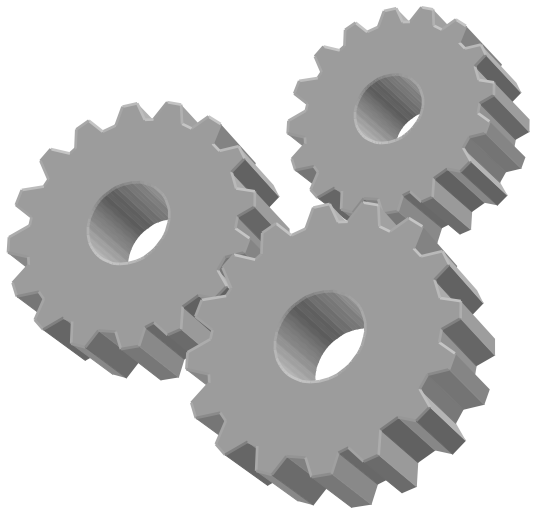
INTERNATIONAL AFRICAN INVENTORS MUSEUM

TEACHER'S PACKAGE

GRADES 9 –10



By: Veronica Sullivan
2003

BLACK SCIENTISTS AND INVENTORS MUSUEM

Teacher's Package

The International African Inventors 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 Canadian 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**

Teacher's Package
Grades 9-10
CURRICULUM CONNECTIONS

Ontario Ministry of Education Expectations Addressed by the Exhibit

Strand	Grade 9	Grade 10
Biology Academic & Applied	**Reproduction** ~ Describe/examine the importance of Canadian research and technological developments in genetics and reproductive biology. ~ Investigate careers that require an understanding of reproductive biology. ~Select and integrate information from various sources, including electronic and print resources, community resources to answer questions chosen.	**The Sustainability of Ecosystems** ~ Analyse issues related to environmental sustainability and the impact of technology on ecosystems. ~ Investigate careers that involve knowledge of ecology or environmental technologies.
Chemistry	**Atoms and Elements** ~ Describe technologies associated with the refinement, use and recycling of chemical elements and compounds. ~ Describe technologies that have depended on understanding atomic and molecular structure; ~ Describe / Investigate potential careers associated with an understanding of physical and chemical properties of elements and compounds .	**Chemical Processes** ~ Demonstrate why knowledge of chemical reactions is important in developing consumer products and industrial processes and in addressing environmental concerns. ~ Select and integrate information from various sources, including electronic and print resources, community resources to answer questions chosen. ~ Identify everyday examples where the rates of chemical reactions are modified. ~ Describe careers based on technologies that utilize chemical reactions.
Earth and Space	~ Demonstrate an understanding of how scientific evidence and technological advances support the development of theories about the formation, evolution, structure, and nature of our solar system and the universe; ~ Evaluate how human endeavours and interest in space have contributed to our understanding of outer space, the Earth, and living things.	**Weather** ~ Explain how people have utilized their understanding of weather patterns for various purposes
Physics	**The Characteristics of Electricity** ~ Explain practical application of static and current electricity. ~ Describe how some common household electrical appliances operate.	**Motion** ~ Analyse everyday phenomena and technologies in terms of the motions involved.
Technological Education	**Integrated Technologies** ~ Demonstrate understanding of how to develop products or provide services to meet identified needs.	

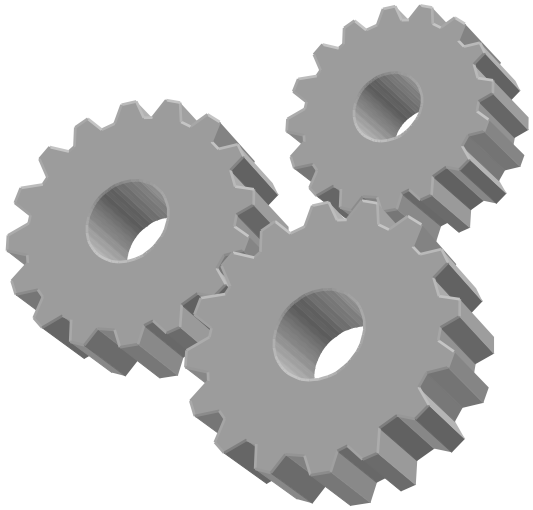
HISTORY CURRICULUM CONNECTIONS

Strand	Grade 9	Grade 10
Canada & World Studies	**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)	~ Demonstrate an understanding of the impact of technological developments on Canadians. ~ Evaluate/analyse information when researching historical topics or issues ~ Demonstrate an ability to draw conclusions base on adequate and relevant supporting evidence. ~Make reasoned generalizations or appropriate predictions based on research

