

mesh.
the smart renewable energy consultancy

SIGNAL BiZHUB Talk:

How Healthy is Your Environment?

Doug Johnson



What We'll Cover...

Coming Up

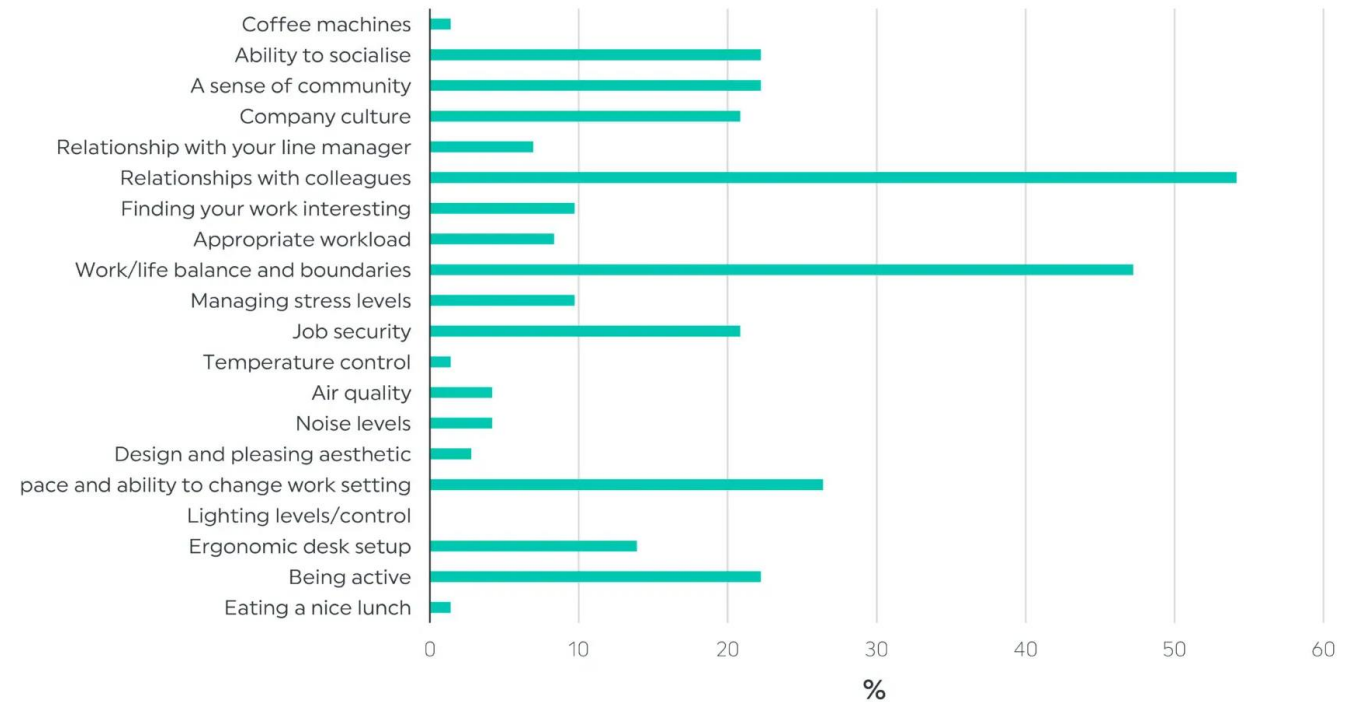
- Context and healthy environment 'elements'
- Benefits
- Quantifying, measuring and improving
- Case Study (Putney High School)
- How to get started: 6 quick 'hacks'
- Key Take-aways



Context

- Rapidly changing times
- Reordered priorities
- Blurred boundaries
- ‘Balance’ is key

Since we have reopened the office and embarked on our back to work journey, what do you feel have been the **3 most important factors** for your own wellbeing at work?



Healthy Environment 'Elements'

