

Plankton and Tube's

AMAZING SCIENCE ADVENTURES

PART 1: MATERIALS AND OBJECTS



Teacher's Guide written by
Mary Cubello & Pauline Weber

Special thanks to:

Mike Anderson
Elementary Curriculum Leader
Upper Grand DSB, Program Services

Dean Elliott
Science Consultant
Saskatchewan Ministry of Education

Erica Fleming-Gillespie,
Consultant, Learning Services
Waterloo Region District School Board

Christine Gard, Grade 1 Teacher
Laurelwoods Elementary School
Upper Grand District School Board

For additional information, call or send orders to:

McIntyre Media Inc.
203 - 75 First St., Orangeville, ON L9W 5B6

800-565-3036
fax: 519-942-8489
email: info@mcintyre.ca
www.mcintyre.ca

Video Synopsis:

Have you ever seen a professional baseball player hit a homerun with a bat made of glass or a hockey player take a slapshot with a stick made of paper? In this fun, educational and entertaining video, students are invited into a science lab where they meet the zany Professor Peter Plankton and his adorable partner, Professor Tess Tube. Professor Plankton takes us on a whirlwind tour around the world as he ends up in the Brazilian rainforest dressed for winter, and in the snowy north dressed for the beach. Thankfully, Professor Tube is on hand to get him back to the lab where they demonstrate the "science of materials and objects". Students will join in the romp as they learn that objects are all around us, and that all objects are made of materials such as plastic, wood, glass, and steel. The two professors demonstrate the various properties of a material and an object and students are introduced to vocabulary such as shiny, hard, smooth, flexible and shiny. Short, fun experiments demonstrate key concepts. Throughout the program, students are encouraged to be environmentally responsible as the 3 R's (Reducing, Reusing and Recycling) are introduced.

Curriculum Connection:

Recommended for the Grade K-1 Physical Science curriculum.

Program Objectives:

Students will learn that:

- Objects have observable characteristics and are made of materials.
- Materials have specific properties and are the substances from which something is made.
- Humans make choices related to their use of objects and materials that have a direct effect on the environment.
- Some objects are found in nature and some are made by humans.
- Objects can be held together by different types of fasteners.
- We prepare for seasonal differences in weather by wearing the proper type of clothing.
- They can explore and describe characteristics of materials using their sensory observations.

Curriculum Correlations:

- YUKON - Grade 1 - Materials and Objects
- NORTHWEST TERRITORIES - Grade 1 - Characteristics of Objects and Properties of Materials
- NUNAVUT - Grade 1 - Materials and Objects
- BRITISH COLUMBIA - Kindergarten - Properties of Objects and Materials
- ALBERTA - Grade 1 - Materials and Objects
- SASKATCHEWAN - Using Objects and Materials
- MANITOBA - Grade 1: Cluster 3 - CHARACTERISTICS OF OBJECTS AND MATERIALS
- ONTARIO - Grade 1 - Materials, Objects and Everyday Structures
Grade 1 - Energy in Our Lives
- QUEBEC - Cycle 2
- PRINCE EDWARD ISLAND - Grade 1- Materials, Objects and Our Senses
- NOVA SCOTIA - Grade 1- Materials, Objects and Our Senses
- NEW BRUSWICK - Grade 1- Materials, Objects and Our Senses
- NEWFOUNDLAND - Grade 1 - Physical Sciences: Materials, Objects and Our Senses

Using the DVD: Objects and Materials

Preview the video and select activities from this guide to help students understand the concepts of objects and their characteristics, and materials and their properties.

Introduction and Concept Development:

- Ask students to name things in the classroom that are objects (chairs, pencils, books, doors, computers, etc.) Are people objects?
- Define an object as a thing that can be seen and felt, used and enjoyed.
- Write the word object for the class to look at and read.
- Write the names of the objects identified by the students below the word object.
- Now look at some of the objects that were named, and ask students what materials were used to make that object. Some objects are made of only one material, but many will be made of more than one material (e.g. screws in a wooden chair).
- Define materials as substances used to make objects (e.g. paper, wood, plastic, glass, metal, - and skin and bone if you decided a person is an object!)
- Beside each object on your list write the material or materials used to make it.
- Talk about why these materials are a good choice for these objects (wood is strong for a chair, paper is thin for a book, etc.)

