

W4.3 PLANNING AND DESIGNING

Maintaining a constant temperature (heating/cooling)

Some inspiring solutions:



TERMITE MOUNDS

Termite mounds and the ventilation of the Eastgate Centre, Zimbabwe

“The mounds act like an ‘external lung,’ harnessing the change in temperature as day becomes night to drive ventilation. Inside the hill is a large central chimney connected to a system of conduits located in the mound’s thin, flutelike buttresses.” (<https://www.sciencemag.org/news/2015/08/how-termite-mounds-breathe>)

“Architect Mick Pearce, one of the designers of the *Eastgate Centre*, was inspired by models of internal temperature regulation in termite mounds. At the time of the building’s design, researchers had proposed that termite mounds maintained stable internal climates by having a physical structure that enables passive internal airflow. While subsequent research on termite mounds has altered our understanding of the function of mound structure, the *Eastgate Centre* still achieves a controlled internal climate with the help of cost-effective and energy-efficient mechanisms originally inspired by termite mounds.” (<https://asknature.org/idea/eastgate-centre/>)

Further information from:

- <https://materialslab.wordpress.com/2015/11/26/learning-from-termites/eastgate-zimbabwe-apartment-building/>
- <https://inhabitat.com/how-biomimicry-can-help-designers-and-architects-find-inspiration-to-solve-problems/>



SEA SPONGE

30 St Mary Axe (the Gherkin), London – air ventilation system is similar to sea sponges and anemones.

“That air is distributed between the connected floors for the natural ventilation through pressure differentials. This mixed-mode ventilation system provides passive cooling and heating effects depending on the season. In the winter, the insulating effect keeps the building warm through passive solar energy. In the summer, external pressure differentials pull out the warmer air. In essence, the building breathes in and out via the flow of air through it. This air flow into and up through the building mimics the flow of water and nutrients through the Venus’ flower basket sponge.” (<https://steemit.com/architecture/@snaves/biomimetic-architecture-the-gherkin>)

Further information from:

- <http://www.miamiironside.com/blog/biomimetic-architecture>





SHAPE OF PENGUIN

The penguin's body is adapted for swimming. Its body is fusiform (tapered at both ends) and streamlined.

<https://seaworld.org/animals/all-about/penguins/physical-characteristics/>

This shape can be used in aerodynamics of buildings, as illustrated in an industrial and office building in Hungary. The covers of the chimney are penguin shaped and help ventilate of the building.

<https://energiadesign.hu/en/article/projects/hungarys-first-energy-positive-industrial-and-office-building-komlo-2012>



MYCELIUM

Fungi mycelium can be used as packaging, and also has good insulation properties.

See more in "Natural economy module"

For further ideas of insulation in nature explore:



Grass



Fur: Grey squirrel (*Sciurus vulgaris*)



Feathers