http://www.fi.edu/pieces/knox/automaton/motionlplans.htm

Pieces of Science
"Maillardet's Automaton"

Lesson Plans
and
Classroom Activities

MOTION

After introducing Newton's Laws and discussing motion with your students, try enlivening your classroom with a few of these activities!

HANDS-ON DESIGN :

Make a Yo-Yo - Teach your students the ups and downs of motion by making button yo-yos to experiment with.

Newton's Cradle - Use a shoebox, string, beads and a few other simple supplies to make a classroom version of the popular desktop toy named after Sir Isaac Newton.

LANGUAGE ARTS:

- Prepare a handout for your students listing Newton's Three Laws of Motion, leaving blank space underneath each law for the student to write in. Ask students to paraphrase each of Newton's Laws in their own words.
- Initiate a class discussion about gravity and how it affects us each day. Now ask students to write a short story about what a typical day would be like if there was no gravitational force. Students must include descriptions of normal activities, such as eating meals, sleeping, going to school, participating in a sport, etc.
- Have students choose a sporting event to research and ask them to write descriptions of how acceleration, mass and force interact in the event chosen.
- Use favorite amusement park rides to introduce the physics of motion to your class! How were roller coasters developed and how do Newton's Laws of Motion affect your amusement park ride? What about bumper cars? Can students list other rides and explain how they are affected by Newton's Laws? The Amusement Park Physics website is a great place to jumpstart your thinking!

MATH & SCIENCE:

- Provide students with an assortment of small toy cars. Have students observe and record the number of inches each car travels on a smooth surface and on a rough surface. Discuss the relationship of friction to the distance the cars travel.
- Have students create soda can towers by stacking empty soda cans in a variety of different ways. Use different variations and different numbers of cans to create several towers. Crash the towers by rolling a single empty can into them. Students should observe the cans as they fall and note how far they roll. Have them add up the number of inches they roll and graph their findings.
- Head outside to the playground for a tug of war! Use different size groups of students on each size. Record the number of minutes it takes to win when the students on the winning side are short, tall, heavy, etc. Have additional contests with the students standing on various surfaces (grass vs. pavement for example) and discuss whether one team has an advantage or not. Have students record and graph the results from the contests for comparison.
- Have students time the speed of objects of differing weights falling from the same height and make graphs or charts showing the results.

COLLECTED LESSON PLANS AND UNITS OF STUDY

FROM THE WORLD WIDE WEB

Forces and Motion Unit - From The K-8 Aeronautics Internet Textbook, this section contains lessons that demonstrate Newton's laws of motion in action. The lessons and experiments are well thought out with clearly written directions. An excellent classroom resource.

Playground Physics - Playground Physics is designed as an introduction to some basic concepts in classical mechanics for upper elementary and middle school grades (4-7). The idea is to use the experience children have on the playground and relate that experience to basic physics concepts. The sections are: jungle-gym drop to explore how gravity affects falling objects, see-saw physics to explore the concept of levers, and swing-set physics to explore the concept of pendulums. Slides can be used to study objects on inclined planes, and merry-go-rounds to explore concepts involved in circular motion (angular momentum, centripetal acceleration, centrifugal force, and instantaneous velocity).

Roller Coaster Physics - This section of the Physics Pavilion will discuss some of the principles involved in the design of a roller coaster. It is intended for the middle or high school teacher. Physics students may find the information helpful as well. Many of the concepts can be applied to topics other than roller coasters. Some sections will use the Roller Coaster Simulator, RCS. The included activities are hands-on in nature.

http://www.learner.org/interactives/parkphysics/