Survive the five!

The person that raises their hand first and answers the question correctly sits down. The others go again.

1

Water Quality Ch. 18/19

Describe Primary Wastewater Treatment

Filtering out solids (plastic, trash, etc) using screens and settling ponds.

2

Water Quality Ch. 18/19

Describe Secondary Wastewater Treatment

Removing Organic materials (sugar, carbohydrates, fats) using aerobic bacteria.

3

Water Quality Ch. 18/19

Describe Tertiary Wastewater Treatment

Removing nutrients pesticides, heavy metals, antibiotics using reverse osmosis, ozone, biological filters, etc.

4

Water Quality Ch. 18/19

Describe Anaerobic Digestion

Sludge is eaten by anaerobic bacteria. Produces biosolids and methane gas.

5

Water Quality Ch. 18/19

Describe how an estuary is an ecotone

An estuary is where fresh and salt water environments meet.

6

Water Quality Ch. 18/19

What similarities can you draw between these case studies: Aral Sea, Tulare Lake, Colorado River, Owens Lake.

Aral Sea and Owens Lake were both drained. Aral sea for Agriculture, Owens Lake for LA municipal Water. Colorado and Tulare were significantly diminished due to damming for agriculture (tulare) and agriculture/municipal use (colorado)

7

Water Quality Ch. 18/19

How is a confined aquifer different than an unconfined aquifer?

A confined aquifer is trapped between impermeable layers of rock/clay.
A unconfined is free to flow.

8

Water Quality Ch. 18/19

Describe Saltwater Intrusion

When aquifer withdrawl near the ocean draws salt water into the aquifer.

9

Water Quality Ch. 18/19

Describe the Safe Water Drinking Act

Established Maximum Safe Levels for drinking water of microbial, inorganic, pesticides, organic, and radioactive contaminants.

10

Water Quality Ch. 18/19

Describe the Clean Water Drinking Act

Set national standards for effluent discharge.

11

Water Quality Ch. 18/19

What is Greywater?

Shower water, sink water, dishwasher water that can be reused to water lawn, garden, etc.

12

Water Quality Ch. 18/19

What is the single largest component of solid waste in the US?

paper.

13

Water Quality Ch. 18/19

What is point source water pollution?

Pollution from an identifiable source

14

Water Quality Ch. 18/19

What does coliform in a water source indicate?

Sewage contamination

15

Water Quality Ch. 18/19

Describe Potable Reuse

Applying primary, secondary, and tertiary water treatment to wastewater bringing it up to drinking water standards.

16

Water Quality Ch. 18/19

What are the benefits and costs of Desalination

Benefits – clean fresh water
Costs - $$$, fresh and very salty water is produced, kills fish in intake.

17

Water Quality Ch. 18/19

What is biological assessment ?

Using living organisms to infer the health of an aquatic system.

18

Water Quality Ch. 18/19

What is the relationship between Dissolved Oxygen and Temperature

Higher Dissolved Oxygen the Lower the Temperature

19

Water Quality Ch. 18/19

List the steps in eutrophication

1. Add nitrates/phosphates
2. Algae Blooms
3. Algae dies and sinks
4. BOD goes up as aerobic bacteria decompose dead organic matter.
5. Dissolved Oxygen Decreases
6. Anaerobic bacteria continue breaking down dead matter.

20

Water Quality Ch. 18/19

What are the benefits and costs of dams?

1. Benefits – water storage, flood control, hydroelectric power generation.
2. Costs – high economic cost, rising reservoir level displaces people, sediment builds up and produces methane, lowers river flow

21

Air Pollution

22

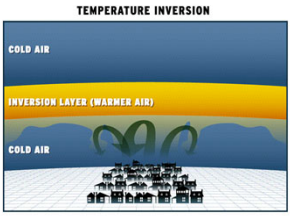
What is HNO_3 falling from the sky?

- Nitric Acid Rain

23

How does a thermal inversion form?

- Warm air moves in and traps cool air below



24

Give 3 examples of primary pollutants with their source?

- SO2 – coal combustion or volcanoes.
- NOx – auto emissions, factory emissions.
- PM – dust, smoke, ash
- CO2- auto emissions, factory emissions.
- CH4 – landfills, cattle
- CO – wood burning, auto exhaust.

25

What international agreement limited the production/use of CFC's?