Play the DVD Program *Objects and Materials*:

Before you begin, ask students to watch for objects and materials shown by Professor Plankton in the video.

After Viewing the Video:

Professor Plankton showed some objects that were made of one material and other objects that were made of more than one material. Recall and list these objects and the materials from which they were made in chart format:

Object	One Material	Object	Many Materials

Using the DVD Objects and Materials, continued...

Reduce, Reuse and Recycle:

Ask students to think of examples in your classroom and school of

- Objects that can be re-used
- Objects that are made of recycled materials
- Objects that you should put into a recycle bin

What could be done in your school to reduce the use of:

- Paper
- Plastic

Make a list of recommendations and invite your principal to visit your classroom to discuss your ideas.

Vocabulary Development – Objects and Materials:

List the following words for the class to read and discuss their meanings. (The Vocabulary list on page 7 has definitions) List examples beside each word to clarify their meaning.

Objects: Characteristics of Objects:

Manufactured
Natural
Size
Height
Colour
Shape
Texture

Materials: Properties of Materials:

Dull
Shiny
Waterproof
Porous
Absorbing
Flexible
Rigid
Brittle
Unbreakable
Soft
Hard
Fluffy

Fasteners:

Nails	Screws
Staples	Glue
Tape	Velcro
Elastic bands	Buttons
Snaps	Thread

Vocabulary

CHARACTERISTIC - a feature of a person or object.

CLOTH - Cloth (also called fabric) is a material that is produced by weaving or knitting thread. Clothing is made from cloth.

DULL - Not bright or shiny. Having little colour.

FASTENERS - To attach firmly to something else, as by pinning or nailing.

FLEXIBLE - Capable of bending easily without breaking.

HUMAN-MADE (MAN-MADE) - made by humans.

JOIN - To put together.

MATERIALS - What objects are made of. Some materials like rubber come from nature and some like steel are made by man.

METAL - A type of material. Some metals include iron, copper, silver, and gold.

NATURAL - occurring in nature without help from humans.

OBJECT - Objects are all around us and they are made of one or more materials.

PROPERTY - A characteristic of a material or object.

RECYCLE - To use again in a different form.

REDUCE - To use less of.

REUSE - Things can be used over and over again. Doing this means we make less waste or garbage.

SHINY - Bright, glossy or polished.

STRUCTURES - A structure is an object that supports, spans or offer shelter. They have different shapes and purposes.

WATERPROOF - A type of fabric that stops you from getting wet - like a plastic raincoat or rubber boots.

WOOD - Wood is a useful material obtained from tree trunks. Wood is used to make furniture, build houses, and make paper.

Exercsie #1: Identify the MATERIALS

Are they made of wood, fabric, plastic, metal, glass or rubber?

Task: Have students look at the various objects pictured below. They are to print in the space provided the material that the object is made of. We have done the first one for you.

























Exercise #2: Identify the MATERIALS

Some objects are made of more than one material. Objects can be made of two, three, four or even more different types of materials. Take a look at this car. How many materials can you name? Write them in the space provided.

You should be able to find 4 different materials - metal, rubber, glass and fabric.



Exercise #3: Identify the MATERIALS

Now it's your turn. Think of an object that is made up of more than one material. Draw a picture of that object in the space below. Then print what materials your object is made of.

My object is a _____

It is made out of _____

Exercise #4: Identify the MATERIALS

All objects must serve a purpose. For example, we use a car to get from place to place. We use a chair to sit on. Some objects that serve the same purpose can be made from different materials.

