

Name: _____

Literacy Lab #1: "Welcome to Physics"

Period: _____

Richmond Hill High School: Physics

Date: _____

"Welcome to Physics"

Directions: Take a few minutes to read the article on the following pages. Write responses to the statements or questions below. Reflect on reading – use your own words and thoughts, based on research, if needed. Use full sentences.

Fact-finding: List three facts that you learned in the reading.

1.

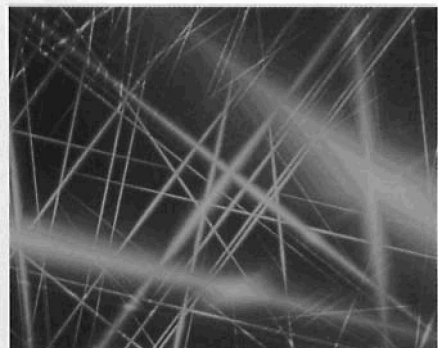
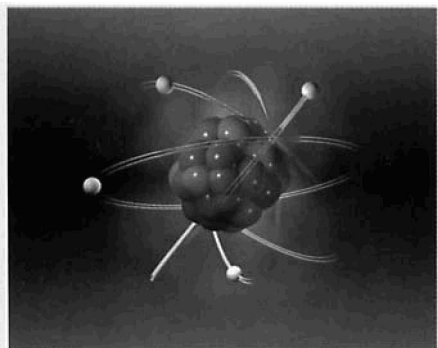
2.

3.

Vocabulary: List and define three unfamiliar words in the space below.

Implications: What are your feelings about the reading? Why is physics important? Fully explain your answers.

WELCOME TO PHYSICS



*Left: Roller coaster. Top: Atom structure.
Bottom: Field of blue lasers.*

What is physics? The simplest answer is that physics is the science that deals with matter, energy, space, and time. These concepts are basic to all phenomena, so it is no exaggeration to say that physics is at the foundation of all science. Because of this, physics has been called the “king of sciences.”

The aim of physics is to understand how nature works. In order to reach this understanding of the physical world, careful observation and experimentation are required, the results of which are analyzed. From this analysis, theories are developed. Predictions can be made from these theories that may lead to a refinement of a theory, or to serious conflict, in which case a theory has to be rejected. Part of this theorizing involves the search for basic laws of the universe. One of the key ideas of physics is that behind the apparent complexity of the world there is an underlying simplicity and unity.

WHY IS PHYSICS IMPORTANT?

Physics is integral to our society. It generates the knowledge needed for technology, but it is also an enterprise that expands our horizons and pushes back the frontiers of our knowledge. It plays a vital role in the education of many types of scientists—engineers, chemists, meteorologists, astronomers, and many types of medical experts. Physics has also provided us with many comforts and has helped extend our lives through its many important contributions to medicine.

Physics is critical to our future. It will be needed to help solve many of the problems now facing the world, such as global warming, waning energy resources, and the poisoning of our atmosphere.

It might seem that physics is a closed science in that most of the major discoveries are behind us, but this pronouncement has been made sev-

eral times throughout history. As interest in the field waned at the end of the nineteenth century, no one could have imagined that in the next few years some of the most important discoveries in physics would be made, including relativity and quantum theory.

THE MANY BRANCHES OF PHYSICS

Physics is divided into sections that deal with separate phenomena. Mechanics, developed by Isaac Newton in the seventeenth century, is one of the oldest branches. It deals with motion, force, energy, and inertia, and how these things act on solids and fluids.

The study of heat is concerned with the principles of temperature measurement, heat flow, and the effect of heat on the properties of matter. Closely related to heat is thermodynamics, the study of the effects





Two burners on a natural gas kitchen stove.

of change of temperature, pressure, and volume on physical systems.

The phenomenon of waves plays an important role all through physics. Sound is a wave, and in the nineteenth century it was found that electricity and magnetism together create electromagnetic waves. Light is an electromagnetic wave, as are radio waves, ultraviolet, infrared, and X-rays.

The study of light led to the field of optics, which is concerned with the nature and propagation of light and its refraction through various transparent media. Light can also be separated into various frequencies, forming what are known as spectra. The understanding of spectra provided a tremendous amount of information about the elements, the stars, and other celestial bodies.

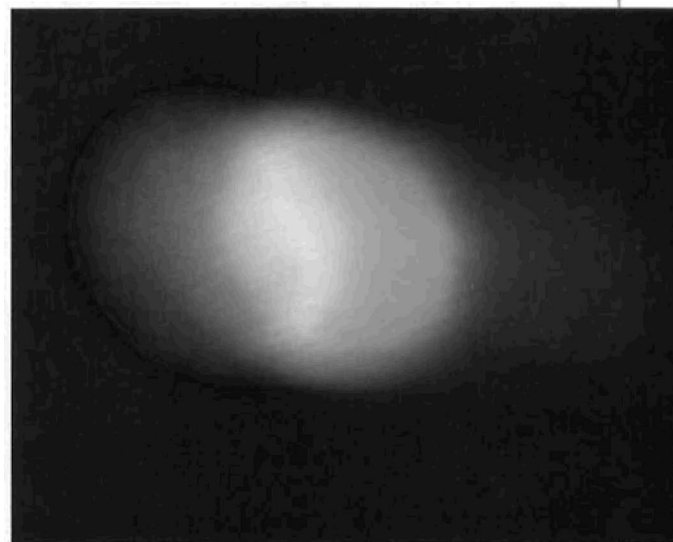
One of the most fascinating areas of physics is referred to as modern physics. This has several subdivisions, including atomic physics, quantum mechanics, relativity theory, nuclear physics, and

solid state physics. Quantum mechanics was developed in the late 1920s and is fundamental to all physics. It tells us how electrons move around the nucleus of the atom and what happens when they jump between orbits.

Relativity shows that mass and energy are equivalent and explains the source of energy for the Sun and stars. Relativity has also given us a new insight into gravity. Newton described gravity as force at a distance, but according to relativity it is curved space. Relativity has also enabled us to understand neutron stars and black holes, giving us profound insight into the workings of the universe.

When basic physics is applied to other disciplines, the result is a number of subfields, such as biophysics, geophysics, astrophysics, and elementary particle physics. The physics of the Earth, namely geophysics, atmospheric physics, and physical oceanography, are also important subfields.

From classical mechanics to quantum mechanics, *Science 101: Physics* delves into the laws of the universe and follows the journey of the brilliant people who were driven to understand the world around them.



Light spectrum.