NEW YORK CITY
COLLEGE OF TECHNOLOGY
THE CITY UNIVERSITY OF NEW YORK

DEPARTMENT OF ARCHITECTURAL TECHNOLOGY

NAME: Ololade T Ouolabi **ARCH3551 Final Take home Exam S2021** **Prof. Azaroff**

3551 Final Vocabulary Quiz:

Answer all of the vocabulary in each section as listed and complete both sketches 2A and 2B. All answers shall be HAND written, complete sentences to receive full credit. Once complete the pages shall be scanned and photographed then emailed in by the end of class on May 25th, 2021

Section 1 Vocabulary Answer **ALL** of the following questions

TROMBE WALL

A trombe wall is a massive equator facing wall that is Painted a dark Colour in order to absorb thermal energy from incident sunlight and covered with a glass on the outside, with an insulating air-gap between the wall and the glaze.

RECYCLED WATER

Recycled water generally refers to treated domestic wastewater that is used more than once before it passes back into the water cycle. Reclaimed water is not reused or recycled until it is put to some purpose. it can be reclaimed and be usable for a purpose but not recycled until somebody uses it.

BIOSOLIDS

Biosolids are a products of the wastewater treatment process. During wastewater treatment the liquids are separated from the solids. Those solids are then treated physically and chemically to produce a semi solid nutrient rich Product known as biosolids. The terms 'biosolids' and 'sewage sludge' are often used interchangeably.

DRAINAGE SWALE

A drainage swale is a low lying or depressed often wet strech of land. The purpose is to slow and control the flow of water to prevent flooding, puddling, and erosion and/or avoid overwhelming the storm drain system.

COMBINED STORM WATER OVERFLOW EVENT (CSO)

During heavy rainstorms, Combined Sewers recieve higher than normal flows. Treatment Plants are unable to handle flows that are more than twice the design capacity. When this occurs, a mix of stormwater and untreated sewage discharges directly into the City's waterways. These events are called Combined Sewer Overflows (CSOs).

RAMMED EARTH

Rammed earth Construction is conducted by erecting wooden or metal forms for the walls and filling them with a Cement Stabilized earth mix which is Compacted by pounding with hand tools or with a mechanical Compactor.

GRAY WATER

Graywater is wastewater from sinks, dishwashers, showers, handbasins, baths and washing machines, and Contains fats, oils, harmful chemicals, bleaches and germs that affect human health.

BLACK WATER

Blackwater is any waste from toilets or urinals.

GROUND WATER

Graund water is water that has infiltrated the graund to fill the spaces between sediments and Cracks in rock. Graundwater is fed by precipitation and can resurface to replenish streams rivers and lakes.

CO-GENERATION

Co-generation is also called Combined heat and Power, CHP systems burn fossil fuels to produce power (electricity) and useful heat.

AQUIFER

An aquifer is an underground layer of water-bearing permeable rock, rock fractures or unconsolidated materials.

PART 2A: Answer the following questions in complete sentences. Sketch your answer in a diagram with explanation.

Provide and illustrate two methods by which Architects/Engineers can control the quantity and quality of water that exits a building or site before it joins the municipal sewer system? Describe each in YOUR OWN WORDS!!!!

The quality of water can be protected by keeping hazardous or toxic substances away from any system that can contaminate the water like motor oil, pesticides, paint and so on.

The quantity of water can be protected through the making of an effect to incorporate systems that would recycle water in the house which would in turn reduce the amount of water used in the house and site. this could be done through a graywater systems.

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Section 2

3551 Final Vocabulary Quiz: Answer and complete **ALL** of the following nine definitions.

MACROCLIMATE

The overall Climate of a region Usually a large Geographic Area.

MICROCLIMATE

The essentially Uniform local Climate of a Usually Small Site or habitat.

MESOCLIMATE

A mesoclimate is the climate at an intermediate geographic scale, such as a downtown district, neighbourhood, large park, farm, or wooded area, it is influenced by the physical characteristics of a local area, for example terrain features such as hills.

