September 11th, 2017

- Canada’s footprint is the 3rd largest in the entire world

- A lot of species around the world are extinct and many more are endangered

- Fish is the richest supply of protein in our diet 🡪 but they are going extinct

- Forests are decreasing at a rapid rate due to clear-cutting and lodging

- GHG increase is linked to climate change

- Population by 2100 can be 10 billion 🡪 Mainly cuz of 3rd world countries

- 3rd world countries are expected to grow by 33% by 2050

- India predicted to overtake China in the coming years

- This huge population increase can be attributed to advancements in technology, food, availability, etc.

- Global energy consumption has increased by 12 folds between the years of 1850 and 1970

- Canada and US consume the most energy per capita

- Wealthy countries use 25x more energy than the poorest country

- Ecological footprint: Measures the human use of the environment in hectares per person

- Canadians have the 3rd largest ecological footprint in the entire world

- Canada and the US have lots of resources (and they use a ton as well)

- To keep up with massive energy demands, the US takes resources from other countries

- Per person, we have about 1.7 gigahectares/person, but we use around 2.8 gigahectares

- High income countries have large carbon footprints

- 20% of the world consumes 75% of resources

- Bio-capacity measures the amount of biologically productive area that can meet humanity’s needs

- Our bio-capacity has exceeded by around 25% since the Industrial revolution

- Carbon footprint has been increasing since 1961

- Nitrogen based fertilizers have disrupted the nitrogen cycle

- The era we are currently living in is called Anthropocene

- The planet is changing due to humanity’s actions 🡪 We drive biological change

- All sustainable development programs have failed 🡪 Canada exceeded energy consumption by 25%

- Carrying capacity measures the max population size that a given ecosystem can support

- If India had an ecological footprint the size of Canada, we’d need 4 earths

- Canada is the highest producer of waste products

- More wealth per capita leads to more consumption of resources, leading to more waste being created

- China racks highest in terms of global awareness

- Canadian’s are fully aware of the impact of climate change, but no one gives a shit

- Federal, provincial, and municipal, are responsible for the environment and green power

- Federal government has the most power in decision making

- Our government lacks at sustainable development because:

1. Implementation gap

2. Lack of coordination and integration

3. Inadequate performance review (No post assessment to see what works and what doesn’t)

- In 2016, the commissioner for sustainable development said that little to no progress made for green policies

- The federal government does not do a proper job at sustaining the environment (i.e. Fail to clean oil spills)

- Reducing biodiversity affects higher trophic levels 🡪 Affects the flow of energy in the ecosystem

- Endemic species are animals that are only found within one geographic area (i.e. Vancouver Island Marmot)

1. Canada has about 5% endemic species

2. Australia has around 68% endemic species

- Lots of tax money is used ineffectively and outright wasted

- There are more than 140,000 species in Canada

- Invasive species are animals that are found outside their normal home. They outcompete the native species

- Canada has about 500 invasive species (i.e. Zebra Mussels, Purple Loosestrife, Etc.)

- About 12% of species in Canada are not native (i.e. Eurasian watermilfoil which appeared in 1970 in B.C.)

- Anthropocentric perspective views the environment in terms of how we would benefit (i.e. Mining resources)

- Bio-centric perspective is about how we can protect other species

- The Great Lakes have been exposed to invasive species

- The Zebra Mussels came from import ships from the Caspian Sea, hiding in ship’s ballast water

- Zebra Mussels can colonize anything, including ship rotors, and damage up to $500 million of utilities/year

- Ships must now empty their ballast water before entering Canadian waters

September 18th, 2017

- Ships must empty their ballast before entering the St. Lawrence Gulf 🡪 Called Swish & Spit

- Invasive species outcompete the native species (i.e. Zebra Mussels, Brown Gobi, etc.)

- Donald Trump is gonna get rid of all that EPA stuff and deregulate everything

- No action plan against invasive species 🡪 Canada’s environmental website is down

- The Stony Fly is native to the Great Lakes {iClicker Question}

- The Round White Fish is native to the Great Lakes {iClicker Question}

- Lamprey (invasive species) decimated the native fish population 🡪 Ate the flesh of other fish

- Government introduced chemicals to kill Lamprey eggs but it didn’t work as effectively as anticipated

- R Strategists = Large offspring count (progeny); small chances of survival per offspring (i.e. Clownfish)

- K Strategists = Small progeny but each offspring has a large chance of survival (i.e. Humans)

- Eutrophication is the natural process of nutrient enrichment 🡪 Leads to greater productivity

