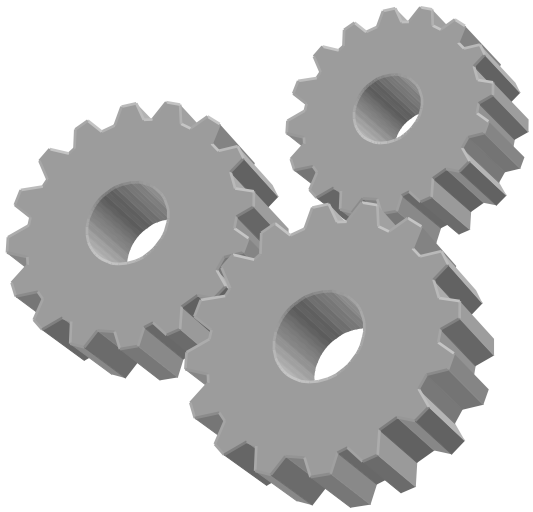
INTERNATIONAL AFRICAN INVENTORS MUSEUM

TEACHER'S PACKAGE

GRADES 7 – 8



Draft by: Veronica Sullivan
2003

Teacher's Package

The International Black Inventions Museum has developed an intriguing school program in keeping with the Ministry of Education's goal for '**teachers to work with the community to develop programs that help students to make connections among various technologies and among broad-based technology and real life experiences**'.

The exhibit presents the African Experiences that helped to shape the development of science and technology throughout the world. Students will learn about the key roles played by individuals to overcome their challenges and make an impact in their respective fields.

Teachers may wish to review the curriculum expectations for specific connections to their programs.
Overall the student will:

- **Understand basic concepts of science and technology;**
- **Demonstrate skills, strategies and habits of mind required for scientific inquiry and technological design; and**
- **Relate scientific and technological knowledge to each other and to the world outside the school**

Introduction to Field Trip

Have students begin to research specific technological developments and other important achievements of People of African descent. (e.g. African Canadians).

Pre Exhibit Activity

Included in your package is a **'Before the Exhibit'** worksheet to be filled out by students before viewing the exhibit. The worksheet is suitable for all grade levels.

The Exhibit

The **Student worksheets** provided are based on Ontario Ministry of Education expectations for Science and History for grades 7 – 12. You may select the ones suitable to your purpose. Please ensure that there are enough copies for each student attending the exhibit. Instruct students to be careful around the exhibits. Encourage the use of clipboards.

Assessment and Evaluation

The student **worksheet** compliments the self-guided time spent viewing the exhibit and will help to ensure that students are completing all elements and expectations of the assigned task.
You may wish to make observations of the student's commitment to task, willingness to examine exhibits carefully and completion of assigned task.

Follow up Activities

A student reflection worksheet entitled ' **After the Tour** 'is provided in your package. This should be filled out following your tour the exhibit.

- **Respond to the Exhibit**
- **Research projects in a variety of interdisciplinary areas**
- **Create an invention based on an exhibit**
- **Make a model of one of the inventions**

Discuss/Debate issues

Grades 7- 8
CURRICULUM CONNECTIONS

Ontario Ministry of Education Expectations Addressed by the Exhibit

Strand	Grade 7	Grade 8
Life Systems	**Interactions with Ecosystems** ~ Demonstrate an understanding of the effects of human activities and technological innovations, as well as the effects of changes that take place naturally, on the sustainability of ecosystems.	**Cells, Tissues, Organs and Systems** ~ Describe ways in which study of the structure, function and interdependence of human organ systems can result in improvements in human health.
Matter and Materials	**Pure substances and Mixtures** ~ Identify human uses of mixtures and solutions in everyday life, and evaluate the environmental impact of some of these uses. ~ Identify a variety of manufactured products made from mixtures or solutions and explain their functions (e.g., medicines).	**Fluids** ~ Describe how knowledge of the properties of fluids can help us to understand and influence organisms in the natural world, and to design and operate technological devices and to evaluate how efficiently different devices make use of these properties. ~ Describe some effects of technological innovations related to hydraulics and pneumatics ~ Identify some design features and explain how the design makes use of one or more of the properties of fluids ~ Identify industries in which the principles of fluid dynamics play a central role.
Energy and Control	**Heat** ~ Explain how the characteristics and properties of heat can be used, and identify the effect of some of these applications on products, systems, and living things in the natural and human-made environments.	**Optics** ~ Describe ways in which different sources of visible light and the properties of light, both natural and artificial, are used by humans for different purposes. ~ Identify ways in which properties of reflection are used in everyday situations.
Structure and Mechanisms	**Structural Strength and Stability** ~ Demonstrate an understanding of the factors that must be considered in the designing and making of products that meet a specific need. ~ Tell the 'story' of a product used everyday, identifying the need it meets and describing its production, use and eventual disposal. ~ Investigate ways in which research is done on existing products to generate new ideas for the products.	**Mechanical Efficiency** ~ Demonstrate an understanding of the factors that contribute to the efficient operation of mechanisms and systems. ~ Demonstrate understanding of the factors that can affect the manufacturing of a product, including the needs of the consumer. ~ Make informed judgments about products designed and made by other.
Earth and Space Systems	**The Earth's Crust** ~ Identify past and present-day applications of technologies that have contributed to the study of geology. ~ Assess the importance of soil conservation.	**Water Systems** ~ Identify ways in which humans have tried to contain damage caused by water

