1. **Chapter Title** Sex and the Biological Basis of Gender

2. **Intended Learning Outcomes**

At the end of this chapter, the students are expected to have:

2.1 Explained the biological definition of sex;
2.2 Identified the various types of intersex; and
2.3 Differentiated sex and gender.

3. **Pre-assessment Activity**
   3.1 Structured Learning Activity
   3.2 Pre-test
   3.3 Readings

4. **Content**
   4.1 Biological Definition of Sex
   - **Sex** is a biological term, often referred to as the act of mating between two organisms, part of the process of biological reproduction; a more technical term is coitus (Eviota, 1994).
   - **Sex** also refers to the two categories of animals – male and female – needed for the act of mating to result in biological reproduction (Eviota, 1994).

Basis	Male	Female
Chromosomes	XY	XX
Gonads	Testes	Ovaries
Hormones	Testosterone	Estrogen
Internal Sexual Properties	Wolffian ducts: vas deferens, seminal vesicles, prostate	Mullerian ducts: fallopian tubes, uterus, inner two-thirds of the vagina
External Sex Structures	Penis & Scrotal Sac	Clitoris & Vagina

Source: Poston & Bouvier, 2010

4.1.1 Chromosomes
- Structures containing genetic material.
- Males have an X chromosome and a Y chromosome, and females have two X chromosomes.
- The ovum of the female and the sperm of the male each contain twenty-three chromosomes.

- When the sperm and the ovum come together in one of the woman's Fallopian tubes, they produce a fertilized egg, known as an embryo.
- It consists of forty-six chromosomes aligned in twenty-three pairs.
- One of these constitutes the sex of the embryo.
- An X chromosome is contributed by the mother and either an X or a Y chromosome is contributed by the father.

4.1.2 Gonads

- If the embryo is chromosomally male, one theory is that a gene on the Y chromosome produces male gonads (**testes**) at about the sixth week after conception.
- If the embryo is chromosomally female, female gonads (**ovaries**) appear a few weeks later.
- produce the sex-specific hormones

4.1.3 Hormones

- Ovaries produce **estrogen** a hormone which develops female sexual characteristics and regulates menstruation.
- Testes release **androgens** which promote the development of male genitals and secondary sexual characteristics
- Another hormone released by the testes, **testosterone,** also promotes *sexual motivation*
- Both males and females produce the sex hormones typically associated with the other *(testosterone and estrogen)* but in much smaller quantities