- Eutrophication controls growth of Algae

- Aquatic dead zone consists of little to no biodiversity, and low oxygen content (Hypoxic environment)

- Hypoxic environments are caused from fertilizer use and run-off 🡪 Causes algal bloom

- The Great Lakes account for about 20% of all fresh water in the world

- Biodiversity in the Great Lakes has decreased 🡪 Large fish are endangered and some are even extinct

- Canada & US have agreed to reducing the phosphorus unloading in the Great Lakes

September 20th, 2017

- Lake Erie is contaminated with phosphorus because of discharge from nearby farms

- Accidental discharge from sewage treatment plants 🡪 Huge source of pollution

- 30% of farmland in Ohio was releasing phosphorus

- Blooms of microcytics in Lake Erie 🡪 Can damage liver 🡪 Unsafe to drink

- Zebra Mussels are linked to blue-green algal bloom

- Toxins in 2011 were 50x higher than safe level

- Algae blooms result in oxygen depletion in water 🡪 Beaches shut down due to this

September 25th, 2017

- Countries have been preoccupied with debt reduction 🡪 Cut down services like environmental protection

- Environmental responsibilities are dumped onto lower governments

- Federal water management has been cut by 35%

- Little interesting in consultative process 🡪 Government backs out from environmental responsibilities

- Honorable President Donald J. Trump just backed out of the Paris Accord

- The Green Belt is a permanently protected green area in Ontario 🡪 Protects family farms & the environment

- Eco-centric perspective is focused on building low-impact technology & preserving the environment

- Ethnocentric perspective believes that technology will save the world & reverse environment degradation

- Obama rejected Keystone XL Pipeline 🡪 He believed that it wouldn’t create many jobs or lower price of gas

- Environment Justice dictates fair treatment of all people when dealing with environmental issues

- An example of enviro. Justice is when companies tried to dump harmful chemicals in poor/black communities

- The Basal Convention extends enviro. Justice to prevent dumping of hazardous materials in poor countries

September 27th, 2017

- In Canada, dumping e-waste (i.e. Old/obsolete technology) to other countries is illegal

- Ontario electronic stewardship has over 100,000 tons of e-waste

- Disputes help clarify possible confusion, but they also reinforce confirmation bias

- Judicial resolution exacerbates division 🡪 Process is fought fiercely 🡪 Loss results in disappointment

- The First Nations prevented the logging of forests in BC

- Environmental Impact Assessment serves to identify and predict the impacts from development proposals

- The EIA considers facts like physical, biological, and social change (i.e. Mackenzie Valley Pipeline)

- The EIA must be done for something as trivial as setting Wild Turkeys free

- Stakeholders are:

1. Anyone who has a stake or impact on the process

2. Anyone who might be impacted as a result of the proposal

3. Anyone with knowledge of the situation

October 2nd, 2017

- Rachel Carson’s *Silent Spring* led to the banning of DDT and stricter policies

- In 1960, over 600 million pounds of chemicals were used

- Silent Spring was published in 1965

- DDT was used a lot in WW2 🡪 Used for killing certain types of insects

- Government agencies started treating the suburbs with DDT 🡪 To kill insects

- Silent Spring remained on the New York Times Best Seller list for several months

October 4th, 2017

- Tokenism is the false appearance of inclusive practices 🡪 Public opinion is not factored in projects/policies

- Projects are no longer covered by the EIA due to it being a heavy/burden task

- Since 19th century, average global temperature has increased by 0.6 °C ± 0.2°C

- We have experienced some of the warmest years since 1850

- There is strong evidence that increase in GHG is from activities (i.e. Burning fossil fuels)

- Sea level is globally rising (+0.1 – 0.2m / century)

- PEI will be heavily affected due to erosion

- Storms have increased in quantity & power

October 16th, 2017

- The Kyoto Protocol:

1. Tried to address climate change and forecast the impact of emissions

2. Tried to reduce emissions by 2012 🡪 Failed miserably

3. 55 countries (except China & India) were targeted to reduce greenhouse gases

4. Targeted gases such as Carbon Dioxide, Methane, Nitrous Oxide, Etc.

- USA & China are the biggest GHG emitters

- There’s a constant exchange of CO2 between atmosphere and ocean

- 1/3 of human emissions end up in the ocean

- Most of the fisheries operate at continental shelves 🡪 Account for 18% of oceans 🡪 Provide 90% of fisheries

- Deep oceans are not rich in life because most of the nutrients are near the surface level