Office design elements that support occupant wellbeing



Natural light



Calming, natural colours and materials



Meditation/relaxation rooms



Minimal noise levels



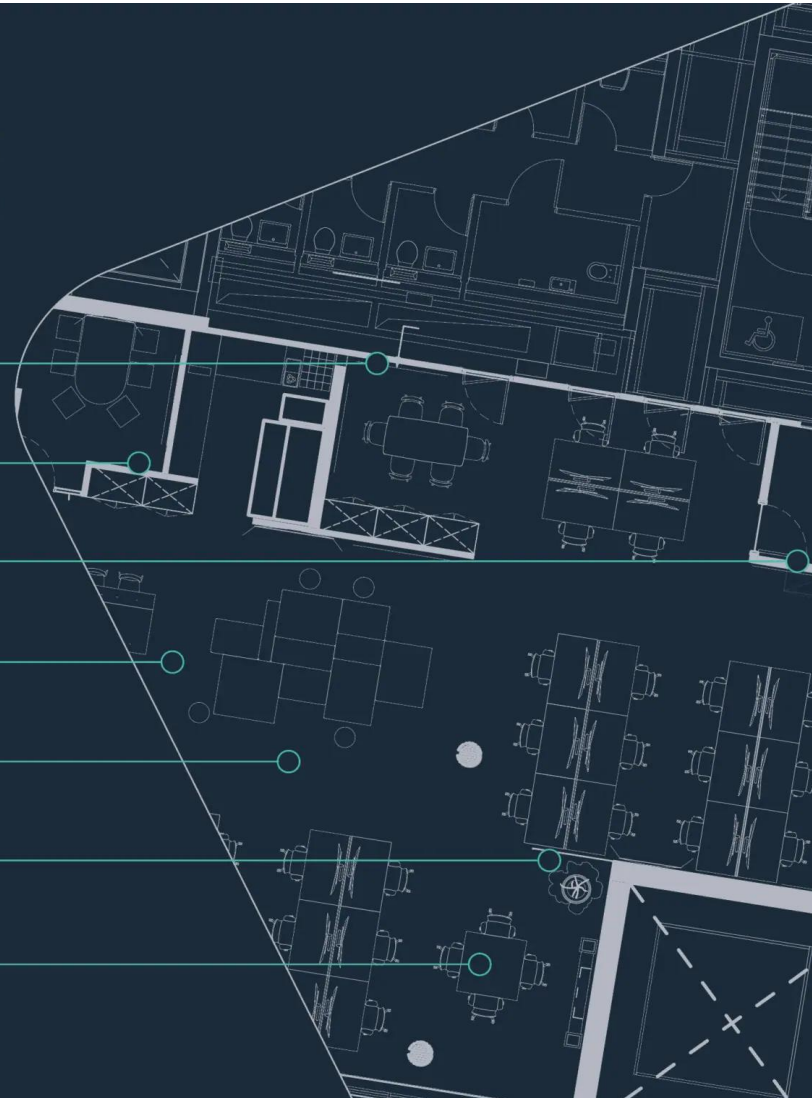
Temperature and air control



Biophilic design



Soft furnishings and domestic décor



Healthy Environment Benefits

Benefits

- Reduced harmful stress levels
- Reduced absenteeism
- Increased engagement
- Improved morale
- Increased concentration
- Improved feeling of wellbeing
- Increased productivity



Quantifying, Measuring and Improving

Quantifying and Measuring

- Instrumentation/data logging
- Questionnaires
- Flourish Model



Measurement (Quantitative)

Air Quality

- The World Health Organisation have specific standards for air quality, for living, for buildings inside and outside so it upholds global living requirement ,so that people can live with no problems with the air around them.
- Humidity is between 40-70%
- Buildings should have a temperature of 13-30°C.
- The air movement is between 0.1-0.15 m/s.
- That CO₂ is below or at 1000ppm.



Dictionary

Search for a word



biophilia

/bɪɪə(ʊ)'fɪɪə/

noun

(according to a theory of the biologist E. O. Wilson) an innate and genetically determined affinity of human beings with the natural world.

What is The FLOURISH Model?

