Unit 2: Balls and Ramps

Content Area: **Science**
Course(s): **Science**
Time Period: **Generic Time Period**
Length: **Weeks**
Status: **Published**

Unit Overview

In the Balls and Ramps unit the children observe, use, and compare different balls. They make balls and in so doing learn about materials, size, and weight. They use balls as they bounce and roll them and experiment with them on ramps. In addition, the children explore how balls are affected by gravity, inertia, momentum, and friction.

Standards

SCI.PK.5.1.P.A.1	Display curiosity about science objects, materials, activities, and longer-term investigations in progress.
SCI.PK.5.1.P.B.1	Observe, question, predict, and investigate materials, objects, and phenomena (e.g., using simple tools to crack a nut and look inside) during indoor and outdoor classroom activities and during any longer-term investigations.
SCI.PK.5.1.P.B.2	Use basic science terms and topic-related science vocabulary.
SCI.PK.5.1.P.B.3	Identify and use basic tools and technology to extend exploration in conjunction with science investigations.
SCI.PK.5.1.P.C.1	Communicate with other children and adults to share observations, pursue questions, and make predictions and/or conclusions.
SCI.PK.5.1.P.D.1	Represent observations and work through drawing, recording data, and “writing.”
SCI.PK.5.2.P.E.1	Investigate how and why things move (e.g., slide blocks, balance structures, push structures over, use ramps to explore how far and how fast different objects move or roll).

Essential Questions

What are the properties and characteristics of balls?

What are the things that affect the way balls move?

Application of Knowledge and Skills...

Students will know that...

- A. Balls have different physical properties and characteristics
- B. There is a relationship between the physical properties of balls and their motion
- C. There is a relationship between the physical properties of balls and their behavior on inclined planes
- D. There is a relationship between the steepness of an inclined plane and the motion of balls
- E. The variety of factors that affect the behavior of balls on inclined planes can be predicted and controlled in the design of complex ramp and roadway systems

Students will be able to...

- 1. Use their senses to gather data
- 10. Recognize everyday applications of scientific ideas
- 2. Work cooperatively
- 3. Ask questions and plan investigations
- 4. Use simple tools
- 5. Categorize data
- 6. Identify patterns
- 7. Describe observations
- 8. Try to explain results
- 9. Consider alternative explanations

Assessments

- balls - design a ball with specific characteristics (rolls far, bounces well, etc) 5.1.P.A.1 / 5.1.P.B.1,2,3 / 5.1.P.C.1 / 5.1.P.D.1 5.2.P.E.1
- balls and ramps - 3 column chart; graphic organizer 5.1.P.A.1 / 5.1.P.B.1,2,3 / 5.1.P.C.1 / 5.1.P.D.1 5.2.P.E.1
- Diagnostic: Other oral assessments
- Formative: Sample Assessment Item
- group questions - What are some different kinds of balls? What do they look like? How do they feel? How do they move? 5.1.P.A.1 / 5.1.P.B.1,2 / 5.1.P.C.1 5.2.P.E.1
- portfolio 5.1.P.A.1 / 5.1.P.B.1,2,3 / 5.1.P.C.1 / 5.1.P.D.1 5.2.P.E.1
- project - build a ramp system 5.1.P.A.1 / 5.1.P.B.1,2,3 / 5.1.P.C.1 5.2.P.E.1
- quick checks during each subunit (balls, ramps) - thumbs up / thumbs down; white board; signal cards (yes, no, unsure); ticket to leave 5.1.P.A.1 / 5.1.P.B.1,2,3 / 5.1.P.C.1 / 5.1.P.D.1 5.2.P.E.1
- Summative: Benchmark Assessment
- Summative: Other oral assessments
- Summative: Personal Project
- Summative: Student Portfolio

Activities

- Explore bubbles and balloons and their movements
- Move different kinds of balls through a block maze
- Explore the idea of friction by rolling balls down ramps that have different surfaces (carpet, sandpaper, etc.)

Activities to Differentiate Instruction

- teacher - repeat, rephrase, clarify
- student - repeat, explain
- vary group size - whole class, hetergeneous small group, individual
- present material in a variety of ways - visual, auditory, tactile, kinesthetic
- allow struggling and advanced learners to work at a different pace than their peers

Integrated/Cross-Disciplinary Instruction

SOCIAL STUDIES and PHYS ED

- Learn and play ball games from other countries. Use The World's Best Ball Games from Resources

PHYS ED

- Play a familiar ball game (such as kick or dodge ball) first with the usual ball and then with a different ball

MATH

- Weigh the different balls and graph the results

Resources

- Teacher's Manual: K-1 Insights - Balls and Ramps
- Nonfiction: Making Things Move by Neil Ardley, Play Ball: The World's Best Ball Games by Jess Brallier, Bouncing and Rolling by Terry Jennings, Cars and How They Go by Joanna Cole
- Fiction: Lets Play Ball by Marty Allen, The Lazy Dog by John Hamberger