Here's an example. A chair serves the same purpose - to sit on - but can be made of different types of material. Here are three different materials:



Wood chair

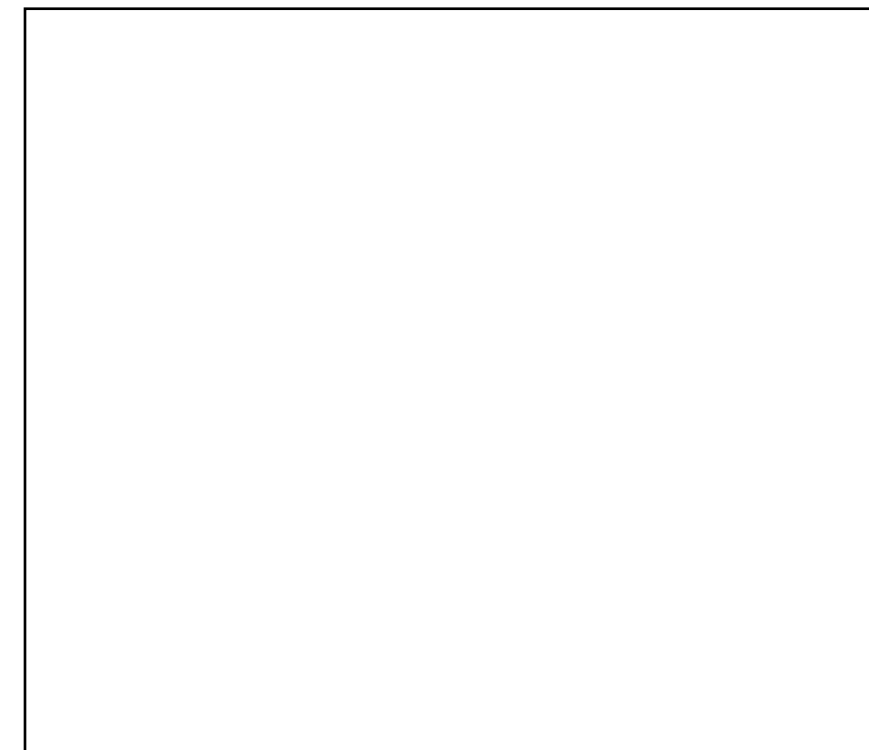


Plastic chair



Fabric chair

Think of an object that serves the same purpose, but can be made out of different materials. Draw a picture of that object below and print the type of materials it can be made from.



Different types of materials:

1. _____

2. _____

3. _____

Exercise #5: Identify the Materials Scavenger Hunt

Here's an activity that can open the door to conversation with your students about how things are made and what exactly they're made from. How amazed will they be when they learn that glass comes from sand and books come from trees!

What You Need:

- Several manufactured items found in your classroom or school.
- Colour-coded round labels in 5 colours (available at office supply stores)

Lesson:

Show students several manufactured items you have collected. These could include such items as a paper bag, a metal toy car, a wool mitten or hat, a running shoe, a wood or metal ruler, a glass jar, or a book.



As you show them each object, ask them what they think the object is made from. Ask if they know where the material they named comes from. Many children will know that wooden items come from trees and woolen clothing comes from sheep. Explain to them that paper comes from trees, cotton fabric comes from plants, metal comes from minerals in the ground and glass comes from sand.

As you identify the source material for each object, write a "master colour code" card, and make a different colour label for each kind of source material: plant, trees, animal, metal, or sand. Emphasize that all the source material comes from our environment.

Then go on a tour of your classroom or school with your students, and identify at least 25 different source materials you can see. Place a colour dot on each one as identification (for example, you might use green for trees and red for animals). As you go, bring a clipboard. After your students have picked each object, list its name on your paper, and leave some room between each item.

Once you've labeled the classroom or school, you're ready for a fun scavenger hunt that also supports first grade reading skills. Photocopy your original object list. Divide students into small groups and invite them to go on a scavenger hunt. They have to find every object on your word list, and then put the appropriate sticker or stickers next to the object name. A prize goes to the team who can read each word and recapture every sticker around the class!

Exercise #6: Sorting Materials - Rough and Smooth



Sandpaper



Floor



Marbles



Tree Bark

You decide! Are these objects rough or smooth. Print the name of the object in the correct box below.

These are **rough**.

These are **smooth**.

Exercise #7: Sorting Materials - Hard, Soft, Heavy or Light



Pot



Feather



Weights



Teddy Bear

You decide! Are these objects rough or smooth. Print the name of the object in the correct box below.

These are **hard and heavy**.

These are **soft and light**.

Exercise #8: Describing materials and blindfold game

Students will be able to make close observational drawings of a selection of objects and use scientific vocabulary to describe them. Children will be able to guess an object using their sense of touch and/or descriptive words given to them.