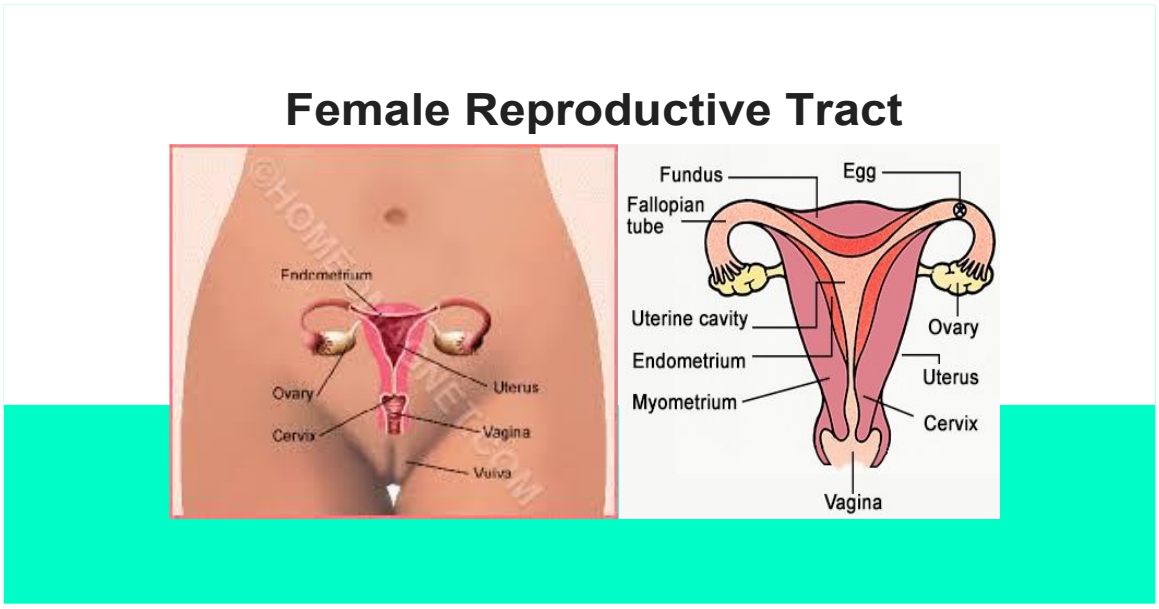
4.1.4 Internal Sexual Properties

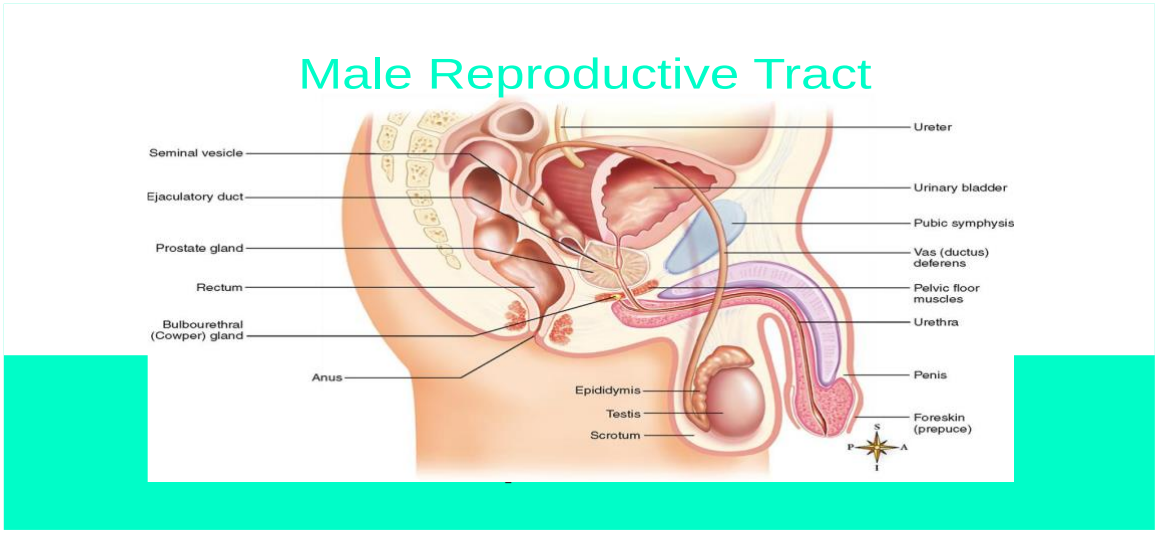
- Every embryo contains "two sets of ducts, one of which will become the internal reproductive structures appropriate to the embryo's sex"
- In males, these tissues are referred to as Wolffian ducts, and they result in the vas deferens, the seminal vesicles, and the prostate.
- In females, they are known as Mullerian ducts, and they become the "Fallopian tubes, the uterus, and the inner two-thirds of the vagina.