SIRR Report

SIRR Acronym for Special initiative for Rebuilding and Resiliency was Convened to address the Creation of a more resilient new York City in the wake of Hurricane Sandy, with a long term focus on preparing for and Protecting against the impacts of climate Change.

DRY BULB TEMPERATURE

The dry-bulb temperature (DBT) is the temperature of air measured by a thermometer freely exposed to the air, but shielded from radiation and moisture.

RESILIENT

Resilience is the ability to recover from a disaster that could have been prevented or mitigated with Sustainable practices Sustainable practices Contribute to resilience and are both ultimate goals of a healthy society.

RELATIVE HUMIDITY

Relative humidity is the ratio of how much water Vapour is in the air and how much water Vapour the air Could Potentially Contain. It Varies with the temperature of the air: Colder air Can hold less Vapour so chilling some air Can Cause the water Vapour to Condense.

DEGREE DAYS (HEATING & COOLING)

Degree days are based on the assumption that given the Outside temperature is 65°F we don't need heating or cooling to be Comfortable. The number of heating degrees in a day is defined as the difference between 65°F and the mean temperature (average of the daily high and daily low) The number of Cooling days is defined as the difference between the mean temperature (average of daily high and low) & 65°F.

BIOCLIMATIC CHART

A bioclimatic chart is a preliminary analysis tool during the early planning stages of a building project. Bioclimatic charts are used in assessing the effectiveness and selection of the passive Cooling. These charts are based on the typical dry bulb temperature and humidity extracted from the typical meteorological years (TMY) at a given location.

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PART 2B: Answer the following questions in **words and Sketch format**.

Sketch 2 examples of Atria and the advantages or qualities they bring to a project. Be specific in your description and use graphics such as arrows to show how the Atria work.

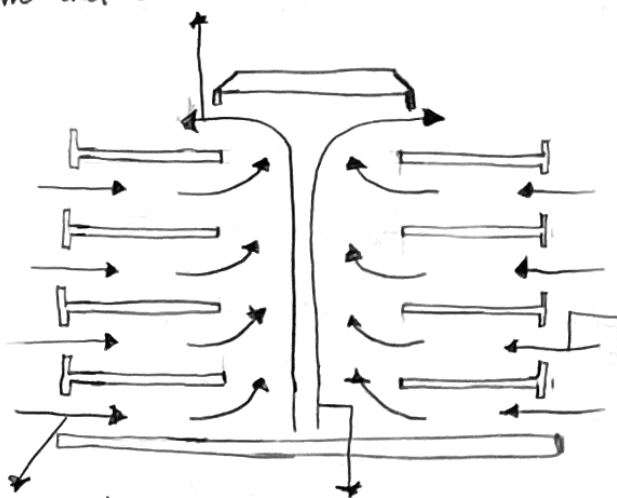
Some of the advantages they bring to a project are

1. Direct sunlight
2. it has the ability to provide natural Ventilation in a building design that is Capable of not only reducing energy Consumption and Cost but also able to provide acceptable, Compartable, healthy and productive Conditions.

Atria 1 Example
Gateway 2 building, London
Architects: Arup Associats

A properly designed natural Ventilation System allows fresh Outside air to enter a large-Volume Space through low-level inlet Ventilators the warm air rises, it exists through high-level Ventilators at the top of the Space The large difference in height between the low level entry of fresh air and exit of warm air through the atrium Creates a large buoyancy effects that draws air through the building. The Upward airflow and Circulation Creates a Cooler, more Comfortable indoor environment and an ideal path for Smoke extraction.

