



**Dr Nelson Lebo**  
Palmerston North City Council

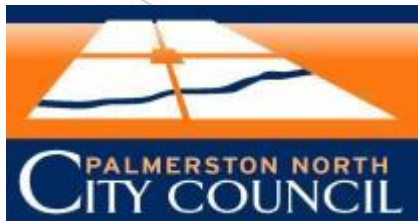
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**VILLA RENOVATIONS:  
THINKING OUTSIDE THE SQUARE**

9:35 am

# Villa Renovations

Thinking Outside the Square



Nelson Lebo, EDA, PNCC



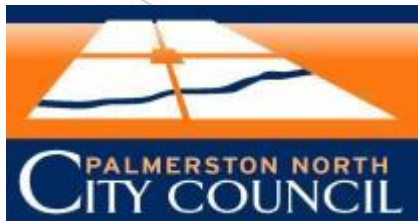






# Passive Solar Potential

Living areas to the north.  
Minimal winter sun obstructions.









# The Design Principles

- Solar Gain
- Thermal Mass
- Insulation
- Draft-Proofing
- Reduce
- Reuse
- Recycle















# Glazing as Double-Edged Sword

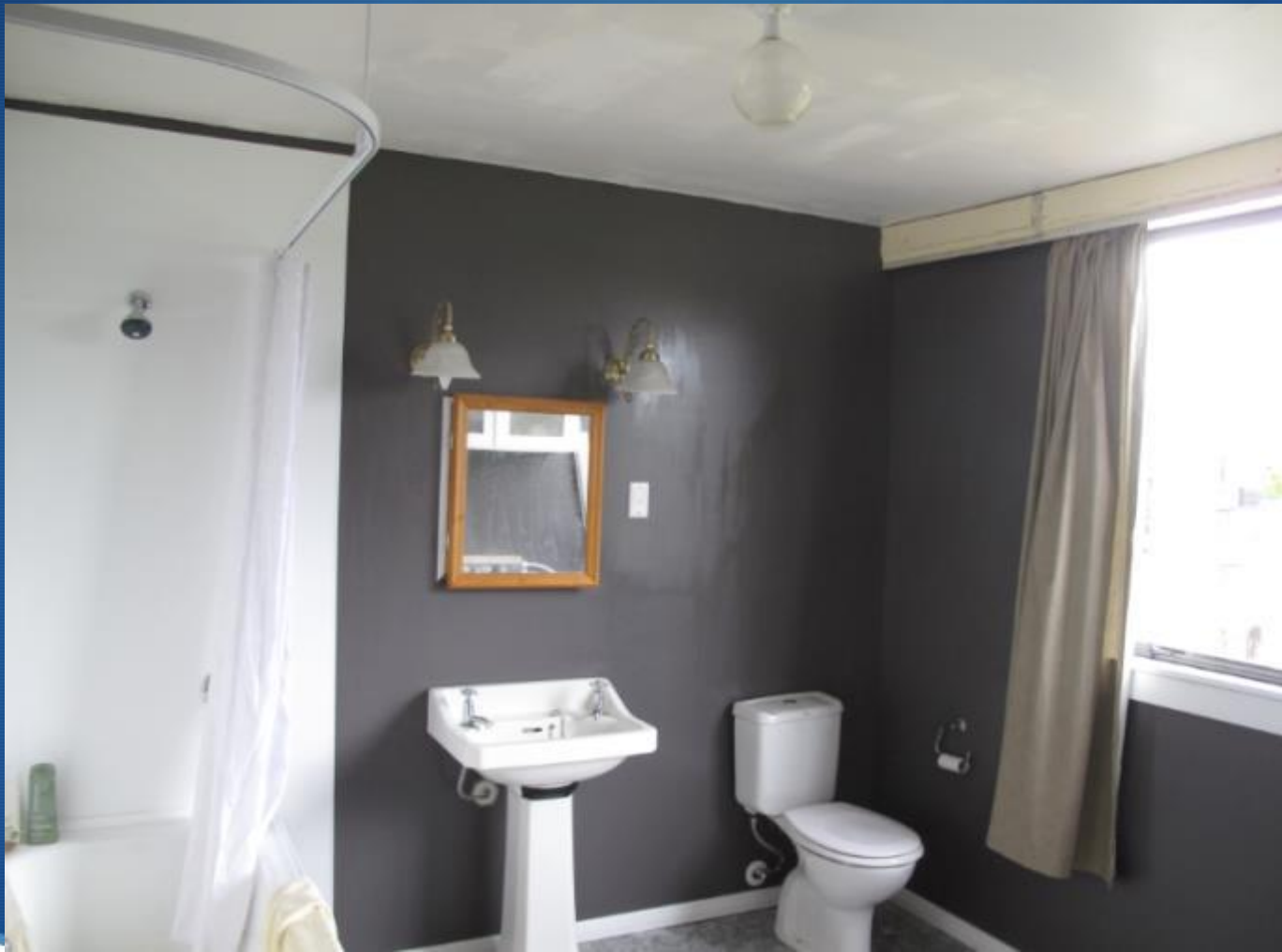






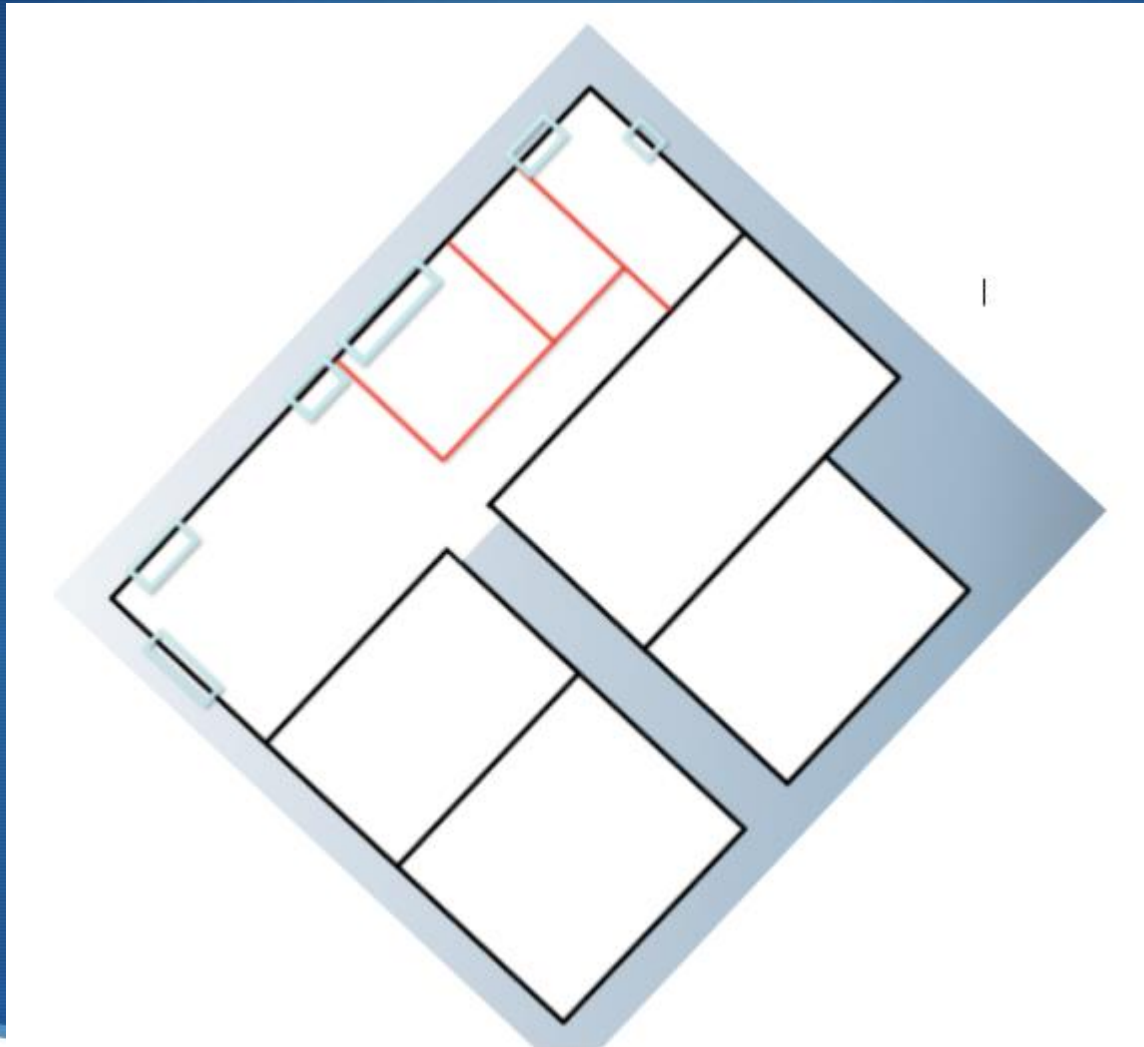