4.1.5 External Sex-Specific Genitals

- a penis and scrotal sac for males

- a clitoris and vagina for females





4.2 Primary vs. Secondary Sex Characteristics

Primary	Secondary
sexual organs that are present at birth: vagina, clitoris, penis, testes	changes that emerge during puberty: pubic hair, enlarged breasts and widened hips of females, and facial hair and Adam's apple on males

4.3 Sexual Dimorphism (Wharton, 2005)

- **Sexual Dimorphism** refers to the claim that sex marks a distinction between two physically and genetically discrete categories of people
- Also termed (by Sociologists) as **sex assignment or sex category** - describe the processes through which social meanings are attached to biological sex.
- Debates between:
    - sexual dimorphism in humans as a biological fact; they believe that sexual differentiation creates two "structurally distinguishable" categories of humans (Breedlove 1994: 390 cited in Wharton, 2005)
    - more skeptical, arguing that social rather than biological forces produce two sexes in humans
- **Sex assignment** refers to the process – occurring at birth or even prenatally – by which people are identified as male or female (their sex category). Sex assignment is guided, at least in part, by socially agreed upon criteria for identifying sex, such as external genitalia.
- In most cases, sex assignment is a straightforward matter. Yet this is not always the case. Researchers estimate that in as many as 2 percent of all live births, infants cannot be easily categorized as male and female (Blackless et al. 2000 cited in Wharton, 2005). In these cases, the sex chromosomes, external genitalia, and/or the internal reproductive system do not fit the standard for males or females. These individuals are called **intersexuals**.

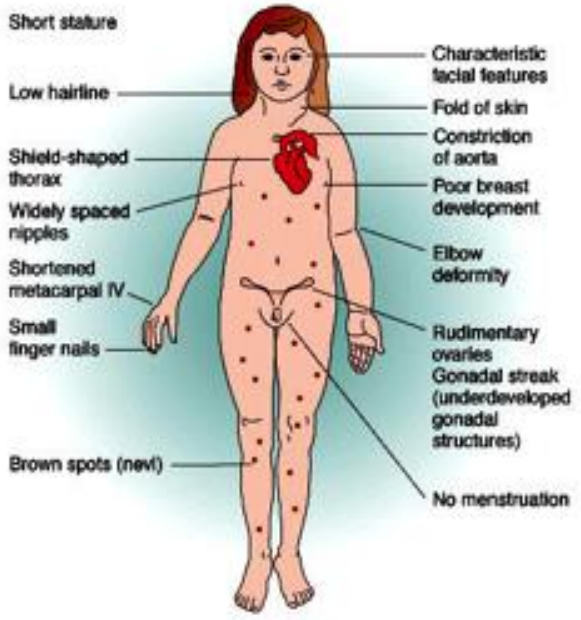
4.4 Types of Intersex/intersexuals (Poston & Bouvier, 2010)

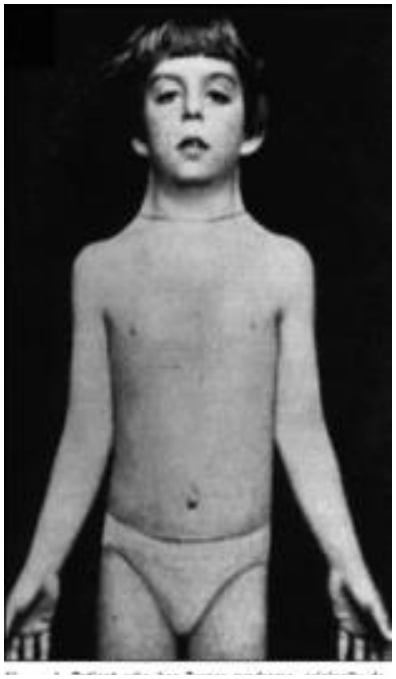
- Most embryos are consistent on the five biological definitions of sex but this is not always the case.
- In around 23/10,000 births, these five definitions of sex are not consistent, resulting in what is referred to as an **intersexed birth**.
- Can be caused by ***chromosomal level inconsistencies*** - abnormal complement of sex chromosome
- Or because of ***hormonal level inconsistencies***

4.4.1 **Turner's Syndrome (X)**

- If the sperm fails to divide properly, that is, if what is called *nondisjunction* occurs, one kind of sperm produced will have neither an X nor a Y chromosome. If this sperm fertilizes a normal egg, the offspring will have **only an X chromosome**.