Negative Air Pressure
Warm and Stale air Out



Possitive Air Pressure Fresh air in

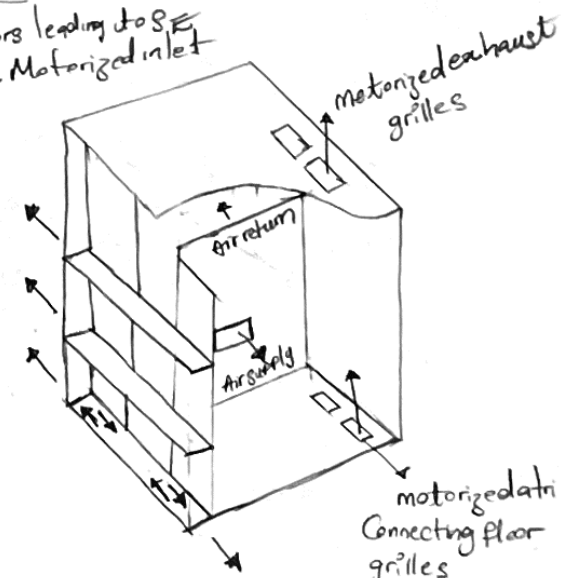
Buoyancy Ventilation in Atrium

* A Flow Diagram representing natural Ventilation through atria.

The Role of this atriums is to Provide stack Ventilation

Engineering Building of Concordia University, Canada.

Corridors leading to SE Facade Motorized inlet grilles.



Corridors leading to NW Facade Motorized inlet grilles.

Section 3

3551 Final Vocabulary Quiz: Answer ALL of the vocabulary in section 3 with complete sentences.

1. LEED
Leadership in energy and environmental Design is a green building certification Program used worldwide.

2. What is Cradle to Cradle mean?
Cradle to cradle can be defined as the design and production of products of all types in such a way that at the end of their life, they can be truly recycled (upcycled), imitating nature's cycle in which everything either recycled or returned to the earth directly or indirectly through food as a completely safe, nontoxic and biodegradable nutrient.

3. Frankenstein products
A frankenstein products is any product that is made out of two or more components or materials which cannot apart could have been disposed of or recycled, but are now a burden on the environments, as they can no longer be seperated.

4. Renewable Resource vs Non-Renewable Resource A renewable resource, also known as a flow resource is a natural resource which will replenish to replace the portion depleted by usage and consumption either through Natural reproduction or other recurring processes in a finite amount of time scale. e.g Solar energy. A non renewable resource is a natural resource that cannot be readily replaced by natural means at a pace quick enough to keep up with consumption eg fossil fuel.

5. Circular economy and give an example
The Circular economy is a model of production and consumption, which involves sharing, leasing, reusing repairing, refreshing and recycling existing materials and products as long as possible for example: recycling plastic into pellets for making new ~~produts~~ plastic products.

6. Passive Solar Systems Passive solar panels depend heavily on the design, construction and building of the name. Passive energy systems use the sun's energy for heating and cooling purposes. Passive solar systems operate without reliance on external devices. The overall success of a passive solar system depends on their overall orientation and the thermal mass of its walls. passive solar systems are independent of all the external devices.

7. Active solar Systems
Active Solar systems use heat water pumps or fans to pump fluids. One of the main benefits of using them is that they can be used to increase the effectiveness of your solar systems.

8. Carbon Emissions Carbon emission is the release of carbon into the atmosphere. To talk about carbon emissions is simply to talk of greenhouse gas emissions; the main contributors to climate change. Since greenhouse gas emissions are often calculated as carbon dioxide equivalents, they are often referred to as "carbon emissions" when discussing global warming or the greenhouse effect.

9. GHG A greenhouse gas sometimes abbreviated as GHG is a gas that absorbs and emits radiant energy within the thermal infrared range, causing the greenhouse ~~gas~~ effect. The primary greenhouse gases in earth's atmosphere are water vapour (H_2O), Carbon dioxide (CO_2), Methane (CH_4), Nitrous oxide (N_2O).

10. Superfund Site A superfund site is a location contamined by hazardous waste that has been designated by the U.S. Environmental protection Agency (EPA) for Management and cleanup.

11. Brownfield The term is also used to describe land previously used for industrial or Commercial purposes often known or suspected pollution including soil Contamination due to hazardous waste.

12. Urban Infill is defined as new development that is sited on vacant or underdeveloped land within an existing Community, and that is enclosed by other types of development. The term "urban infill" itself implies that existing land is mostly built-out and and what is being built is in effect filling in the gaps.

