



Drexel-SDP GK-12 ACTIVITY

Science

Energy

Exploring Friction with Shuffleboard

Grade Level _6_ (_5_-_8_)

Time Required: 2 Hours

Engineering Connection

Students explore the effects of friction on motion, and how it “takes away energy” from an object in motion. Students also discuss why friction is necessary in everyday life despite its parasitic effects (for example, we could not walk without it), and how it varies across various surfaces such as carpeted floors, waxed wood floors, and an ice rink. Students also explore how to minimize friction using variations to surfaces (such as wax or wood smoothing agents), and how to minimize the effect of friction on an object (by rolling the object instead of sliding, minimizing contact with the surface, etc.).

Keywords

- Shuffleboard
- Friction
- Surfaces
- Energy

PA Science Educational Standards

- 3.1.7B Describe the use of models as an application of scientific or technological concepts.
- 3.2.7A Explain and apply scientific and technological knowledge.
- 3.2.7C Identify and use the elements of scientific inquiry to solve problems.
- 3.4.7C Identify and explain the principles of force and motion.

Materials

- Wood boards: unfinished, partly finished, and fully finished (buffed and waxed)
- Shuffleboard pucks of any size
- Rubber bands
- Books, etc. to incline boards

Procedure

You will measure and record the different distances that your disc will travel along different pieces of wood – one finished and buffed, one partly finished, and one unfinished. But first, does this even matter? Write down what effect you think the wood finishing will have on the distance the disc will travel, and why you feel that way.

Hypothesis: _____

Now, to find out, we need to do more than just try each piece of wood. What if we don't pull back the same amount on the disc before we let it go? Maybe the wood isn't level. There are all kinds of variables that can introduce error into our experiment. So we will get around this by trying each piece of wood more than once, and at different inclines. Using the rubber band, pull back a certain distance on the disc and let it roll along the wood. Fill in your results in the table.

Wood Type	Pull-Back	Incline	Distance Travelled
Unfinished	1cm	No	
Unfinished	1cm	Yes	
Unfinished	2cm	No	
Unfinished	2cm	Yes	
Unfinished	4cm	No	
Unfinished	4cm	Yes	

Partly Finished	1cm	No	
Partly Finished	1cm	Yes	
Partly Finished	2cm	No	
Partly Finished	2cm	Yes	
Partly Finished	4cm	No	
Partly Finished	4cm	Yes	
Finished	1cm	No	
Finished	1cm	Yes	
Finished	2cm	No	
Finished	2cm	Yes	
Finished	4cm	No	
Finished	4cm	Yes	

Conclusions:

Vocabulary / Definitions

Word	Definition
Energy	The ability for an object to perform work. That is, the ability to move, or the potential to move.
Potential Energy	The possibility that an object can perform work via height above the ground. By “working against” gravity, one can hold an object above his/her head, storing energy that can be converted to kinetic energy (by dropping the object, allowing it to fall on its own).
Kinetic Energy	The energy of motion.

Friction	Force applied to an object that opposes motion. This can be air resistance, sliding along a table, etc. Friction is observed in sound, heat, or other forms. Friction force varies by surface (i.e. ice vs. sandpaper), but in all cases “robs” one during the conversion from potential to kinetic energy or vice versa.
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