

The Little Years

by John Mighton

an NAC English Theatre/Neptune Theatre coproduction

Study Guide

**THE NATIONAL ARTS CENTRE ENGLISH THEATRE
PROGRAMMES FOR STUDENT AUDIENCES
2006-2007 SEASON**

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This Study Guide was written and researched by **Jim McNabb** for the National Arts Centre, English Theatre, September, 2006. It may be used solely for educational purposes.

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About the Play (page 1 of 2) (see Activity 1)

SETTING The play takes place in an undefined community, probably a large city, in locations such as: a garden of the home where Kate grew up, a church hall, a principal's office, the family home now owned by Kate's brother William, a mausoleum, a seniors' residence, and the garden again. Time passes from the 1950s to the 1970s to the 1990s.

PLOT SYNOPSIS "Kate, an aspiring math and science prodigy, is persuaded by her mother that her ambitions and perspectives are unrealistic for a young woman in 1950. Her brother William, however, is celebrated and nurtured for his genius. Twenty years into the future, the consequences of Kate's suppressed ambition are carefully explored. She appears and acts very differently. Unacknowledged, she is disgruntled and unable to commit to anything or anyone. While unmarried and unable to hold a job for any extended period of time, she nonetheless maintains and documents her theoretical convictions involving space and time. Another twenty years into the future, William is an internationally celebrated, award-winning poet, while Kate has grown increasingly introspective and more unlike the girl she once was. *The Little Years* is a poignant chronicle of a life un-lived and unregarded." -- NAC English Theatre Handbook

CHARACTERS

Alice – William's mother. A widowed housewife raising her beloved son and difficult daughter. Rather unsupportive towards Kate throughout her life.

Kate – William's sister. An extremely gifted child, largely self-taught, with knowledge of mathematics and physics well beyond her grade level. Initially sensitive, inquiring and expressive; later, withdrawn and unfeeling. Kate ages from 13 to somewhere in her sixties and is played by a young actor in scenes one–three, and by a more mature actor in the rest of the play.

Grace – William's wife. Supportive and compassionate but at times superficial.

Tanya – William's daughter. Young, bright, sensitive and looking forward to college and the myriad of possible opportunities for her.

Roger – William's friend. An egotistical and moderately talented painter.

Minor characters – **Mary** (Kate's 13 yr. old former friend), **Norman** (young boy at a dance), **Mr. Castle** (principal at Kate's school), **Mr. York** (manager of a mausoleum).

An interesting point: Although William seems to be the principal character in the play, he never appears on stage. However, his presence is definitely felt.

About the Play (page 2 of 2)

STYLE The style of the play is fragmented realism in that only partial events or objects are seen. The most influential character, William, never appears onstage; important events happen offstage; we're never quite sure of the outcome of certain events. Many things are left unsaid just as many things are not accomplished. Watch for the fragments of details we learn about the characters in each scene. The dialogue is very sparsely written with many pauses.

THEMES Watch for themes like:

- The effects of the recognition of talent, interests and genius vs the neglect or discouragement of them.
- Gender stereotyping of interests and abilities.
- The unexpected influence and inspiration one has on other people's lives.
- Changes in attitudes over the span of time from 1950 to the present.

WHAT TO WATCH FOR IN THE PRODUCTION

Hear how Nigel Scott, the set designer, describes his concept:

Time and Space and the Setting of John Mighton's *The Little Years*

"What is the true nature of time and how does it play against our own measure of personal achievement?"

"Life's events are so little, the scale of time is so grand and the intersection between them so poignant.

"Our goal in setting the play is to bring attention to the relentless yet abstract reality of time passing. We see the manifestation of seasons, annual cycles and the cultural aspects of time expressed in the fashion and manners as the '1950s' the '1970s' and the '1990s'. These aspects can be rendered in the costume design or the musical soundscape. But the larger structure of planetary time we wanted to express through a clockwork mechanism that provides apogees and perigees of objects, people, and understandings. The tree does not transform seasonally or grow larger over the years, but revolves around its axis as a measure of long time passing.

"The various spatial locations of the play explore spiritual stations of life, beginning and ending with The Garden. The return to The Garden became the main element expressing the metaphysical space for the play's action. Other locations such as The Church (dance), The School, The Home, The Mausoleum, The Nursing Home are satellites within our constellation structure. The irrepressible Garden is grafted onto a gridwork forced perspective that traps the characters in 'non Euclidian space' — a simple spatial metaphor that points to the larger mathematical universe of Kate's (and John Mighton's) work.

"Unusually, the play runs contrary to a heroic structure in that the applauded hero, Kate's brother William, is never seen. Major actions run offstage or happen elsewhere. I wanted the doorframe to stand as a threshold to that 'other' world where the real action is taking place. With Kate, we are washed in the shallows of the universe, watching it turn."

Who Helped Put the Production Together? (see Activity 10)

The Creative Team

Director:	Leah CHERNIAK
Playwright:	John MIGHTON
Set Design:	Nigel SCOTT
Costume Design:	D'Arcy MORRIS-POULTNEY
Lighting Design:	Leigh Ann VARDY
Music and Sound Design:	Marc DESORMEAUX
Assistant to the Director:	Tanner HARVEY
Stage Manager:	Jane BUTLER CREASER
Assistant Stage Manager:	Jane VANSTONE OSBORN

Cast Members (in alphabetical order)

Alice:	Mary-Colin CHISHOLM
Kate:	Tanja JACOBS
Mr. Castle / Roger / Mr. York:	Christian MURRAY
Young Kate / Tanya:	Krystin PELLERIN
Mary:	Julie STEWART

The Neptune Theatre (see Activity 2)

The Little Years is a coproduction between the National Arts Centre and **Neptune Theatre** of Halifax. On this occasion Neptune is the originating theatre, which means that the production was rehearsed and built in Halifax and has had a three-week run there before transferring to Ottawa.