- 20% of global protein supply comes from fish 🡪 2.6 billion people rely on fish for protein

- Fishes are caught near coast ( < 100 km )

- More than 80% of global fisheries are fully utilized or over-exploited

- Aquaculture is emerging – Our dependence on them is rising

October 18th, 2017

- Fish size is on the decline 🡪 Fish are 20 – 50% smaller than previous generation

- Nearly 50% of fish have been killed off 🡪 Fish is now being caught at greater depths than before

- Bycatch is fish that is unnecessarily caught as an accident/by-product

- More than 60% of oil is from offshore drilling

- About 50% of the worlds population lives less than 100km from the coast 🡪 Causes destruction of wetlands

October 23rd, 2017

- Aquaculture promotes the spread of diseases 🡪 Chemicals are used to mitigate diseases

- Fish waste causes reduction in water quality

- Aquaculture is costly 🡪 Because we use smaller fish to feed bigger fish 🡪 Energy lost during this process

- About 3 – 4kg of marine fish produces 1 kg of Salmon

- Farmed Salmon loses its pink color 🡪 Fish are fed astaxanthin and canthaxanthin 🡪 Can damage the retina

- There are 11x more toxins in wild Salmon than farmed

- Closed system farms can be used to control fish quality 🡪 Leads to more expensive fish

- Less than 1% of the world’s oceans are protected

- Less than 10% of Canada’s marine coasts are protected

- Small scale fishing is better than large scale 🡪 Helps preserve the wildlife & benefits local communities

- Large scale fishing requires subsidies, releases GHG, & damages wildlife

- Coastlines are the most productive areas 🡪 More fish leads to more exploitation

- USA is the biggest consumer of freshwater 🡪 Canada is right behind in terms of consumption

- A lot of water is wasted on flushing dumb shit down the toilet (i.e. Pills, plastic crap, etc.)

- Companies dump tons of chemicals into lakes

- Secondary treatment is most effective in treating 🡪 But it’s very expensive

- Water is mainly contaminated with Nitrate and Ammonia

- Water is now laced with drugs and other pharmaceutical compounds (i.e. Estrogen from birth control pills)

- About 40% of the worlds population doesn’t have access to potable water or sanitation

- High levels of E.coli found in Kashechewan in October 2005

- People in Neskantanga have been living without freshwater since 1995 (for over 20 years)

October 25th, 2017

- It’s impossible to mitigate 100% of environmental damage, but a significant amount can be prevented

- Water resources may become as important as oil during this century

- 60% of the population in developing countries are involved in agriculture

- Quinoa is not increasing in agriculture yield 🡪 Hard to grow due to strict conditions

October 30th, 2017

- Pesticide use is dramatically increasing 🡪 30x increase in pesticide use 🡪 It was rarely used before WW2

- 10x increase in fertilizer use

- 4x increase in fossil fuel use

- 2.5x increase in irrigated areas

- Soil foundation is less potent due to soil degradation

- Africa is most affected by food shortages

- Some parts of Asia are just as bad as Africa

- North Americans typically consume 3400 calories/day 🡪 Huge increase in consumption of food

- Beef/cattle have become expensive to produce

- Global population to hit 8 billion by 2050

- Between 1700 – 1950, cropland has increase from 230 million to 1.3 trillion 🡪 Quality of farmland decreased

- World grain production has sky-rocketed 🡪 48% of our diet comes from grains

- Annual growth of cereal yields has decreased by about 40%

- Rice does not grow after 40o C

- United States & Brazil lead in the production of ethanol

- Ethanol is created using crops 🡪 Has grown 20% since 2015 🡪 Helps reduce carbon emissions

- Mexico’s attempt at ethanol production resulted in civil unrest 🡪 Because corn prices started to rise

November 1st, 2017

- E\_Square Video is about locally grown food and small farms being driven out by large corporations

- The average food travels 1500 miles before reaching your plate 🡪 Huge ecological footprint

- For instance, salmon is caught in Canada, fried in China, and consumed in New York City

- Fair Food means no pesticides, locally grown, treated right, etc. 🡪 Results in fresher, tastier, & healthier food

- Americans spend 9.5% on food 🡪 Less than any other country in the world

- American Diet is very unhealthy 🡪 Most unhealthy in the world 🡪 Leads to several kinds of cancers/diseases

- Government subsidizes large corporate farms, allowing them to dump cheap food & outcompete small farms

- People should buy locally first 🡪 Community wealth relies in local self-reliance