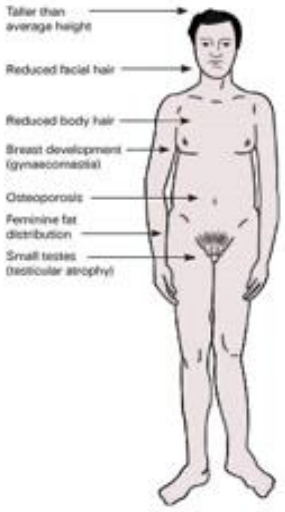
- The person appears to be a **female** because although it **lacks ovaries**, it **possesses some external female characteristics**.
- This condition is estimated to occur in about 4/10,000 live births (Fausto-Sterling, 2000: 53 cited in Poston & Bonvier, 2010).





4.4.2 **Klinefelter's Syndrome (XXY syndrome)**

- Another case of nondisjunction is a sperm produced with both an X and a Y chromosome, or two Y chromosomes, resulting in the XXY and XYY chromosome abnormalities.
- Occurs in roughly 9/10,000 live births
- A person born with this chromosomal characteristic has the height of a normal **male**, with long legs, an absent or weak sex drive, "feminized" hips, some breast development, and a small penis and testes (Money and Ehrhardt, 1972).
- Presence of extra **X** stops development of male structures, resulting in sterility
- No interest in sex, no testosterone



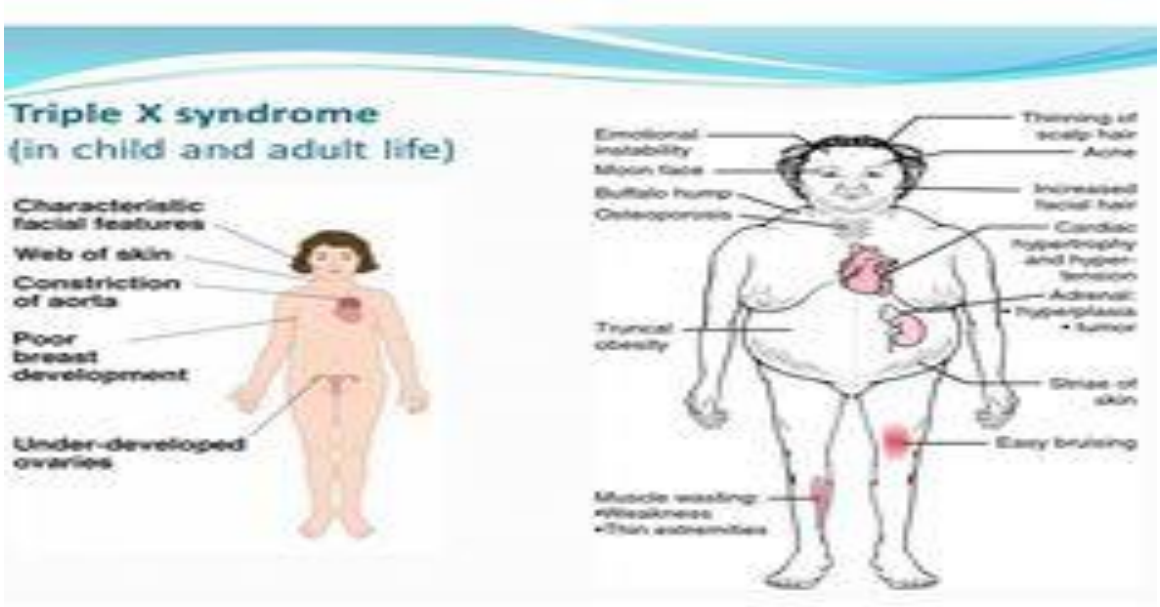
4.4.3 **Jacob's syndrome (XYY syndrome)**

- Occurs in about 1/2,000 births
- A person born with this chromosomal characteristic is an anatomical male with no physical abnormalities, except for unusual height.
- The extra Y chromosome does not result in the person's having more androgens than an XY male. Such persons appear to be able to reproduce successfully and rarely come to the attention of investigators, except through large-scale screening of newborns.