The Neptune Theatre is named after the first theatrical production ever mounted in Canada, *Théâtre de Neptune en la Nouvelle France*, staged in 1606 at Port Royal. One of the very first professional regional theatres in Canada, Neptune Theatre Company began in 1963 and was originally housed in the Garrick Theatre, built in 1915 as a vaudeville house and later a movie theatre. From the beginning, productions were chosen from classical works and popular Broadway shows, as well as Canadian plays, often with a strong regional flavour. In 1979, the Theatre began to tour live theatre productions to schools throughout Nova Scotia with the Neptune Young Company Tour and in 1983, The Neptune Theatre School was formed and now offers classes for students of all ages who have an interest in learning more about theatre. By the 1990s it was clear that the old facilities were no longer adequate and a new multi-million dollar building with two theatres, several rehearsal halls and a theatre school was opened in 1997.



Selected Bios (page 1 of 2) (see Activity 4)

Director Leah Cherniak



Leah Cherniak is an acclaimed writer, actor, teacher and director. She is the co-founder and co-artistic director (with Martha Ross) of Theatre Columbus, a Toronto company committed to creating new works, often on a collective basis, as well as taking a fresh look at the classics. Trained in clown and movement at the renowned L'École Internationale Théâtre Jacques LeCoq in Paris, she brings a clownlike openness to her work. Leah directed and co-wrote *The Anger in Ernest & Ernestine* (see below) which was published in 1990 and has been performed in theatres across Canada and internationally. In 1997 she created and performed the role of Jelly in *The Attic, the Pearls and 3 Fine Girls*, a collaboratively written play which was presented at Great Canadian Theatre Company in Ottawa. Leah also teaches theatre with clown as her specialty. She taught for 14 years at The National Theatre School of Canada in Montreal and now teaches at The Ryerson Theatre Program and George Brown College in Toronto. She has directed plays across Canada and won the Pauline McGibbon Award for Directing and the Chalmers Canadian Play Award. Among the non-original plays she has directed are *Peer Gynt, Twelfth Night, The Cherry Orchard* and *The Barber of Seville*.

The Anger in Ernest & Ernestine is a play which begins as a light comedy but soon turns dark. Ernest and Ernestine are a shy couple who meet, fall in love, wed and move into a small apartment only to discover that their daily habits threaten to erode their relationship. Ernest is neat and tidy whereas Ernestine is a flurry of activity. *The Attic, The Pearls and 3 Fine Girls* is about three adult sisters who revisit their childhoods in the attic of their late parents' house.

Playwright John Mighton



John Mighton is an award-winning playwright and an acclaimed teacher of mathematics. He was born in Hamilton, Ontario in 1957. As a youngster in school he read voraciously and was interested in a wide variety of subjects from drama to time travel. He lost confidence in his math abilities, convincing himself that he had no hope of being a genius, and instead studied philosophy in university. He was inspired by the poetry of self-taught Sylvia Plath and began writing poetry and drama. By the end of the 1980s he was an award-winning playwright. His plays include *Scientific Americans*, which received the Dora Mavor Moore Award for best new play, *A Short History of Night*, which won the Chalmers Award, and *Possible Worlds* (performed at the NAC in 1999) which won the Governor General's Award and was turned into a film. Each of his plays somehow explores ideas from the worlds of math and science. He believes that there is a strong connection between the two, each having an equal amount of creativity and spirituality. During his time as a writer he answered an ad to work as a math tutor for young students and refreshed his knowledge of

Selected Bios (page 2 of 2) (see Activity 4)

Playwright John Mighton (continued)

the subject only to find it exhilarating – so much so that he went back to university to earn a PhD in Mathematics at University of Toronto in 2000. In perfecting his teaching of math to challenged students he realized that intelligence and ability, rather than innate and unchangeable, are quite plastic. The key was to give the students confidence in their ability. He has lectured in philosophy at McMaster University and is currently an adjunct professor of mathematics at University of Toronto. John Mighton's plays have been performed across Canada, in Britain, Europe, Japan and United States. His most recent play *Half Life* toured to the NAC as part of the 2005 Magnetic North Theatre Festival.

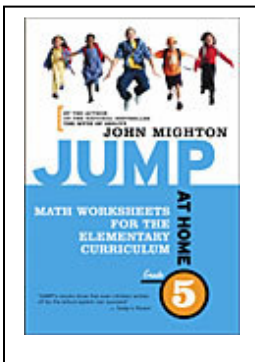
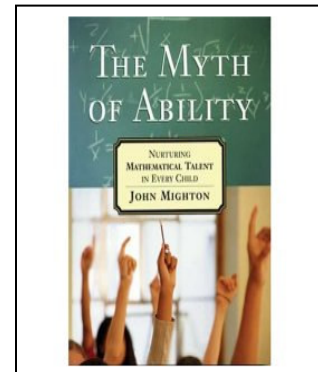
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John Mighton's JUMP Program

While working part time as a math tutor for young students who were having difficulty in that field, John Mighton realized that possibly it wasn't the students' fault that they couldn't grasp the concepts, but that perhaps it was the teaching method he and their teachers were using. Through this work with students Mighton developed a highly successful technique of teaching mathematics that he outlined in a national best-selling book, *The Myth of Ability: Nurturing Mathematical Talent in Every Child*.