- Green Revolution has caused a dramatic increase in production of wheat and rice

- NERICA Rice produces 50% more yield, is more resistant to pests, requires less pesticides, & has more protein

- Soils are becoming depleted of nutrients 🡪 Drives the need for fertilizers 🡪 More fertilizers != more yield

- 70% of global freshwater is used for agriculture 🡪 Up to 90% in developing countries

- GMOs make crops more resistant to pests, increase yields, and increases climate tolerance

- There is no consensus for GMO use 🡪 Huge debate whether they should be labelled or not

- Subsistence farming uses 10x less energy

- United States uses double the amount of fertilizer than Canada 🡪 Worldwide, Japan uses the most

- We rely on technology to produce our food

- It’s better to consume lower on the food chain 🡪 Because energy transfer is more efficient

November 6th, 2017

- In Ontario & Quebec, there are about 10,000 animals per farm 🡪 50% of poultry comes from Canada

- 66% of NO2 omissions come from livestock

- Timber products are the least valuable service provided by Canada’s forests

- Non-timber products include berries, sap, maple syrup, etc.

- About 120 million hectares for timer production, ownership is divided between:

1. Provinces responsible for 77%

2. Feds and territories = 16%

3. Private landowners = 7%

- Clear-cutting is when trees are removed in one large swoop, leaving no tree behind 🡪 Greatest nutrient loss

- Seed-tree cutting = Some trees left behind

- Shelter wood cutting = More trees left behind

- Selective cutting = Cut specific trees (i.e. Bad, unhealthy, etc.) 🡪 Costly & difficult to manage

- 90% of harvesting is done by clear cutting 🡪 Size of cuts vary from 15 – 250 hectares

- Until 1985 reforestation was considered unnecessary

- Forest fires are caused by ground fuel

- There are over 1000 invasive species of invertebrates that pose a threat to our forest

- The Mountain Pine Beetle in BC destroyed $30 billion worth of forestry & released 200 million tons of CO2

- The spotted owl is the most endangered species in Canada 🡪 Located in Southwestern B.C.

- There were about 25 breeding pairs of Spotted Owls in 2003, and then 6 pairs in 2011

November 8th, 2017

- Deforestation leads to CO2 emissions

- Fossil fuels meet 15% of energy needs

- Every year we consume more energy 🡪 38% increase between 1990 & 2008

- 70% of planet is covered by water

- 3/5 of petroleum comes from offshore plants 🡪 We are digging deeper/further than ever before

- The Deepwater Horizon oil drill exploded and caused a massive oil spill

- Oil rigs have no plans to clean oil spills 🡪 Deepwater Horizon took 5 months to clean/fix

- Saudi Arabia has the largest petroleum reserve 🡪 Canada has the 2nd largest reserve

- Most of Canada’s oil is trapped inside the oil sands

- Oil sands are 10 – 12% bitumen mixed with sand, clay, & silt 🡪 Must inject steam to break bonds between oil

- 1 barrel of oil from the oil sands requires 4000 litres of water & 1,000,000 L of natural gas

- Water drawn from rivers to separate oil from bitumen impacts the water quality and damages the ecosystem

November 13th, 2017

- Alberta releases the most volatile organic compounds & pollutants 🡪 About 1 billion kg emitted in 2003

- GHG emissions will triple in next years to 75 million tons

- Obama opposed the keystone pipeline 🡪 Trump approved it

- Fracking involves extracting fossil fuels deep within earth that’s trapped between fractures

- Fracking in Ontario has good prospects 🡪 Ontario has tons of black shale

- Canada and US are the leading consumers of energy 🡪 Per Capita & In Joules

- Developing countries are expected to use the most energy in the future

- Historical shifts in Energy use in USA 🡪 Wood was the dominant source in 1850s 🡪 Now we burn coal 24/7

- From 1850s, Oil and Gas were the dominating forms of energy 🡪 Because of cars and home heating

- Nuclear energy is rarely used, and has been decommissioned in some areas

- Hydro and solar are on the rise as new renewable resources

- Oil is projected to be the dominant energy source 🡪 Emerging economies are getting cars

- Fossil fuels are the dominant source of electricity 🡪 Easy to burn, store, and ship 🡪 Contain high-energy

- Persian gulf countries have the most oil, worldwide

- US relies on fossil fuels and nuclear, more than anything 🡪 Oil, coal, & natural gas account for 60% of use

- Polar oil reserves are expected to be exploited last 🡪 Hardest and most difficult to extract

