

THIS WEEK'S LESSON ACTIVITIES

INSTRUCTOR: _____ DATE: _____ CLASS LEVEL: Advanced Basic Skills

Topic: Motion and Energy

Lesson Objectives:

The students will:

- 1) Identify Isaac Newton's 3 laws of motion and give examples.
- 2) Explain transfer of energy.
- 3) Write an essay offering their opinion of the idea instigated by New York City.

CCR Standards aligned to this lesson:

RI.4.2, RI.4.2, RI4.3, RI5.4, RI.5.9, SL.4.2, SL.5.4, W.5.1, W.5.4, L.4.1, L.5.1, L.4.2, L.5.2, L.4.6, L.5.6

Newton handouts available at <http://teachertech.rice.edu/Participants/louviere/Newton/law1.html>

Reading: to include text dependent questions and reading strategies as needed, such as vocabulary, grammar, spelling, phonics, sentence structure along with writing and listening/speaking activities throughout the unit.

Reading: "Heat, Energy, and Bicycling in New York City" (on readworks.org), plus 3 handouts.

Vocabulary: innovative, combustion, conversion, reluctant, spontaneously, inertia, acceleration, friction, radiation, conduction, convection, evaporation

Text dependent questions:	Evidence based answers:
What reasons were given for New York City trying this program?	They wanted to ease traffic flow, especially at rush hour, and help improve people's health. (paragraph 1)
How are Newton's laws of motion addressed in this article?	An object in motions uses force to produce and expend energy.

	(paragraph 3)
Explain how cars and bicycles are energy conversion devices.	Cars burn fuel to spin cylinders, which in turn spin tires, which causes the car to move. Fuel converts to forward motion. Bikes take the energy from your foot pushing the pedal to cause the wheels to turn. Force from your foot causes forward motion. (paragraphs 3 and 4)
What other examples are given of energy conversion devices?	Airplanes, trains, and pogo sticks (paragraph 4)
Which form of the body's heat transfer is addressed in this article?	Evaporation-the sweat you produce is used to cool you. (paragraph 6)
What are two reasons given for the slow start of the program?	People had to get used to the idea of borrowing a bike, and the first week of the program the temperature outside was very hot. (paragraph 6)
What factors affect how much body temperature increases?	Outside temperatures, different bodies react differently, properties of a person, such as what a person is wearing. (paragraph 7)
How does sweat cool the body?	Heat moves to cooler areas, so sweat draws it away from your body. As the sweat heats up, it evaporates, taking heat with it. (paragraph 8)
How does air conditioning affect body temperature?	As your body moves into cooler air, the heat of your body moves to the cooler air, as your temperature decreases, you no longer need to sweat. (paragraph 8)

Day 1: We will have a class discussion of Newton's 3 laws of motion. Vocabulary will be clarified. With a partner, students will brainstorm examples of each law. We will compile a class list of ideas. (2 hrs.)

Day 2: In small groups, students will brainstorm 3 simple (but unique) ways from real life to visually demonstrate Newton's 3 laws of motion. They will use a simplified scientific method graphic organizer to help them. They can use illustrations, or actual objects. They will be presenting their ideas to the class. (1.5 hrs.)

Day 3: Groups will present their ideas to the class. From these, we will filter out the ones that have to do with humans exerting energy. As a class, we will review the "Heat Transfer by the Body" handout, and make connections to Newton's 3 laws. (1.5 hrs.)

Day 4: In small groups, students will read "Heat, Energy, and Bicycling in New York City". They will discuss the text dependant questions. As a class, we will review the outcomes of the group discussions. We will also brainstorm positives and negatives of the program, along with alternative ideas. The students will then individually write a one page essay, summarizing their views of the New York City bike program. (2 hrs.)

Day 5: Students will show their understanding of vocabulary used by writing sentences which use each word. (1 hr.)

Language: Examination and discussion of the scientific terms related to motion and energy. Clarifying steps in a process.

How I will scaffold my lessons to reach all of my students' levels:

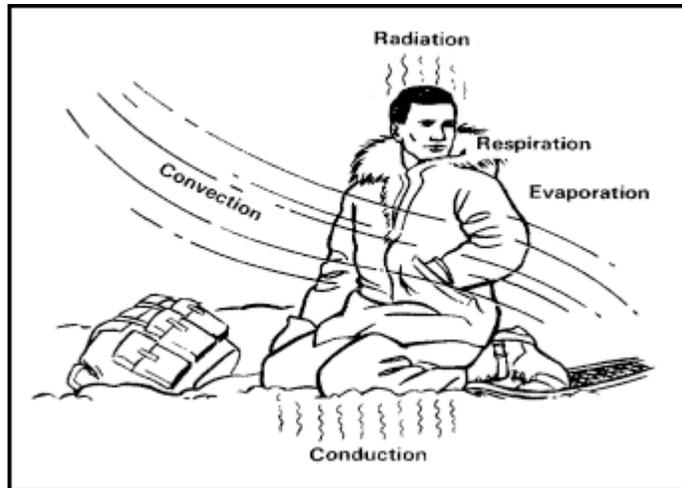
An in depth discussion of Newton's laws, and of the body's heat transfer systems will help to clarify the information discussed in the article. Group work to explain examples of Newton's laws. We will brainstorm positives and negatives of the program in NYC, and suggest other alternatives.

How I will assess my students' mastery of the lessons: The clarity and creativity of group presentations showing Newton's 3 laws. Students will also write an opinion essay on the New York City program and how effective they feel it is, using information from the article to support their views.

My reflections of the lessons (what worked, what didn't, what I might change for next time):

Heat Transfer by the Body

Heat produced by metabolism must be transferred to the external environment, principally via the skin, although a small amount of heat is transferred via the respiratory tract. The term “heat transfer” refers to a mechanism whereby heat is transferred from an area of higher temperature to an area of lower temperature. Human skin temperature is $\sim 32^{\circ}\text{C}$ (89.6°F) in normothermic (i.e., temperatures that support a normal body temperature) environments. Because outside temperatures are usually lower, body heat can be transferred to air or other objects. When the external temperature is greater than skin temperature, the body gains heat. There are four primary mechanisms by which heat is transferred to the environment: **radiation**, **conduction**, **convection**, and **evaporation**



Conduction - Touching
Convection - Through the air - Wind
Radiation - emitting heat from body
Respiration - breath - lose heat and moisture
Perspiration - Sweat – Evaporation

Newton's Law	
Plan	
Materials	
Outcome	