In this book, he sets out and describes in detail a program, JUMP ("Junior Undiscovered Math Prodigies"), that he has developed for teaching the basics of mathematics, especially at a remedial level. It has been tested in many places, with many different instructors, and it seems fairly clear that it works and that anybody can do it. The basic principles are straightforward, and can be summarized in the phrase "Students must be allowed to succeed". Learning is broken down into tiny and carefully-structured chunks, which any student, working with any tutor, can learn thoroughly. A tutor, who does not need any great level of training, follows the child's work carefully making sure that each

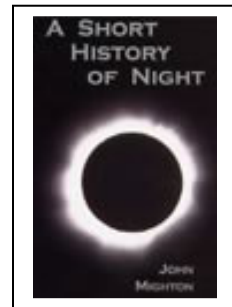


step is easy enough to ensure a successful answer which is then rewarded. Wrong answers are explained as not having had a clear enough explanation on the part of the tutor. One on one interaction is important for remedial students but there is also a high success rate in classroom situations in Toronto schools if the program is introduced from the start. The increase in confidence has a remarkable effect on the student's interest in mathematics, so much so, that many participants move through the curriculum much faster and develop a natural aptitude for the subject. To learn more about the program visit <http://www.jumpmath.org/> and <http://www.ocri.ca/education/jump.asp>

Other Plays by John Mighton

Scientific Americans – (premiered 1988, Theatre Passe Muraille, Toronto) Set during the Reagan Administration in the United States, the play centres on a brilliant young physicist, Jim, and his fiancée, Carol, a computer whiz, who think their life is finally working out when they land jobs for a corporation in New Mexico only to gradually find out that their work may be involved in the development of a powerful new weapon. The drama asks the question, if you are involved in creating a mathematical formula or computer code that is eventually used to build a deadly missile, are you also responsible for the deaths incurred? We are invited to think about the wider moral implications of our acquisition of knowledge.

A Short History of Night - (premiered 1990, Black Horse Theatre, Vancouver) This comedy/drama is another of John Mighton's explorations of the drama of science. The story tells of Johannes Kepler (1571-1630) who discovered three laws of planetary motion, and his deep friendship with Tycho Brahe (1546-1601), the astronomer who disproved the theory that no change could occur in the heavens. It is set in a time of a society strongly controlled by religion but conflicted with the explosion of scientific thought and discovery. It tells of a group of alchemists and astrologers who try to unlock the secrets of the cosmos while religious wars and witch hunts rage around them. This play which takes place in a world of intolerance, violence, lack of reason and short memories could stimulate discussion about the moral aspects of scientific research and the exploration of our imagination.



Possible Worlds - (premiered 1990, Canadian Stage, Toronto) This unusual play, which is part murder mystery, part science-fiction, and part mathematical philosophy, follows the multiple parallel lives of George Barber who is found dead with his brain missing. Two detectives set out to uncover the truth behind his grisly death, and stumble upon the astonishing fact that George's brain is still alive and living in several worlds simultaneously. In each of these worlds George meets and falls in love with a woman, but the romance follows significantly different paths. The play which speculates about questions of identity and the role of imagination in love, was made into a film directed by Robert Lepage which has been compared to *existenZ* and *Sliding Doors* in its exploration of parallel experiences.

Body and Soul - (premiered 1994, Theatre Passe Muraille, Toronto) Jane, while working at a funeral home, passes up her chances of a date with Mark in order to make out with one of the corpses. Henry, although married to Sally, volunteers for an experiment involving virtual sex. This edgy one-act drama presents us with the question: what constitutes a loving relationship? Is it the emotional connection or the physical connection? Do we really need each other, or do we just need another body, real or not?

Half Life - (premiered 2005, Tarragon Theatre, Toronto) *Half Life* portrays the relationship of an elderly man and woman in a nursing home, and the way in which this relationship affects their respective middle-aged son and daughter. It considers how memory loss associated with Alzheimer's disease redefines character and identity. Patrick, a former military code-breaker, and Clara may have known each other briefly almost 60 years ago, but when they meet now they develop a powerful sexual and emotional bond. Clara's son Donald, a stuffy scientist, fears losing control of his mother, while Patrick's artist daughter Anna finds the union amusing. The script has a dream-like quality as incomplete memories seem to float by, tales are interrupted and scenes begin or end in the middle of an exchange. This gives the play an open-ended quality that allows the audience a subjective view of events in the past and the present.



Many of John Mighton's plays are available to order at <http://www.theatrebooks.com/>.

