How to make our school more sustainable

Key Stage 4 Programme

Pupil Name	
Handbook Designed by	Dr Gholami

Timetable and Assignment Submission

Timetable – Tutorials

Tutorial	Date	Time	Location
1	12/12/2018	2pm	KCL
2	7/1/2019	3pm	Harris Academy Battersea
3	14/1/2019	3pm	Harris Academy Battersea
4	21/1/2019	3pm	Harris Academy Battersea
5	28/1/2019	3pm	Harris Academy Battersea
6 (Feedback)	11/2/2019	3pm	Harris Academy Battersea
7 (Feedback)	18/3/2019	3pm	Harris Academy Battersea

Timetable – Homework Assignments

Homework Assignment	Description	Due Date
Tutorial 1		
Tutorial 2		
Tutorial 3		
Tutorial 4		
Tutorial 5		

Assignment Submission – Lateness and Plagiarism

Lateness	
Submission after deadline	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Uni Pathways – Pupil Feedback Report

Grade	Marks	Guidance
1st	70+	
2:1	60-69	
2:2	50-59	
3rd	40-49	
Working towards a pass	0-39	
Did not submit	DNS	No assignment received by The Brilliant Club

Lateness	
Any lateness	10 marks deducted
Plagiarism	
Some plagiarism	10 marks deducted
Moderate plagiarism	20 marks deducted
Extreme plagiarism	Automatic fail

Name of PhD Tutor	Dr Gholami		
Title of Assignment	How to make our school more sustainable		
Name of Pupil			
Name of School	Harris Academy Battersea		
ORIGINAL MARK / 100		FINAL MARK / 100	
DEDUCTED MARKS		FINAL GRADE	

If marks have been deducted (e.g. late submission, plagiarism) the PhD tutor should give an explanation in this section:

Learning Feedback Comment 1 -	
What you did in relation to this Key Learning Priority	How you could improve in the future
Learning Feedback Comment 2 –	
What you did in relation to this Key Learning Priority	How you could improve in the future
Learning Feedback Comment 3 –	
What you did in relation to this Key Learning Priority	How you could improve in the future
Resilience Comment	
How you showed learning resilience during the course	How you could build learning resilience in the future

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Course Rationale

What difference can an architect make to the world?

Humans have had an impact on the Earth's environment since they first appeared as a species hundreds of thousands of years ago. Over the past 100 years this impact has become devastating and has led to up to 10% (including over 80% of mammal species) of species becoming extinct, worsening droughts in many parts of the world, and a rise in average temperatures of 1°C. Much of this climate change has been driven by emissions of carbon dioxide and other greenhouse gases, and attempts to limit these by reducing car usage and switching to green sources of energy are well-known.

Perhaps surprisingly, buildings are the single largest contributor to atmospheric carbon dioxide, and use up around 40% of the world's energy and material output. Hence architects have a huge responsibility in promoting sustainability.

In this course we will look at the strategies that architects are using to reduce the impact of their constructions on the world. We will look at these strategies as applied to this school and assess how sustainable it is, compared to how sustainable it could be. You will suggest effective strategies which, following the end of the course, we will discuss with the Principal so that you can make a real difference.

Mark Scheme

Skills	1st (70-100)	2:1 (60-69)	2:2 (50-59)
Knowledge and Understanding	All content included is relevant to the general topic and to the specific question/title Good understanding of all the relevant topics. Scientific terms are defined and used accurately throughout Clear justification on how the content included is related to the specific issues that are the focus of the assignment	Most of the content included is relevant to the general topic and to the specific question/title Good understanding of most the relevant topics Scientific terms are used accurately but not always clearly defined. Adequate justification on how the content included is related to the specific issues that are the focus of the assignment	Some of the content included is relevant to the general topic and to the specific question/title Good understanding on some of the relevant topics but occasional confusion on others. Scientific terms are used mostly accurately with occasional confusion and often not defined. Some justification on how the content included is related to the specific issues that are the focus of the assignment
Critical Evaluation/ Problem solving	Moved beyond description to an assessment of the value or significance of what is described Evaluative points are consistently explicit/systematic/reasoned /justified Effective critiques on the reliability of sources provided Consistently demonstrate clear, analytical and logical steps to solving problems	Mostly description but some assessment of the value or significance of what is described Evaluative points are mostly explicit/systematic/rea soned/justified Some evidence of critiques on the reliability of sources provided Some examples of solving problems but not consistently clear, analytical and logical	Only description with minimal assessment of the value or significance of what is described Evaluative points are at times explicit/systematic/rea soned/justified Limited evidence of critiques on the reliability of sources provided Demonstrate clear steps to solving problems but not consistently analytical or logical

