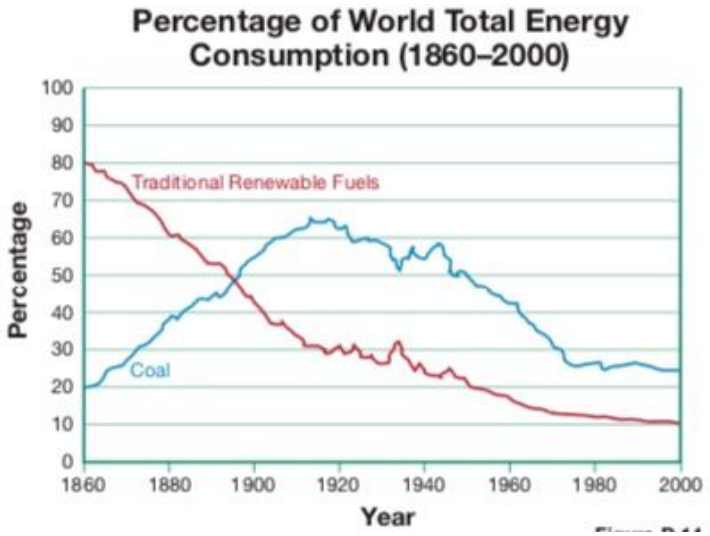
Science 30	Unit D: Energy and the Environment
Lesson 2 - Energy in Different Forms	84 mins

Renewable vs Non-Renewable Energy

Can be produced in a short period of time. - Solar - Wind - Hydro - Biomass - Thermal	Takes millions of years to produce new - Nuclear - Coal - Fossil Fuel Oil - Natural Gas

Transition from Renewable Wood to Coal

Wood - 18.5 MJ per kg Coal - 30 MJ per kg - Coal is more energy dense therefore more efficient heat source for steam engines for weight	

Formation of Fossil Fuels

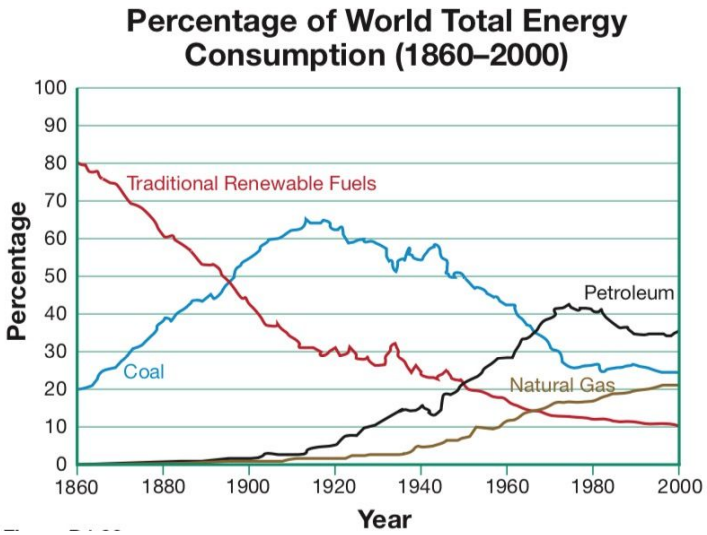
Coal 1) Above ground trees and swamps 2) Buried for millions of years 3) Under pressure 4) Coal formed underground Oil 1) Below water small plants 2) Buried for millions of years 3) Under pressure 4) Coal formed underground	Picture Picture

Extracting Fossil Fuels

Coal - Mining Oil - Push water/steam into the ground with other chemical to force oil out of the ground	Downsides - Stripmining… destruction of whole ecosystems - Water used is now contaimiated and can't be used again

Natural Gas - Water is “sucked” through coal containing dissolved methane,	- Makes huge empty caverns in the ground - Oilsands uses a similar process but from bitumen (oil sand) - “Sour” gas can be mixed in the methane - Highly poisonous

Consumption of Different Energies

Reclamation

- restoring an area to its original form or some other usable form	Dumps to Golf Courses Old surface mines to farmers fields

Science 30 - Lesson 38 - Unit D - Energy in Different Forms

Name: _____

1) Peat forms at an average rate of 5.0×10^{-4} m/a (metres per year). It takes 10 m of peat to make 1 m of coal.
    a. Calculate the time it took to produce the peat required to make a 5-m thick layer of coal. (Hint: Think of this question as a speed problem, v = d/t)

    b. Does your answer to the above question account for the total time it would take to make the 5-m thick coal layer? Explain.

    c. According to the evidence and the answers to the previous questions, should coal be classified as a renewable or non-renewable resource?

2) List the three main fossil fuels used today. Of these fuels, identify which is consumed globally at the highest rate.

3) Identify the energy source used to generate most of Alberta's electricity.

4) Identify the world's main energy source prior to the widespread use of coal in the 1800s.

5) Determine whether the energy stored in fossil fuels is best classified as kinetic energy or chemical potential energy. Explain your reasoning.

6) Imagine that fossil fuels are no longer available and there is no replacement available. List the activities in your life that would no longer be possible or would have to change.

7) As petroleum and natural gas become more difficult to extract in the coming decades, describe the likely effect on the price of gasoline.

8) Identify the main areas of the economy that would be affected by a shortage of petroleum and natural gas.

9) Explain why a shortage of petroleum might lead to new developments in automotive technology.