INTERNATIONAL AFRICAN INVENTORS MUSEUM

STUDENT WORKSHEETS

GRADES 9 –10



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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 9	Grade 10
Biology Academic & Applied	**Reproduction** ~ Describe/examine the importance of research and technological developments in genetics and reproductive biology. ~ Investigate careers that require an understanding of reproductive biology.	**The Sustainability of Ecosystems** ~ Analyse issues related to environmental sustainability and the impact of technology on ecosystems. ~ Investigate careers that involve knowledge of ecology or environmental technologies.

STUDENT WORKSHEET

Gr.9 **Find inventions that contributed to technological developments in genetics and reproductive biology. List the careers associated with the inventions.**	**Gr.10** **Find inventions that impacted on an ecosystem. Which Inventions required knowledge of ecology or environmental technologies?**
Inventor: Time Period: Invention/discovery: How did this invention contribute to technological developments in genetics and reproductive biology? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Impact on the Ecosystem: What knowledge of ecosystems or the environment was needed for this Invention?
Inventor: Time Period: Invention: How did this invention contribute to technological developments in genetics and reproductive biology? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Impact on the Ecosystem: What knowledge of ecosystems or the environment was needed for this Invention?
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Inventor: Time Period: Invention: How did this invention contribute to technological developments in genetics and reproductive biology? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Impact on the Ecosystem: What knowledge of ecosystems or the environment was needed for this Invention?

Suggested Exhibits

Queen Hashepsut Ernest Just	Seed Cotton Planter Organic Fertilizer Carver Safety gate for Bridges	Locomotive Smoke Stack Dr. George Washington Trench Digger

Strand	Grade 9	Grade 10
Chemistry	**Atoms and Elements** ~ Describe technologies associated with the refinement, use and recycling of chemical elements and compounds. ~ Describe technologies that have depended on understanding atomic and molecular structure; ~ Describe / Investigate potential careers associated with an understanding of physical and chemical properties of elements and compounds.	**Chemical Processes** ~ Demonstrate why knowledge of chemical reactions is important in developing consumer products and industrial processes and in addressing environmental concerns. ~ Describe careers based on technologies that utilize chemical reactions.

STUDENT WORKSHEET

Gr.9	Gr.10
Find inventions associated with refinement, use and recycling of chemical elements and compounds. List careers associated with these inventions.	**Find inventions associated with consumer products and industrial processes that addresses environmental concerns. List careers associated with these inventions.**
Inventor: Time Period: Invention: How is this invention associated with the refinement, use and recycling of chemical elements and compounds? Career associated with the invention /discovery	Inventor: Time Period: Invention: Product / Industrial Process: Environmental concern addressed: Career associated with the invention /discovery.
Inventor: Time Period: Invention: How is this invention associated with the refinement, use and recycling of chemical elements and compounds? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Product / Industrial Process: Environmental concern addressed: Career associated with the invention /discovery.
Inventor: Time Period: Invention: How is this invention associated with the refinement, use and recycling of chemical elements and compounds? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Product / Industrial Process: Environmental concern addressed: Career associated with the invention /discovery.
Inventor: Time Period: Invention: How is this invention associated with the refinement, use and recycling of chemical elements and compounds? Career associated with the invention /discovery.	Scientist/Inventor: Time Period: Invention: Product: / Industrial Process: Environmental concern addressed: Career associated with the invention /discovery.

Suggested Exhibits

Africans (oils, perfumes/incense) Dr. George Washington Carver Madame C. J. Walker Dr. Betty Harris Dawn Harris Morris B. Williams Tanya Allen	Elijah McCoy Safety gate for Bridges Gertude E. Dowing Tanya Allen Alice H. Parker Kelli Clift Morris B. Williams Dr. George Washington Carver Dr. Adolphus Samms

Strand	Grade 9	Grade 10
Earth and Space	~ Demonstrate an understanding of how scientific evidence and technological advances support the development of theories about the formation, evolution, structure, and nature of our solar system and the universe; ~ Evaluate how human endeavours and interest in space have contributed to our understanding of outer space, the Earth, and living things.	**Weather** ~ Explain how people have utilized their understanding of weather patterns for various purposes