Resources needed:

A selection of objects of varying textures for each group e.g. shiny paper, corrugated cardboard, tissue paper, stone, cork, silver foil, mirror, string, plastic bag, spoon, coloured paper, cotton wool, list of descriptive words on board, copies of worksheet (see page 14), blindfold for each group.

Vocabulary List:

Hard
Soft
Shiny
Dull
Rough
Smooth
Heavy
Light
Flexible
Rigid

Lesson:

As a whole class, children use descriptive words to describe texture and appearance of objects, rather than what it is or does. Children go off and sit in groups but work individually to do close observational drawings of 4 objects from the selection and write at least 3 descriptive words next to it.

Demonstrate game - One child is blindfolded, the other children in the group give him/her one of the objects and he/she has to guess which it is by using sense of touch.

Children play the game in groups of 3, taking turns to be blindfolded.

Extension activities

Blindfold game, version 2 - the other children in the group choose an object and use appropriate vocabulary to describe it to the blindfolded child, who guesses the object without touching it.

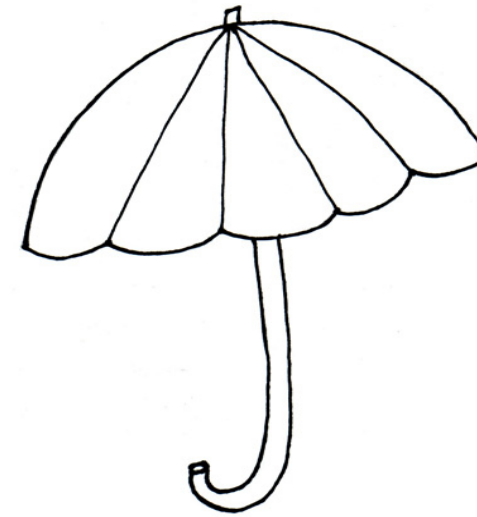
Exercise #8: Worksheet

Draw 4 objects and write 3 descriptive words for each object. Use the words from the vocabulary list.

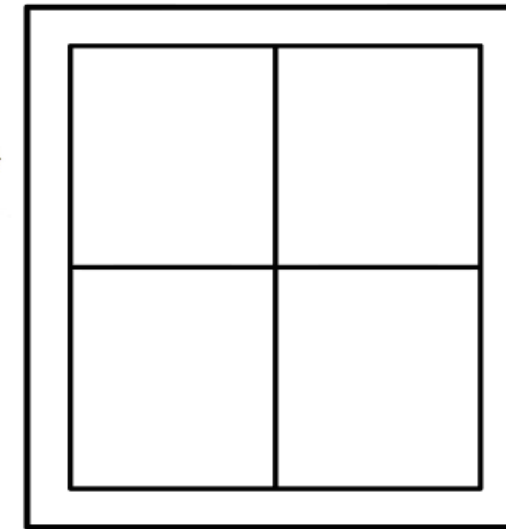
Exercise #9: Sorting and using materials

Colour in the pictures. Then chose the words from the list below to describe each object.

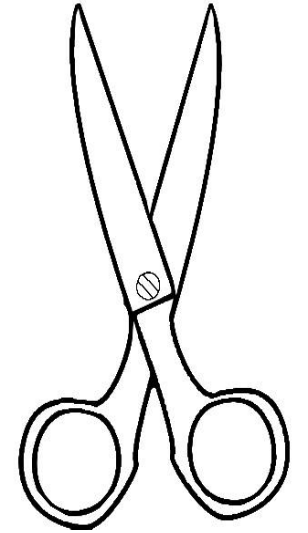
umbrella



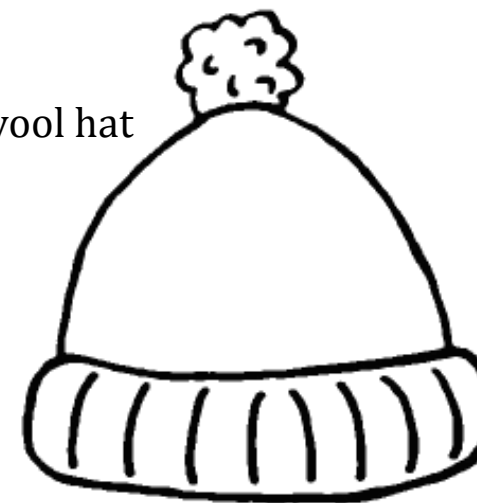
window



scissors



wool hat



school bus



hard	dull	sharp	wet
soft	transparent	cold	dry
rough	waterproof	warm	think
smooth	flexible	heavy	thin
shiny	strong	light	rigid

Characteristics of Materials

Understand that materials are suitable for making a particular object because of their properties, and that some properties are more important than others when deciding what to use.