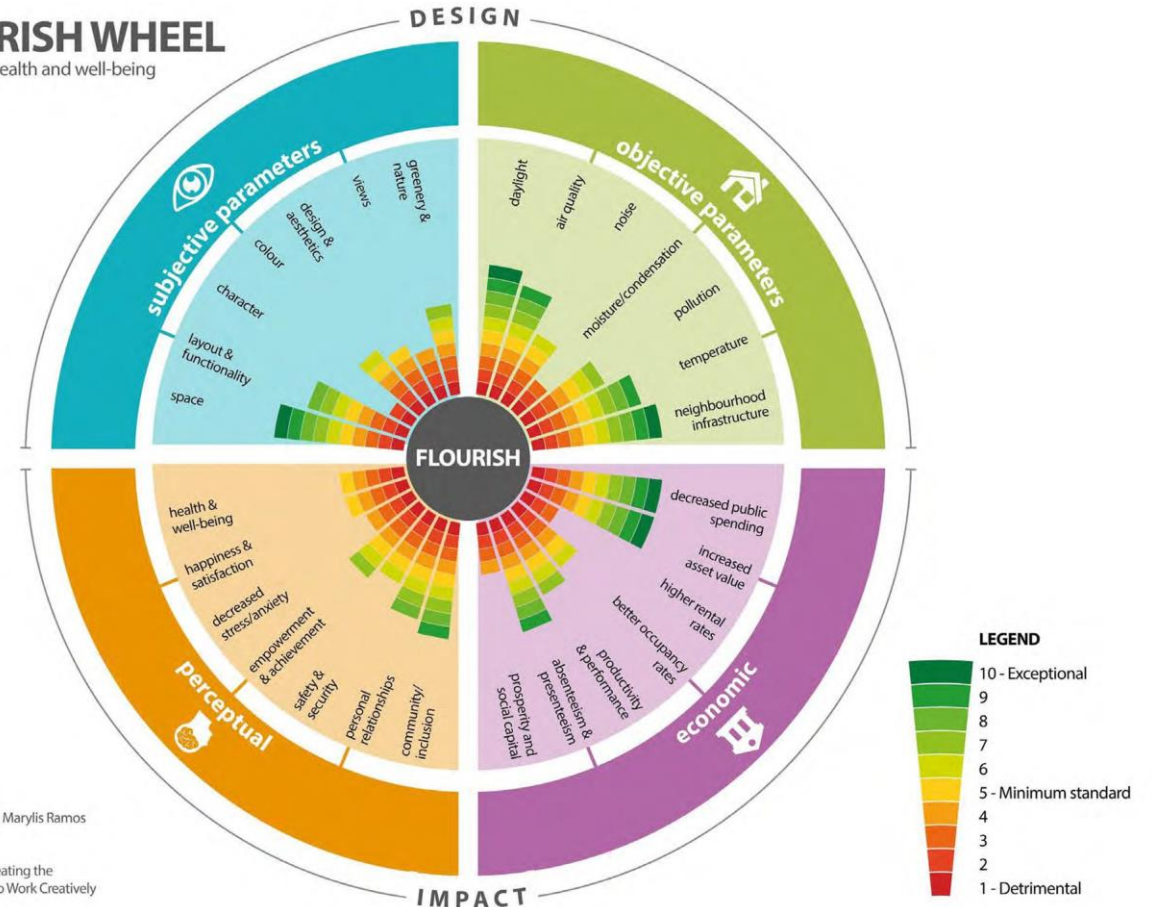
A theory of calming the mind

- Improved physiological and cognitive performance through exposure to biophilic environment (Yin, Zhu, MacNaughton, Allen, & Spengler, 2018)

4 Quadrants/3 Layers:

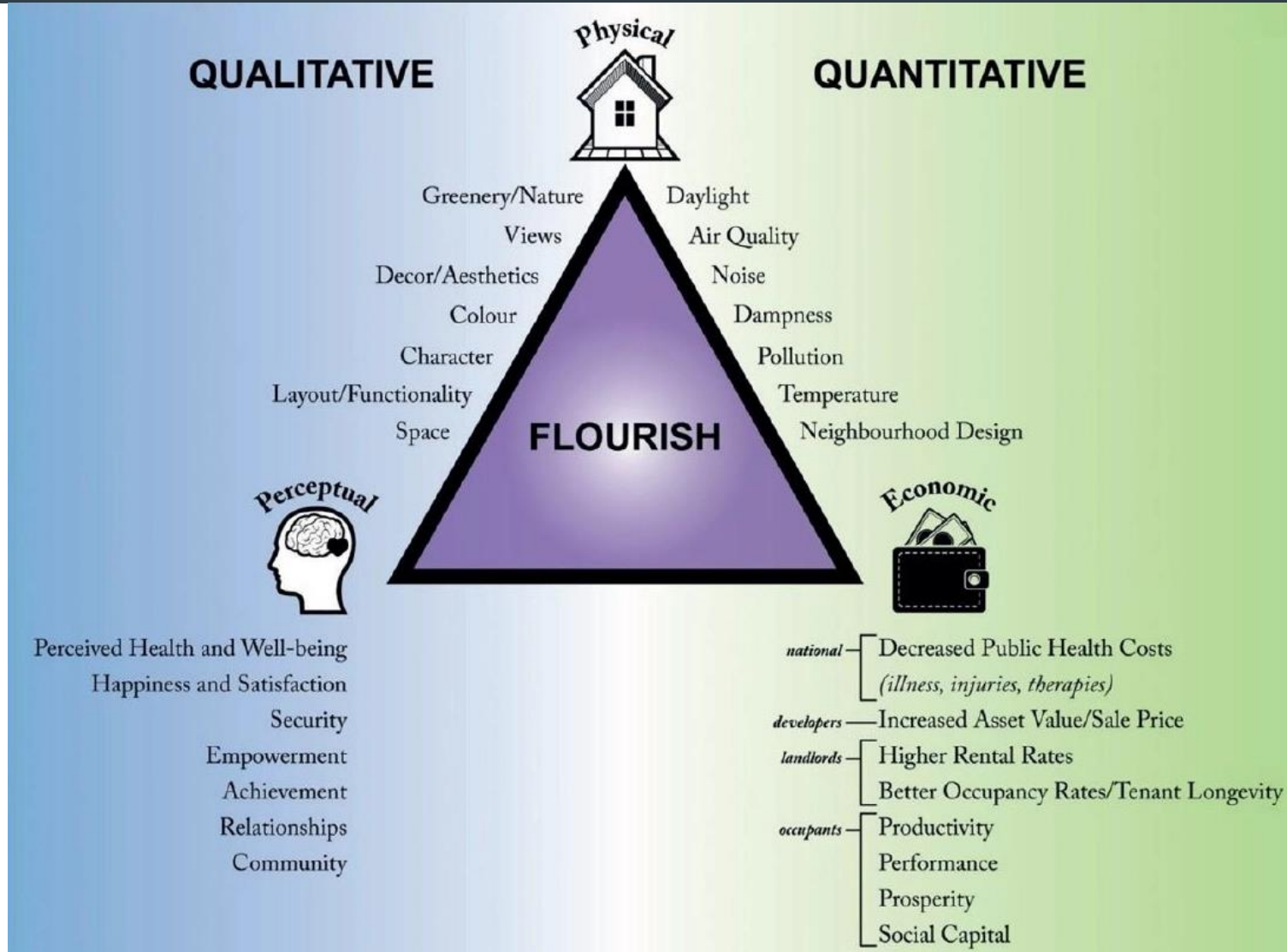
- Objective – Environmental Factors
- Perceptual – Feelings & ‘a choice’
- Subjective – The ‘Sparkle’ layer