- Coal is the most abundant fossil fuel 🡪 Energy use is increasing & so is demand 🡪 Can last for 200 years

- Bituminous is the most damaging. In order of least dangerous to most: Peat, Lignite, Bituminous, Anthracite

- Brown coal, soft coal, and hard coal, isn’t actually coal. It’s the beginning of coal formation

- Coal contains a lot of sulfur, and turns water acidic 🡪 Release of SO2 causes acid rain (damages trees)

November 15th, 2017

- Nuclear energy is produced by breaking atoms up 🡪 Process = Fission 🡪 Heat generated drives a turbine

- Chernobyl is the worst nuclear reactor failure ever, in the history of mankind 🡪 Area is still poisoned/unsafe

- Wind has more growth than solar and any other form of energy (i.e. Hydro, nuclear, etc.)

- Transition to renewables is to slow to taper off of fossil fuels

- Undesirable effects of urban sprawl is traffic congestion & noise pollution 🡪 Leads to variety of health issues

- Landfills are an extremely unsustainable method

- We should protect natural open space, and green space 🡪 More parks and conservation areas

November 20th, 2017

- Sustainable practices include Natural open space, protection of wetlands, woodlands, etc.

- Less sustainable practices include destruction of landscape and aggressive development

- Leap-frog development is unsustainable because it’s spread out, resulting in low-density

- We should strive for integrated land use 🡪 Work, shop, eat & sleep in the same area 🡪 Minimizes transport

- As of 2008, more than half of human population lives in urban areas

- By 2030, more than 5 billion people will live in cities 🡪 Population will mainly grow in Asia & Africa

- Urban sprawl is low population densities with higher travel costs 🡪 Decreases air and water quality

- As of 2001, 80% of Canadians live in urban areas

- Houses have increased in size, and so has energy use person 🡪 Results in more GHG emissions

- People tend to move to the suburbs because of low-rise and low density

- Low density development comes at the cost of environmental impacts

- More integration of transit services allows people to ditch their cars

- Markham recycles 70% of its waste 🡪 Best city in GTA

November 22nd, 2017

- Portland is centered around people 🡪 Walking and public transit oriented 🡪 Street cars serve 10k ppl./day

- Portland uses less energy and burns less fossil fuels than any other city 🡪 Use of cars is scarce

- Smog is known to cause asthma, bronchitis, & emphysema 🡪 Health problems cost up to $9 billion a year

- Future cities should integrate economic, ecological, & social components 🡪 Cities should be more compact

- Whistler’s footprint was reduced by developing clean energy and making the community more public

November 27th, 2017

- More species are becoming endangered 🡪 Parks != Adequate protection

- Impacts from modern society affects species 🡪 Cars kill animals trying to cross roads

- Extinction is a natural long term process 🡪 Human intervention has messed this up big time

- 99.8% of world’s plants have not been tested for food, sustainability, medication, etc.

- Freshwater is heavily threatened by pollution

- Weak support of ivory trading in Canada

- Federal and provinces are responsible for protecting endangered species 🡪 Extreme lack of coordination

- COSEWIC determines the status of rare species (i.e. Atlantic Cod) 🡪 Does not guarantee protection

December 4th, 2017

- Atlantic COD is an endangered species 🡪 Less than 1% left

- Lack of progress in Canada 🡪 Not enough recovery strategies in place 🡪 Not enough research in species

- There is 3x more shopping space in Banff than Toronto

- Smaller habitat area = Greater potential for extinction (& V.V) 🡪 More disturbance and contact with people

- Throughout the 21st century the environment will continue to deteriorate 🡪 Climate change is serious

- Rate of consumption of goods has dramatically increased and keeps on increasing

- 25% of humanity is within the consumer class

- Countries have shifted from developing to developed (i.e. China & India)

- US houses were 38% bigger in 2002 than 2015

- 15 ecosystem services are pushed beyond their limits 🡪 Water, trees, agriculture, etc. are stressed out

- Global fisheries will collapse by 2055 🡪 Marine protected areas will recover by 2085

- Consumption is only good to a certain point 🡪 Increases education, quality of life, etc.

- Wealthy nations need to reduce consumption by 90% to help needy countries

- Oil sands has caused GHG to triple 🡪 No regulation on oil sands

- Up to 2 million people restricted from activity due to asthma 🡪 $9 bill in health costs 🡪 1.5 mill days wasted

- Canada’s progress on eco-activity is unsatisfactory

- By 2020, pests will cause $5 billion in damages 🡪 $43 billion by 2050