STUDENT WORKSHEET

Gr.9 **Find discoveries/inventions that contributes to our understanding of the solar system, the universe or outer space.**	**Gr.10** **Find discoveries /inventions which required an understanding of weather patterns.**
Discovery/invention Scientist/Inventor Time Period: Knowledge of solar system/universe connection:	Discovery/invention: Scientist/Inventor: Time Period: What knowledge of weather patterns was required?
Discovery/invention Scientist/Inventor Time Period: Knowledge of solar system/universe connection:	Discovery/invention: Scientist/Inventor: Time Period: What knowledge of weather patterns was required?
Discovery/invention Scientist/Inventor Time Period: Knowledge of solar system/universe connection:	Discovery/invention: Scientist/Inventor: Time Period: What knowledge of weather patterns was required?
Names of 4 Astronauts of African Origin 1. 2. 3. 4.	Discovery/invention: Scientist/Inventor: Time Period: What knowledge of weather patterns was required?
Describe in detail one invention that contributed to the Space program.	Describe in detail how one scientist utilized knowledge of weather patterns for his/her discovery or invention.

Suggested Exhibits

Egyptians	Benjamin Banneker	J. F. Pickering	James Smith
Astronauts	Peachy Booker	James S. Adams	Hermon L. Gimes
Adolfphs Samms	Maj. Federick D. Gregory	Dr. Thomas O. Mensah	
Hugh D. MacDonald	Robert E. Shurney		
Dr. Warren E Henry	Christine Voncile Mann Darden		

Strand	Grade 9	Grade 10
Physics	**The Characteristics of Electricity** ~ Explain practical application of static and current electricity. ~ Describe how some common household electrical appliances operate.	**Motion** ~ Analyse everyday phenomena and technologies in terms of the motions involved.

STUDENT WORKSHEET

Gr.9 **Find household electrical appliance inventions and describe how they operate.**	**Gr.10** **Select Inventions of your choice. Sketch then describe how they work in terms of the motions involved.**
Household appliance: Inventor: Time Period: *Sketch of appliance*	Invention: Inventor: Time Period: *Sketch*
How it operates	Describe how it works.
Household appliance: Inventor: Time Period: *Sketch of Appliance*	Invention: Inventor: Time Period: *Sketch*
How it operates	Describe how it works.

Household appliance: Inventor: Time Period: *Sketch of Appliance*	Invention: Inventor: Time Period: *Sketch*
How it operates	Describe how it works.
Other interesting household products:	Amazing Inventions

Suggested Exhibits

Lewis Latimer Granville T. Woods Shelby J. Davidson Dr. James Andrew Harris Marie Van Brittan Brown Joseph Lee Alexander Miles Dennis Burrell Henry T. Sampson Marjorie G. Joyner Ruane Jeter John Standard	All sections of the exhibit present information that compliments this strand.

Strand	Grade 9	Grade 10
Technological Education	**Integrated Technologies** ~ Demonstrates understanding of how to develop products or provide services to meet identified needs.	

STUDENT WORKSHEET

Gr. 9&10 **Find products that were invented to meet specific needs?** ⟷	
Product: Inventor: Time Period: *Sketch*	Explain the needs this product meets.
Product: Inventor: Time Period: *Sketch*	Explain the needs this product meets.
Product: Inventor: Time Period: *Sketch*	Explain the needs this product meets.
An Unusual Product: Inventor: Time Period: *Sketch*	Explain the needs this product meets.

Suggested Exhibits

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

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. ~ 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.

STUDENT WORKSHEET

Gr.9 **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.10** **Discover the role African Canadians in the field of Science and Technology.** **What kind of discoveries/inventions did they make?** **How many African Canadian Inventors can you find?** **(<u>You may use the African Canadian Student Work Sheet</u>)**
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	Scientist/Inventor: Time Period: Discovery or Invention: Purpose of Discovery or Invention:
Scientist/Inventor: Time Period: Invention: Challenges/biases faced:	<u>Tally of African Canadian Scientist& Inventors</u> □□□□□□□□□□□□□□□□□□□ □□□□□□□□□□□□□□□□□□□

Suggested Exhibits

The Slave Trade Benjamin Banneker, Benjamin Montgomery, Sarah E. Goode Emancipation Proclamation Henry E. Baker Josiah Henson <u>Section: 2nd Encounter</u>	<u>Section: 3rd Encounter</u> <u>African Canadian Scientist & Inventors Exhibit</u>

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.