The FLOURISH WHEEL
An assessment tool for health and well-being



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read more about Flourish in:
Clements-Croome, D (2018) Creating the
Productive Workplace: Places to Work Creatively

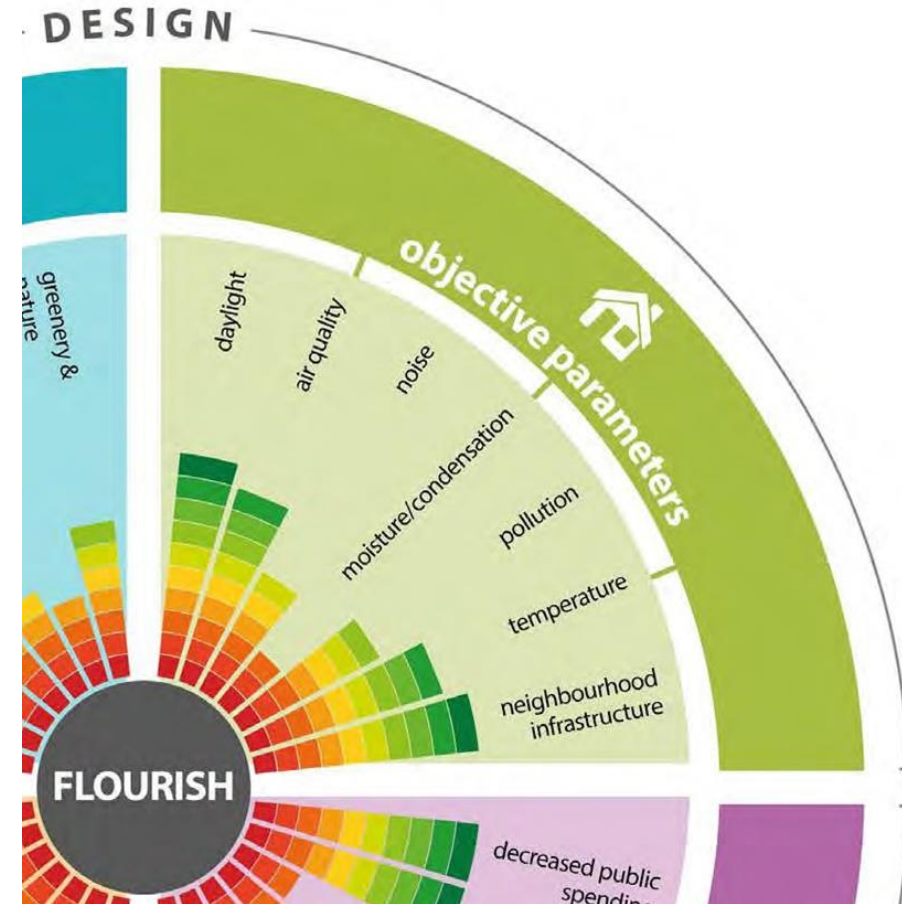
What is The FLOURISH Model?



What is The FLOURISH Model?