References from the Play You Might Like to Know More About

(page 1 of 2) (see Activity 11)

1. In trying to make idle conversation with her dance partner at a school function Kate mentions the **Michelson-Morley Experiment**. This experiment was performed in 1887 by Albert Michelson and Edward Morley and was one of the most important experiments in modern physics – even though it didn't work out the way the scientists hoped it would. The men were trying to prove the existence of luminiferous aether, the medium by which light waves travel through space. If aether (or ether) was a substance then there would be a measurable "wind" as earth and the sun moved through space. This wind would cause light waves to change speed when traveling with or against the wind. Their experiment showed no such change in speed which meant that no such substance exists. Visit http://en.wikipedia.org/wiki/Michelson-Morley_experiment for a much more detailed account of the experiment and what it meant to the concept of the nature of light and to Einstein's theory of special relativity concerning time and space. http://galileoandeinstein.physics.virginia.edu/more_stuff/flashlets/mmxpt6.htm is a website that contains a movie simulating the Michelson-Morley experiment including the non-existent aether they were trying to detect.
2. Roger, an artist friend of Grace and William, says he is often referred to as the "**Barry Manilow** of the painting world". Barry Manilow is an American singer and songwriter who rose to fame in the 1970s and is best known for his hit recordings "I Write The Songs" "Mandy", and "Copacabana". His music has often been considered by many to be "kitsch" or "camp" and is regularly lampooned by critics and comedians. He still maintains a fan base with American baby-boomer women.
3. Mr. Castle, the principal of the school attended by young Kate, advises Kate's mother to discourage her hopes for a career in mathematics and instead place her in a vocational school to learn a trade. Mr. Castle justifies this because girls, he claims, don't have adequate **Spatial Skills** to rotate objects in their minds, a concept necessary to understand higher mathematics. Spatial skills or spatial intelligence is one of a number of recognized categories of mental abilities which include verbal skills, motor skills, emotional intelligence, creative intelligence, etc. – although much debate and research is still going on concerning these categories. (Investigate <http://www.ul.ie/~mearsa/9519211/newpage2.htm> for a fuller description of special intelligence and multiple intelligence.) Spatial skills allow for the brain to interpret information about visual objects, particularly in three dimensions, such as understanding plans, maps and pictures. Although females tend to have lower abilities in this area initially training can strengthen the skills. (For comments on gender differences in mental skills see Reference B - page 8)
4. In a conversation between Kate and Roger she bombards him with concepts of time when he expresses his wish to create art that will be immortal. (See Reference A – page 8) She mentions **Circular Time**, **Branched Time**, and **Dilated Time** (as in a speeding rocket). All of these are in contrast to **Linear Newtonian Time**. In general, the Judaeo-Christian concept of time, based on the Bible, is that time is linear, with a beginning, the act of creation by God. This also implies an end if linear time is like a string. The Christian view is that God and the supernatural world are outside time and exist in eternity. On the other hand, Buddhism and Hinduism, have a concept of



References from the Play You Might Like to Know More About

(page 2 of 2) (see Activity 11)

4. (continued) a wheel of time, in that time is cyclical consisting of repeating ages that happen to every being of the Universe between birth and extinction. In recent years this cyclical vision of time has been embraced by theorists of quantic space-time and systems theory. (See <http://en.wikipedia.org/wiki/Time>) Branched time involves a dimension beyond our 3-D and space dimensions in which a time continuum can take separate paths or versions, the same object experiencing the same events over and over, such as watching an episode of *The Simpson* on several DVD players. (See <http://jyouyang.blogspot.com/2005/12/free-will-through-both-linear-and.html>).

Reference A

Kate's speech from Act 1, Sc. 5: "Suppose one of your paintings is put on a rocket ship and sent to a distant planet. If two years pass in the rocket ship time, and ten thousand years pass in earth time, how long has your painting existed? Did you know that some infinite sets are larger than others? It's an elementary fact of set theory. If time branches you would have more immortality than in linear Newtonian time. Infinitely more immortality. And if time is circular then every work of art would be immortal. A hundred years from now we'll have new ideas about time that we can't even imagine now. Did you ever think of that?"

Reference B*

"Men have better spatial skills than women. This is particularly true regarding tasks that require mental rotation, a right hemisphere task. This finding is robust and consistent. However, it does not follow that men are stronger in right hemisphere functioning in general. For example, women are distinctly better at recognizing facial expressions, and some studies show that women have superior ability to distinguish melodic sound patterns. Since these too are right hemisphere tasks, it would be incorrect to say that either gender is better at right hemisphere tasks. It would be more correct to say that each gender excels in different *kinds* of right-hemisphere tasks."

(<http://www.megafoundation.org/Genius/GenderCognition.htm>)

"Women have better verbal skills than men. The greatest female advantage appears with respect to measures of general verbal ability, anagrams, and quality of speech production. The advantage increases with the introduction of a memory or learning component that raises task complexity."

(<http://www.megafoundation.org/Genius/GenderCognition.htm>)

"Ever wonder, for example, why the men in your office work quietly at their computer screens for hours while the women talk incessantly? A woman has 11 per cent more neurons in her brain centre for language and hearing than a man. On average she uses 20,000 words a day. He uses about 7,000. ... And what about the fact women seem more emotional? The principal hub for emotion and memory formation – the hippocampus – is larger in a woman than in a man. Meanwhile, the amygdala, which registers fear and triggers aggression, is larger in the male brain. A woman instinctively knows what people are feeling. A man can't spot an emotion unless somebody cries or threatens bodily harm." – Shelley Page in *The Ottawa Citizen*, Sept. 24, 2006 in a review of the recently published book *The Female Brain* by Louann Brizendine, M.D., published by Morgan Road Books.

*The views expressed above are generalizations, and not necessarily the views of the writer of this Study Guide, nor of the National Arts Centre. They are included herein merely to spark discussion.