13. Ecological Footprint Ecological footprint is a method of gauging humans' dependence on Natural resources by calculating how much of the environment is needed to sustain a particular lifestyle. in other words, it measures the demand Vs Supply of Nature.

14. Define Lux and Lumens Lux and lumens both units indicate a light intensity. Lumen indicates the amount of light emitted by a light source, while lux gives the illuminance on a certain surface, for example a desk or workstation.» Lumen Symbol: lm is the unit for luminous flux.

15. Building Commissioning is the professional practice that ensures buildings are delivered according to the owner's project requirements <OPR>. Buildings that are properly commissioned typically have fewer change orders, tend to be more energy efficient, and have lower operation and maintenance cost. The documentation of the Commissioning process provides the foundation for correctly benchmarking the baseline energy consumption.

16. R Value / U Value
The R-value is a measure of how well a two dimensional barrier, such as a layer of insulation, a window or a complete wall or ceiling, resists the conductive flow of heat. The U-Value also known as thermal transmittance is the rate of transfer of heat through a structure divided by the difference in the temperature across that structure. The units of measurement are W/m²K. Better insulation equals lower U-Value

17. I.C.F's = Insulated Concrete forms <ICFs>
ICF building structures are sustainable/green buildings that qualify for LEED Certifications. They allow architects, engineers and designers to create buildings that uses fewer natural resources, are more efficient, sustainable and having a lasting value.

18. Heat Island Effect - An Urban heat island effect occurs when a city experiences much warmer temperatures than nearby rural areas. The difference in temperature between urban and less-developed rural areas has to do with how well the surfaces in each environment absorb and hold heat.

19. Low 'E' is low emissivity which is a microscopically thin, virtually invisible, metal or metallic oxide layer deposited directly on the surface of one or more of the panes of glass. The low-E coating reduces the infrared radiation from a warm pane of glass to a cooler pane, thereby lowering the U-factor of the window.

20. Fritted Glazing - Ceramic fritting is a process by which glass enamel is fused on the glass surface. Fritted glazing is a fenestration system. Ceramic frit onto glass enables the designer to use color and patterns on architectural glazing. Combined with clear or tinted glass substrates, as well as high-performance coatings, fritted glazing can help reduce solar heat gain.

21. S.I.P's
Structural insulated Panels <SIPs> are an high-performance building system for residential and light Commercial Construction. The panels consist of an insulating foam core sandwiched between two structural facings, typically oriented strand board (OSB).

22. SRI is a composite index called the Solar reflectance index <SRI> is used by the U.S Green Building Council and others to estimate how hot a surface will get when exposed to full sun. The solar reflectance index <SRI> is used to determine the effect of the reflectance and emittance on the surface temperature and varies from 100 for a standard white surface to 0 for black surface

23. upcycle
Reuse <discarded objects or materials> in such a way as to create a product of higher quality or value than the original.

24. Energy Audit An energy audit can be performed on an existing building to determine potential improvements to the existing system. There are three levels of thoroughness which are Preliminary Audit, ~~Energy Audits~~ General audit and investment-Grade Audits.

25. Solar Heat refers to the renewable energy system that collects energy from the sun in the form of heat rather than using the sun's energy to produce electricity, as in the case with Solar photovoltaics. Solar heating systems can be used to provide space heating and water heating to be used in residential, commercial, or industrial facilities.

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26. Geothermal Heat-Pumps A geothermal (aka Graundgaurce) Heat pump gets heat energy from the earth, not from fossil fuels. Geothermal is considered an "active" system because geothermal heat pumps use a combination of Mechanical and fixed components like a Compresser and Heat exchanger.

27. Building Management Systems (BMS) The Combination of software and hardware that is used to Control a buildings Mechanical and electrical equipment is Called the Building Management System. The Building Management System (BMS) Primarily measures: Temperature, Humidity, CO2 levels.

28. Commissioning is a method of quality Control in which Someone is hired to Monitor HVAC and other energy dependent systems within a building to ensure Optimum performance. Commisioning is required by LEED.