Objective Parameters

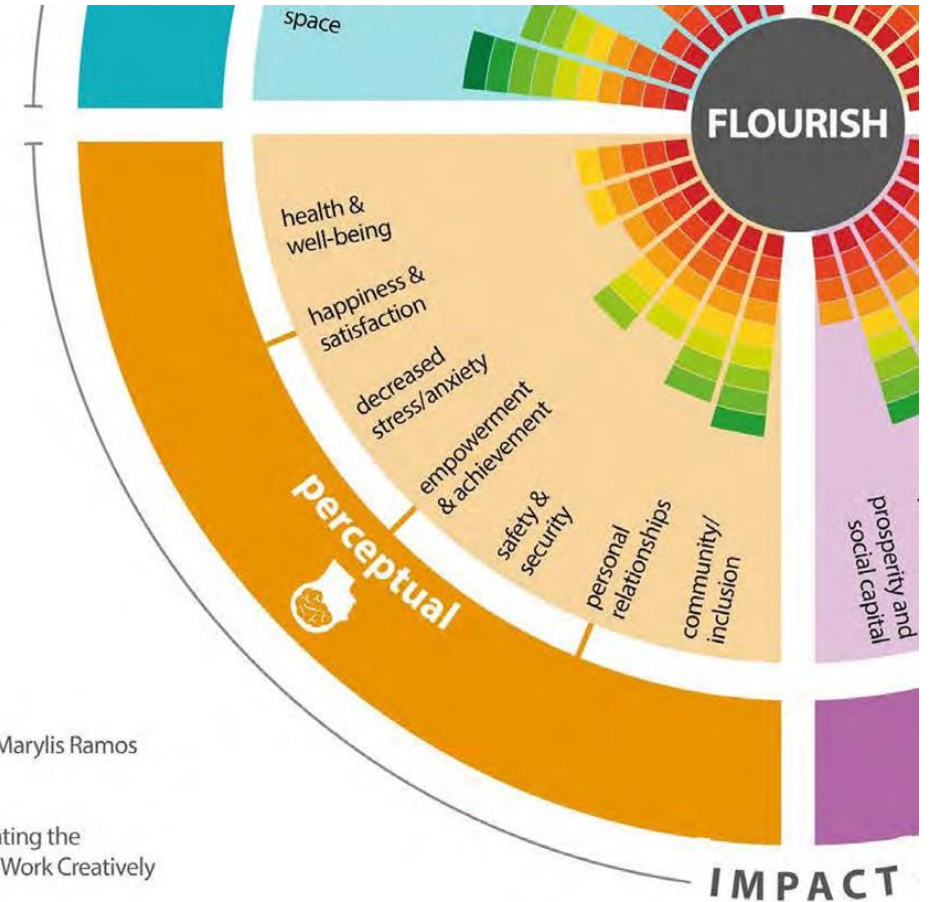
- 'Normal' layer
- Standard comfort health and safety guidelines
- Thermal comfort
- Noise
- Light
- Air quality



What is The FLOURISH Model?

Perceptual Parameters

- Individual or 'proportional' layer
- Choice must be made as to priorities
- Based on energy efficiency and cost
- Health and productivity must be considered too



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read more about Flourish in:
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What is The FLOURISH Model?

Subjective Parameters

- The 'Wow' layer
- Access to views on nature
- Daylight
- Colour and image
- Layout and green space

The FLOURISH WHEEL

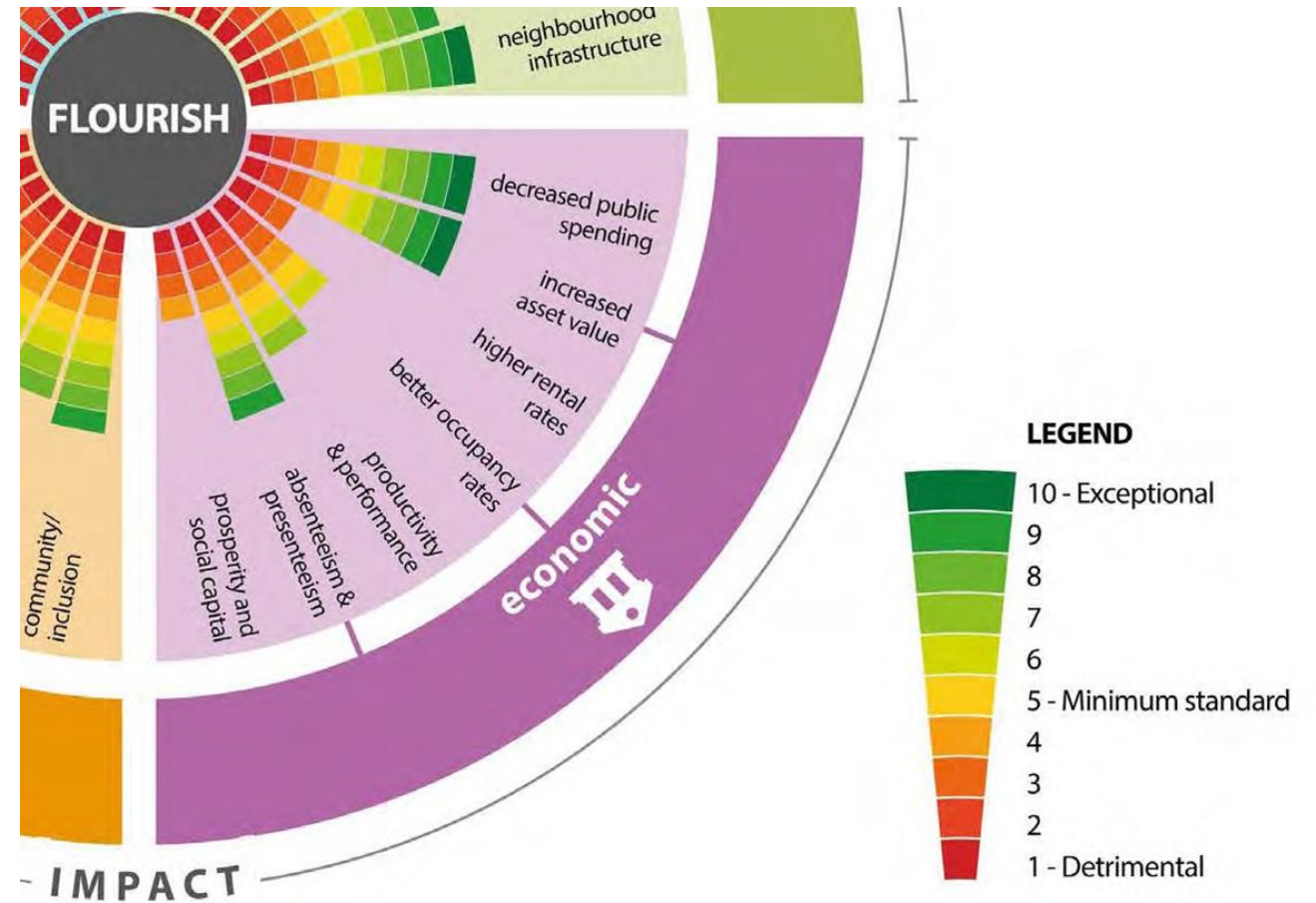
An assessment tool for health and well-being



