

## Spatial Skills

Research has shown that one of the fundamental barriers to success in engineering is the lack of development of spatial skills, particularly spatial visualization, mental rotation, and transforming from two-dimensional to three dimensional and back. Many girls lack this skill set, due in most part to lack of experience, not genetic capabilities, as has been debated for years.

We have a unique opportunity in GEMS to change the course of girls' lives by giving them opportunities to tinker and mess around with equipment and tools they may never get to use at home or in school.

Standard LEGO® blocks, not the new “girly” product, offer a great tool for building spatial skills. Consider bringing them in as part of your GEMS curriculum. Many schools still use the LEGO® Dacta™ sets as part of their science unit. Call the school system’s science department and ask. Other school systems use these sets as part of the middle school or high school technology department. Many other school systems have these sets sitting in warehouses—if you beg, you may be able to borrow them for a couple of meetings. You also can start a donation campaign to have people—friends, family, acquaintances, etc.—haunt yard sales and give you old LEGO® sets. For many people, sets with lost parts are useless. For you, they are priceless. You want the girls to do free-building—you don’t want them to always feel they have to follow the directions.

Hidden Building (building structures behind a screen while telling a partner how to build the same structure) is a great activity for working on spatial skills. Every time we do this, a girl or two who never knew how good her spatial and communication skills are, discovers building and communicating as strengths. It is gratifying to see this discovery.

For more information, see the research below and the resources on the Spatial Skills page of the GEMS website.

[http://www.engr.psu.edu/awe/misc/ARPs/VisualSpatialWeb%2003\\_22\\_05.pdf](http://www.engr.psu.edu/awe/misc/ARPs/VisualSpatialWeb%2003_22_05.pdf)

<https://www.kqed.org/mindshift/43802/can-teaching-spatial-skills-help-bridge-the-stem-gender-gap>

<https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4960251/>

<https://www.parentingscience.com/spatial-intelligence.html>