Structure and Presentation	Ideas are presented in paragraphs and arranged in a logical structure that is appropriate for the assignment The introduction clearly outlines how the essay/report will deal with the issues The conclusion summarises all the main points clearly and concisely All calculations, formulas and methods are clearly structured, clear to follow and correct Tables and graphs are effectively constructed including appropriate headings, units and scales. All sources are referenced correctly in an agreed format No spelling, grammar or punctuation errors Writing style consistently clear, tone appropriate and easy to follow Accurate and consistent use of technical language and vocabulary	Ideas are presented in paragraphs and arranged in a structure that is mostly appropriate for the assignment The introduction adequately describes how the essay/report will deal with the issues The conclusion summarises most of the main points clearly Calculations, formulas and methods are mostly structured, clear to follow and correct Most tables and graphs are well constructed Most sources are referenced correctly in an agreed format Minimal spelling, grammar or punctuation errors Writing style mostly clear, tone appropriate and easy to follow Some attempts of using technical language and vocab alary, but not always accurate	Ideas are presented in paragraphs and arranged in a structure The introduction mentions how the essay/report will deal with the issues The conclusion summarises some of the main points clearly Calculations, formulas and methods are not always structured, clear to follow and correct. Some tables and graphs are well constructed but contains some errors Some sources are referenced correctly in the agreed format with occasional errors Some spelling, grammar or punctuation errors Writing style moderately clear, tone appropriate and easy to follow Use of simple language and vocabulary effectively but struggles to use technical language

Knowledge Organiser

This space should be used to note key words and terms. These will be pointed out when they come up in the tutorials.

Word	Definition	Example/In a sentence

Tutorial 1 – Climate Change: Fact or Fiction?

What is the purpose of Tutorial 1?

- To increase understanding of climate change
- To understand the human impact on environment
- To understand how to address climate change in practice
- To understand what is meant by "sustainability" and know the main pillars of sustainability

Activity 1: Think, pair and share

Write down next to above each photo how they could be related to climate change.

1

2

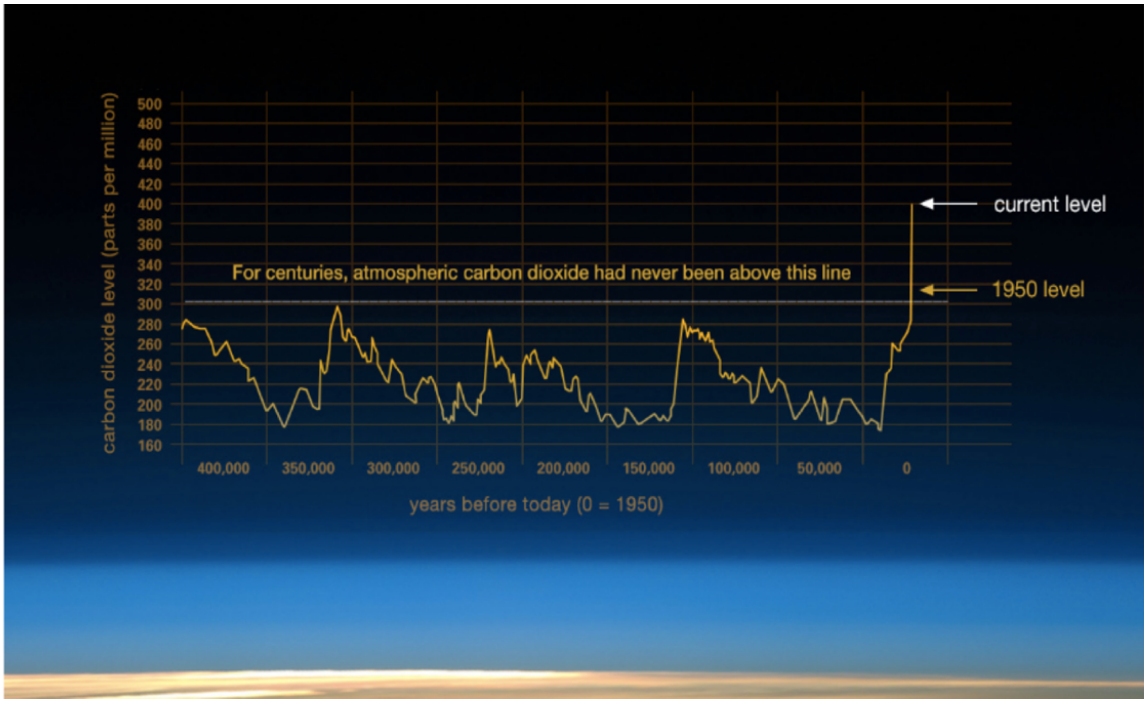
3

Climate change: how do we know?

Landmark report by the UN Intergovernmental Panel on Climate Change (IPCC): Urgent and unprecedented changes are needed to reach the target, which they say is affordable and feasible although it lies at the most ambitious end of the Paris agreement pledge to keep temperature rise between 1.5 °C and 2 °C.

The dominant driver of changing climate is the atmospheric concentration of carbon dioxide (CO_2) and other Long-Lived Greenhouse Gases (LLGHG). Emissions of these either caused naturally or due to human activities. These greenhouse gases act as a "blanket" that traps incoming solar energy and keeps the Earth's surface warmer than it otherwise would be.

Activity 2: Based on the given lecture, explain the diagram in your own words.