What is The FLOURISH Model?

Economic Parameters

- Decreased public health costs
- Increased asset value/sale price
- Higher rental and occupancy rates
- Productivity, performance prosperity



GDST Putney High School – Case Study



GDST Putney High School – Case Study

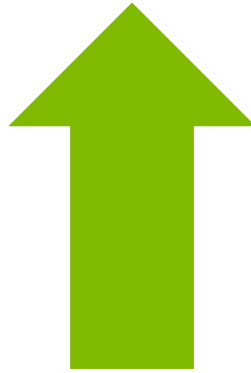
Indoor environments with natural elements such as GI and daylight have been found to lead to an increase of...

Up to 47%



Wellbeing

Up to 38%



Productivity

Up to 45%

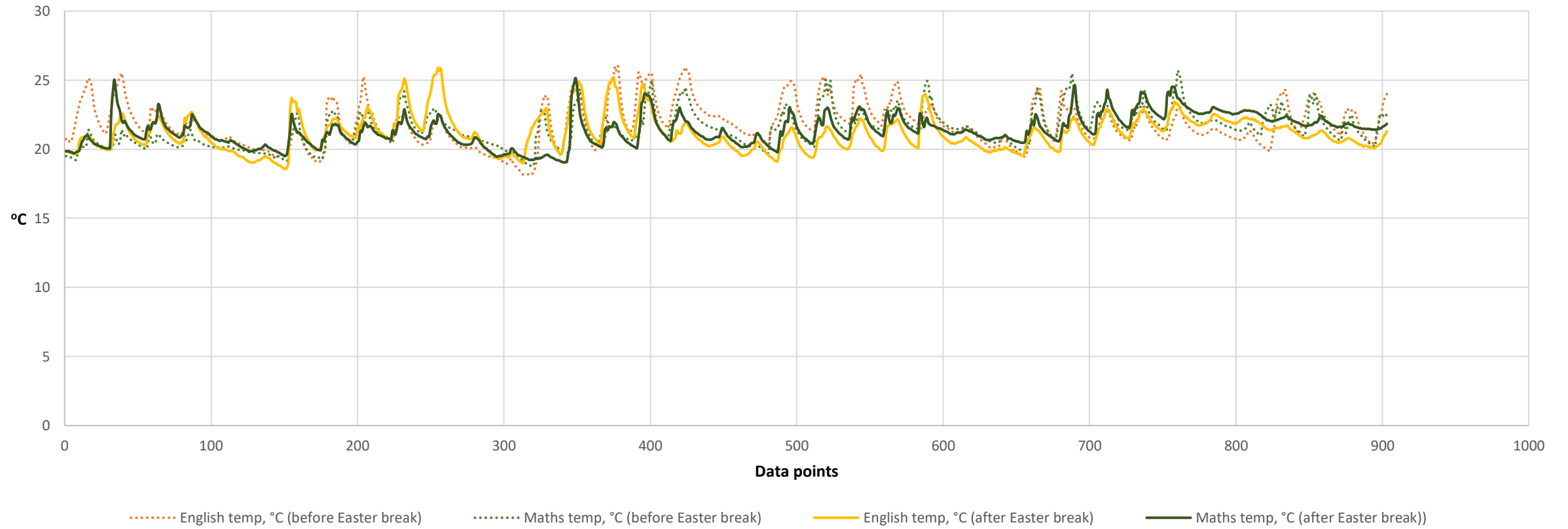


