

**Physical Science Comes Alive:  
Energy Systems Grades K – 1 (Invent-a-Wheel)**

**Alignments to State Math Standards**

**Table of Contents**

<b>California Mathematical Content Standards</b> .....	2-3
Standards by lesson .....	2
Description of standards (Kindergarten) .....	3
Description of standards (Grade 1) .....	3
<b>District of Columbia Mathematics Standards</b> .....	4-5
Standards by lesson .....	4
Description of standards (Kindergarten) .....	5
Description of standards (Grade 1) .....	5
<b>Minnesota Academic Standards – Mathematics</b> .....	6-7
Standards by lesson .....	6
Description of standards (Kindergarten) .....	7
Description of standards (Grade 1) .....	N/A
<b>NY State Learning Standards for Mathematics</b> .....	8-10
Standards by lesson .....	8
Description of standards (Kindergarten) .....	9
Description of standards (Grade 1) .....	10

**California State Science Content Standards  
Physical Science Comes Alive: Energy Systems Grades K – 1 (Invent-a-Wheel)**

Lesson #	California Mathematical Content Standards	
	Kindergarten	Grade 1
<b>1. How Can You Get It To Move?</b>	SDAP: 1.0-1	SDAP: 1.1-2
<b>2. Playground</b>	SDAP: 1.0-1	SDAP: 1.1-2
<b>3. Ramps and Sleds</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1 SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>4. Surfaces and Friction</b>	AF: 1.0-1 MG: 1.0-1 SDAP: 1.0-2 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>5. Sled Re-design</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>6. Let's Roll</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>7. Make a Car</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>8. A Test Drive</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>9. Car Facts</b>		
<b>10. Write a How-to-Book</b>		
<b>11. Improve Your Ride</b>	MG: 1.0-1 SDAP: 1.0-1 MR: 1.0-2, 2.0-2	MG: 1.0-1, SDAP: 1.1-2 MR: 1.0-2, 2.0-1, 3.0
<b>12. The Auto Show</b>		
Key	AF (Algebra and Functions) MG (Measurement and Geometry) SDAP (Statistics, Data Analysis and Probability) MR (Mathematical Reasoning)	

## Full Description of Standards

<b>California Mathematical Content Standards – Kindergarten</b>
<b>Algebra and Functions</b>
1.0 Students sort and classify objects: 1.1 Identify, sort, and classify objects by attribute and identify objects that do not belong to a particular group (e.g., all these balls are green, those are red).
<b>Measurement and Geometry</b>
1.0 Students understand the concept of time and units to measure it; they understand that objects have properties, such as length, weight, and capacity, and that comparisons may be made by referring to those properties: 1.1 Compare the length, weight, and capacity of objects by making direct comparisons with reference objects (e.g., note which object is shorter, longer, taller, lighter, heavier, or holds more).
<b>Statistics, Data Analysis, and Probability</b>
1.0 Students collect information about objects and events in their environment: 1.1 Pose information questions; collect data; and record the results using objects, pictures, and picture graphs. 1.2 Identify, describe, and extend simple patterns (such as circles or triangles) by referring to their shapes, sizes, or colors.
<b>Mathematical Reasoning</b>
1.0 Students make decisions about how to set up a problem: 1.1 Determine the approach, materials, and strategies to be used. 1.2 Use tools and strategies, such as manipulatives or sketches, to model problems. 2.0 Students solve problems in reasonable ways and justify their reasoning: 2.1 Explain the reasoning used with concrete objects and/or pictorial representations. 2.2 Make precise calculations and check the validity of the results in the context of the problem.
<b>California Mathematical Content Standards – Grade 1</b>
<b>Measurement and Geometry</b>
1.0 Students use direct comparison and nonstandard units to describe the measurements of objects: 1.1 Compare the length, weight, and volume of two or more objects by using direct comparison or a nonstandard unit.
<b>Statistics, Data Analysis, and Probability</b>
1.0 Students organize, represent, and compare data by category on simple graphs and charts: 1.1 Sort objects and data by common attributes and describe the categories. 1.2 Represent and compare data (e.g., largest, smallest, most often, least often) by using pictures, bar graphs, tally charts, and picture graphs.
<b>Mathematical Reasoning</b>
1.0 Students make decisions about how to set up a problem: 1.1 Determine the approach, materials, and strategies to be used. 1.2 Use tools, such as manipulatives or sketches, to model problems. 2.0 Students solve problems and justify their reasoning: 2.1 Explain the reasoning used and justify the procedures selected. 3.0 Students note connections between one problem and another.