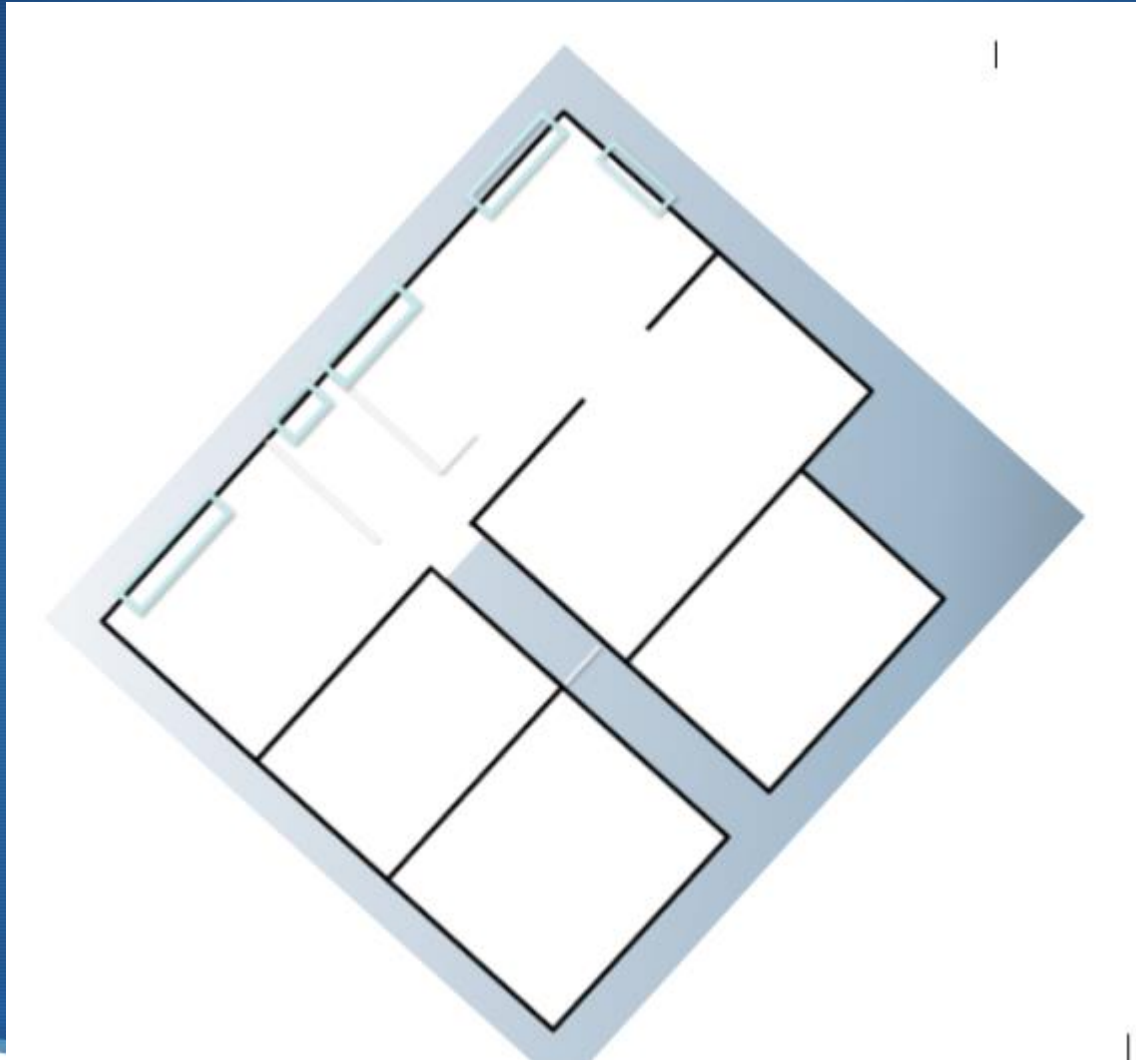


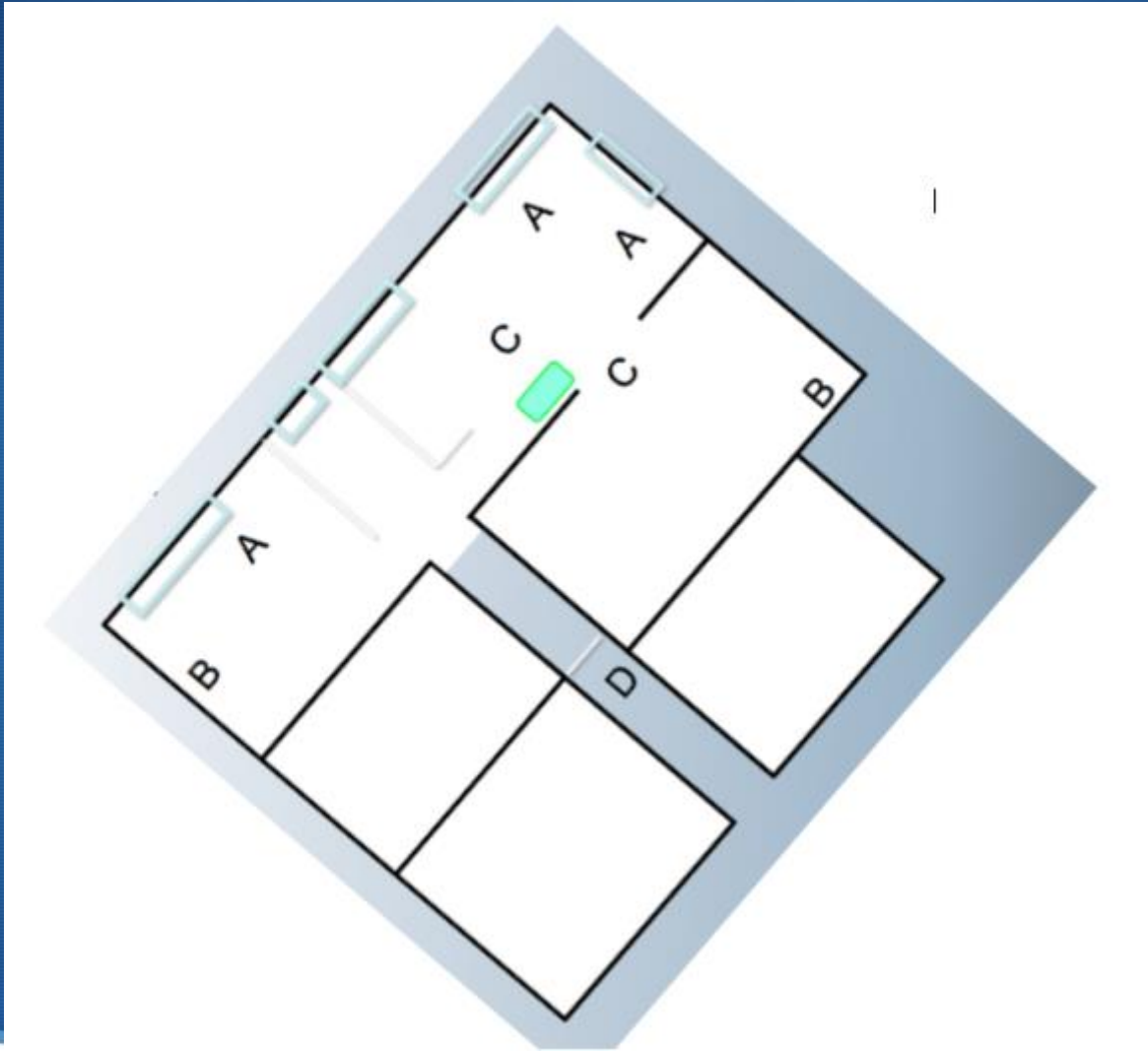










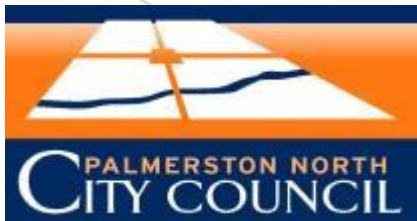






# Thermal Mass

The battery of a passive solar home.  
(More thinking outside the square.)





