

Physics in the Nature Park: the school grounds as GCSE contexts for evaporation and latent heat

This is a great starter or plenary for a lesson on evaporation. Exploring the school grounds gives learners real-world context, linking vegetation and water to cooling in an urban setting.

Teaching Time

~10 minutes

Learning Outcomes

- understand that thermal stores of energy increase during a change of state, but temperature remains constant
- observe evaporation in the school grounds and natural environment and link this with the latent heat of vaporisation
- begin to understand how plants and water keep places cooler and protect against heatwaves and climate change

Step by Step

1. Choose when to use this activity—either as a starter to prompt links between vegetation and cooling, or as a plenary to apply learning about latent heat of vaporisation.
2. Explore evaporation and latent heat using the school grounds—ideally on a hot day. Use observations, data, or thermal/infrared images to support discussion. You can use images and observations from your own school grounds or the example thermal images in the PowerPoint.
3. Questions to prompt discussion are:
 - What is the effect of long grass on temperature?
 - What is the effect of a pond on temperature?
 - What is the effect of replacing gardens with paving and artificial grass?
 - What is the effect of trees on temperature?
4. Discuss why vegetation and water (“green and blue” areas) help protect against heatwaves.

Green Skills



Suitable for

Key Stage 4

Location

Indoors
Outdoors

Season

Spring
Summer

What you need

Optional: Infra-red thermometer
Optional: FLIR™ or another thermal infra-red camera
Sunny day school ground photos or satellite image

Key vocabulary

Evaporation / vaporisation

Latent heat of vaporisation
thermal energy store

Support and extension opportunities

See the step by step for guidance on extension opportunities.

Cross curricular links with biology (transpiration) and geography (challenges of urban growth and features of sustainable urban living).

Interested explore more real-world data with learners? Check out the [Nature Park Map](#) for further opportunities.

Question to help emphasise the global importance of heat.

Question: When water evaporates, its thermal energy store is boosted, and the surroundings are cooled. When might that energy be transferred back to the surroundings?

Answer: When the water condenses again, to form clouds.

Explanation: Latent heat released during cloud formation warms the air, increases pressure, and drives wind—making it a key force behind our weather.

Background on teaching latent heat of vaporisation



Warm water splashed onto the skin begins to feel cold as it dries. Learners will know this from after a shower or swimming.

An infra-red thermometer will reveal the cooling of room-temperature water splashed onto a paper towel. It will show the temperature drops – by 2°C or 3°C - over a minute as the paper towel is gently wafted through air.

Explain to learners the connection between these observations and latent heat: energy has moved between thermal stores as liquid water vaporises. The residual water has a reduced thermal store, and that of the vapour has been increased.

What is happening in the school grounds?

Temperatures are lower where water and vegetation is compared to the built environment because the evaporation, and therefore transpiration, is a cooling process. The more vegetation, the greater the transpiration.

A common misconception is that trees cool just by their shade. Instead, a major part of the cooling process is transpiration; mentioning this can give real climate significance to the teaching of latent heat.

Why does this matter?

Trees and other vegetation can cool our school grounds and our urban spaces – they are “nature’s air conditioner”. Wise planting, along with good urban design, can mitigate against heatwaves, helping to make schools, workplaces and our homes more comfortable places to be, reducing the need for electrically driven air conditioners.

Air conditioners add to the heating of our towns because they transfer energy to the thermal store of the air around buildings, heating everyone else and putting significant stress on electricity grids during heatwaves.

For further reading on this topic:

[Using Trees and Vegetation to Reduce Heat Islands | US EPA](#)

[The potential of urban trees to reduce heat-related mortality in London - PMC \(nih.gov\)](#)



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