

Low-Cost Experiments in STEM Education



Denis McCarthy | Hazelwood College | Limerick | Ireland

Building Stem Connections

Play well, Inquire well

Building bricks are often used to model ideas, like the atomic theory. There is also huge potential to exploit their adaptability in carrying out experiments, and graphing data in the STEM area.

Students tend to be more comfortable expressing ideas using physical models. This allows for common misconceptions to be identified and teased out at a very early stage in the learning process. The therapeutic element of manipulating building bricks cannot be underestimated. Students with additional educational needs show greater levels of motivation.



Light ... **Model**
Expressing ideas, misconceptions

Reflection
Air
Water
Refraction

A LEGO model on a blue baseplate illustrating light refraction and reflection. A vertical red brick acts as a boundary between a green area labeled 'Air' and a blue area labeled 'Water'. Yellow and red bricks are arranged to show light rays bending at the interface. Labels 'Reflection' and 'Refraction' are written in white cursive.

Equilibrium... **Experiment**
Variety of variables

Equilibrium

A LEGO model on a blue baseplate showing a balance scale. A yellow brick is on the left pan, and a blue brick is on the right pan. The scale is balanced. The word 'Equilibrium' is written in white cursive at the bottom.

Patterns... **Represent**
Choice of 2D, 3D representation

Patterns

A LEGO model on a blue baseplate showing three yellow and red brick structures of different heights and widths, representing patterns. The word 'Patterns' is written vertically in white cursive on the left.

Graphing experimental or other data often represents the least stimulating part of the investigation process for students in the STEM subjects. Even with the aid of the technology, there can be a challenge to draw a conclusion or find patterns. Building bricks allow for a more personal, relevant method of presenting results. Modelling chemical reactions adds greatly to the understanding of chemical equations.

Conclusion: Using physical models gives greater opportunities for inquiry in topics not ideally suited to conventional experiments. The chance to return to a box of building bricks, abandoned years earlier, can be nostalgic and bring a playful, creative feeling sometimes absent in STEM classrooms.

