and what can you use it for?

Bitcoin is increasing in value and somethings we can do with it is buy things from over 100,000 merchants, sell it or just hang on to it for the future.

1. What are the risks of using BitCoin?

There is a legal risk if the government decides to take action against it because they think that Bitcoin or its usage is against the law. The financial value of a Bitcoin is highly volatile and can swing a lot in value in a short amount of time. Money laundering a theft is not tolerated and authorities may also arrest people.

1. How much of BitCoin business is related to criminal activity?

Almost half of BitCoin transactions are through criminal activity. A quarter of bitcoin users are linked to criminal activity.

1. What are some of the reasons why criminals use BitCoin?

It is popular among criminals because it allows them to conceal their identity.

1. What are some of the disadvantages of BitCoin when used for criminal activity?

Some disadvantages from using bitcoin for illegal activity is that every transaction is recorded on the blockchain. Using this information, it is possible to identify specific individuals.

1. 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.  
     
   Guidelines for writing a supported opinion paragraph (SOP)

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

Cryptocurrencies are an ever-growing sector financially and in technology. I think that Bitcoin is not for criminal activity, but it is rather for general public and for those who wish to invest for the future. Firstly, the intensions of the creator of Bitcoin was not for criminal activity. Even if there is some illegal activity, it is far less than what the average Bitcoin user who does transactions legally. Secondly, Bitcoin is good for the general public because everyone has access to the blockchains, which is a disadvantage for criminal activities. Lastly, a large portion of Bitcoin users buy Bitcoin and hold on to it. They want to invest and then save it for later. In conclusion, Bitcoin only being good for criminals is a myth and a stereotype because Bitcoin is rewarding to anyone who takes a risk and puts effort into it.

**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?  
   Bitcoin miners are those who use computer processing power to solve complex math equations. People are concerned because it requires a massive amount of energy, even more than some countries.
2. Why does BitCoin mining use so much energy?

The increased complexity and competition of mining has resulted in powerful but high energy using computers. They heated up very quickly and there are millions of these computers being used around the world.

1. 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?

The Hut-8 has decided to locate its facility in Alberta because of the low for the energy usage. Medicine Hat, the city in which the facility is located, believes that this project will be an economic boost to the city.

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

While adding the economic benefits, the city will receive a financial boost from the new project because of new jobs and the cost of electricity.

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

The concern that the city of Medicine Hat is that the facility uses 10 times more power than any other facility in the city. That is why in the event of a heat wave, the city is prepared to stop giving electricity to the facility.

1. What concern do environmentalists have about the Medicine Hat facility and about BitCion mining in general? E.g. how does BitCoin mining harm the environment?

The concern that environmentalists have is from the massive amount of energy that the facility requires and the fact the city gets its electricity from fossil fuels. Over time, as the amount of bitcoins available becomes more rare, the electricity and energy required to mine will significantly increase.

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.

Although bitcoins are a going industry, the energy required outweighs the money benefits. I would not be in favor of this proposal because it impacts the environment negatively, I don’t receive any benefits from it and the electricity and equipment required for the future is going to become more harmful. Firstly, the energy required to run on of these facilities is very high and the energy is retrieved from mainly fossil fuels. Fossil fuels have a dangerous impact because they release carbon dioxide. Secondly, I don’t receive any benefits because only the company will receive the profits. Lastly, the competition is going to increase so more powerful computers will need to be built, but they will also require more energy, and this will just worsen the impact. In conclusion, I am not in favor of building this facility.