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ONTARIO SCIENCE CENTRE



Exhibit Inquiry

Matter & Materials

An agency of the Government of Ontario

Grade SK - 3



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Exhibit Inquiry

Matter & Materials

Have students look for the following exhibits related to matter and materials during their visit to the Ontario Science Centre:

Magnetic Materials

Where to go:

Science Arcade (Level 6)
Magnetic Balancing Act
The Magnetic Twain Shall Never Meet



What it's about:

Magnetic materials have special properties that allow them to attract or repel each other. Explore some of the properties of magnets at these two exhibits.

What to say and do:

- Move the hanging magnet at the *Magnetic Balancing Act* up and down. What happens as the hanging magnet gets closer to the floating magnets? What happens as it moves further away?
- Why do you think the floating magnets come together as the hanging magnet gets closer then separate when it moves further away? (*The hanging magnet's pole is opposite to that of the floating magnets. They are attracted when the hanging magnet gets close. The floating magnets have identical poles, so as the hanging magnet moves farther away, the floating magnets repel each other.*)
- Find the exhibit called, *The Magnetic Twain Shall Never Meet* (near the Electricity Demonstration stage). Bring the two magnets together. What force makes it harder to push the magnets together? (*The magnets have identical poles, creating a repulsion force.*)

Which Wood You Rather Lift?

Where to go:

Beside the main elevators
(Level 6 - In the hallway
between escalators and
elevator)
Which Wood You Rather Lift?



What it's about:

Balsa and ebony are both wood, but have very different properties and are therefore used for different purposes.

What to say and do:

- Look at (but don't touch!) the wood in the exhibit and describe similarities and differences. Predict which wood is heavier and explain how you made your prediction. Now try lifting the two pieces of wood. Was your prediction correct?
- Describe some possible reasons for the differences in the wood. (*Balsa has thin-walled, loosely packed fibres that stay hollow. Ebony has thick-walled, densely packed fibres that fill with sap.*)
- Explain what types of products you might make out of each wood. Explain your reasons (*e.g. Ebony – piano keys, because they have to withstand being pressed all day; balsa – model airplanes because they have to be light.*).
- Describe why it is important to consider a material's properties when deciding what to use to create a product. (*e.g. balsa is light, so we use it to make things that need to have little weight. Balsa damages easily, so it would not be a good material for a floor.*)

Matter & Materials

Where to go:

Weston Family Innovation
Centre (Level 6)

Racing Irons



Race Against Resistance

What it's about:

A force of resistance, friction is what happens when two surfaces rub together. Race irons down various surfaces to see which combinations have less friction, and which have enough to slow down or even stop the iron on its path.

What to say and do:

- With one or two friends, choose an iron and race it down one of the slides. Which materials did you choose, and why?
- Which iron/slide combination is the fastest? The slowest? Why do you think this is?
- Which slides prevent some of the irons from sliding easily? What are these materials used for? Why would it be important that they aren't slippery?
- Based on their properties, which materials would be good to use in a kitchen, on a playground, for building houses, for clothing, for sports equipment? Why?

Papermaking

Where to Go:

D5 (Level 6)

Papermaking Demonstration



What it's about:

Materials are often made from other materials. You can make sheets of paper out of a variety of fibre-based things, such as vegetables, cloth, fruit and old paper— even elephant poop!

Fibre-based materials, like wood, need to be broken down and mixed with water to create a soupy mixture called “pulp”. The pulp is then shaped into a sheet of paper using a mould.

What to say and do:

- Watch the Papermaking Demonstration and note the steps used to make paper.
- Handouts with complete instructions are available near the Papermaking Demo area or just ask one of our friendly Science Centre Hosts!

Duration: 25 minutes

Demonstration times are listed on schedule boards and video monitors throughout the building.

Magnified Materials

Where to go:

KidSpark (Level 4)

Time for a Checkup?



What it's about:

A camera microscope shows things 240 times larger than normal.

What to say and do:

- Hold some fabric under the camera and look at the screen. What is the fabric made of? (*Threads woven together.*)
- Compare two different fabrics. Now compare them under the microscope. What do the threads making the fabric and the fabric itself have in common? (*e.g. They are the same colour, they are smooth/fuzzy, etc.*)
- Have students look carefully at Velcro® fastener. See if they can guess which half has the loops and which has the hooks. Then, look at it under the microscope to see if they were correct.

Resources

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Vocabulary

Buoyancy	The property of a material that determines whether it will float or sink in a given fluid (liquid or gas), due to the difference between the density of the object and the density of the fluid (e.g., ice is buoyant in water; helium is buoyant in air).
Density	The mass per volume of a substance ($d=m/v$). For example, the density of ice is 0.92 g/ml, while the density of liquid water is 1 g/ml. Therefore, ice floats in water because it is less dense.
Gases	One of the three states of matter. Gases flow and expand until they fill the container that holds them.
Glycerol	A dense (heavy, sticky) liquid that is used as a lubricant to keep motors and machines moist. Denser than water, it's also used in foods and in medicines.
Ingot	A block of metal that is cast in a particular shape for convenient handling. The ingots shown in the program are made of silicon.
Liquids	One of the three states of matter. Liquids can flow and take the shape of the container that holds them.
Materials	Any kind of matter that can be used for something (e.g., wood, plastic, metals, glass).
Matter	Everything that exists; has mass and occupies space (e.g., your pencil).
Solids	One of the three states of matter. Solids have a fixed shape and do not easily change. They resist pressure.
States of Matter	Matter can exist in three forms: solid, liquid and gas (e.g., ice, water, vapour).
Viscosity	A fluid's resistance to flow. For example, a thicker, stickier fluid like glycerol flows less easily than something runny like water, so glycerol is said to have a "higher viscosity" than water.
Wafer	A thin slice of semiconducting material such as a silicon crystal, upon which microcircuits are constructed.

Internet Links

Strange Matter
<http://www.strangematterexhibit.com>

Books

Amato, Ivan. *Stuff: The Materials the World is Made of*. New York: Avon Books Inc, 1997.
Sass, Stephen. *The Substance of Civilization*. New York: Arcade Publishing, 1998.

PLEASE NOTE: Programs and exhibits are subject to change without notice.