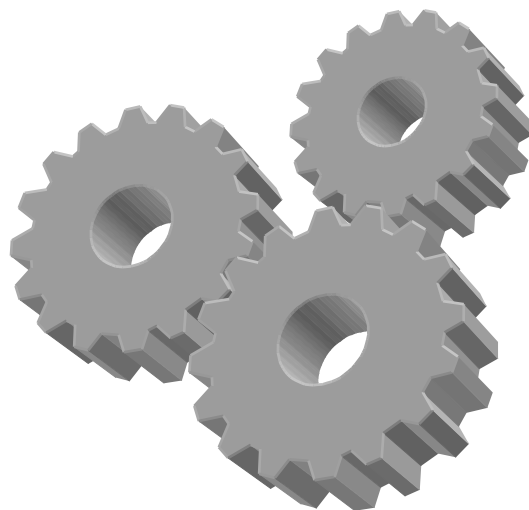


INTERNATIONAL AFRICAN INVENTORS MUSEUM

DISCOVERING THE SCIENTIFIC CONTRIBUTIONS OF AFRICAN CANADIANS Curriculum Connections (All Grades)

CC7T12



By: Veronica Sullivan
2003

INTERNATIONAL AFRICAN INVENTORS MUSEUM

DISCOVERING THE SCIENTIFIC CONTRIBUTIONS OF AFRICAN CANADIANS

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**

Assessment and Evaluation

The student **worksheet** [Open file: [African Canadian Activity Sheet \(Legal size paper\)](#)] compliments the self-guided time spent viewing the exhibit and will help to ensure that students are completing all elements 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.

Introductory Activity Suggestion

Have students begin to research specific technological developments and other important developments of African Canadians.

Follow up Activities

Respond to the Exhibit

Sending students' & teachers' opinions about the Exhibit to the Black Scientist and Inventors Museum

Research projects in a variety of interdisciplinary areas;

- History
- Science (past and present contributors)
- Social Issues (racism, immigration)

Teacher's Package
Grades 7- 8
CURRICULUM CONNECTIONS

Ontario Ministry of Education Expectations Addressed by the Exhibit

Strand	Grade 7	Grade 8
Life Systems	<p>Interactions with Ecosystems</p> <ul style="list-style-type: none"> ~ 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. 	<p>Cells, Tissues, Organs and Systems</p> <ul style="list-style-type: none"> ~ 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	<p>Pure substances and Mixtures</p> <ul style="list-style-type: none"> ~ 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). 	<p>Fluids</p> <ul style="list-style-type: none"> ~ 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	<p>Heat</p> <ul style="list-style-type: none"> ~ 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. 	<p>Optics</p> <ul style="list-style-type: none"> ~ 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	<p>Structural Strength and Stability</p> <ul style="list-style-type: none"> ~ 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. 	<p>Mechanical Efficiency</p> <ul style="list-style-type: none"> ~ 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	<p>The Earth's Crust</p> <ul style="list-style-type: none"> ~ Identify past and present-day applications of technologies that have contributed to the study of geology. 	<p>Water Systems</p> <ul style="list-style-type: none"> ~ Identify ways in which humans have tried to contain damage caused by water explain how changes in the water table ~ Discuss the technologies used to extract and secure oil and natural gas from the ocean floor.

HISTORY CURRICULUM CONNECTIONS

Strand	Grade 7	Grade 8
<p>Canada</p>	<p>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)</p>	<p>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)</p>

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
<p>Canada & World Studies</p>	<p>British North America</p> <ul style="list-style-type: none"> ~ 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) 	<ul style="list-style-type: none"> ~ 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

