BIG Learning, Inc.
Hands-On, Real-World Learning for School and Life Success

Toymaking

An 8-week After-School Series for Grades 2-4 by Big Learning, Inc.

Skier on Springs

Overview

Packed with Big Learning: Our young toymakers don't just learn science – they take command of it to make their toys work. Each week students learn new techniques for building bright, sophisticated moving toys from wood, wire, cloth, and found objects. They learn to make classic mechanisms from scratch – including wheel and axle assemblies, cranks, and springs. With materials that are easy to work with and tools that are safe for kids, our young toymakers construct amazing toys that really work.

No "cookie cutter" projects: Every task engages children's creative energy. Every child's project is unique.

Class Outline

Turntables: Stories in Motion

1. Field Trip (5-10 minutes). The class begins with a real-world-based discussion of the structures and building principles for that day. For example, before building balloon-powered cars, students examine wheel-and-axle mechanisms in a variety of vehicles and learn how Newton's Laws of Motion apply to balloon power.

2. New building techniques (5 minutes): Next, we demonstrate the techniques students will use to build their toys.

3. Building, playful testing, and problem solving (45 minutes): Kids build their toys and test them by playing with them. They are guided in finding solutions to design challenges and building creative enhancements.

4. Cleanup (5 minutes)

5. What did we figure out? (5 -10 minutes): Students share their work and discuss what they learned while they worked.

6. Going home: Teachers go over the take-home materials, which include a review of the day's concepts and vocabulary, plus additional activities and resources for students to share with their families.

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Typical Session Outline

Session	What we make	Big Learning
1	**Springy Toys**	Types and characteristics of springs, scientific function of springs (storing energy).
2	**Posable People and Animals**	Skeletal structure and joints, using anatomy to make accurate models of creatures.
3	**Spinning Action Toys**	More anatomy, using a compass to draw a circle, sculptures that tell stories.
4	**Folk Toys**	History of toys, forces and motion, optical illusions, using a compass to draw a circle of a given size, measuring in inches.
5	**Lever Acrobats**	Levers, projectile motion of weighted objects, Newton's Law of Inertia, Archimedes.
6	**Rubber band Gliders and Spinners**	More about springs, making wings that work, Wright Brothers history.
7	**Balloon Buggies**	Wheel and axle machines, storing energy, Newton's Third Law (Law of Reciprocal Actions) and application to rocket engines and balloon cars.
8	**Crank-powered flyers**	Building crank mechanisms, centripetal force, art techniques for making eye-catching flying objects.