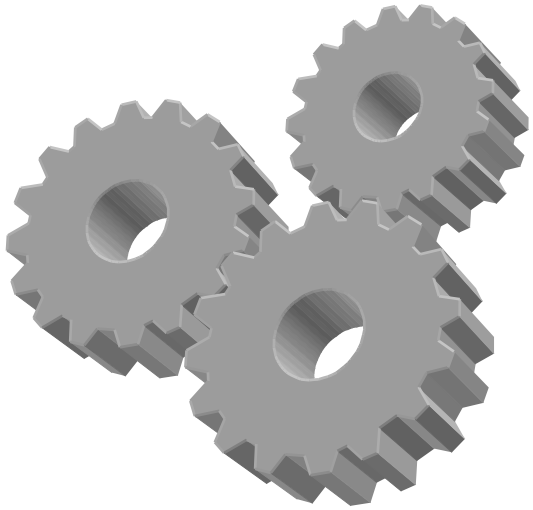
HISTORY CURRICULUM CONNECTIONS

Strand	Grade 7	Grade 8
Canada	**British North America** ~ Locate relevant information about how early settlers met the challenges of the new land, using a variety of sources (e.g., artifacts, field trips, original documents etc.) ~ Analyse, synthesize, and evaluate historical information (e.g., examine historical accounts for evidence of bias)	**Canada: A Changing Society** ~ Demonstrate an understanding of how diverse groups and individuals have contributed to the historical, cultural, and economic development of Canada ~ Analyse, synthesize, and evaluate historical information (e.g., compare and evaluate the role of women in the nineteenth century and the Twentieth century);

INTERNATIONAL AFRICAN INVENTORS MUSEUM

STUDENT WORKSHEETS

GRADES 7 – 8



By: Veronica Sullivan
2003

BEFORE YOU VIEW THE EXHIBIT

Name: _____
Grade: _____
Subject: _____

What you will need:

- Clipboard (Please **do not lean against the exhibits to write**)
- Pen /Pencil
- Student worksheet based on the purpose of your visit
- Extra writing paper

Please fill in this section at school or prior to entering the exhibit

What is the main purpose of your visit?

Do you know the names of any Black Scientists or Inventors?
Do you know of any inventions made by Black Inventors?
Do you know the names of any African Canadian Scientists or Inventors?

In which areas of Science do you expect to find the largest number of African Canadians?	**In which areas of Science do you expect to find the largest number of Black Scientist and Inventors?**

In which time periods (e.g. 1800's) do you expect to find the greatest number of achievements?

YOU ARE NOW READY TO TOUR THE EXHIBIT.
Check once more to ensure you have all that you need.
!!!ENJOY DISCOVERING!!!

Strand	Grade 7	Grade 8
Life Systems	**Interactions with Ecosystems** ~ Demonstrate an understanding of the effects of human activities and technological innovations, as well as the effects of changes that take place naturally, on the sustainability of ecosystems.	**Cells, Tissues, Organs and Systems** ~ Describe ways in which study of the structure, function and interdependence of human organ systems can result in improvements in human health.