Introduction:

Write on the board or on a large sheet of paper a list of materials and a list of properties. Go through each material and ask which of the properties it has.

List of materials - rubber, paper, glass, plastic, steel, fabric, wood.

Activities:

Tell the students you are going to think about which materials would be suitable for a making a notebook. What is a notebook used for? Which of the materials in our list can you write on? Make a list of these materials. Why are some of these materials unsuitable for a notebook even though you can write on them (e.g. too heavy, too bulky, the ink rubs off)? Which material is the most suitable? What properties does this material have that makes it the most suitable? Repeat this discussion for other everyday items, e.g. a towel, a saucepan, a window, an umbrella.

Divide the class into six groups. Give each group a collection of everyday items. In their groups, children fill in a Characteristics of Materials worksheet recording the name of each item, its use, what it is made from, and why this is a good material to use.

Plenary:

Why would these new inventions fail? A glass umbrella, a rubber cup, cardboard boots, a paper house, a metal shopping bag. In each case, you suggest one property of the material that makes it suitable for that purpose, and ask the children to explain why it would not be suitable.

Extension Activity:

Children look at objects made from two or more different materials, e.g. a saucepan, or a ring binder, and explain why different parts of the object have to be made from different materials.

Suggested homework:

Design three new inventions for household items that are destined to fail.







Name of Object	Purpose of Object	Material of object:	Why is this a good materials to use?

Characteristics of Materials Worksheet

Identifying Different Types of Fasteners

A fastener is something that is used to join two or more objects together. Some examples of fasteners are: glue, staples, buttons, velcro, zippers, nuts and bolts, shoe laces, rubber bands or elastics, paper clips, and tape.

Below are some pictures of fasteners. Print the name of each and where they would be used.

Fastener	Name of fastener	Example of how you would use it
		
		
		
		
		
		

Identifying Different Types of Fasteners

In the space provided below, draw a picture of yourself as you are dressed today. Label all of the fasteners on your clothing.

A picture of _____

Fasteners - Let's Take a Look...

Read the following story to your students and show them the pictures on page .



Have you ever gone for a walk in the forest or a field of tall grasses and returned with burrs stuck to your clothing. Well, that is what happened to George de Mestral, a Swiss engineer. One day he took his dog for a walk and when he got home, he found burrs stuck to his clothing and his dog's fur. He looked at the burrs under a microscope and saw that they had little hooks that could cling to anything with a loop - fabric, animal fur, even hair. He had an idea! He said to himself, "I will design a unique, two-sided fastener, one side with stiff hooks like the burrs and the other side with soft loops like the fabric of my pants. It will rival the zipper in its ability to fasten." It took him 8 years to experiment, design and perfect his invention.

Can you guess what Mr. de Mestral invented? Have students guess. You can give them some hints.

That's right!

Velcro.

Velcro is a hook and loop type of fastener that has been used for lots of things. Velcro is made of two strips - one contains thousands of small hooks and the other strip contains small loops. When the two strips are pressed together, they form a strong bond.

Have students answer the following question: Can you think of some of the ways we use Velcro?