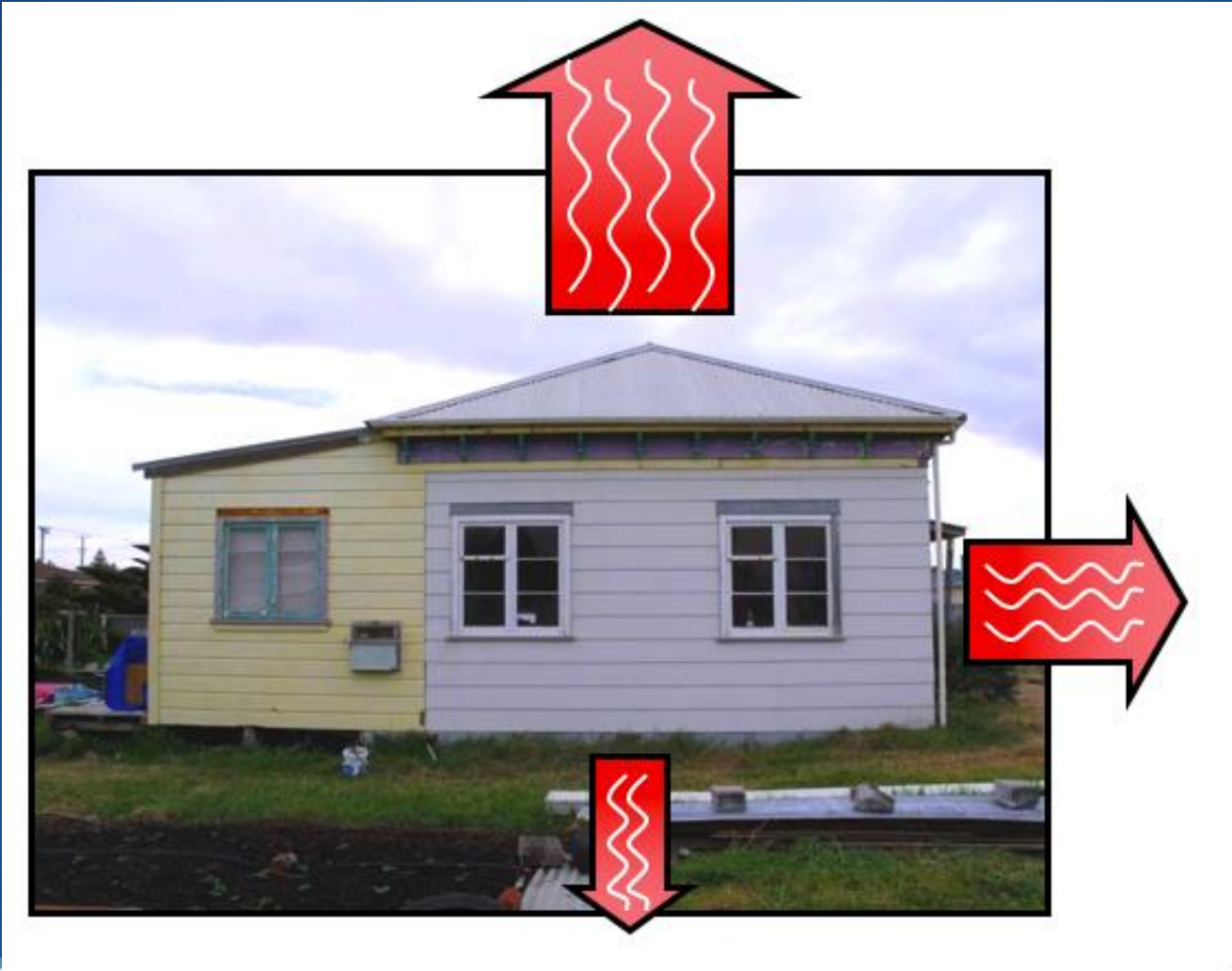












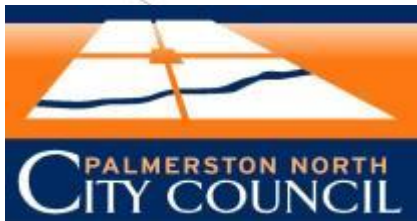






# Question:

What is the 'safest' way to insulate walls when removing interior linings?