Sustainability

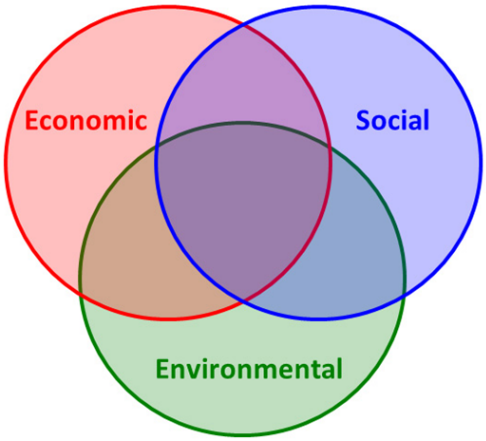
The Brundtland Commission Report issued in 1987 the document 'Our Common Future', which includes the following most used definition of sustainability:

> 'Development that meets the needs of the present without compromising the ability of future generations to meet their own needs.'
>
> Bruntland 1987

The concept of sustainability builds on the knowledge that human activities historically have had irreversible negative affects on the environment and ecology and that such unsustainable activities are now affecting humans. Some examples of how the effects of human activities can affect humans include the growing number of cancer cases due to ozone depletion and the now regular casualties of flooding due to global warming. Our understanding of sustainability today also takes into account the fact that environmental sustainability is not realistically possible without considering the economic cost to implement it and the social issues associated with it. Historically environmental improvements have only taken place if forced by legislation or if associated with an immediate (as opposed to long-term) economic advantage. Equally, where social issues, such as poverty, lack of housing or education, were prevalent, environmental issues were considered of subordinate importance. Only where social environment is stable and healthy and the economic investment is considered reasonable are environmentally sustainable practices put into action.

Sustainability today is therefore seen to have to work on three levels:

- Environmental
- Social
- Economic.



Activity 3: In pairs explain different issues that sustainability addresses and write them down below.

Homework 1: Baseline assessment

The purpose of this homework is to check and consolidate your understanding of the introduction to this course.

I. Update your knowledge organizer

II. Write a short essay (around 500 words) about the impact of human activities and sustainability.

A good essay will:

- Discuss how human activity impact the environment in London
- Explain how sustainability can reduce this impact?
- Give some examples of activities to improve the sustainability
- Use key words learnt in this tutorial
- Use correct spelling, punctuation and grammar
- Reference appropriately

Some issues to get you started:

- Public transport
- Parks & green spaces
- Waste management & recycling
- Food

Tutorial 1 Notes

Tutorial 2 – How do buildings contribute to climate change?

What is the Purpose of Tutorial 2?

- To understand the carbon footprint
- To learn how buildings contribute to climate change

A Sustainability Indicator

Activity 1: In pairs answer below questions

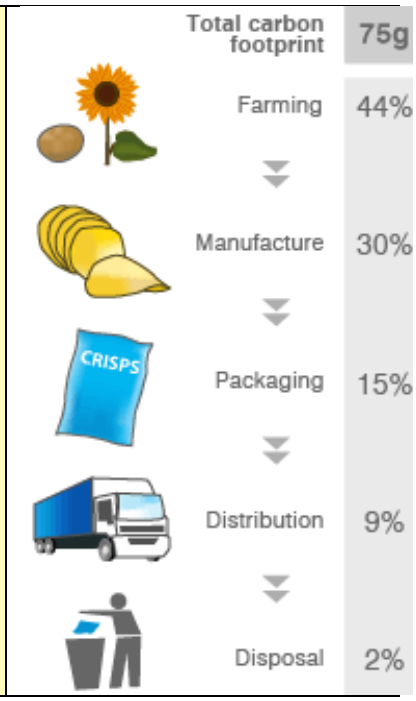
Carbon foot print of a packet of walkers crisps

1. Where does the footprint come in?

2. How does carbon relate to carbon dioxide?

3. What about other greenhouse gases?

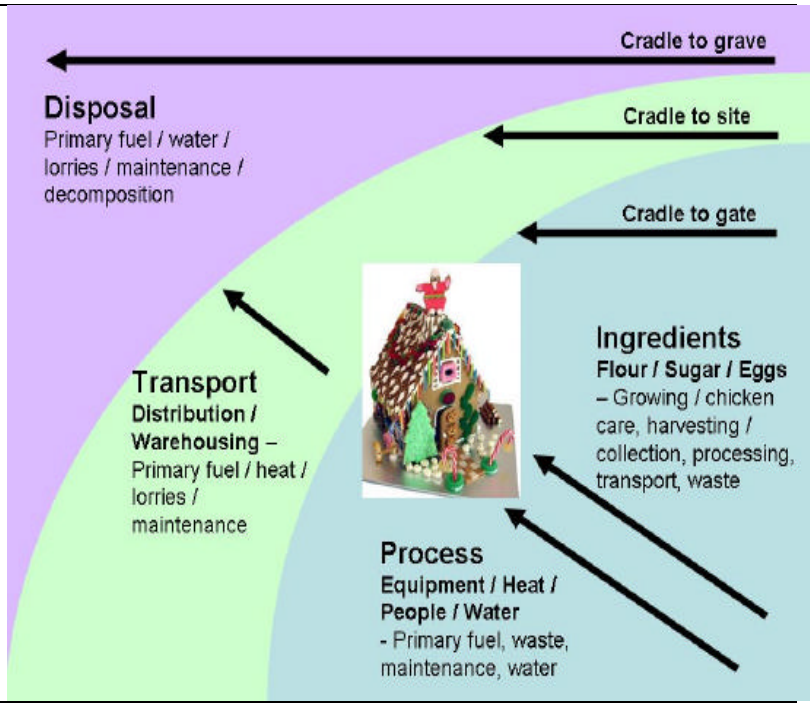
4. How does carbon relate to energy?