STUDENT WORKSHEET

Gr. 7 **Which invention/discovery impacted an ecosystem?**	Gr. 8 **Which inventions have brought about improvements in Human Health?**
Invention/Discovery: Time Period: Inventor: Ecosystem Impacted:	Scientist/Inventor: Time Period: Organ system: Impact on Human Health:
Invention/Discovery: Time Period: Inventor: Ecosystem Impacted:	Scientist/Inventor: Time Period: Organ system: Impact on Human Health:
Invention/Discovery: Time Period: Inventor: Ecosystem Impacted:	Scientist/Inventor: Time Period: Organ system: Impact on Human Health:
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Suggested Exhibits

Seed Cotton Planter Locomotive Smoke Stack Organic Fertilizer Dr. George Washington Carver (peanuts)	First Open Heart Surgery Blood Plasma Egg Fertilization & the Study of the Cell Preparation of Cortisone Pediatric Lumbar Puncture Immobilizer Laser Ophthalmology Sun Protection

Strand	Grade 7	Grade 8
Matter and Materials	**Pure substances and Mixtures** ~ Identify human uses of mixtures and solutions in everyday life, and evaluate the environmental impact of some of these uses. ~ Identify a variety of manufactured products made from mixtures or solutions and explain their functions (e.g., medicines).	**Fluids** ~ Describe how knowledge of the properties of fluids can help us to understand, design and operate technological devices ~ Describe some effects of technological innovations related to hydraulics and pneumatics ~ Identify industries in which the principles of fluid dynamics play a central role.

STUDENT WORKSHEET

Gr. 7 **Find products that have been made from mixtures or solutions. Can you determine the mixtures/solutions used and the impact on the environment?**	**Gr.8** **Find inventions that are designed to make use of one or more properties of fluids. Which industry would benefit from this invention?**
Product: Scientist/Inventor: Time Period: Mixtures/Solutions Used: Function of Product: Environmental Impact:	Invention: Inventor: Time Period: Property of Fluid used: Industry Impacted:
Product: Scientist/Inventor: Time Period: Mixtures/Solutions Used: Function of Product: Environmental Impact:	Invention: Inventor: Time Period: Property of Fluid used: Industry Impacted:
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Suggested Exhibits

Africans (oils, perfumes/incense) Dr. George Washington Carver Madame C. J. Walker Dr. Betty Harris Morris B. Williams	Elijah McCoy Charles M. Banks Ralph W. Sanderson Dr. Betty Harris Morris B. Williams Dr. George Washington Carver

Strand	Grade 7	Grade 8
Energy and Control	**Heat** ~ Explain how the characteristics and properties of heat can be used, and identify the effect of some of these applications on products, systems, and living things in the natural and human-made environments.	**Optics** ~ Describe ways in which different sources of visible light and the properties of light, both natural and artificial, are used by humans for different purposes. ~ Identify ways in which properties of reflection are used in everyday situations.

STUDENT WORKSHEET

Gr. 7 **Which inventions or products use the properties of heat?**	**Gr. 8** **Find inventions /discoveries that utilize the properties of light (natural and artificial).**
Invention: Time Period: Inventor: How heat is used: Effect on the environment:	Scientist/Inventor: Time Period: Natural/Artificial Light: Purpose of Invention/Discovery:
Invention: Time Period: Inventor: How heat is used: Effect on the environment:	Scientist/Inventor: Time Period: Natural/Artificial Light: Purpose of Invention/Discovery:
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Suggested Exhibits

Granville T. Woods Dr. James Andrew Harris Andrew F. Hilyer Nathaniel Minor James D. Brownridge Norbert Rillieux Dr. Ken Effah Guarkro John T. Pride	Lewis Latimer Powell Johnson Artist C. Jenkins Dr. Marshall Jones Dr. Ken Effah Guarkro Michael C. Harvey Henry T. Sampson Dr. Carton Truesdale Kenneth Dunkley

Strand	Grade 7	Grade 8
Earth and Space Systems	**The Earth's Crust** ~ Identify past and present-day applications of technologies that have contributed to the study of geology. ~ Assess the importance of soil conservation.	**Water Systems** ~ Identify ways in which humans have tried to contain damage caused by water.