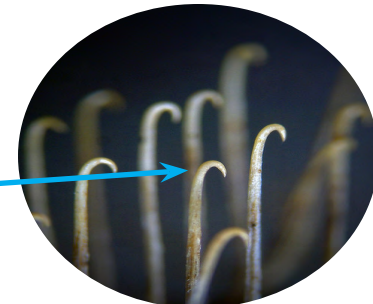
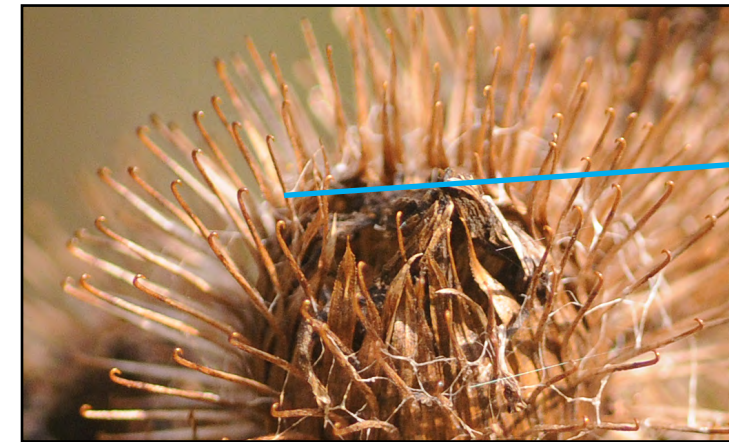
Did you know Velcro is even used on space shuttles? In space, objects tend to float around because of the near-weightless conditions. So NASA uses Velcro to hold objects down and keep them from floating away. Astronauts have used Velcro to keep track of personal items and even to play board games. One astronaut working at the International Space Station brought a chessboard with pieces lined with Velcro that could be anchored and removed from the board with ease.



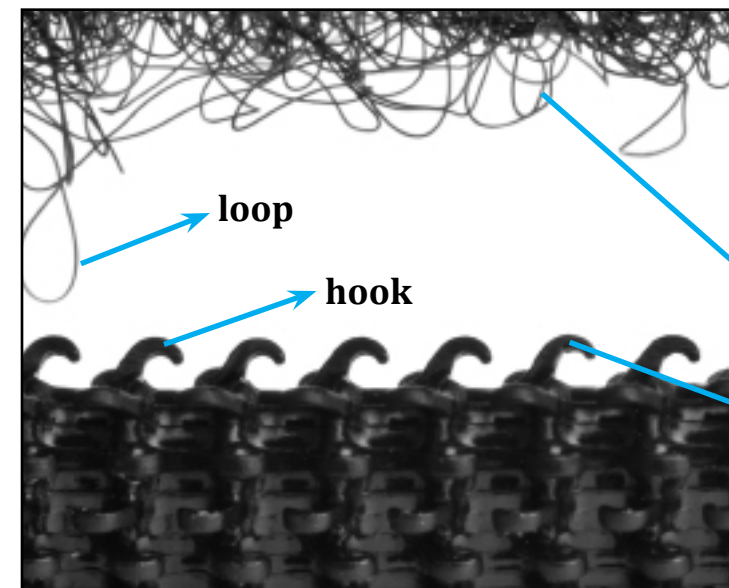
Fasteners - Let's Take a Look...



When we go for walks in the forest or fields, burrs sometimes get stuck to our clothing or to our pet's fur.

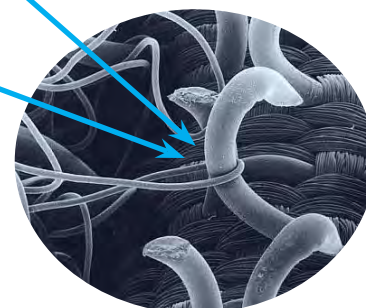


Burrs have lots of tiny hooks that attach themselves to things like clothing and animal fur - anything with a hook.



Velcro

This is a close up of 2 strips of velcro. One strip contains lots of hooks and the other strip contains lots of tiny hooks. When pressed together, the two strips grab onto one another.



Reduce, Reuse and Recycle



Ask students if they know what happens with plastic after you throw it away? Will it disappear? Explain to students that plastic needs thousands of years to decompose or rot.

What is a solution to this problem?

Have you heard about reduce? Do you know what it means?

REDUCE - To use less of.

Have you heard about reuse? Do you know what it means?

REUSE- Things can be used over and over again. Doing this means we make less waste or garbage.

Have you heard about recycle? Do you know what it means?

RECYCLE - To use again in a different form.

Explain the basics of recycle, reduce and reuse: If we use less plastic, we have less plastic waste. If we recycle the plastic that we have used, we need to produce less plastic.

Let the students think of a way to reuse a plastic bottle. You could draw a plastic bottle in the middle of the blackboard and draw different ways of reusing the bottle around it. Connect with arrows.

