**BASIC SCIENCE JSS 2**

**UNIQUENESS OF HUMAN BEINGS**

Human beings have a well organized body and intelligent brain for reasoning. The quality of both the brain possessed by man enables him to think, plan and solve problems more effectively than order animals. He thinks faster and therefore provides solution to his problem. Because of mans intelligence, he thinks in a sequential order to help him solve his problem and such order are;

1. Identification of his problems.
2. Observation which employs most inquisitiveness.
3. Experimentation by which measuring can arrive at solving his problem.
4. Recording: it involves putting down what was measured during experiment.
5. Conclusion: from what he got and recorded he then concluded that it is how to solve such or his problem.

**HUMAN BEINGS AS HIGHER ANIMALS**

Human beings belong to the group of animals called mammals. Mammals are divided into many groups, one of which is the primates. Human beings belong to the group of primates. As mammals, human beings have the following characteristics:

1. They have hairs on their body
2. They don’t lay eggs but give birth to their young ones.
3. They have mammary glands and breast to feed their young ones.
4. They breathe with lungs.
5. They are warm blooded animals

Examples of mammals are; man, goat, monkey, dog, elephants, rat, etc.

**CHARACTERISTICS OF PRIMATES**

1. They have nails on their feet and hands not claws.
2. They have eyes in front of their head and not by the side.
3. Their hands are designed to hold things.
4. They can stand upright.
5. They can pick things up with their thumbs and their forefingers.

**DIFFERENCE BETWEEN MAN AND OTHER PRIMATES**

1. Man has an ‘S’ curve in his back bone that enables him to balance in an upright position.
2. His brain is developed for reasoning and for speech.
3. His ability to think helps him to plan and solve problems.
4. He has the largest skull and largest at all primates.

**UNIQUENESS OF MAN AMONG OTHER PRIMATES**

1. Man is distinguished from lower animals not only by his greater intelligent but also by his power of reasoning.
2. Man is the most intelligent animal shown by their organizational and problem solving.
3. Human beings can talk and develop its ideas into tools. Examples; televisions, video, telephones, etc.

**BASIC INTELLIGENT SKILLS**

Some basic intelligent skills are; identification, observation, experimentation or measurement, recoding and conclusion.

1. **Identification/ Curiosity**: Man is able to identify a problem and have a desire to learn something new in his environment.
2. **Observation:** This is the act of studying or examining things closely using our five sense organs (eyes, nose, tongue, skin, ear )
3. **Experimentation/ Measurement:** Without accurate experimentation and measurement, scientist will not be able to make accurate description, explanation and prediction.
4. **Recording:** It involves putting or writing down what was measured during experiment.
5. **Conclusion/ Inference**: This is coming to a decision or conclusion about the problem under study.

**GROWTH AND DEVELOPMENTAL CHANGES IN LIVING THINGS**

Growth is an irreversible increase in weight, size, and height. It is brought about by food intake and cell division. Growth may occur in part of organism to become taller or heavier, thus increase in weight and height is growth changes. Increase in height is referred to as vertical growth while increase in size is referred to as horizontal, lateral or side growth.

Development is the changes that occur during growth. Development can also be defined as series of orderly changes by which a living thing comes to maturity or an organism becomes fully matured (i.e. the organism becomes ready to reproduce).These changes are different from increase in size (growth), thus development is referred to as maturity.

**STAGES IN THE DEVELOPMENT OF HUMAN**

1. **Infancy/ Childhood**: This is the period from birth to adolescence stage, just before the onset or beginning of puberty. Developmental changes that occur during this stage are development of body organs such as heart, liver, kidney, bones and gastrointestinal tract. There is also ability to sit, move and communicate with others.
2. **Puberty:** This is the transition stage from childhood to adolescence. It is the stage at which the reproductive organs become functional or functioning. It can be seen as a short span of time which marks the beginning of sexual maturation. It differs between boys and girls. Boys generally reach puberty at about the age of fourteen, while girls reach it at about twelve years of age (it differs sometimes). The developmental changes that occur at this stage are continual development of body organ, development of secondary sexual characteristics (signs of puberty).
3. **Adolescence**: It is the stage from puberty to adulthood. During this stage, the secondary sexual characteristics continues to develop and becomes more elaborate, opposite sex organs becomes pronounced and body activities reaches to its peak.
4. **Adulthood**: It is the period after adolescence when an organism becomes fully matured. Sometimes within this stage, growth cease, development of body organs and structure gets to the peak and eventually begins to weaken. At this stage the individual is biologically and socially ripe for reproduction.