Education for Women Over the Ages *(see Activity 6)*

Education, either formal or informal, developed from the human struggle for survival and enlightenment. Informal education refers to the general social process by which people acquire the knowledge and skills needed to function in their culture. Formal education refers to the process by which teachers instruct students in courses of study within institutions. Unfortunately for women, until relatively recent times most of these institutions were for men only.

- Instruction in preliterate communities involved gender-specific life skills imparted by the appropriate parent or elder. After a written language was developed education in more advanced practices was the domain of priests or others connected with religious ceremonies and therefore largely for males.

- In ancient Egypt women were freer to pursue interests and talents but it was accepted that males and females had different roles to play. High ranking and royal women, as well as females in households with well educated men would have had private tutors who taught them reading and writing. This allowed them to enter certain professions such as music, weaving and certain supervisor positions.

- In ancient Greece women received their education at home from husbands, fathers or brothers, with the exception of music and dance which were often a main focus of their education. Boys were taught by special teachers in schools and learned grammar, logic, rhetoric, arithmetic, astronomy, geometry and music. Certain girls selected to be hetaerae (similar to Japanese geishas) were also educated in schools studying grammar, rhetoric and other male oriented subjects. Greek women seem to have been the best educated of any culture up until fairly recently in the 19th century. The women of ancient Rome often taught Roman culture to their sons and daughters up to

a certain age, after which the males would be educated in schools by Greek tutors. Girls were usually married and bearing children by 12 or 13, so higher education was not available to them. Reading, writing, music, politics and rhetoric were subjects for women of wealthy families whereas sewing, weaving and cloth-making were taught to girls in poorer families. Upper class youths, preparing for the forum or the battle field, learned oratory and practiced physical training.

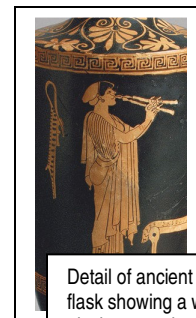
- In Eastern cultures formal education was largely the responsibility of priests and slave tutors who focused mainly on male learners. Wealthy families might have tutors for their daughters to learn art and music.

- During the Middle Ages, which lasted roughly from the fifth to the 15th century, Western society and education were heavily shaped by Christianity, particularly the Roman Catholic Church. The Church operated parish, chapel, and monastery schools at the elementary level for boys whereas girls of well-off families received any formal education from a tutor. Schools in monasteries and cathedrals offered secondary education for young men. Much of the teaching in these schools was directed at learning Latin, the old Roman language used by the church in its ceremonies and teachings. The church provided some limited opportunities for the education of women in religious communities or convents. Convents had libraries and schools to help prepare nuns to follow the religious rules of their communities.

- During the Renaissance (mostly the 15th century) educational opportunities for women improved slightly especially for the upper classes. Some girls from wealthy families attended schools of the royal court or received private lessons at home. The curriculum studied by young women was still based on the belief that only certain subjects, such as art, music, needlework, dancing, and poetry, were suited for females. For working-class girls, especially rural peasants, education was still limited to training in household duties such as cooking and sewing.

- Following the Protestant Reformation in England and Europe and the invention of the printing press there was a determination by the Church to instruct followers to read the Bible in their native language and reformers made literacy available to the masses, both males and females. They established vernacular (i.e. teaching in the local language) primary schools that offered a basic curriculum of reading, writing, arithmetic, and religion for children in their own language. While the vernacular schools educated both boys and girls at the primary level, upper-class boys attended preparatory and secondary schools that continued to emphasize Latin and Greek. These preparatory schools taught young men the classical languages of Latin and Greek required to enter universities – a system that still often denied women to higher education.

- In North America the movement for equal education for boys and girls began near the beginning of the 19th century with publicly supported co-education at the primary and later secondary level. Universities in the Maritime provinces were the first to admit women as students: Mount Allison in New Brunswick in 1862, Acadia University in Nova Scotia in 1880, and Dalhousie University in Nova Scotia in 1881. In 1875 Grace Annie Lockhart was awarded a bachelor's degree in Science and English Literature from Mount Allison University, the first degree awarded to a woman in Canada and in the British Empire.



Detail of ancient Greek flask showing a woman playing an aulos, a double reed wind instrument.

Women in Mathematics (see Activity 5)

Over the centuries women have made remarkable contributions to the field of Mathematics despite the fact that education in this area was often discouraged. Here are a few female mathematicians who are inspirational. For a more complete list see <http://www.agnesscott.edu/lriddle/women/women.htm>.

Theano (sixth century BCE) was the wife of the Greek mathematician Pythagoras. She and her two daughters carried on the Pythagorean School after his death. She wrote treatises on mathematics, physics, medicine, and child psychology. Her most important work was on the principle of the "Golden Mean" or Golden Ratio, a proportion that is seen repeatedly in nature, architecture and art. (For an explanation of the Golden Mean visit <http://goldennumber.net/goldsect.htm> or http://en.wikipedia.org/wiki/Golden_ratio.)



Hypatia (370?-415) Well schooled in astronomy, astrology, mathematics, physical education and rhetoric by her father Theon who was considered to be the most educated man of his time in Alexandria, Egypt, Hypatia became a highly honoured teacher and mathematician. Her most significant contribution came from her work on sections of cones, developing the concepts of hyperbolas, parabolas and ellipses. Some historians credit Hypatia with the invention of the astrolabe, a device used in studying astronomy.