How does this relate to buildings?
Activity 2: Complete the sentences and explain how this related to building.

Why calculate a carbon footprint?

- To establish a _____which can be improved over time
- To report to a _____ _____
- To be _____against similar entities
-



Activity 3: Calculate a carbon footprint?

What mass and volume of CO_2 is emitted by 72kg of concrete?

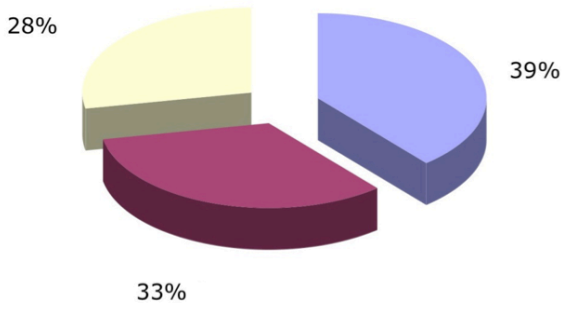
1. find embodied energy of concrete (2MJ/kg)

2. calculate embodied energy of amount in kWh:1kWh = 3.6 MJ [8]

3. find CO_2 emission factor for energy used

4. calculate volume of CO_2: CO_2 density = 1.977 kg/m3

Activity 4: Annotate the pie chart with following three labels: Building, Industry, Transport



Homework

I. Update your knowledge organizer
II. Write a paragraph (at least 80 words) under each heading about lifecycle analysis and how this relate to buildings?

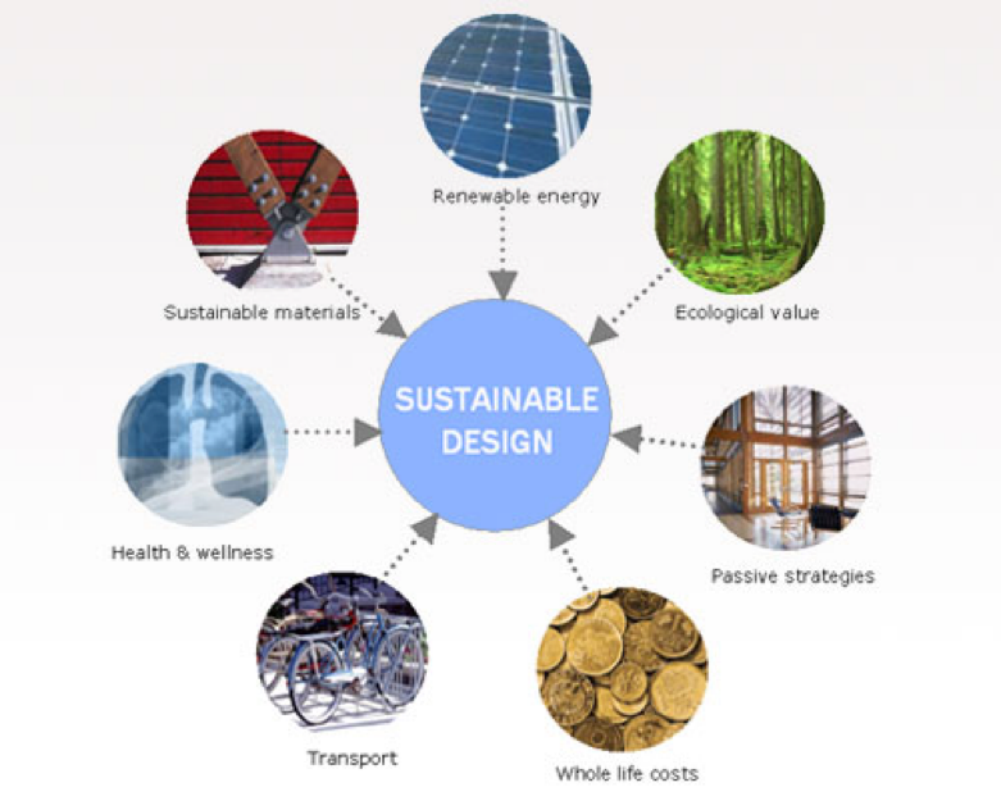
Land use change

Deconstruction and recycling

Construction embodied energy

Operation and maintenance

Tutorial 3 – Sustainable Building



What is the Purpose of Tutorial 3?

- To understand the scope of sustainable design
- To know different features of sustainable building
- To learn about the sustainable material

Lecture- Sustainable Building

Activity 1: Write down what sustainable building means in your own words

Activity 2: Draw lines to match the principal issues associated with sustainable building and how they are connected to the main pillars of sustainability

1. Health and well being
   maximise occupant control: e.g. of Heating / Lighting / Air quality / Noise

2. Energy / CO_2
   CO_2 emissions from building operations: CO_2 emmisions / Low energy lights / Metering / 'A' rated white goods / Energy management

3. Transport
   minimise CO_2 emissions from transport to and from a building:
   The location of the development / Parking & cyclist facilities / Access to public transport and local amenities/ Implementation of travel plans

4. Water
   Use water sparingly: Water efficient appliances / Water metering / Leak detection systems / Water butts

5. Materials & waste
   Raw materials / embodied energy: Materials with a low embodied energy i.e. 'A' rated in the Green Guide to Specification / Re-use (i.e. refurbishment projects) / Responsibly resourced materials / Use of recycled materials