Teacher's Package

Grades 11-12

CURRICULUM CONNECTIONS

Ontario Ministry of Education Expectations Addressed by the Exhibit

Strand	Grade 11	Grade 12
<p>Biology Academic & Applied</p>	<p>Internal Functions ~ Identify examples of technologies that have enhanced scientific understanding of internal systems. ~ Analyse ways in which societal needs have led to technological advances related to cellular processes. ~ Identify and describe Canadian contributions to technologies and techniques related to genetic processes. ~ Explain how scientific knowledge of cellular processes is used in technological applications ~ Describe and analyse examples of genetic technologies that were developed on the basis of scientific understanding ~ Evaluate the impact of personal lifestyle decisions on the health of humans, and analyse how societal concern for maintaining human health has advanced the development of technologies related to the regulation of internal systems. ~ Explain the relevance of current studies of viruses and bacteria to the field of Biotechnology.</p>	<p>Genetics ~ Describe some of the theoretical issues surrounding scientific research into genetic continuity; the general impact and philosophical implications of the knowledge gained; and some of the issues raised by related technological applications. ~ Investigate careers that involve knowledge of ecology or environmental technologies.</p>
<p>Chemistry</p>	<p>Matter ~ Describe how an understanding of matter and its properties can lead to the production of useful substances and new technologies.</p>	<p>Energy Changes & Rates of Reaction ~ Demonstrate examples of technologies that depend on exothermic or endothermic changes Organic ~ Describe the variety and importance of organic compounds in our lives</p>
<p>Earth and Space</p>	<p>~ Investigate challenges related to survival of humans in space</p>	<p>~ Explain how the study of other planets and objects in the solar system has led to a better understanding of the earth ~ Explain how the study of other planets and objects in the solar system has led to a better understanding of the Earth</p>
<p>Physics</p>	<p>Forces and Motion ~ Evaluate and describe technological advances related to motion; and identify the effects of societal influences on transportation and safety issues. ~ Analyse ways in which an understanding of the dynamics of motion relates to the development and use of technological devices.</p>	<p>Energy ~ Analyse and describe the application of the concepts of energy and momentum to the design and development of a wide range of collision and impact - absorbing devices used in everyday life. ~ Analyse and describe, using the concepts and laws of energy and of momentum, practical applications of energy transformations and momentum conservation. ~ Analyse ways in which an understanding of the dynamics of motion relates to the development and use of technological devices, including terrestrial and space vehicles, and the enhancement of recreational activities and sports equipments.</p>
<p>Technological</p>	<p>Integrated Technologies</p>	

Education	<ul style="list-style-type: none"> ~ Demonstrate understanding of the principles of science underlying applications of technology in everyday life. ~ Evaluate the design and function of an everyday technology using identified criteria. ~ Describe the importance of contributions of Canadian scientists to the development of modern everyday technologies. 	
------------------	----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------	--

HISTORY CURRICULUM CONNECTIONS

The basic goals of the Canadian and world studies program in Grades 11 and 12 are to ensure that students Understand the relationship between technology and society and the factors contributing to society’s continuous evolution.

Strand	Grade 11	Grade 12
Canada and the World Studies	<p>Continuity and Change</p> <ul style="list-style-type: none"> ~ Demonstrate an understanding of the effect on the development of American society and daily life of social and technological changes; ~ Effects of the closing of the frontier in 1898, of industrialization and urbanization after the Civil War, of the transformation from an industrial to a post-industrial economy) ~ Describe the roles played by key individuals in the process of change in American history (e.g., George Washington, Harriet Tubman). ~ Analyse the factors that contributed to the process of change from prehistory to the sixteenth century; ~ Demonstrate an understanding of the contributions of recently arrived and more established peoples and cultures to Canadian society ~ Describe key relationships and connections in the data studied (e.g., chronological ties, cause and effect, similarities and differences); <p><u>Methods of Historical Inquiry</u></p> <ul style="list-style-type: none"> ~ Critically analyse historical evidence, events, and interpretations; communicate ideas and opinions based on effective research clearly and concisely ~ Identify and describe relationships and connections in the data studied (e.g., chronological ties, cause and effect, similarities and differences) 	<p>Technology and Society</p> <ul style="list-style-type: none"> ~ Analyse the relationship between major social and technological changes in Canada; ~ Evaluate the social impact of new technologies (e.g. reproductive technologies) ~ Analyse the ways in which ecological knowledge resulting from advances in technology influences indigenous approaches to resource management and land tenure. ~ Analyse how changes in transportation and communications technology have influenced Canadian society and identity ~ Analyse how the cultures of Canadian workplaces have been affected by technological changes ~ Evaluate the extent to which technological and scientific innovations in the home (e.g., the introduction of electricity and electrical appliances) have affected Canadians’ everyday lives and helped shape national identity. <p><u>Methods of Historical Inquiry</u></p> <ul style="list-style-type: none"> ~ Critically analyse historical evidence, events, and interpretations; communicate ideas and opinions based on effective research clearly and concisely ~ Identify and describe relationships and connections in the data studied (e.g., chronological ties, cause and effect, similarities and differences)