29. Eco Efficient. Eco efficiency Coined by inventors and industrial participants was mainly Created to make things less bad which is no good. Although the act of reduction is a major Principle of eco-efficiency this does not make it a long-term Solution for any problem as it does not stop the depletion of natural resources or any other forms in the air or environmental Problems it only does the Job of slowing down the negative effects however are still very much a threat.

30. Renewable Energy - Distributed Generation
Distributed generation, also Called On-Site generation embedded generation or distributed energy, is the use of small power plants at Close proximity to a Smaller population of users.

31. Direct solar gain systems list 2 advantages The two advantages are: 1) Simplest Solar heating System. 2) Combination of gaining Solar radiation, good visual Connections and natural daylighting.

32. Direct solar gain systems list 2 dis-advantages The two disadvantages are:
1) Even with thermal ~~Systems~~ mass, diurnal temperature Swings will occur.
2) Ultraviolet radiation in the Sunlight will degrade fabrics and photographs.

33. Indirect solar gain systems list 2 advantages The two advantages are:
1) Glare, Privacy and degradation of fabrics are not a problem.
2) Temperature Swings are lower than with direct gain Systems.

34. Indirect solar gain systems list 2 disadvantages The two disadvantages are:
1) Two South walls, One glazed and one Massive are required, with also issues Space and Cost disadvantages.
2) Depending on the U-Value Condensation on the glass Can occur.

35. Eco Effective
The Concept of eco-effectiveness has been defined as working on the right things, on the right products, services, and systems rather than making wrong things less bad. Once Something is done the right way it Can only get better.

36. What does DFE stand for?
DFE : Design flood elevation.

37. What does BFE stand for?
BFE : Stands for Base Flood elevation.

ARCH 3551 SUSTAINABILITY THROUGH ARCHITECTURE
Final Vocabulary Quiz

38. Define Freeboard - Freeboard is a factor of safety usually expressed in feet above a flood level for the purpose of floodplain management.

39. What does the cherry tree represent in our readings? The cherry tree represents an eco-effective way as it would produce a side effect of a broader and more complex design goal that would create a building that celebrates a range of cultural and natural pleasures of the sun, light, air, nature, & food to enhance the lives of the people who work there.

40. Who was Rachel Carson and name two of her contributions to sustainability: Rachel Carson 1907-1964 was a biologist, writer and ~~ecologist, writer~~ & she was named one of the top 100 most influential people of the 20th century by time Magazine in 1999 and also known as the Mother of the environmental movement. She authored Silent Spring in 1962 and challenged the misuse of chemical pesticides. Racel Carson writings are responsible for the environmental agency and inspiration of nearly every piece of environmental legislation.

41. Who was Ian McCarg and name one of his major contributions to sustainability Ian McCarg (1920 - 2001) was a landscape architect, writer who founded the department of landscape architecture at University of pennsylvania and authored design with nature in 1969. According to Ian his role in every case is to find, of all environments the most fit and to adapt the environment and themselves to accomplish creative fitting. One of his major contributions to sustainability was that he created the basis for geographic information systems (GIS)

42. What does 80 x 50 stand for?
80 x 50 means reducing greenhouse gases produced in New York City 80 percent by the year 2050.

43. Biomass is a renewable organic material that comes from plants and animals. Biomass contains stored chemical energy from the sun. Plants produce biomass through photosynthesis. Biomass can be burned directly for heat or converted to renewable liquid and gaseous fuels through various processes.

44. Name 3 SDGs: Sustainable development Goals are No poverty, Zero hunger and Quality education.

3A. **Sketch the following (Extra Credit)**

Sketch or diagram a **Passive Hot Water** heating system and an **Active Hot Water** heating system. Describe in your own words the way in each system works in detail. How does the system heat water? How does the system maintain heated water?

Passive hot water heating system can either be direct or indirect but is known as the simplest as to make the system work the water storage is painted black to enable the tank to absorb the heat into the water.

