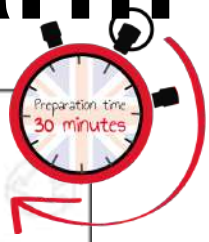
Walls to keep us warm



EAE Learning objectives for this lesson

Learn different phrasal verbs and vocabulary used in both architecture and engineering. Practice listening and reading comprehension



Introduction – **Questions and Answers**

With your partner or teacher, ask and answer the questions below

1) Do you know how efficient your apartment or home is?
2) Have you done something to make a change?
3) Do you have a challenge at work to improve efficiency
4) What changes have you seen in buildings over the last fifty years?
5) Is it hard to heat your home and keep that heat in?
6) What about in the summer when you need to cool it down?



Activity One – **Match**

Match the definitions on the right with the vocabulary on the left

Terms	**Definitions**
Green computing	A unit that is put on the top of the building in the sun
Set Point	Cools down a building or room
Rooftop device	Do not allow light to pass through or penetrate them.
Block heat	A monthly peer-reviewed scientific journal published by the Nature Publishing Group
Air conditioning	Environmentally responsible and eco-friendly use of computers and their resources (reducing their environmental impact
Nature energy	Stop hot air coming in or affecting the temperature of the building
Estimation	A desired or target value for an essential variable, or process value of a system
Opaque fabric	A rough calculation of the value, number, quantity, or extent of something.

Activity Two – **Reading Comprehension**

Read the article and answer the comprehension questions

Future of Energy: EfficiencyBy Amy Adams

In the past few decades, improvements in energy efficiency in our homes, buildings and cars have significantly reduced carbon emissions by cutting demand. In addition to the environmental impacts, this enhanced efficiency has improved national security, reducing energy imports four times as much as the combined increases in domestic production of all energy sources combined.

Continuing that trend of increasing efficiency has been the focus of the Precourt Energy Efficiency Center (PEEC), which emphasizes efficiency in buildings and homes – like more efficient heating, cooling and lighting – as well as transportation, green computing and how people make energy decisions in their daily lives.

Buildings

Yi Cui, a professor of materials science and engineering who works on energy efficiency as well as improved batteries, said he started thinking about heating and cooling when looking at where most energy goes.



A fluid-cooling panel designed by Shanhui Fan, professor of electrical engineering at Stanford, and former research associates Aaswath Raman and Eli Goldstein being tested on the roof of the Packard Electrical Engineering Building. This is an updated version of the panels used in the research published in Nature Energy. (Image credit: Aaswath Raman)

"We spend 30 percent of electricity to cool and heat the building, which is about 13 percent of the total energy consumption," he said. "The estimation is, if you can change the set point of air conditioning by 1 degree Celsius, you save 10 percent of energy use in the building heating and cooling."

A team led by Shanhui Fan has developed a rooftop device that reflects heat from the sun back into space rather than letting it be absorbed by the building. The group recently showed that it could cool water for air conditioning without electricity, and calculated that on a hot day it could save as much as 21 percent on energy to cool the building. Another group has developed a window that quickly transitions between clear and dark to block heat on sunny days.

Inspired by the cost of cooling buildings, Cui wondered if he could cool people instead. He and his group developed an opaque fabric that allows body heat to pass through. People wearing cooling clothing made from this material would require less energy spent on air conditioning.

https://news.stanford.edu/2017/10/05/future-energy-efficiency/

Answer the comprehension questions:

1) What have improvements to energy efficiency reduced?
2) What does the Precourt Energy Efficiency Center emphasize?
3) What made Yi Cui start thinking about energy efficiency?
4) How much electricity do they spend on cooling and heating the building with the panels?
5) Which device did they develop to stop heat from being absorbed by the building?
6) How did the cost of cooling buildings inspire Cui?

Activity Three – Listening Comprehension
Listen to the video and then answer the comprehension questions
Energy Efficiency: Our Best Source of Clean Energy (0:00 - 1:28)
https://www.youtube.com/watch?time_continue=10&v=bJh53jhpKDA

1) What is the OAPEC embargo?
2) What year did the crisis happen?
3) What did people have to change?
4) What did they use less of?
5) What has happened since the embargo?
6) What had the most impact on America's consumption and energy security?
7) Which approach do we need to commit to?

Activity four – Discussion and vocabulary
Think about architecture or engineering terms.
What terms do you use in your job?
Do you know what these following words are and how they are related to your job?

Seismic load
Strut
Shear
Pitch / slope
Stud
Torsion load
Joist
Grade
Foundation

Check the vocabulary's meanings at this link:
http://www.strucalc.com/the-most-used-engineering-terminology-defined/

Activity Five- Phrasal verbs
Read about phrasal verbs and then fill in the gaps
Phrasal verbs are used all the time in spoken and written English. They are formed from a verb + a preposition or verb + adverb (or both). The preposition/adverb often changes the meaning of the verb.

Have a look at the phrasal verbs below and discuss them with your teacher. Which ones do you already know?

Build on
Check over
Knock down
Drain away
Eat away (erosion)
Fence off
Build around
Build up
Tear down
Carry out



Fill in the gaps with the correct phrasal verbs from the list above:
Which one hasn't been used? Can you think of an example of how to use it?

- The whole site was _____ _____ energy efficiency
- The far wall could be _____ _____ to make the room bigger
- We have to _____ _____ the ideas we already have
- The project should be _____ _____ for mistakes
- The building work was _____ _____ by a local contractor
- The old house should have been _____ _____ a long time ago
- He played a key role in _____ _____ the company from nothing
- They _____ _____ the bottom end of the garden during construction for health and safety
- I watched all the energy _____ _____ from the system

Activity Six – Taboo
Let's use the vocabulary from this lesson to play taboo.
Choose a word, and without using that word, describe it to your teacher

Activity Seven – Buildings for the future
Discuss what you think will happen in the world of construction.

1) What will be in demand?
2) How much more efficient can buildings be?
3) Do you have any ideas of what we could do to make buildings more energy efficient in the future?
4) What do you think will be the biggest problem in the future when trying to make buildings more energy efficient
5) What will happen to those houses that we cannot adapt or change in this way?

Activity Eight – Role plays
Act out the following role plays with your teacher:

A) Imagine that you have a client that is over spending on heating and cooling their house. The house was built in 1950 and is not attached to another house. What changes can you make to the house to make it more efficient.

B) Your friends bought an old farm but the buildings have been eaten away by the weather and they are most likely going to have to be torn down. They want a house that is very energy efficient and produces its own electricity. What can they do? There are no neighbors.

C) Your roof top was damaged during a storm and you will have to replace it. This is your opportunity to make some big improvements. Maybe you can build on the house.

D) There is an office building that needs to be checked over for efficiency defects. What did you discover? Report your findings to the building's owner and tell him what to do for improvements.