Sophie Germain (1776-1831) Born in Paris shortly before the French Revolution into a middle-class family, she embodied the spirit of revolution and went against her family's wishes and the social prejudices of the time to become a highly respected mathematician. Teaching herself at night from books furtively borrowed from her father's library she achieved the knowledge necessary to enroll in the prestigious École Polytechnique but because of her gender was denied entry. She continued her education by borrowing the notes of other students, submitted papers under a pseudonym and attracted the interest of senior mathematicians. She made important contributions in her studies of number theory and won an prestigious prize from the French Academy of Sciences with her work on the theory of elasticity, a contribution that made her the first woman to be admitted to the Academy.



Florence Nightingale (1820-1910) is most remembered as a pioneer of nursing and a reformer of hospital sanitation methods which is amazing considering that most Victorian women of her age group did not attend universities or pursue professional careers. For most of her 90 years, Nightingale pushed for reform of the British military health-care system using new techniques of mathematical statistical analysis to plot the incidence of preventable deaths in the military during the Crimean War. She developed the "polar-area diagram" to dramatize the statistics of the needless deaths caused by unsanitary conditions and the need for reform. As Nightingale

demonstrated, statistics provided an organized way of learning and analyzing collected data.

Winifred Edgerton Merrill (1862-1951), the first American woman to receive a Ph.D. in mathematics and astronomy (so-called 'masculine' fields) which she earned from Columbia University in 1886 with highest honors. Her thesis dealt with geometric interpretations of multiple integrals and translations and relations of various systems of coordinates. Her work in mathematical astronomy included computation of the orbit of the comet of 1883.



Excerpt from Act 2, Sc. 3 of *The Little Years* – (page 1 of 3)
a scene for two females (see Activity 3)

TANYA When I leave [mother]’ll be alone here.

KATE Have you chosen a university?

TANYA I’d like to be close to home. But there are better programs further away.

KATE What are you taking?

TANYA Math. (*Pause*) I hate having to specialize. Do you think I should take a year off?

KATE What for?

TANYA To travel. There are so many things I want to do. A friend of mine wants me to go to India with him.

KATE I don’t know.

Pause

TANYA Have you heard of imaginary time?

KATE What’s that?

TANYA We measure time using real numbers. But if you use complex numbers you get a new kind of time. The universe is closed, like a sphere. With no singularities.

KATE I’m afraid it’s all beyond me. (*pause*) I’m a little tired. I didn’t sleep well last night. I may leave before the ceremony.

TANYA I understand.

Pause

KATE It’s hard being away from home. I’m not very good at parties. I’m sorry. I’m not sure why your mother invited me.

Excerpt from Act 2, Sc. 3 of *The Little Years* – (page 2 of 3)
a scene for two females (see Activity 3)

TANYA I asked her to. (*pause*) I've learned so much from you, Aunt Kate.

KATE We've never spoken.

TANYA When I was twelve I found a box of your books in the basement. With your diaries. I read them. (*pause*) You made me think about infinity, the beginning and end of time, things I'd never heard about at school. I saw how vast and mysterious the world is and that I would never run out of things to inspire me. Until then I'd been an average student. You made me believe I could do anything I wanted, as long as I believed in myself. (*pause*) I wish I had more time to talk to you ... Why don't you stay a little longer?

KATE I can't. I have to be back at work.

TANYA Do you like your work?

KATE No.

TANYA Then why do you do it?

KATE To stay alive.

TANYA You should quit.

KATE It's not that easy.

Pause

TANYA There's something I wanted to ask you.

KATE What's that?

TANYA What was my father like?

KATE You know what he was like.

TANYA You're the only person that knew him his whole life. When he was young, was he happy?

Excerpt from Act 2, Sc. 3 of *The Little Years* – (page 3 of 3)
a scene for two females (see Activity 3)

KATE Yes.

TANYA Did he have a lot of friends?

Pause

KATE *(slowly, without emotion, as if trying to remember)* We always had kids hanging around the house, from morning until night. And he kept in touch with them over the years. A lot of them were at the funeral. Everyone who met him knew there was something different about him. He was so full of life, so excited about everything. And he could talk to anyone about anything. You see, he really believed that everyone has the potential to be great or interesting. He believed that people are born equal, that we've created a false hierarchy of talent and intelligence, to keep from thinking about death. He hated being famous. He said, "I used to learn things talking to people - now I only hear about myself."

Pause

TANYA This morning I had to get some clothes out of my drawer. I found some pills.

KATE They were prescribed for me. *(pause)* They help me sleep.

TANYA Sometimes I'm so afraid, Aunt Kate.

KATE Of what?

TANYA Everyone expects so much from me.

KATE It doesn't matter what they think. Just do your best.

TANYA I miss him. I wish he was here.

KATE He is here.

[End of scene]

Suggested Movies/Books/Websites

Movies



Proof (2005) written by David Auburn and directed by John Madden, starring Gwyneth Paltrow, Anthony Hopkins and Jake Gyllenhaal. Catherine, the daughter of a brilliant but mentally disturbed mathematician, recently deceased, tries to come to grips with her possible inheritance: his insanity. Complicating matters is one of her father's former students who, while searching through his papers, comes across some notebooks in which the proof of a complicated mathematics problem is written which she eventually claims is hers. He does not believe that Catherine is capable of such advanced reasoning.

