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.

**BitCoin & Crypto currencies**

Use the following resource to answer the questions below:

* <https://www.investopedia.com/tech/most-important-cryptocurrencies-other-than-bitcoin/>

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

Cryptocurrencies are virtual/digital money which uses the form of tokens or coins. Cryptocurrencies are different from everyday currencies because they are almost strictly electronic; intangible. They cannot be used like regular cash either.

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

**Litecoin**. it has a faster block generation rate, which offers a faster transaction confirmation.

**Ethereum**, enables Smart Contracts and Distributed Applications (DApps) to be made and run without downtime, control, fraud or interference from third parties.

**Ripple,** allows banks to settle cross-borders payments in exact time, with end-to-end transparency and at lower expenses.

**Block Chains Explained**

Use the following resource to answer the questions below:

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

1. “Block chains” are the basic technology behind crypto currencies and other emerging technologies. Explain block chains work with respect to:
   1. What they store

Blocks keep info about transactions such as the date, time and dollar amount of the most recent purchase from an online store. They store info about who is part of transactions. Blocks also store info that differentiates them from other blocks.

* 1. How they work

 After a purchase, you need to verify the purchase by adding in the dollar amount, time, and participants. Then, thousands of computers ensure that all the information you have inserted is correct within a second. After this, the info is stored in a block so the transaction goes through, and it joins thousands of other purchases. Then, the block is given a HAS (a unique code) and it is added to the block chain.

* 1. How they are secure and private

Because the large amount of accounts, a hacker would need to infest the whole block chain and not just one, making it much harder to break into. It’s difficult to obtain personal information and it is not displayed. Also, one a block is added to the chain, it is next to impossible to change or delete since one would have to change the hash and every other block as well.

* 1. How they use public and private encryption keys

 Private encryption keys are used as locker combinations where only the person who knows the combination can access the goods. The entire block chain is shared and maintained by a group of users and when the chain is updated, so is theirs. Also, the program will ensure that block chain does not have any duplicate blocks by deleting the shortest block that copies another.

1. How does BitCoin use block chains?

When one person pays another for goods using a bitcoin, computers on the bitcoin network quickly verify the transaction. To do it, users run a program on their PCs and try to fix a complex math problem called a “hash”. When the PC solves the problem by “hashing” the block, it will also have to be verified by a complex algorithm.

1. What are some advantages and disadvantages of block chains?

Advantages:

Secure, safe and private

Improved accuracy by removing human involvement

Cost reductions

Disadvantages:

Low transactions per second

Can be hacked/breached

Very expensive to mine bitcoins/pricy tech needed

**Crypto-Games & Other Applications**

Use the following resource to answer the questions below:

* <https://egamers.io/beginners-guide-to-crypto-games/>

1. What are some interesting Crypto Games (i.e. games that use Block Chain technology) available for Android or iPhone?  
   MyCryptoHeroes

The Multiverse

Etheremon

Gods Unchained

1. How are Crypto Games different from conventional games?

Crypto games are usually browser-based games that have the use of smart contracts and a blockchain for some/all the game’s features. Most games use ERC721 tokens are game assets. One of the most familiar crypto games is CryptoKitties. Each kitty has its own genetic code that affects how the cat looks in the game, the ERC721 token that represents the kitty is in the Ethereum blockchain.

1. What are some other real-world applications of block chains besides games and crypto currencies?

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

Bitcoin was invented in 2009. His goal was to make a new electronic cash system that was completely decentralized with no server or central authority. Basically, bitcoin is strictly digital currency, nothing physical. You mine bitcoin by doing a combo of advanced math and record-keeping. When someone sends a bitcoin to someone else, the network records that transaction, and all of the others made over a certain time period, in a “block”.

1. Can you buy BitCoin and what does it cost?  
   You need a digital currency exchange like Coinbase. With Coinbase, you can use your bank or paypal account to make a deposit into a virtual wallet, where there’s many to choose from. When your account is funded (usually takes a few days), you’re able to trade traditional currency for bitcoin.
2. What can you use BitCoin for?

Bitcoin can be used to buy things from over 100,000 sellers, though only a few major ones. You can sell bitcoins or hold on to them.

1. What are the risks of using BitCoin?  
   Bitcoins are an investment, so they are very risky. They can drop value instantly and you can be at high loss values. Bitcoin transactions can’t be traced back to individuals. They’re secured but also obstacle through the public and private encryption keys. You can never be certain about who is selling you bitcoins or buying them. Bitcoin theft is also a risk. Hackers can breach and steal bitcoins.
2. How much of BitCoin business is related to criminal activity?  
   Criminals are major reasons for the value of bitcoins. Bitcoin is so popular with criminals because it allows them to conceal their identity. Ransomware is very popular crime related to bitcoin, and theft of bitcoin is very popular too. Hackers can hack into virtual wallets and steal them.
3. What are some of the reasons why criminals use BitCoin?

They use bitcoin because it allows the criminals to hide their identity and be completely anonymous. They cannot be tracked and traced at all. Criminals use bitcoins because they are a very reliable system that simply just works properly.

1. What are some of the disadvantages of BitCoin when used for criminal activity?  
   The open nature of bitcoin blockchain transactions means that the bitcoin community can closely watch the ransom money. Authorities can use the bitcoin blockchain to track criminals who commit crimes related to bitcoin. Also, if criminals stop using bitcoins, the value of them might drop drastically, so criminals actually help bitcoins stay afloat.

**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 performed by high-performance and high-power computers, which solve complex math problems. The work and luck needed to solve one of these problems is very difficult (1 in 6 trillion). Bitcoin mining produces new bitcoin. People are concerned about bitcoin miners because they use a lot of electricity.
2. Why does BitCoin mining use so much energy?

A lot of people part take in bitcoin mining, and their high-performance and high-powered computers require a lot of electricity to run. On top of that, mining bitcoin is a highly energy intensive process, which sucks up a lot of electricity.

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 bitcoin mining facility is right beside Medicine’s Hat new natural gas powerplant. The bitcoin plant can use up more than 60 megawatts of power, which is 10x more than any other facility in the city.

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

Medicine Hat owns the natural gas generation facility, and it leases the land to Hut 8, the facility has 40 employees. Medicine Hat will receive many financial boost from the new project. Medicine Hat has offered low-cost energy for a long time, which is advantageous to Hut 8 and Medicine Hat.

1. What concern does the city of Medicine Hat have about from this Bitcoin facility?  
   They are concerned about the great amounts of energy that is going to be consumed by this bitcoin mining facility. More specifically, in Medicine Hat, where most of the electricity is being produced by fossil fuels, so there will be a lot of pollution.
2. 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?

There will be a lot of pollution due to what is being used to produce all this electricity; fossil fuels. There is a lot of electricity being produced, which also means a lot of fossil fuels being used, causing many harmful gases being released into the environment; harming it.

1. If Hut-8 wanted to build a facility in Brampton, would be in favor of this proposal? Explain why and why not.

No, Brampton and its citizens would not be in favour of Hut-8’s proposal. First of all, there is not much space in Brampton for building the facility anyways, and there would be a lot of energy being consumed for this bitcoin mining facility. Brampton is a very urban area and is not as rural and remote as Medicine Hat. On top of that, there would be a lot of pollution released into the environment, which would be good for the city or the people living in it. Great amounts of energy would be consumed, and a lot of money would also be wasted in the process.