Western Upper Peninsula Center
for Science, Mathematics and Environmental Education

FAMILY SCIENCE/MATH NIGHT LESSON PLAN

Family Math & Science Lesson Plan from students in ED 3510 Communicating Science course (2-credits)
Western Upper Peninsula Center for Science, Mathematics & Environmental Education at Michigan Technological University
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Slip & Slide

Presenter's name: Phillip Barton, senior, Civil Engineering
Age Group: K-2
Topic: Friction
Michigan Content Standards

- Describe or compare motion of common objects in terms of speed and direction.(SCI IV.3.Elem.1)

Lesson Overview: Students will make predictions and record results for cars running down different surfaces: sandpaper, rubber, felt, smooth. Students will observe how surface material affect movement.

References

1. Broughton, Sara. Science Lesson on Friction. www.lessonplanspage.com,11/5/96, http://www.lessonplanspage.com/ScienceLessonFriction.htm
2. Science Projects, Lesson Plans and Experiments – Friction. /www.theteacherscorner.net. 2/9/06, http://www.theteacherscorner.net/lesson-plans/science/experiments/friction.htm
3. Jouppi, Kaitlin, Middle School Teacher, 2/6/06

Objectives

After this presentation, students will be able to:
1. Define friction.
2. Identify how the type of surface material affects movement
3. Make predictions for how different surface material will affect movement
4. Collect data and analyze results. Draw conclusions.

Materials

Per group (in tub): data sheet, pencil, four 3' long foamboards with different surfaces(sandpaper, rubber, felt, smooth), washers (about 40), 2 plastic containers connected by string, heavy bolts, matchbox race cars, stop watch
Different surface pictures

Room Arrangement or Special Needs: Preferably tables and chalk board

Procedure

Introduction (1 min)
"Welcome to Family Science Night everyone! Tonight we will be scientists studying, observing, and making conclusions on how surface material affects movement. Family Science Night is sponsored by the Western U.P. Math and Science Center. Every year Michigan Tech students conduct Family Science

Nights in various counties throughout the western U.P. The students come from a variety of disciplines including education, biology, engineering, and forestry.

My name is Phillip Barton. I am a Civil Engineering major at Michigan Tech. My assistant is _____ I will be graduating next December and plan on working for a company in the field of transportation engineering design road pavements such as asphalt and concrete."

Attention-getter 5 min
Have pictures up on board in a random order with 4 headings written on the board for each surface category. Talk about the Olympics and different materials that are used: skating, snowboarding, skiing, shoes for different sports. Ask students to place pictures of different activities under correct heading: rubber, sand, smooth, snow/ice on board. Discuss results and how they relate to everyday life.

Activity #1 (Have everything set out for students in tubs) 3 min

Tell students to compare how fast the same car rolls down the four different surfaces. (20 min)

- Show how to do roll the cars down the boards and record their times. Explain to parents how to operate stopwatch and record data.
- Slide race car down different surfaces. Record time.

Activity #2
Students make predictions of how many washers it will take to pull containers across each surface. Count the washers as you place them into one container to pull the attached container across the surface. Record data.

Teacher should walk around helping students with activities as necessary.

Record student results on board and discuss conclusions with students. What kind of materials make objects go faster? (smooth materials). What kind of materials make objects slow down? (bumpy materials, such as sand on the road or cleats on shoes.)

Ask students why we sand icy streets? (to increase friction and help ensure safe driving)
Ask why do skiers wax their skis or snowboards? (to increase their speed, because every second counts in the Olympics!).

Assess Student Learning (5 min)
Ask students:

1. Give an example of a surface that is very slippery?
2. Give an example of a surface that is very sticky?
3. Give some examples where surfaces can affect us?
4. What do we call where two materials rub against each other?

Filler: Science Scavenger Hunt

Take Home Handouts and/or materials: Student Data Sheet to record info

Cleanup: Ask students to stack boards and bins and put washers back in containers. Have students return materials to original locations. 3 min

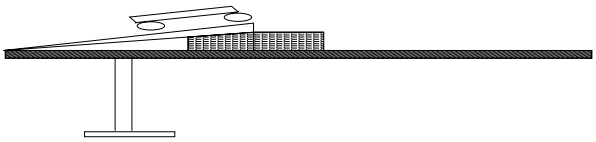
Safety Considerations:
Students could misuse materials in a dangerous manner. It is important that the teacher keep a good eye on the class to make sure everyone is using the equipment properly and safely.

Slip and Slide

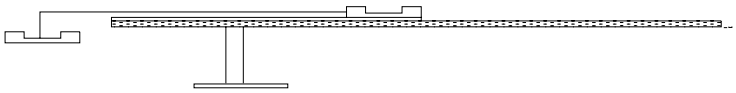
Different Surfaces affect our daily activities in many different ways. What are the different surfaces shown in the pictures below? Do they help to increase speed or reduce speed?

_____ _____ _____

Today we will be comparing the effects of different surfaces by doing an experiment. Using the stopwatch, record the time it takes for the racecar to go down the different ramps.



Using the bins, first predict the number of washers it will take to pull the bin across the surface. Then place washers in the hanging bin and record how many it actually takes to pull the bin across the surface.



Surface	Time for Race Car to go down ramp (sec.)	**Predict** Number of Washers	**Actual** Number of Washers
Plain			
Sandpaper			
Felt			
Rubber			

Things to think about while performing experiments:

- Why do we ice and sand the roads in the winter?
- Why do Olympic athletes wax their skis?
- Why do hockey players sharpen their skates?
- Why do football players wear cleats?