- hypotonia
- involuntary muscle movements
- taller-than-average height
- larger head dimensions
- low testosterone levels
- infertility

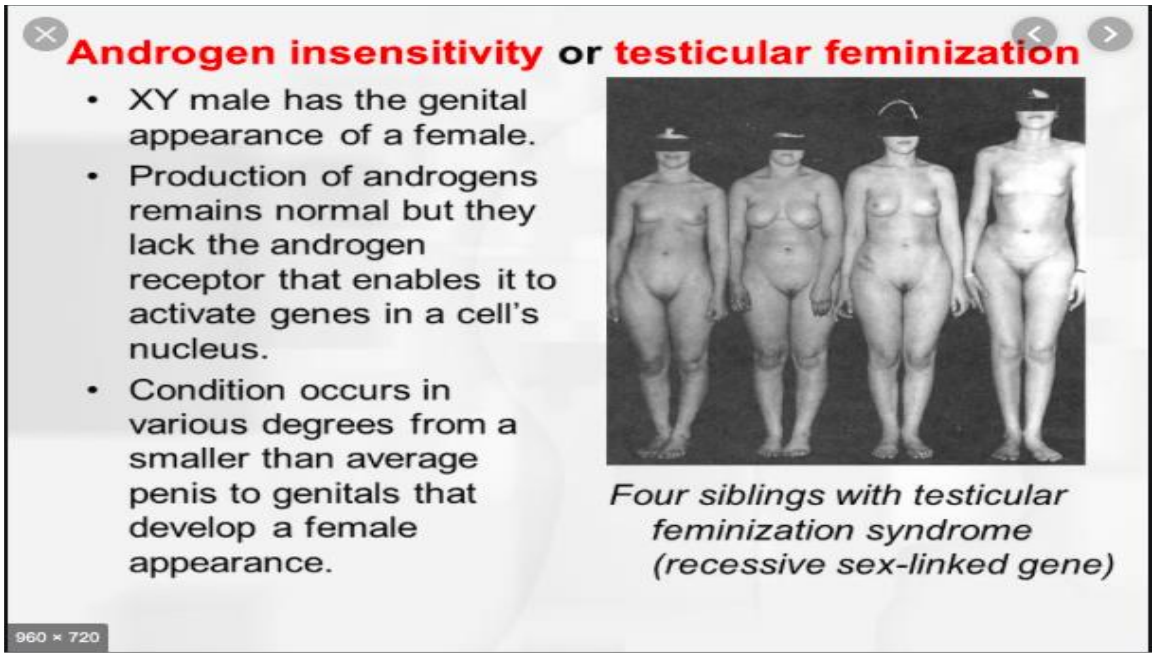
4.4.4 **Triple X Syndrome, XXX or (Trisomy X)**

- This too occurs roughly in 1/2,000 live births.
- People born with this chromosomal characteristic are **anatomically females** and show few visible signs of abnormality, although they tend to be taller than XX females and have a slightly higher incidence of learning disorders