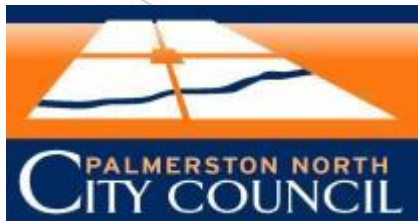
# V-Profile Weather Strip

Much better than foam for timber windows and doors.



# And then...

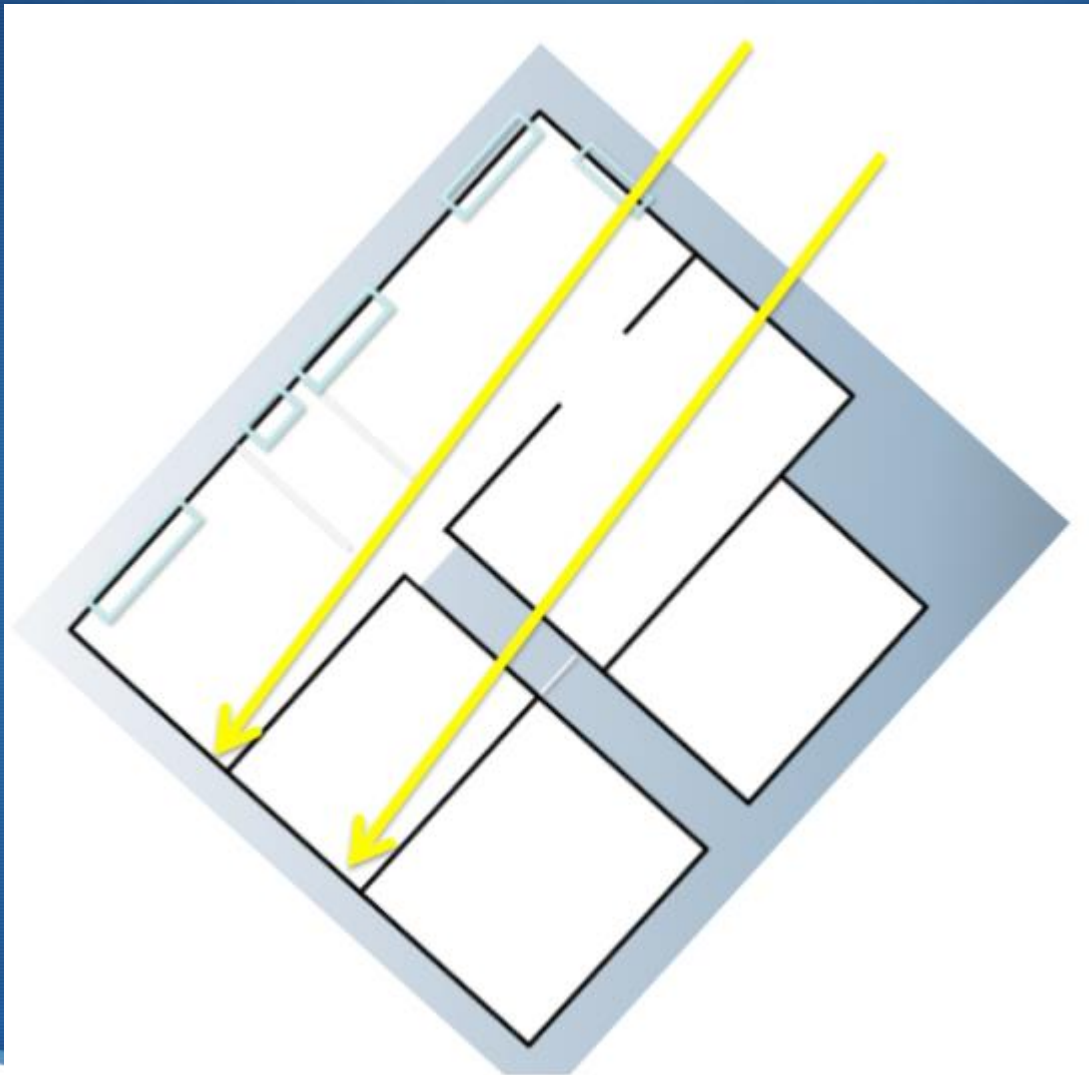
...something amazing happened.