OR

Let the students draw a picture of what you could make of a certain material (i.e. a wooden table), let the students be creative!

OR

If there are magazines available: Let the students make a collage of all materials from 1 specific material. They can cut out pictures in the magazines and glue them on their collage.

Lastly have students present their findings.

Purchase the entire series...



Objects and Materials

Grade 1 2011 13 min

Have you ever seen a professional baseball player hit a homerun with a bat made of glass or a hockey player take a slapshot with a stick made of paper? In this fun, educational and entertaining video, students are invited into a science lab where they meet the zany Professor Peter Plankton and his adorable partner, Professor Tess Tube. Professor Plankton takes us on a whirlwind tour around the world as he ends up in the Brazilian rainforest dressed for winter, and in the snowy north dressed for the beach. Thankfully, Professor Tube is on hand to get him back to the lab where they demonstrate the "science of materials and objects". Students will join in the romp as they learn that objects are all around us, and that all objects are made of materials such as plastic, wood, glass, and steel. The two professors demonstrate the various properties of a material and an object. Students are introduced to vocabulary such as shiny, hard, smooth, and flexible. Short, fun experiments demonstrate key concepts.

#MCI046DV-NR2 \$149: DVD, PDF Teacher's Guide & Student Worksheets

Structures: Man-made and Found in Nature

Grade 3 2011 22 min

Structures are all around us. Take a look. Structures include bridges, buildings, chairs, shoes, spider webs, beehives, anthills, tables and even your own body. Structures are made by man and also found in nature. This program looks at various made-made and natural structures found all over the world. Through the use of fun experiments and short skits in their science lab, our two engaging hosts, Professor Peter Plankton and Professor Tess Tube help young students explore the science of structures. They learn that both humans and animals build specific structures with specific functions and that structures have many forms. Students are introduced to the complex, yet intriguing honeycomb structure that bees build. We look at modern day structures as well as those used by the First Nations people and other cultures around the world. In addition, students are introduced to the concept of reducing, reusing and recycling, and how structures impact the surrounding environment.

#MCI047DV-NR2 \$149 DVD, PDF Teacher's Guide & Student Worksheets

Forces Acting on Structures

Grades 5-8 2011 24 min

Structures are all around us. Everywhere we go; everywhere we look. They come in all shapes and sizes. Some are made by people while others are natural. Structures provide us with shelter and protection. All structures have forces acting on them. In this video, Professor Peter Plankton and Professor Tess Tube examine these forces. They specifically look at the impact of earthquakes and tornadoes. Footage from the recent earthquake and tsunami in Japan shows the devastating impact of these natural forces. Students will learn the difference between internal forces and external forces; live load vs. dead load; the various types of forces including compression and tension; materials and their properties; and the environmental impact of these events.

#MCI048DV-NR2 \$149 :DVD, PDF Teacher's Guide & Student Worksheets

Properties of Air

Grades 5-8 2011 123min

Our two engaging hosts, Professor Peter Plankton and Professor Tess Tube take students on a fun science field trip to discover the properties of air. Through engaging onscreen experiments, students explore the various properties of air such as air has mass, air takes up space, air expands when heated, and air can be compressed. #MCI049DV-NR2 \$149: DVD, PDF Teacher's Guide & Student Worksheets

The Science of Flight

Grades 5-8 2011 25 min

Building on the *Properties of Air* DVD, this program introduces students to the science of flight and aerodynamics. Once students understand the properties of air, they begin to look at how air makes flight possible. For thousands of years, humans dreamed of flying, but it isn't as easy as birds make it look. Students now learn about lift, gravity, thrust and drag -- the four forces that make it possible for an airplane to fly. Our two hosts also examine Bernoulli's Principle, Newton's Third Law of Motion, the Angle of Attack, natural and man-made objects that use airfoils and how a pilot controls the airplane. In addition, students learn about the history of flight in Canada.

#MCI050DV-NR2 \$149: DVD, PDF Teacher's Guide & Student Worksheets



203 - 75 First St., Orangeville, ON L9W 5B6

800-565-3036

fax: 519-942-8489

email: info@mcintyre.ca

www.mcintyre.ca