Creativity

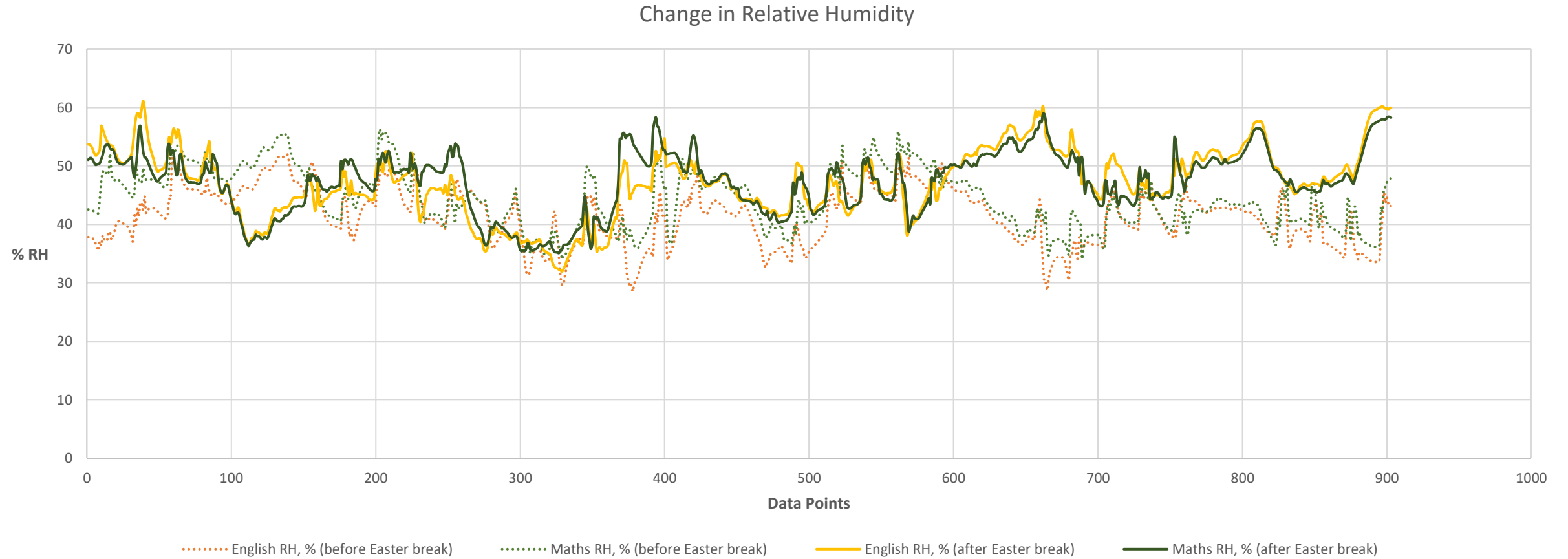
...than those with no natural connection.

The Research Outcomes

Change in Temperature

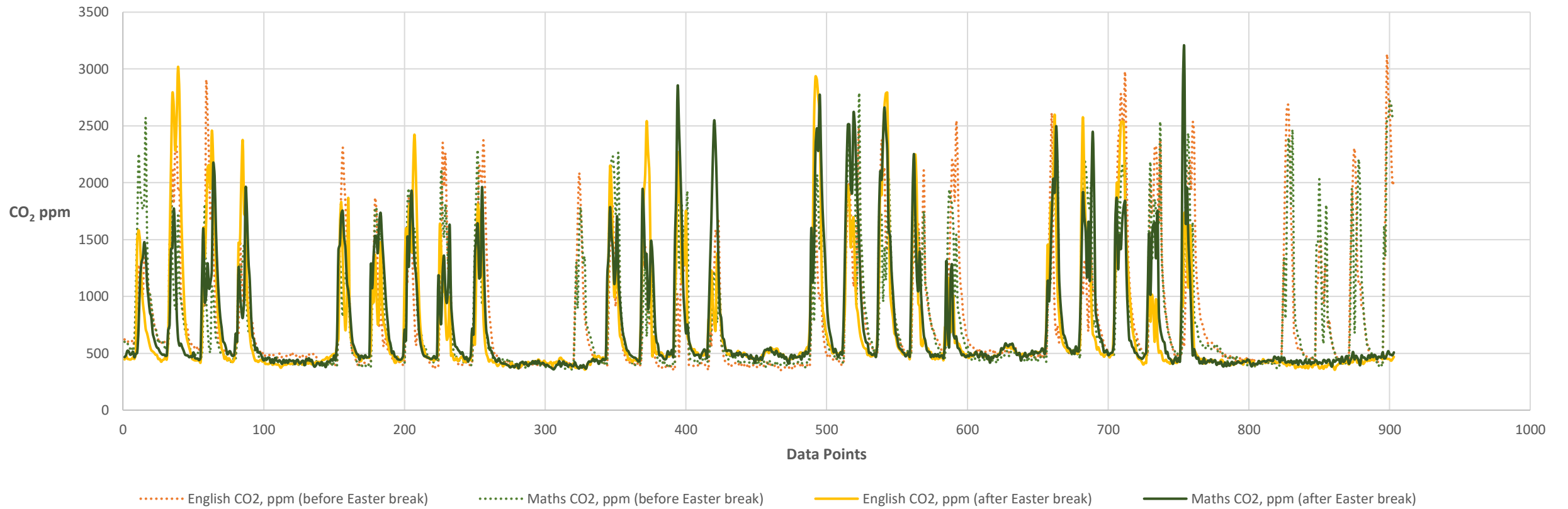


The Research Outcomes



The Research Outcomes

Change in CO₂



In summary

- Nature in the space has a stronger relationship with occupant cognitive wellbeing
- Less window opening due to regulated indoor air temp
- Humidity improved by 10%
- Level of engagement went from 'High' to 'Extremely High'
- The feedback process continues...



