Physical science is a natural fit for active, curious young children. Early childhood settings generally include spaces and materials that invite children to explore phenomena connected to the big ideas in this discipline—properties of matter, motion, forces, and energy. As children build castles and homes in a block area, they have opportunities to observe how the properties of building materials influence their structures’ strength and stability. At a water table, children can’t help but notice how water responds as they splash and squirt it and how tipping a seemingly empty container under the water sometimes creates air bubbles that rise to the surface. Blocks, water tables, and other standard classroom materials lend themselves to physical science exploration, and play with these materials allows children to observe immediately the results of their actions. Children can repeatedly investigate interesting physical science phenomena in a relatively short period of time by testing several different types of building materials in the foundation of a tower or by changing the steepness of an incline and observing how cars move on it differently, for example.

Despite the potential for physical science learning in early childhood settings, many teachers of young children seem to be less confident about this domain than they are about life science. By focusing on specific topics and materials that maximize children’s opportunities to explore them, we hope to help teachers become more confident and intentional about promoting physical science teaching and learning in their settings, all the while addressing a number of the science and engineering practices, crosscutting concepts, and disciplinary core ideas of the Next Generation Science Standards (NGSS Lead States 2013).

Exploring Building

A standard set of wooden blocks offers children many opportunities to experiment with different shapes, sizes, and weights and explore how these properties contribute to the strength and stability of the structures they build. Try adding building materials other than wood to the building center—foam and cardboard “blocks” of various densities, for example. These enable children to investigate different materials as well as other properties. Also think about providing children with building sets in which all of the pieces are identical, such as Kapla blocks and Dr. Drew’s blocks (see Internet Resources). When children use these blocks, they are encouraged to focus on the design of their structures and the properties of the materials. They also encounter Structure and Function and Stability and Change, two of the crosscutting concepts of the NGSS.
Exploring Ramps
Ramp explorations connect children to concepts of motion, inertia, and momentum as they investigate how objects roll, slide, or remain still on different surfaces and inclines, all of which address NGSS physical science disciplinary core ideas related to Forces and Interactions (K-PS2-1 and K-PS2-2). Consider a trip to a home-goods store to look for pine cove molding (see Internet Resources). Molding can be cut into two-, three-, and four-foot lengths and used for rolling toy vehicles and balls. Foam pipe insulation, also available at home-goods stores, can be cut lengthwise and provides an alternative, flexible surface for motion investigations. A variety of balls of different materials, sizes, weights, and textures, such as Ping-Pong balls, golf balls, tennis balls, and Wiffle balls, promotes children’s inquiry into how the properties of objects influence movement. Visit the University of Northern Iowa’s website to learn more about using ramps and pathways in your classroom (see Internet Resources).

Exploring Light and Shadow
Opportunities to investigate how light passes through some materials, is reflected by others, and can create shadows when blocked lay the foundation for children’s later understanding of waves and energy and address NGSS performance expectation 1-PS4-3. Shadows can, of course, be explored outdoors, with the Sun as the light source and children’s bodies as the shadow-making objects. Indoors, provide children with flashlights and a range of materials, including those that reflect light (aluminum foil, mirrors), those that allow light to pass through (clear plastic cups), and those with interesting shapes for indoor shadow-making (see Internet Resources). Consider adding theater lighting gels of various colors to the flashlights so that children can play with different light colors (see Internet Resources).

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Reference

Resources

Internet Resources
Dr. Drew’s Blocks
www.drdrewsblocks.com
Kapla Blocks
www.kaplaus.com
PEEP Science Curriculum
http://peepandthebigwideworld.com/en/educators
Pine Cove Molding (Item #10000683)
www.homedepot.com
Ranger Pipettes
www.scrapbooking-warehouse.com/302232.html
Safety Mirrors
www.sciplus.com/p/PLEXI-MIRROR_40222
Theatrical Gel Sheets
www.stagelightingstore.com/Stage-Lighting-Store/Theatrical-Gel-Sheets-Swatchbook-Order
University of Northern Iowa: Ramps and Pathways
www.uni.edu/rampsandpathways