**District of Columbia Mathematics Standards**  
**Physical Science Comes Alive: Energy Systems Grades K – 1 (Invent-a-Wheel)**

Lesson #	District of Columbia Mathematics Standards	
	Kindergarten	Grade 1
1. How Can You Get It To Move?	DASP.1-2	DASP.1-3
2. Playground	DASP.1-2	M.1-3 DASP.1-3
3. Ramps and Sleds	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
4. Surfaces and Friction	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
5. Sled Re-design	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
6. Let's Roll	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
7. Make a Car	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
8. A Test Drive	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
9. Write a How-to-Book		
10. Car Facts		
11. Improve Your Ride	PRA.1-2 M.1-3 DASP.1-2	M.1-3 DASP.1-3
12. The Auto Show		
Key	M (Measurement) DASP (Data Analysis, Statistics and Probability)	

## Full Description of Standards

<b>District of Columbia Mathematics Standards – Kindergarten</b>
<b>Patterns, Relations and Algebra</b>
K.PRA.1. Identify the attributes of objects as a foundation for sorting and classifying (e.g., a red truck, a red block, and a red ball share the attribute of being red; a square block, a square cracker, and a square book share the attribute of being square). K.PRA.2. Sort and classify objects by attributes such as color, shape, size, number, and other properties and explain; identify objects that do not belong to a particular group (e.g., all these objects are red; those are green).
<b>Measurement</b>
K.M.1. Recognize and compare objects with respect to the attributes of length, volume/capacity, weight, area, and time using appropriate language (e.g., longer, taller, shorter, same length; heavier, lighter, same weight; holds more, holds less, holds the same amount). K.M.2. Make and use estimates of measurements from everyday experiences. K.M.3. Use standard and nonstandard units to measure length.
<b>Data Analysis, Statistics and Probability</b>
K.DASP.1. Gather data about self and the environment to answer questions of interest to children; record the results using concrete graphs and simple picture graphs to display data. K.DASP.2. Describe relationships displayed in graphs, tables, or other representations (e.g., Which has the most or least number of objects?).
<b>District of Columbia Mathematics Standards – Grade 1</b>
<b>Measurement</b>
1.M.1. Compare the length, weight, and volume of two or more objects by using direct comparison. 1.M.2. Make and use estimates of measurement, including time and weight. 1.M.3. Measure the length of objects by repeating a nonstandard or standard unit.
<b>Data Analysis, Statistics and Probability</b>
1.DASP.1. Use surveys and observations to gather data about themselves and their surroundings (e.g., What is your favorite dessert?). 1.DASP.2. Represent and compare data (e.g., largest, smallest, most often, least often) using tally charts, pictures, and bar graphs. 1.DASP.3. Ask and answer simple questions related to data representations (e.g., Who is the tallest student in the class? What is the favorite fruit of the class?).

**Minnesota Academic Standards – Mathematics**  
**Physical Science Comes Alive: Energy Systems Grades K – 1 (Invent-a-Wheel)**

Lesson #	Minnesota Academic Standards – Mathematics	
	Kindergarten	Grade 1
1. How Can You Get It To Move?		
2. Playground		
3. Ramps and Sleds	GM: 3.1.1-3, 3.2.1	
4. Surfaces and Friction	GM: 3.1.1-2, 3.2.1-2	
5. Sled Re-design	GM: 3.1.1-2, 3.2.1-2	
6. Let's Roll	GM: 3.1.1-2, 3.2.1-2	
7. Make a Car	GM: 3.1.1-2, 3.2.1-2	
8. A Test Drive	GM: 3.1.1-2, 3.2.1-2	
9. Car Facts		
10. Write a How-to-Book		
11. Improve Your Ride	GM: 3.1.1-2, 3.2.1-2	
12. The Auto Show		
Key	GM (Geometry and Measurement)	

**Full Description of Standards**

<b>Minnesota Academic Standards – Mathematics – Kindergarten</b>			
<b>Strand</b>	<b>Standard</b>	<b>No.</b>	<b>Benchmark</b>
Geometry & Measurement	Recognize and sort basic two- and three-dimensional shapes; use them to model real-world objects.	K.3.1.1	Recognize basic two- and three-dimensional shapes such as squares, circles, triangles, rectangles, trapezoids, hexagons, cubes, cones, cylinders and spheres.
		K.3.1.2	Sort objects using characteristics such as shape, size, color and thickness.
	Compare and order objects according to location and measurable attributes.	K.3.2.1	Use words to compare objects according to length, size, weight and position.  <i>For example:</i> Use same, lighter, longer, above, between and next to.  <i>Another example:</i> Identify objects that are near your desk and objects that are in front of it. Explain why there may be some objects in both groups.
		K.3.1.2	Sort objects using characteristics such as shape, size, color and thickness.