6. Passive Design Strategies
   Maximise the benefits of ambient sources and sinks of energy for heating, lighting and cooling

7. Land use & ecology
   location being developed: brownfield or contaminated site / ecological enhancements / Protecting ecological features / optimise building footprint

8. Pollution
   Minimise associated pollution: Refrigerants and insulation with a low global warming potential / low flood risk sites / of surface water run off attenuation / oil interceptors/filtration in car parks etc

9. Management
   commissioning stages through to maintenance, monitoring and setting targets for improvements.

Social sustainability

Environmental sustainability

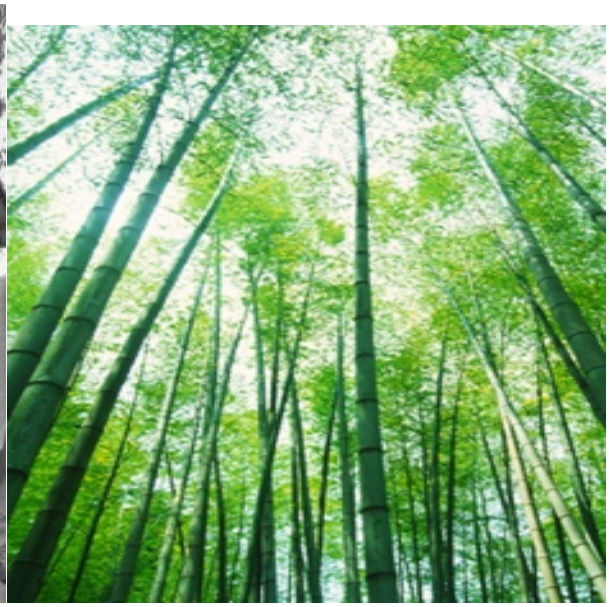
Economic sustainability

Materials
Activity 3: What construction materials are used in our school building?

Why worry?

- Pollution: toxic, heat air, water, soil
- Depletion: Biodiversity, gene pool, ozone, adaptability, water, mineral
- Destruction: Ecosystem, species, social structures
- Waste
- Harm

What are criteria for sustainable materials?



- Plentiful
- Renewable
- Low toxicity
- Low energy
- Durability
- Strength
- Embodied Energy
- Issues
- Environmental Cost

Homework

I. Update your knowledge organizer
II. Name one material used in our school building
III. Identify whether your chosen material is sustainable or not sustainable.
IV. Explain in less than 300 words why they are considered to be sustainable or not sustainable

Tutorial 4 – Passive Design Strategies

What is the Purpose of Tutorial 4?

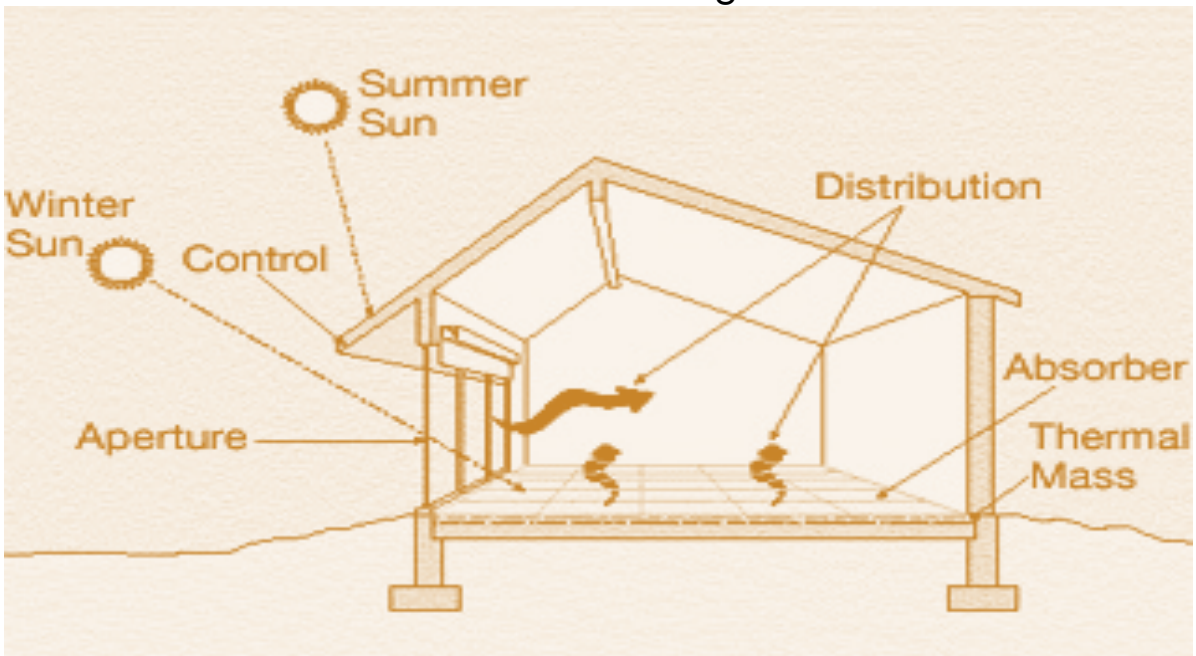
- To learn about passive design
- To identify the passive strategies implemented in the school building (walk through school and spot the passive strategies)