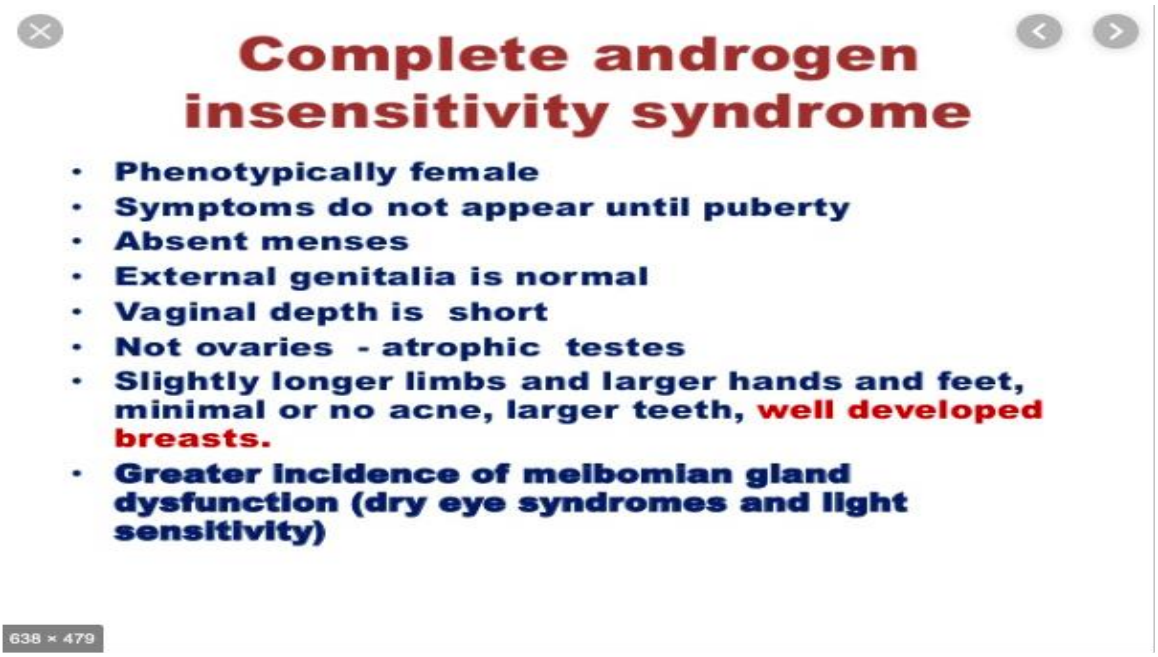
4.4.5 **Adrenogenital syndrome (AGS) or Congenital adrenal hyperplasia (CAH)**

- An XX fetus receives an excessive amount of androgens
- Untreated females with AGS have normally functioning ovaries and normal internal female sexual organs but a masculinized external appearance.
- This can vary from a slightly enlarged clitoris to a nearly normal-size penis with an empty scrotum.
- If treated with cortisol from birth on, these females will have a later menarche than normal but will be able to conceive, lactate, and deliver babies normally.



4.3.5.1 **Androgen Insensitivity Syndrome (AIS)**

- Fetuses that are chromosomally male with genitals that are ambiguous or that look more like a **clitoris** than a penis.
- It cannot be treated by administering androgen after birth because the cells remain incapable of responding to androgen. At puberty, AIS persons develop breasts and a feminine body shape, and identify as females.
- Results in female genitals, including a shallow, but nonfunctional vagina
- Raised as girls, they assume a female **gender identity** and thrive as females



4.3.5.2 Fetally Androgenized Females

- Chromosomally normal females exposed to excessive **androgens**
- At birth genitals *appear* to be male
- "*Corrected"* by minor surgery, most still reject a *female gender identity* with some assuming a *male* gender identity and behavior

4.3.5.3 DHT-Lacking Males

- Males who cannot produce crucial **DHT**
- Dihydrotestosterone, a hormone with powerful androgenic actions, causes the body to mature during puberty and is responsible for many of the physical characteristics associated with adult males.
- Result – female *appearing* external genitals, at least initially
- Typically raised as girls, they suddenly sprout into males at puberty
- In one study, 16 of 18 cast off their *female* gender identity and happily assumed male sex roles

LESSONS FROM THE INTERSEXED

> *"In recent years, some intersexuals have begun to speak out **against this practice of surgically altering children born with ambiguous genitalia**. In 1992, Cheryl Chase, an intersex woman, founded an organization called the Intersex Society of North America (ISNA). This group's primary goal is to **reduce, if not***

eliminate, genital surgery on intersex infants*. Instead, members of INSA believe* ***that surgery should be a choice made when the intersexed person is old enough to give informed consent****. In 1996, members of INSA demonstrated at the American Academy of Pediatrics annual meeting in Boston, advocating* ***"an avoidance of unnecessary genital surgery, family counseling with regard to the child's future medical needs and options, complete disclosure of medical files, referral of the adolescent to peer support, and the fully informed consent of the intersexual youth to any and all medical procedures****" (Turner 1999: 457). INSA also* ***advocates for people's right to remain intersexed and to gain social acceptance for this status****. Members of ISNA thus reject the belief that* ***everyone must fall into one of two sex categories, and they envision a society where genital variation is accepted*** " (Wharton, 2005).