- The Montreal Protocol of 1987

26

What is a primary pollutant?

- Is emitted directly from a source

27

Give one example of PM 10 and one example of PM 2.5

- PM 10 – dust, pollen, ash
- PM 2.5 - smoke

28

What type of UV radiation does Ozone block out entirely?

- UVC

29

What kind of pollutants penetrate the lungs and enter the blood

Fine/ ultra fine suspended particles

30

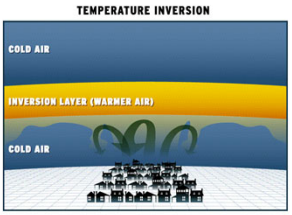
What atmospheric gas is most responsible for the greenhouse effect?

- Water Vapor

31

What effect does a thermal inversion have on the pollutants

- Air pollutants get trapped in the cold air below.



32

What ANTHROPOGENIC atmospheric gas is most responsible for the greenhouse effect?

- Carbon Dioxide

33

What elements are considered toxic pollutants?

- Cadmium
- Chromium
- Lead
- Mercury

34

What conditions are caused by exposure to photochemical smog

- Asthma
- Bronchitis
- Emphysema
- Heart disease

35

Where is ozone beneficial and where is it harmful?

- Beneficial in the stratosphere
- Harmful in the troposphere.

36

Why is ozone beneficial in the stratosphere?

- Protects us from more intense UVC and UVB rays.

37

How is ozone harmful in the troposphere? (there are two ways)

- Lung Irritant causing respiratory issues.
- Greenhouse Gas that traps heat in the troposphere

38

What are the effects of sick building syndrome?

- Coughing, eye irritation, wheezing, sneezing, depression.
- Effects only present when inside the building.

39

What 6 (7) air pollutants did the Clean Air Act aim to reduce?

$PM_{(2.5, 10)}$
So_x
No_x
CO
O_3, (VOCs)
Pb.

40

What did the clean air act of 1990 do?

established air quality standards
Required fuel efficient cars
Promoted pollution prevention vs clean up

41

How can a volcanic eruption effect the Earth's temperature?

- The PM blocks the suns rays from getting to the earth.
- Earth cools.

42

What are the most dangerous indoor air pollutants

- Asbestos
- Radon
- Cigarette smoke
- Formaldehyde

43

What pollutants come from things like wood paneling?

- Formaldehyde

44

Give a source and example of a secondary pollutant.

- Sulfuric Acid Rain, from coal combustion.
- Nitric Acid Rain, NOx from combustion
- Ozone, from NOx or VOC and sunglight

45

Explain dry acid deposition.

- Nitrates and Sulfates fall down from the sky due to gravity (no water involved)

46

The frequency and severity of smog depends on

- Density of population
- Local climate
- Local practices- wood burning
- Industry

47

What happens to the polar vortex in the Antarctic spring?

- The vortex breaks up and the suns radiation splits a CL from the $CFCl_3$

48

What are the negative health effects of a thin ozone layer?

- Cataracts and skin cancer

49

Write the chemistry of Ozone production/ destruction in the stratosphere

- **CL+ O3 → CLO + O2**
- **O_2 + UV -------> O + O**
- **O + O_2 -------> O_3**

50

What two elements are most responsible for ozone depletion?

- Chlorine and Bromine

51

What methods are used by industrial plants to remove particulates?

- Filters
- Separators
- Precipitators
- Scrubbers

52

What elements (things) are most responsible for lung irritation?

- Nitrates
- Particulate matter
- Ozone
- Nitrogen dioxide

53

What are the main sources of CFC's?

- Chlorine – refrigerants, aerosols, dry cleaning solution, Styrofoam blowing agents.
- Bromine – fire extinguishers, pesticides.

54

What are the major greenhouse gases

- CFC's
- Co2
- Nitrous oxide
- Water vapor

55

What greenhouse gas has the highest absorbing capacity?

- Nitrous oxide

56

What's the chemistry of brown air smog?

- $2NO + O_2 \rightarrow 2NO_2$

57

What is the likely source of mercury in the atm?

- coal

58

Ways to prevent global warming include..

- Slowing population growth
- Using renewable energy
- Improving energy efficiency
- Taxes on things like gasoline

59

What would a warmer climate cause?

- Decreased food production
- Reduced biodiversity
- Higher sea levels
- Increased disease

60