

Matter defines and describes the physical and general properties of the subject including phase changes. Matter compares weight and mass. It also describes mass in relation to inertia. Phase changes are presented in relation to the changes in energy. The gas laws are thoroughly discussed and chemical changes are briefly mentioned. Students use the information Dr. Science presents to answer questions put forth in the program. This video has natural stopping points which allow for discussion of each question in class. The program reinforces the discussion by presenting the correct answer to each question posed. Throughout the program there are demonstrations and activities that may easily be duplicated in the classroom.

Vocabulary:

Matter: Anything that has mass and takes up space.

Solids: Have definite volume and definite shape.

Liquids: Have definite volume, but NO definite shape.

Gases: Have No definite volume, and No definite shape.

Plasma: Has no definite volume and No definite shape, and is composed of extremely hot electrically charged particles.

Weight: The force of gravity on an object. Weight can change depending on force of gravity.

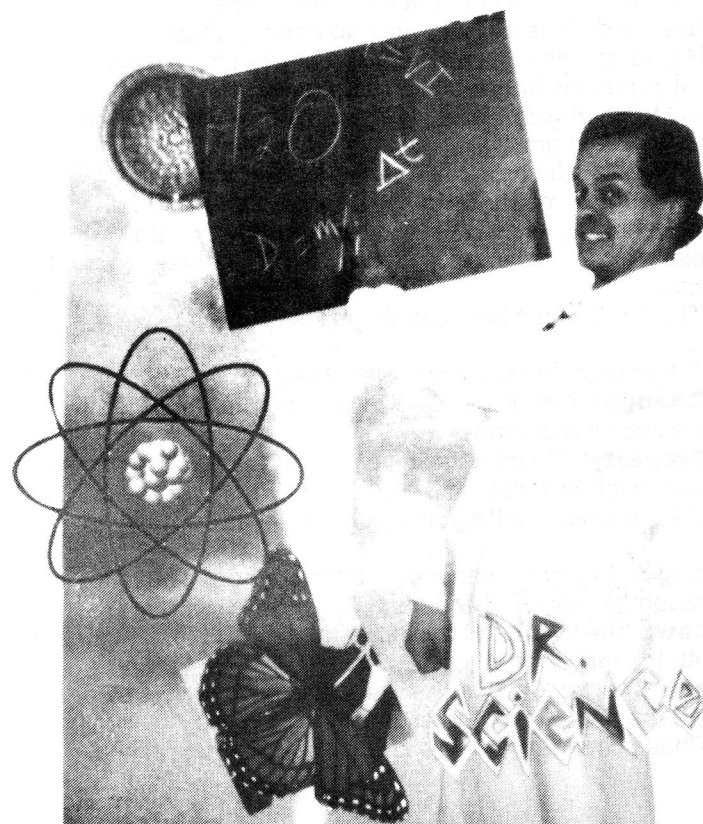
Gravity: A force of attraction between two objects.

Mass: The amount of matter in an object.

Inertia: The tendency of an object to remain at rest or stay in motion unless a force acts upon it. The inertia is dependent on the object's mass.

Teacher's Guide

VOL. 2 Matter



TMW MEDIA GROUP

2321 Abbot Kinney Blvd., Venice, CA 90291

(310) 577-8581 Fax: (310) 574-0886

Email: sale@tmwmedia.com Web: www.tmwmedia.com

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Gravity: A force of attraction between two objects.
Mass: The amount of matter in an object.
Inertia: The tendency of an object to remain at rest or stay in motion unless a force acts upon it. The inertia is dependent on the object's mass.
Density: The relationship between the mass and unit volume.
 $d=m/v$
Volume: The amount of space an object takes up.
Physical Change: A change in physical form, but the substance remains the same kind of matter.
Physical Property: Characteristics of matter that can be observed and measured, such as color, volume, and density.
Phase : State in which matter can exist, such as a solid, liquid, gas, or plasma.
Phase change: Physical change in matter from one phase to another, through the loss or gain of energy.
Charles' Law: The volume of a fixed amount of gas is directly proportional with the temperature of the gas.
Boyle's Law: The volume of a fixed amount of gas inversely proportional with the pressure of the gas.
Melting: Phase change from a solid to a liquid. A gain in heat energy.

Freezing: A phase change from a liquid to a solid. A loss in heat energy.

Vaporization: A phase change from a liquid to a gas. A gain in heat energy.

Condensation: A phase change from a gas to a liquid. A loss in heat energy.

Sublimation: A phase change from a solid directly into a gas. A gain in heat energy.

Chemical Properties: Describes how a substance changes into a new substance.

Chemical Change: A process in which a substance becomes a new and different substance.

Preview and review questions:

- What is matter made of? (Simple substances called elements).
- How is matter identified? (By its physical properties, color, shape, hardness, and odor).
- Is air matter? Does it take up space? (Air is matter and it does take up space. Refer to the balloon in the video).
- What are some examples of plasma? (The sun and stars).
- What is the difference between weight and mass? (Weight is the measure of the force of gravity on an object. Mass is the amount of space an object takes up. An object's mass does not change due to its environment. Weight may change because of its environment).
- What is gravity? (Gravity is the force between two objects, such as the force you exert opposite the force the earth exerts on you.)
- How does the density relate to mass and volume? (Density is mass divided by volume or the amount of mass in a given volume of an object)
- What instrument do scientists use to measure mass? (A scale, or triple beam balance).
- In the video an experiment in density was done. A marble was dropped into a glass of water. How do you know the marble is more dense than water? (It sank to the bottom and displaced some of its water.)
- Of the following, place in order of density from more dense to less dense. Aluminum, water, alcohol, gold? (Gold is the most dense, aluminum, water and alcohol is the less dense.)
- In the film Dr. Science puts an inflated balloon into the freezer. When he takes it out, it is deflated. Explain what happened in relation to heat energy. (Heat energy was lost, so the particles of air in the balloon did not move as fast, exerting less pressure on the walls of the balloon. Therefore, it was deflated.)