4.5 Is there a **gay gene**?

- Geneticist **Dean Hamer**, scientist emeritus at the National Institutes of Health, published a study in 1993 that proposed that **Xq28**, a region of the X chromosome, might play a role in determining whether a man was gay.
- Several other scientists were investigating the cause of homosexuality.
- In 1991 Simon Levay, at the University of California, San Diego in La Jolla, California, found differences in size for a region of the brain between homosexual and heterosexual men.
- Levay argued that differences in brain sizes between homosexual and heterosexual men could indicate that homosexuality results from genetic factors rather than environmental ones.
- Later in 1991 John Michael Bailey, at Northwestern University in Evanston, Illinois, published results about the genetic heritability of homosexuality. Bailey found that both monozygotic and dizygotic twins were more likely to be homosexual than were other related siblings. Since twins share the same DNA, Bailey claimed that the cause of homosexuality was genetical and not environmental.
- In 1995, *Scientific American* published an article about scientific doubts about the genetic influences of homosexuality.
- A later study duplicated Hamer's study and found no X-linked gene that contributed to male sexual orientation. The researchers of that study agreed with the possibility that homosexuality is genetically inherited, but they found no evidence to justify the claims that Hamer

and his team had made that homosexuality was maternally inherited and that the gene Xq28 contributed to homosexuality.

4.6 Sex or Gender?

Is sex the biological and genetic substrate from which gender distinctions emerge, or do gender distinctions lead us to perceive two, easily distinguishable sexes? Is sexual dimorphism itself a social construction?

4.6.1 Biosocial Perspective

- Treats sex as objectively, identifiable "real" distinctions between males and females that are rooted in human physiology, anatomy, and genetics
- Sex limits the construction of gender; sex is the basis for gender distinction

4.6.2 Social Construction Perspective

- Gender is not grounded in any biological or genetic reality (Lorber 1994 cited in Wharton, 2005).
- The body "is a more or less neutral surface or landscape on which a social symbolism is imprinted…accordingly, sexual dimorphism, from this perspective, is less an objective reality than a socially constructed distinction";
- "Scientists construct dimorphism where there is continuity… Biological, psychological, and social differences do not lead to our seeing two genders. Our seeing of two genders leads to the 'discovery' of biological, psychological, and social differences" (Kessler and McKenna, 1978:163 cited in Wharton, 2005).
- "In other words, first we have social understandings of what men and women are, or should be, and then we perceive sex differences".
- "While assignment to a sex category occurs first at birth (or perhaps even prenatally), people continue to categorize one another as males or females throughout life; This continual process of categorization (or, in their words, "attribution") is the means through which gender distinctions emerge and are reproduced."
- "Since clothing usually hides people's genitals from the view of others, people rely on other "markers" to assign a sex category; these markers may include physical characteristics, such as hair, body type, or voice, or they may include aspects of dress, mannerisms, or behavior."

- “What count as markers of sex category depend heavily on cultural circumstances and thus vary widely across time, place, and social group.”
- “Matters of appropriate hair length for women and men – as well as views about appropriate clothing or decoration – are clearly governed by social norms, rather than biological or genetic factors.”
- “That these and other related characteristics are used to assign a person to a sex category thus underscores the idea that assignment to sex categories relies heavily on social criteria.”

5. **Post-assessment Activity**
   5.1 Post-test
   5.2 Structured Learning Activity