Please Turn to the back

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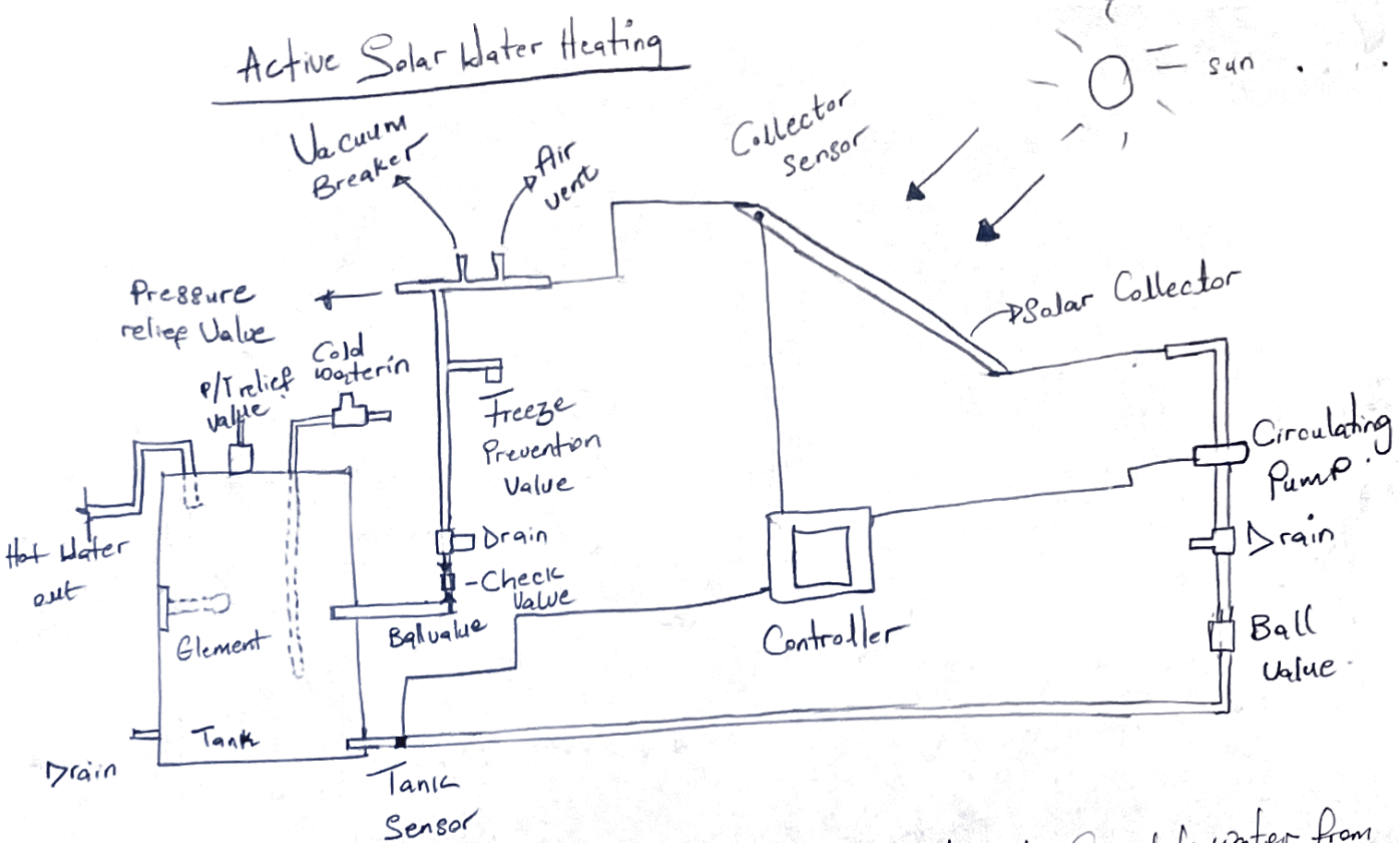
Active Solar Water Heating



In an active Solar Water heating System pumps are used to Circulate water from the Storage tank to the Collector with the use of necessary elements. The active Solar water heating System Can be Used through a direct System in which the water to be Used would run directly through the Solar Collectors but in an indirect system. Water would run through the Collectors then the heat exchanger to heat the Water.