**NY State Learning Standards for Mathematics**  
**Physical Science Comes Alive: Energy Systems Grades K – 1 (Invent-a-Wheel)**

Lesson #	NY State Learning Standards for Mathematics			
	Kindergarten		Grade 1	
<b>1. How Can You Get It To Move?</b>	CM: 5	CM: 5	CM: 6	
<b>2. Playground</b>				
<b>3. Ramps and Sleds</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>4. Surfaces and Friction</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>5. Sled Re-design</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>6. Let's Roll</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>7. Make a Car</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>8. A Test Drive</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>9. Car Facts</b>				
<b>10. Write a How-to-Book</b>				
<b>11. Improve Your Ride</b>	RP: 2-4 CM: 1-5 CN: 1-3	R: 1-5 M: 1, 2 S: 1, 3-5	RP: 3-7 CM: 1-6 CN: 7-9	R: 1-7 M: 1-3, 11 S: 1-2
<b>12. The Auto Show</b>				
Key	RP (Reasoning and Proof) CM (Communications) CN (Connections)		R (Representation) M (Measurement) S (Statistics and Probability)	



## Full Description of Standards

<b>NY State Learning Standards for Mathematics - Kindergarten</b>
<b>Reasoning and Proof</b>
K.RP.2 Investigate the use of knowledgeable guessing as a mathematical tool K.RP.3 Explore guesses, using a variety of objects and manipulatives K.RP.4 Listen to claims other students make
<b>Communication</b>
K.CM.1 Understand how to organize their thought processes with teacher guidance K.CM.2 Share mathematical ideas through the manipulation of objects, drawings, pictures, and verbal explanations K.CM.3 Listen to solutions shared by other students K.CM.4 Formulate mathematically relevant questions with teacher guidance K.CM.5 Use appropriate mathematical terms, vocabulary, and language
<b>Connections</b>
K.CN.1 Recognize the presence of mathematics in their daily lives K.CN.2 Use counting strategies to solve problems in their daily lives K.CN.3 Recognize and apply mathematics to objects and pictures
<b>Representation</b>
K.R.2 Use standard and nonstandard representations K.R.3 Use objects to show and understand physical phenomena (e.g., guess the number of cookies in a package) K.R.4 Use objects to show and understand social phenomena (e.g., count and represent sharing cookies between friends)
<b>Measurement</b>
K.M.1 Name, discuss, and compare attributes of length (longer than, shorter than) K.M.2 Compare the length of two objects by representing each length with string or a paper strip
<b>Statistics and Probability</b>
K.S.1 Gather data in response to questions posed by the teacher and students K.S.3 Sort and organize objects by two attributes (e.g., color, size, or shape) K.S.4 Represent data using manipulatives K.S.5 Identify more, less, and same amounts from pictographs or concrete models

<b>NY State Learning Standards for Mathematics – Grade 1</b>
<b>Reasoning and Proof</b>
1.RP.3 Investigate the use of knowledgeable guessing as a mathematical tool 1.RP.4 Explore guesses, using a variety of objects and manipulatives 1.RP.5 Justify general claims, using manipulatives 1.RP.6 Develop and explain an argument verbally or with objects 1.RP.7 Listen to and discuss claims other students make
<b>Communication</b>
1.CM.1 Understand how to organize their thought processes with teacher guidance 1.CM.2 Verbally support their reasoning and answer 1.CM.3 Share mathematical ideas through the manipulation of objects, drawings, pictures, charts, and symbols in both written and verbal explanations 1.CM.4 Listen to solutions shared by other students 1.CM.5 Formulate mathematically relevant questions 1.CM.6 Use appropriate mathematical terms, vocabulary, and language
<b>Connections</b>
1.CN.7 Recognize the presence of mathematics in their daily lives 1.CN.8 Recognize and apply mathematics to solve problems 1.CN.9 Recognize and apply mathematics to objects, pictures, and symbols
<b>Representation</b>
1.R.1 Use multiple representations including verbal and written language, acting out or modeling a situation, drawings, and/or symbols as representations 1.R.2 Share mental images of mathematical ideas and understandings 1.R.3 Use standard and nonstandard representations 1.R.4 Connect mathematical representations with problem solving 1.R.5 Use mathematics to show and understand physical phenomena (e.g., estimate and represent the number of apples in a tree) 1.R.6 Use mathematics to show and understand social phenomena (e.g., count and represent sharing cookies between friends) 1.R.7 Use mathematics to show and understand mathematical phenomena (e.g., draw pictures to show a story problem, show number value using fingers on your hand)
<b>Measurement</b>
1.M.1 Recognize length as an attribute that can be measured 1.M.2 Use non-standard units (including finger lengths, paper clips, students' feet and paces) to measure both vertical and horizontal lengths 1.M.3 Informally explore the standard unit of measure, inch 1.M.11 Select and use non-standard units to estimate measurements
<b>Statistics and Probability</b>
1.S.1 Pose questions about themselves and their surroundings 1.S.2 Collect and record data related to a question