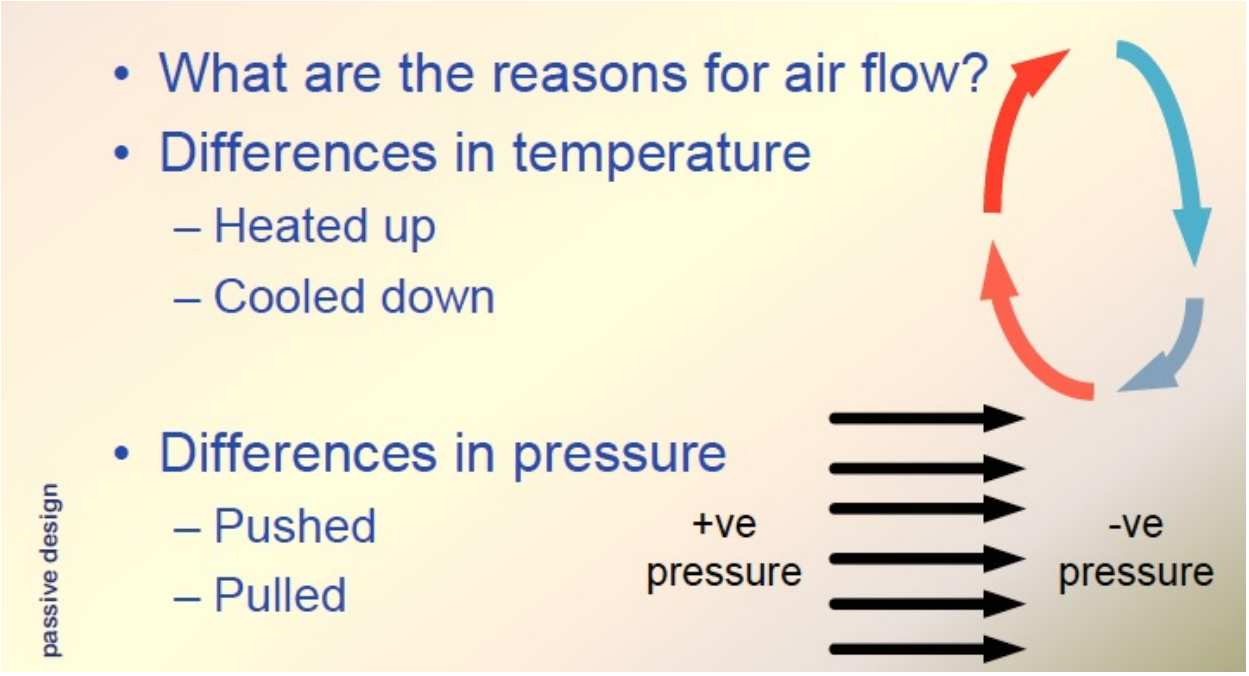
Lecture- Passive Design

A passive design is one in which the form, fabric and systems of a building are arranged and integrated to maximise the benefits of ambient sources and sinks of energy for heating, lighting and cooling in order to reduce the consumption of conventional fuels and the emission of greenhouse gases.

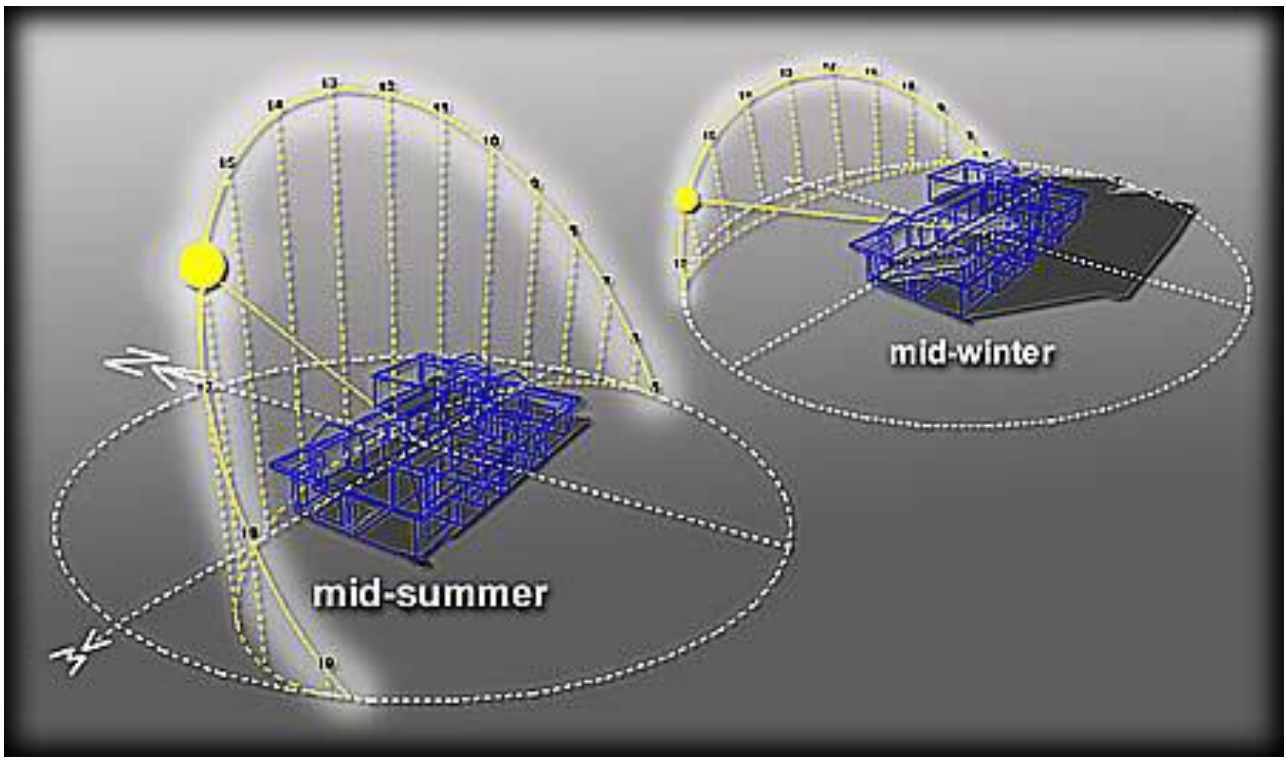
Activity 1: Make notes while we are surveying the building (you will use this data for your final assignment)