What Happened Next

RC
ZM

Sustainable Building
Performance Analysis
and Design



PUTNEY
HIGH SCHOOL
GDST

Interface®
LSA
International



INNERSPACE
CHESHIRE



husk
hate plastic love husk.

THE
PALM
CENTRE

BOTANICAL BOYS
CONNECTING PEOPLE TO NATURE



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What Happened Next



6 Quick Health and Wellbeing Hacks

1. Lighting: Fit a dimmer switch and daylight light bulbs
2. Biophilic design: Put some plants in your space!
3. A lick of paint and fittings with some thoughtful colour choices
4. Proper room temperature control: A thermostat and working TRVs
5. Cut out draughts and aim to reduce extremes of heat and cold
6. Noise cancelling: Secondary glazing and soft furnishings



Key Takeaways











- Lighting, air quality and connection with nature key to feeling of wellbeing
- Thermal stability and humidity important
- Biophilic design (plants can help concur many of these issues in one fell swoop)
- Leads to increased concentration and productivity
- Measure and compare
- Doesn't take much to change! Small steps



Bonus Slide – Plants that do stuff

“It’s not rocket science but we did get it from NASA”

LOW LIGHT











		1a Chrysalidocarpus lutescens (Areca palm) 1b Howea forsteriana (Kentia palm) Release moisture into the air and remove formaldehyde, xylene and toluene.
		2a Ficus elastica 'Melany' (Rubber plant) 2b Peperomia obtusifolia (Baby rubber plant) Remove chemical toxins from air.
		3a Dracaena 'Janet Craig' 3b Dracaena marginata (Dragon tree) Effective air cleaners removing xylene and trichloroethylene.
		4a Epipremnum aureum (Marble queen, Golden pothos, Devil's Ivy) 4b Philodendron oxycardium (Heart-leaf philodendron) Remove chemical vapours.
		5a Chamaedorea elegans (Dwarf palm) 5b Zamioculcas zamiifolia (Eternity plant) Produce oxygen and reduce carbon dioxide at night.

Putney High School's plant selections are all taken from a NASA study based on guidance set out by Dr B C Wolverton in his publication *How to Grow Fresh Air*. The plants were chosen on the basis of:

- Removal of chemical vapours
- Resistance to insect infestation
- Ease of growth and maintenance
- Transpiration rate

TOP LOW MAINTENANCE PLANTS WHICH THRIVE IN LEARNING ENVIRONMENTS

BRIGHT LIGHT

6a Anthurium andraeanum (Flamingo flower)		
6b Sansevieria trifasciata (Snake plant) Remove formaldehyde, xylene, toluene and ammonia. The flowers are a visual highlight.		
7a Aloe mitriformis (Mitre aloe)		
7b Phalaenopsis sp. (Moth orchid) Effective in removing xylene from the air.		
8a Chlorophytum comosum (Spider plant)		
8b Asplenium antiquum (Japanese bird's nest fern) Improve indoor air quality.		
9a Rhipsalis baccifera (Oasis mistletoe cactus)		
9b Tradescantia zebrina (Inch plant) Improve indoor air quality.		
10a Pilea peperomioides (Chinese money plant)		
10b Calathea ornata (Prayer plant) Improve indoor air quality.		

PLANTS AND CARE

The selected plants enjoy fortnightly watering, and daily misting helps to improve humidity which creates a fresher learning environment.
Allow one plant per 6 cubic metres.

MORE PLANTS THAT BRING DELIGHT FOR BRIGHT AND DIRECT LIGHT

Cereus peruvianus ('Florida' cactus)	Tillandsia (Air plant varieties)
Haworthia (White spider)	Echeveria 'Doris Taylor' (Woolly rose)
Senecio cephalophorus (Mountain fire)	Echeveria (Purple pearl)
Crassula ovata (Friendship tree, Jade plant)	Echeveria agavoides
Crassula (Buddha's temple)	Echeveria shaviana 'Truffles'

Who are Mesh Energy?

We are independent energy consultants

Purpose

“To inspire and forge a sustainable legacy”

Mission

“To instil confidence and pride in low energy projects through intelligent design”

How can we help you?

- Holistic and independent
- Deliver intelligent design and feedback
- Your partner in ‘simplifying the sustainable energy landscape’
- Support at every project stage





Questions





Thank you

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