Good Will Hunting (1997) written by Matt Damon and Ben Affleck and directed by Gus Van Sant, starring Matt Damon, Robin Williams and Ben Affleck. A janitor (Will Hunting) at MIT, seriously abused as a child and constantly in trouble with the law, has an amazing but hidden gift for math. When his ability is discovered he must choose between an academic career and his old neighbourhood and best friend. With the help of a therapist, Will comes to terms with the possibilities of the future. John Mighton, writer of *The Little Years*, plays a physics professor at the school.

Books



Gender Differences in Mathematics: An Integrated Psychological Approach (2004) edited by Ann Gallagher and James C. Kauman; Cambridge Press. This book explores gender differences in math performance--and why males outperform females on high stakes standardized tests but not in the classroom. These differences are important because scores on such tests are generally used in decisions that have important consequences for students such as college admissions and job placement.

The contributions in this volume present a variety of theories and research that help to explain the differences, and highlight the consequences. Illustratively, if females receive lower scores on the tests, they are likely to be exposed to fewer opportunities thereafter.

The Female Brain (2006) by Louann Brizendine; Morgan Road Books. Risking political incorrectness, the author reveals the scientific facts concerning the anatomical and psychological differences between male and female brains and how women must use their strengths to compete in a male world.

Websites



<http://home.hccnet.nl/robert.kamp/AFrameworkOfIntelligence.htm> A website that defines and discusses the various mental skills and intelligences that make up the general cognitive problem solving skills.

<http://www.ul.ie/~mearsa/9519211/> A website that thoroughly describes spatial intelligence and multiple intelligence.

<http://www.agnesscott.edu/Lriddle/women/women.htm> A list of biographies of women who made remarkable achievements in the field of mathematics from ancient Greece to modern day

Activities (page 1 of 3)

Before Seeing the Play

- 1.** Students should be familiar with the basic plot line and style of *The Little Years* so they will be prepared to enjoy the stage production. Distribute copies of pages 1 and 2 of the Study Guide "About the Play" for perusal.
- 2.** *The Little Years* is a coproduction with The Neptune Theatre of Halifax. One of the mandates of the National Arts Centre is to bring productions from across Canada to its national performance space in Ottawa. However, Ottawa has a number of local theatre companies and theatre venues of its own. Have the class read page 3 about The Neptune Theatre company. Through a class discussion have the students collect the names of venues and theatre companies in the Ottawa area and if possible determine what kind of plays each company chooses to produce.
- 3.** Distribute copies of "An Excerpt from Act 2, Sc. 3 of *The Little Years*" found on pages 11 – 13 of the Study Guide and have the scene read aloud in class. If time permits, form the class into groups of two (or three if one person takes on the job of directing) and have the students rehearse the scene. Thoughts of the characters may be either spoken aloud or left unspoken. Pauses in the dialogue indicate that something is going on in the characters' minds which may or may not be revealed verbally. Have the students plot the inner world of the characters given only the information held in this isolated scene before viewing the entire play. If a thought is not spoken aloud, how might it be conveyed? How will nuances of thought come out in the way a line is spoken? Visit the *ArtsAlive* website of the NAC (<http://www.artsalive.ca/en/eth/actor/>) which discusses the actor's process in bringing a character to life using techniques such as "given circumstances", "motivation", "obstacles" to help create the subtext of the scene. Repeat the exercise following the students' trip to the NAC now that they know much more about the events in Kate's life, as well as the likely events in Tanya's life.
- 4.** John Mighton is both a gifted mathematician and an award-winning playwright. The two talents would seem to be unrelated, or even contradictory. Research John Mighton's theories about his talent (a good place to start is his book *The Myth of Ability*.) Do you agree with him that talent can be taught? Can you think of any other famous people with talent in two areas? Do you think that success in one area makes it harder or easier to be successful in another?
- 5.** One of the issues dealt with in *The Little Years* is the stereotype that girls do not excel in mathematics. Distribute copies of page 10 "Women in Mathematics" for reading. Have the students research three other notable female mathematicians from different eras by visiting the website indicated.

Activities (page 2 of 3)

Before Seeing the Play (continued)

6. Gender stereotyping is often an issue with certain careers, such as firefighting and engineering for women, dance and nursing for men. Have the students brainstorm career choices where a young person might get opposition from a parent or peers. Have the students divide into groups of two or three and improvise scenes where opposition or discrimination is experienced because of this sex stereotyping. One example would be a boy is confronted by one or two peers over his hopes to join a ballet company. A second example would be a girl is discouraged by her mother from entering the military because it isn't lady-like.

7. Several characters in *The Little Years* age 20 or more years over the course of the action of the play, most notably Kate who we see first as a thirteen year old and finally as a woman in her 60s. In the case of Kate, there will be two actors playing her: one as a youth, the other as an adult. Do you think this will be a hindrance to following her story? How do you think an actor can portray the changes that come about as the body and mind age?

8. Any trip to the theatre should also involve the students being made aware of proper theatre etiquette while at the NAC. A handout is available on page 19.

Activities (page 3 of 3)

After Seeing the Play

9. The teacher could conduct a class discussion on the following topics:

- Style of acting chosen for this show; style of writing;
- Themes explored in the play – what was it about?
- Effect of Marc Desormeaux' music on the impact of the play and its ability to define time periods;
- Production aspects:
 - Costumes – how well did they define time period, character, mood?
 - Set – how well did it define location? theme? what mood did it convey? what abstract ideas did it evoke? what effect does its non-specific style have on the viewer?
 - Lighting – did the realistic/non-realistic nature of lighting express anything? what special effects were used?
- The characters – why is William never shown? is William the central character? the significance of double casting certain roles; the changes in characters over the course of 40 years.
- Relevance of this material set in 1950, 1970 and 1990 to today's audiences.