Passive Heating




• What are the reasons for air flow?
• Differences in temperature
– Heated up
– Cooled down
• Differences in pressure
– Pushed
– Pulled
+ve pressure
-ve pressure
passive design

Daylighting



Homework

I. Update your knowledge organizer
II. From the provided list explain how these passive strategies are used in our school building: Explain in a sentence how they benefit environment and minimise greenhouse gas emission

A. Passive heating

Orientation

Building shape

High-performance windows

Operable shading

B. Passive ventilation

Operable windows

Strategic architectural features

Openings to corridors and between

Central atria and lobbies

C. Daylighting

Window size and placement (window to wall area ratio)

Interior surface colours and finishes

Strategic architectural features

Tutorial 5 – Social Sustainability

What is the Purpose of Tutorial 5?

- To learn about social sustainability and how it relates to you and our school building
- To bring together knowledge and skills from tutorials 1-4 in order to evaluate sustainability in our school

Activity 1: Reading
Read the literature review of social sustainability and discuss how it relates to you and our school (make notes and annotate the text)

2. Literature Review

2.1. Social sustainability (SS) overview

Scholars observes social sustainability in several dimensions. Sachs (1999) discusses social sustainability in reference to two factors- democracy and equity. Becker and Jahn (1999) describes it as a longtime relationship between nature and the society. Meanwhile, Polèse and Stren (2000) portrays it as a movement that occurs while adjusting the advancement of a civil society, and the improvement bringing about a rich environment. Chan and Lee (2008) highlighted certain features that hinder urban development and social aspect of sustainable development: (i) Provision of infrastructure that generates opportunities for social interaction. (ii) Availability of job opportunities and provision of employment for individuals as a source of income, with the working area serving as a place for social interaction. (iii) Ease of access to available infrastructure and residences with convenient traveling times. (iv) Townscape should be designed with aesthetics that encourages communal social interaction. (v) Preservation of local features for generations to come. (vi) Aptitude to accomplish psychological necessities. Social sustainability is a manner in which a society is formed based on peoples wants and needs (Woodcraft, Hackett, & Caistor-Arendar, 2011). By doing so, the process helps provide social amenities, which in turn promotes participation in social and cultural efforts amongst residents, and also serve as a place for personal development. Murphy (2012) developed four conceptual categories: equity, participation, awareness of sustainability and social cohesion. Where these categories frame the premise of another set of social categories that would aid current social categories and grasp the environmental dimensions of sustainable development. Davoodi, Fallah, and Aliabadi (2014) evaluate social sustainability from the architectural design context, with six principles: social interaction in place; social security; flexibility; hierarchy; architectural identity; and participatory design.

Chiu (2003) describes social sustainability as an aspect that contributes to the enlightening and sustaining the human welfare. Enyedi (2002) social sustainability can be accomplished when a project work

agreeably with the environment while diminishing the social disparities and distinction, along these lines advancing and enhancing the personal satisfaction. However social sustainability can be pursued in different ways from subjective - objective, intangible-tangible, nonphysical –physical and from individual - groups (Atanda & Öztürk, 2018).

Green building assessment tool has however intended to keep a balance of the triple bottom line, but only a few have been able to integrate all aspects (Yigitcanlar & Dur, 2010). BREEAM, one of the most populous tools, is centered mostly on the ramifications of the environmental issues and its resulting impacts on the health and well-being of the users, which is rather restricted to what the social criteria depicts. LEED, on the other hand, has an apparent overemphasis on environmental aspect without a comparable stress for the versatility of the product used to achieve this ecological benefits, and many more others to name a few.

Socially sustainable approaches in building assessment tools will be more vigorous when the interface between the building and its users is thought about in an incorporated way, in this manner, factoring in both environmental and social aspects of sustainability. Hence, GBAT for example BREEAM, LEED, CASBEE, etc., should manage and evaluate the user's perception through an organic integration of the environmental issues weighing the social aspect within the same bracket.