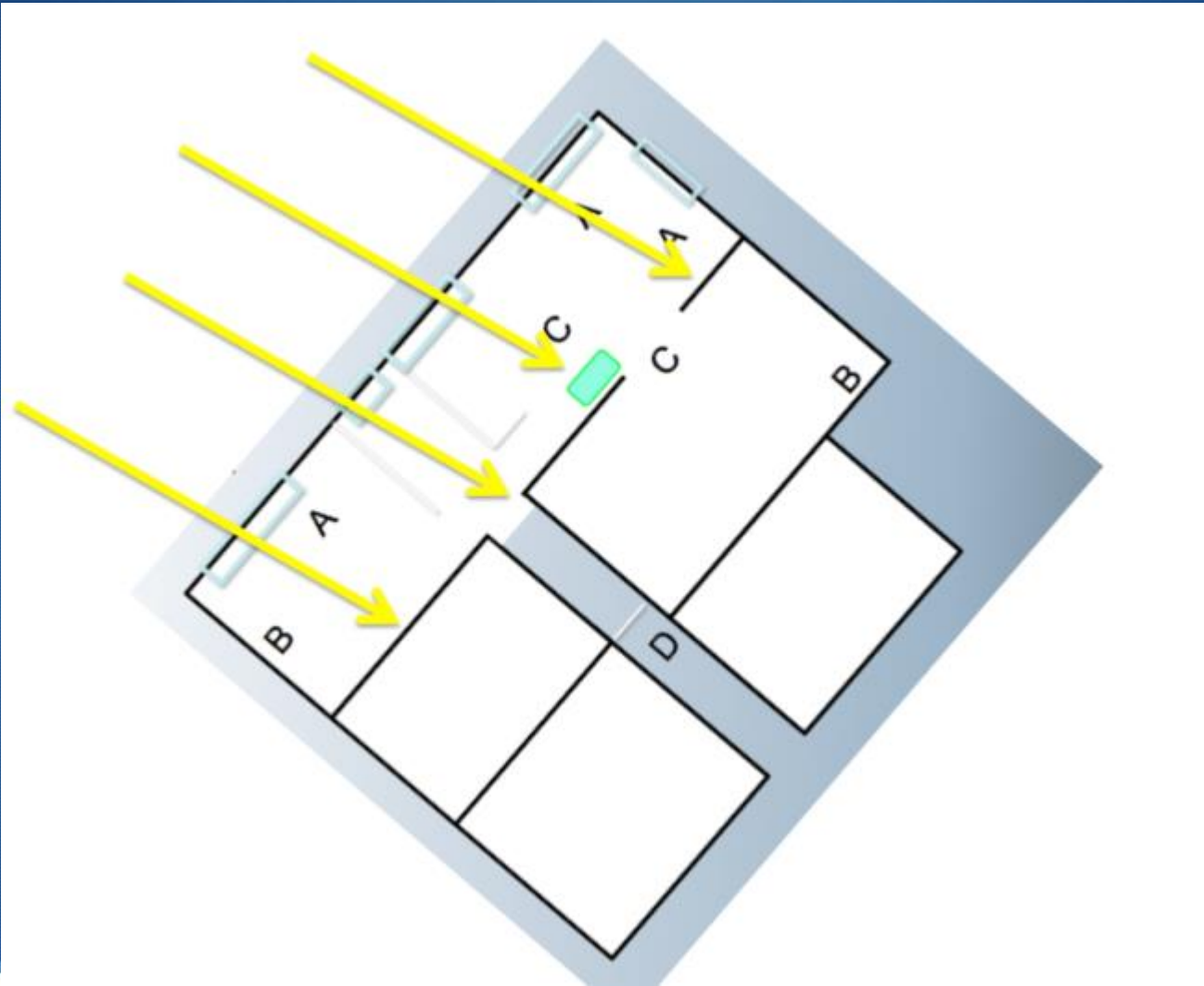














# Moral of the Story

Be open to new possibilities.



# Questions?