STUDENT WORKSHEET

Gr.7 **Which inventors and inventions have contributed to the study of geology?**	**Gr.8** **Which inventors or inventions have impacted the water system?**
Inventor: Time Period: Invention: Geology connection:	Scientist/Inventor: Time Period: Invention: Impact on the water system:
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Inventor: Time Period: Invention: Geology connection:	Scientist/Inventor: Time Period: Invention: Impact on the water system:
Sketch one of the inventions that have a Geology focus.	**Sketch one of the inventions that impacted the water system.**

Suggested Exhibits

Seed Cotton Planter Organic Fertilizer Dr. George Washington Carver	Safety gate for Bridges Trench Digger

Strand	Grade 7	Grade 8
Structure and Mechanisms	**Structural Strength and Stability** ~ Demonstrate an understanding of the factors that must be considered in the designing and making of products that meet a specific need. ~ Tell the 'story' of a product used everyday, identifying the need it meets and describing its production, use and eventual disposal. ~ Investigate ways in which research is done on existing products to generate new ideas for the products.	**Mechanical Efficiency** ~ Demonstrate an understanding of the factors that contribute to the efficient operation of mechanisms and systems. ~ Demonstrate understanding of the factors that can affect the manufacturing of a product, including the needs of the consumer. ~ Make informed judgments about products designed and made by other.

STUDENT WORKSHEET

Gr. 7 **Find products that were invented to meet specific needs?** **Which products are improvements on existing products**?	**Gr. 8** **Find Inventions that were used to assist in the manufacturing of a product.** E.g. (Shoe Lasting Machine 'in the production of shoes).
Product: Time Period: Inventor: Needs met: Is this product an improvement on an existing product? If yes, How?	Scientist/Inventor: Time Period: Invention: Product: Explain how this invention assists in the production of this product.
Product: Time Period: Inventor: Needs met: Is this product an improvement on an existing product? If yes, How?	Scientist/Inventor: Time Period: Invention: Product: Explain how this invention assists in the production of this product.
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Product: Time Period: Inventor: Needs met: Is this product an improvement on an existing product? If yes, How?	Scientist/Inventor: Time Period: Invention: Product: Explain how this invention assists in the production of this product.

Sketch 4 products and state the reason for your choice.		Sketch 4 products and state the reason for your choice.	

Suggested Exhibits

All sections of the exhibit present information that compliments this strand.	All sections of the exhibit present information that compliments this strand.

Strand	Grade 7	Grade 8
Canada	~ Locate relevant information about how early settlers met the challenges of the new land, using a variety of sources. ~ Analyse, synthesize, and evaluate historical information (e.g., examine historical accounts for evidence of bias)	**Canada: A Changing Society** ~ Demonstrate an understanding of how diverse groups and individuals have contributed to the development of Canada ~ Analyse and evaluate historical information (e.g., compare and evaluate the role of women in the nineteenth century and the twentieth century)

STUDENT WORKSHEET

Gr.7 **Find Early Scientists/Inventors who overcame the challenges and biases of the time and contributed to the development of North America. E.G. (1600's – 1800)**	**Gr.8** **Discover the role Women of Women of African Descent in the field of Science and Technology.** **What kind of discoveries/inventions did they make?** **How many African Canadian Women Scientist or Inventors can you find?**
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Women of African Descent Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Women of African Descent Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Women of African Descent Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Women of African Descent Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	**Tally of African Canadian Women Scientist** □□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□

Suggested Exhibits

The Slave Trade Benjamin Banneker, Benjamin Montgomery, Sarah E. Goode Emancipation Proclamation, Henry E. Baker, Josiah Henson Section: 2nd Encounter	Section: 3rd Encounter Women E.g. Madame C. J. Walker, Clara C. Frye, Sarah Boorne, Lyda D. Newman, Henrietta Bradberry, Ann A. Moore, Vida Harley, Tanya Allen, Dr. Shirley Jackson, Dr. Patricia Bath, Dr. Betty Harris etc.

AFTER YOUR TOUR OF THE EXHIBIT

Take time to complete this worksheet. Make sure that all the spaces are filled in.

Compare what you knew before the exhibit with what you now know. In which areas did you increase in knowledge?

Look at your Tally Column. What are your most interesting observations? What conclusions can you draw?

How did what you learn today influence your views on Scientist and Inventors of African Descent?

Which inventions did you find to be the most interesting?

SUGGESTED FOLLOW UP ACTIVITIES

1. Write a letter to the Black Scientist and Inventors Museum with your comments and suggestions.
2. Research one of the Scientists or Inventions observed at the exhibit.
3. Make a model of one of the inventions.
4. Create your own inventions based on an invention seen at the exhibit.
5. Generate discussions/debates around issues relating to the contributions made by scientist of African Descent.