To study the state of SS in the built environment, this research focuses on data's from social reports and building assessment tools. Therefore, sustainable indicator were adopted to collect qualitative and quantitative information's (Pires & Fidélis, 2015). Sustainable indicators help simplify and clarify information for policymakers. They integrate the physical and social science knowledge into decision-making (United Nations. Department of Economic, 2007). Recent studies on social sustainability has concentrated more on policy objectives and listings of the categories with relatively little or no research about the building environment and its applications. Therefore, social sustainability in building assessment tool is still in its infancy stage, and this can be improved through the development of a tool that factors the social aspect into the overall appraisal of a building.

Tutorial 5 Notes

Final assignment

To conclude this course you have a choice of two final assignments. Either:

I. An essay (around 1500 words)

Or

II. A poster (with at least 1000 words of text)

You will have an opportunity to show your poster or essay to the Principal in a meeting to share our ideas for making the school more sustainable.

Success criteria

A good assignment will:

- Contain an introduction to climate change and sustainability. This could be based on your first homework.
- Explain different aspects of sustainability and how buildings contribute to climate change.
- Discuss the passive strategies used in our school and importance of these strategies to mitigate environmental impacts.
- Discuss the social aspect of sustainability in our school and how it could be improved.
- Include a conclusion: summarise what you learnt in this course; any insights you have gained from studying the sustainability in our school; and a direction in which this project could continue.
- Be appropriately referenced
- Include relevant figures with informative labels (if appropriate) and captions, which are referenced within the text (e.g. "This may be seen in figure 2")
- Use key words learnt through the course correctly
- Have good spelling, punctuation and grammar throughout

Tutorial 6 – Feedback tutorial

What is the Purpose of Tutorial 6?

- To receive feedback on final assignments.
- To share examples of best practice with the other pupils in your group.
- To write targets for improvement in school lessons.
- To reflect on the programme including what was enjoyed and what was challenging.

Final assignment feedback

What I did well…	What I could have improved on…
•	•
•	•
•	•

My target for future work is…

Tutorial 7 – Feedback tutorial

What is the Purpose of Tutorial 7?

- To receive feedback on final assignments.
- To share examples of best practice with the other pupils in your group.
- To write targets for improvement in school lessons.
- To reflect on the programme including what was enjoyed and what was challenging.

Final assignment feedback

What I did well…	What I could have improved on…
•	•
•	•
•	•

My target for future work is…

Reflecting on Uni Pathways

What did you most enjoy about Uni Pathways?
•   •   •

What did you find challenging about the programme?	How did you overcome these challenges?
• • •	• • •

Appendix 1 – Referencing correctly

When you get to university, you will need to include references in the assignments that you write, so we would like you to start getting into the habit of referencing in your Brilliant Club assignment. This is really important, because it will help you to avoid plagiarism. Plagiarism is when you take someone else's work or ideas and pass them off as your own. Whether plagiarism is deliberate or accidental, the consequences can be severe. In order to avoid losing marks in your final assignment, or even failing, you must be careful to reference your sources correctly.

What is a reference?

A reference is just a note in your assignment which says if you have referred to or been influenced by another source such as book, website or article. For example, if you use the internet to research a particular subject, and you want to include a specific piece of information from this website, you will need to reference it.

Why should I reference?

Referencing is important in your work for the following reasons:

- It gives credit to the authors of any sources you have referred to or been influenced by.
- It supports the arguments you make in your assignments.
- It demonstrates the variety of sources you have used.
- It helps to prevent you losing marks, or failing, due to plagiarism.

When should I use a reference?

You should use a reference when you:

- Quote directly from another source.
- Summarise or rephrase another piece of work.
- Include a specific statistic or fact from a source.

How do I reference?

There are a number of different ways of referencing, and these often vary depending on what subject you are studying. The most important to thing is to be consistent. This means that you need to stick to the same system throughout your whole assignment. Here is a basic system of referencing that you can use, which consists of the following two parts:

1. A marker in your assignment: After you have used a reference in your assignment (you have read something and included it in your work as a quote, or re-written it your own words) you should mark this is in your text with a number, e.g. [1]. The next time you use a reference you should use the next number, e.g. [2].
2. Bibliography: This is just a list of the references you have used in your assignment. In the bibliography, you list your references by the numbers you have used, and include as much information as you have about the reference. The list below gives what should be included for different sources.

    a. Websites – Author (if possible), title of the web page, website address, [date you accessed it, in square brackets].

    E.g. Dan Snow, 'How did so many soldiers survive the trenches?', http://www.bbc.co.uk/guides/z3kgjxs#zg2dtfr [11 July 2014].

    b. Books – Author, date published, title of book (in italics), pages where the information came from.

    E.g. S. Dubner and S. Levitt, (2006) Freakonomics, 7-9.

    c. Articles – Author, 'title of the article' (with quotation marks), where the article comes from (newspaper, journal etc.), date of the article.

    E.g. Maev Kennedy, 'The lights to go out across the UK to mark First World War's centenary', Guardian, 10 July 2014.

Appendix 2 – Glossary (continued)

This space should be used to note key words. These will be pointed out when they come up in the tutorials.

Word	Definition	Example/In a sentence

Notes

Notes

Notes

How to make our school more sustainable

Key Stage 4 Programme

researchersinschools.org