

<b>Science Strand 2: Properties and Principles of Force and Motion</b>	
<b>CLE: 2.1 The motion of an object is described by its change in position relative to another object or point.</b>	
<b>Health Profession:</b>	<b>Nurse</b>
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<b>Reference(s)</b>	
<b>Guidelines for Nursing Homes: Ergonomics for the Prevention of Musculoskeletal Disorders. Retrieved on January 28, 2008, from <a href="http://www.osha.gov/ergonomics/guidelines/nursinghome/final_nh_guidelines.pdf">http://www.osha.gov/ergonomics/guidelines/nursinghome/final_nh_guidelines.pdf</a></b> <b>Missouri Western State University: Retrieved February 24, 2008, from <a href="http://www.missouriwestern.edu/nursing/SampleProgram.pdf">http://www.missouriwestern.edu/nursing/SampleProgram.pdf</a></b>	
<b>Objectives:</b>	
<b>At the completion of this presentation the high school student will be able to:</b> <b>1. Explain how friction is higher with larger mass and how an assistive device reduces friction in a transfer</b> <b>2. Demonstrate how to transfer a person safely using assistive devices</b> <b>3. Identify the importance of this information to nursing.</b>	
<b>Background Summary of Information as Related to Nurses and CLE 2.1</b>	
<b>Friction is the force of two surfaces in contact. A greater amount of friction will reduce the momentum and require greater force for movement. When transferring a patient there is friction between the patient and the bed or gurney therefore moving a patient with a larger mass will have greater friction which will require a greater force to transfer the patient. Using assistive devices will reduce friction during transfers. Assistive devices can be made of a smooth plastic, a flexible air overlay, or a device that rotates as the patient moves. When transferring a patient &lt;100lbs use two caregivers and a lateral transferring device. If a patient is 100-200lbs use a friction reducing device and two caregivers. If a patient is &gt;200lbs use a friction reducing device and 2-3 caregivers.</b>	
<b>Scenario</b>	
<b>Betty is a nurse on the Orthopedic floor and is getting a new patient from the Emergency Department. Her new patient, Tommy, is a 32 year old male that weighs approximately 260lbs and is 6' tall and is being admitted with a broken leg from an MVA that will require surgery the next day. Tommy is being transported from the ER on a gurney and will need to be transferred to a bed on the unit but he is unable to move himself.</b>	
<b>How will Betty transfer Tommy to the bed?</b>	
<b>Betty will need the assistance of 2 other nurses to transfer Tommy. They will place the gurney next to the bed with one nurse on the side of the gurney and the other two nurses on the side of the bed. An assistive transfer device such as a slide board will be placed under Tommy by rolling him onto one side and then sliding the slide board under the other side. Tommy will roll back onto his back and then the two nurses on</b>	

the side of the bed will hold the slide board and pull him onto the bed while the other nurse on the side of the gurney will help push and guide him onto the bed. Once on the bed Tommy will roll onto his side once again to remove the slide board from underneath him.

**How do assistive devices make the transfer easier?**

**When moving a patient with a large amount of friction it will require greater force. When using the assistive devices it decreases the friction and therefore decreasing the amount of force needed.**

**There are different types of degrees available for nursing, an associate's degree and a bachelor's degree and a graduate degree such as a Masters or Phd. Some area colleges that offer these programs are: Colorado Technical University (Kansas City), National American University (Kansas City), University of Missouri-Kansas City (Kansas City), Graceland University (Independence), Lincoln University (Jefferson City), Missouri Western State University (St. Joseph), North Central Missouri College (Trenton), Park University (Parkville), Penn Valley Community College (Kansas City), and William Jewel College (Liberty)**

### Sample Program

FRESHMAN YEAR - First Semester		FRESHMAN YEAR - Second Semester	
ENG 104	College Writing and Rhetoric (3)	ENG 108	College Writing and Research (3)
BIO 101	Principles of Biology (5)	CHE 104	Fundamentals of Chemistry (5)
PED 101	Fitness and Wellness (3)	PSY 101	General Psychology (3)
MAT112/116	Finite Math/College Algebra (3)	SOC SCI	Social Science Requirement (3)
	(Modified if developmental courses required)	PED	Activity (1)
SOPHOMORE YEAR – First Semester		SOPHOMORE YEAR - Second Semester	
BIO 250	Anatomy & Physiology (5)	BIO 251	Medical/Public Health Microbiology (4)
PSY 240	Developmental Lifespan Psychology (3)	PHL 230	Ethics (3)
SOC SCI	Social Science Requirement (3)		Humanities Requirement (3)
	Humanities Requirement (3)	ALH 352	Applied Nutrition (2)
COM 104	Oral Communications (3)	BIO 375	Pathophysiology (4)
JUNIOR YEAR – First Semester - NURSING		JUNIOR YEAR - Second Semester - NURSING	
NUR 312	Foundations of Standards-Based Nursing (6)	NUR 336	Pharmacology II (2)
NUR 314	Quantitative Analysis for Health Professions (3)	NUR 352	Acute and Chronic Health Alterations (10)
NUR 316	Health Promotion and Holistic Assessment (6)	NUR 395	Nursing Research in Practice (2)
NUR 334	Pharmacology I (2)		
SENIOR YEAR - First Semester - NURSING		SENIOR YEAR - Second Semester - NURSING	
NUR 433	Health Alterations: Maternal/Child (6)	NUR 453	Health Alterations in the Community (6)
NUR 435	Health Alterations: Psychiatric Disorders (3)	NUR 457	Professional Development in Nursing (1)
NUR 437	Complex Health Alterations (5)	NUR 474	Leadership & Management in Nursing (3)
NUR 459	Research Application (1) Elective (2-3)	NUR 475	Senior Capstone Clinical (4)

## **Activities**

**Use 3-4 volunteers to demonstrate transferring a patient first without the use of any assistive devices to reduce friction then demonstrated transferring a patient with the proper use of assistive devices to show the decreased friction and the reduction in force necessary to move the patient.**

**First start with one volunteer to act as the “patient”. Then use 2-3 more volunteers to act as the nurses transferring the patient. During the first attempt the patient will be lying on a regular blanket to create friction and will demonstrate the difficulty of transferring a patient without using any assistive devices. The next attempt will use a draw sheet to assist with the transfer. The draw sheet will be under the “patient’s” hips and to transfer the nurses will have 1-2 pulling the draw sheet while the other nurse will be on the other side of the patient and transfer the “patient” onto the new surface. During the last attempt we will use a slide board which will be under the patient and running the length of the patient. There will also be 1-2 nurses on the side that will be pulling while the other nurse is on the other side. The nurses will use the slide board to grasp and pull the patient onto the new surface.**

**This activity demonstrates how important friction, momentum, and force are in the nursing field. Using an assistive device to minimize friction is much help to the patient and to the nurses.**

## **Supplies Needed**

**2 long tables (enough for a person to lay on)**

**A slide board**

**A draw sheet**

**A blanket (to lay on the table to create friction if table is smooth to simulate a bed)**