10. While the play is still fresh in their minds, give students the assignment of writing a review of the production of *The Little Years*. Have them read reviews of other plays in *The Citizen* or *Xpress* to give them an idea of the standard approach to theatrical criticism. A suggested outline for writing a review can also be found on page 18 of this Study Guide. Another excellent guide to writing a review can be found on the Theatre Ontario website http://theatreontario.org/content/play_reviews.htm. Students may have received programs at the matinee, or may refer to page 3 of this Study Guide (Who Helped Put the Production Together?) for the correct information about the production in their reviews. The areas the review should cover, in general and more specifically when merited, are: all design elements (lighting, sound, set and costumes), the performance of the actors, the direction, the basic narrative, dialogue and the central theme(s) of the script.

11. Gender differences in mental and physical skills/intelligences is always a hot topic for discussion in class. Distribute copies of page 7 and 8 of the Study Guide "References from the Play ...". Reference B has three quotations concerning gender differences. Have the students discuss these. Do you think these differences actually exist? Either way, do you think that such perceived differences have any impact on educational/career choices? On advancement in the corporate world?

12. "Ideas for Designing a Set" can be found on page 12 of the NAC Study Guide website http://www.nac-cna.ca/en/allaboutthenac/publications/education/earshot_guide.pdf. Many more ideas on designing sets, costumes, lighting, etc. can be found on the *ArtsAlive* website <http://www.artsalive.ca/en/eth/design/>. Examine these pages and the colour pages of designs found in this Study Guide, read set designer Nigel Scott's thoughts concerning this play found on page 2 of this Study Guide, then have the students discuss choices made by the director or designers for *The Little Years*. Discuss use of colours, lines, shapes, or motifs in the set design as well as in styles of costumes.

Instructions on Writing a Play Review *(see Activity 10)*

Depending on the grade level the review may take different approaches. At lower levels the focus could be largely on relating the story and making observations on aspects of the production. At higher levels the focus could be of a more comprehensive nature, dealing with a critical analysis of the effects of the choices made by the director / designer / composer / actor.

Organization of the review could be in the following pattern:

Paragraph one: Identification of the production with information on play title, playwright, company, venue, run of the show. Inclusion of several names of important personnel such as director, designer, and several actors is helpful.

Paragraph two: A brief plot synopsis of the play(s) giving the sequence of events. If the students have been given the material from the NAC Study Guide they should put the synopsis into their own words. They may wish to reveal the surprises, plot twists and events that conclude the play.

Paragraph three: This should include many detailed observations on the set, costumes, lights, music, in other words the technical aspects of the production. It may also include comments on the effect of these technical aspects, or how they worked together to achieve an overall result, such as creating a mood and atmosphere. What was the overall “world” of this production and how effectively was it achieved? The student should also provide the reasoning behind each of his/her comments or evaluations.

Paragraph four: This should include observations on the acting and directing. Comments on the actors’ use of voice, movement, methods of characterization would be appropriate, as well as on choices made by the director to create an overall concept for the play.

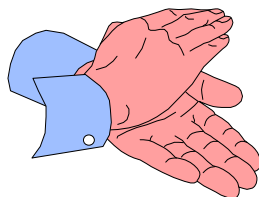
Paragraph five: A summary of the student’s overall impression of the play and how well it achieved what it set out to. Did it achieve what the playwright probably intended?



Theatre Etiquette

Please take a moment to prepare the students for their visit to the National Arts Centre by explaining good **Theatre Etiquette** which will enhance the enjoyment of the play by all audience members:

- 1.** *The Little Years* will be performed in the Theatre of the NAC. Matinées at the NAC are for students and the general public. It is important for everyone to be quiet (no talking or rustling of materials) during the performance so others do not lose their immersion in the “world of the play”. Unlike movies, the actors in live theatre can hear disturbances in the audience and will give their best performances when they feel the positive involvement of the audience members. The appropriate way of showing approval for the actors’ performances is through laughter and applause. For the enjoyment of all, people who disturb others during the show may be asked to leave the Theatre.
- 2.** It is important that there be no electronic devices used in the Theatre so that the atmosphere of the play is not interrupted and others are not disturbed. Cell phones, pagers and anything that beeps must be turned off. Cameras and all other recording devices are not permitted in the Theatre.
- 3.** You will be seeing *The Little Years* in the Theatre of the NAC. Tickets with assigned seats will be distributed by your teacher and to avoid confusion it is important to sit in the designated seat. All even numbered seats are on the left side of the theatre and all odd numbered seats are on the right. This means that seats 10 and 12, for example, are actually side by side.
- 4.** Programs may or may not be distributed at this student matinée. Information on the artists who put this play together, however, can be found in this Study Guide for those who wish to use it in writing a review. Some programs can be made available to teachers if desired as a teaching aid to show how a program is put together.
- 5.** The play is performed in nine scenes with one 15-minute intermission. Anyone leaving while the play is in progress may unfortunately not be allowed back into the Theatre.





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as young audiences, through professional training
and in classrooms across the country.

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