**SIGNS OF PUBERTY IN BOYS**

1. There is rapid increase in size.
2. Hair grows under the armpit and around the pubic region.
3. Moustache and beard appear.
4. Voice break and becomes deeper because the vocal cord becomes longer and thicker.
5. Shoulder becomes broader and the body becomes more muscular.
6. Testicles start to produce sperm and genitals grow bigger.
7. Semen sometimes escapes from the penis during sleep. This is called wet dream.

**SIGNS OF PUBERTY IN GIRLS**

1. There is rapid increase in height.
2. Enlargement of breast.
3. Pimple sometimes starts to appear.
4. Hairs grow under the armpit and around the pubic region
5. Hip becomes broaden and the body becomes more rounded.
6. Menstruation starts
7. The ovaries starts to produce eggs and the uterus grow bigger.

**GENERAL CHARACTERISTICS THAT ARE BOTH COMMON IN BOTH ADOLESCENCE BOYS AND GIRLS**

1. Try to gain independence from their parents.
2. Feel hungry easily because they are growing fast and need extra food.
3. Developing advanced reasoning skills; the ability to think about multiple option and possibilities.
4. They become self-conscious i.e. bother about their appearance.
5. They could show concern about their future.
6. Have emotional changes like being anxious, moody or irritated.
7. Secrecy: become isolated and seeks privacy.
8. Increased desire to spend more time with friends.
9. They could start being attracted to the opposite sex.

Adolescence is a delicate period that you can build or destroy yourself.

**MESTRUATION**

Menstruation is the monthly flow of blood from the uterus or womb through the vagina which occurs in every woman of childbearing age. Menstruation is also called menses or period. It is the self cleaning actions of a healthy uterus. The first menses is called **Menarche**.

Once every month, the lining of the womb build up and prepare itself to receive a fertilized egg. If no fertilized egg reaches the womb within 2-3 days, the lining of the womb breaks down and the bits of tissues are passed out through the vagina with some blood. The hormone that causes menstruation is called **Estrogen.** Each period can last from 4 to 6 days. The first period starts between the ages of 11 and 15 years and is known as **Menarche**, and periods usually stops between the ages of 40 and 50 years and is known as **Menopause**.

The length of the menstrual cycle is the interval from one menstruation to the next. It is usually about 28days but can vary from 21 and 35 days or even more.

**MENSTRUAL HYGIENE**

1. Use good absorbent sanitary pads or towels and pants. To prevent your clothes from being stained by blood.
2. Change the sanitary pad as often as three times a day to prevent bad smell.
3. Have frequent bath during menstruation at least twice a day.

**TEMPORARY AND PERMANENT CHANGES ASSOCIATED WITH GROWTH AND DEVELOPMENT**

Temporary changes are those changes that are reversible that is, can change back to its previous state. While permanent changes are those changes that last for a very long time.

**Temporary growth changes include;**

1. Eating excess food: it makes the stomach to swell up after heavy lunch.
2. Muscle building exercise: it causes enlargement of arm and thigh muscle when involved in weight training exercise.
3. Enlargement of muscles due to intake of steroidal drugs.

All of them can reverse back when an individual stops or limits the activities.

**Permanent growth changes include**;

1. Increase in height.
2. Increase in size associated with height.
3. Increase in weight associated with increase in height.

**Temporary developmental changes include**;

1. Development of skills including manual skills like playing piano, typewriting, technical skills like dribbling an opponent in a football match, communication skills like speaking foreign languages.
2. Development of sexual traits and urges.

**Permanent developmental changes include;**

1. Development of body organs and sex organs.

**CHEMICALS**

Chemicals are substances solid, liquid or gaseous states which can be useful or hazardous on their original state or when combined with other chemicals to form new substances.

**CLASSES OF CHEMICALS**

Chemicals are classified into two categories they are;

1. Classification based on use
2. Classification based on hazardous nature.

**Based on use they are:**

1. Pharmaceuticals. Example: blood tonic, antibiotics etc.
2. Cosmetics. Example: lip stick, powder, perfume, mascara, etc.
3. Agro chemicals. Example: fertilizer, pesticides, insecticides, fungicides, etc.

**Based on hazardous nature:**

1. Some are highly hazardous and toxic chemicals. Example: ammonia, bromine, chlorine, etc.
2. Some are moderately hazardous.
3. Some are non-hazardous and non-toxic chemical. Example: sodium chloride (salt), alcohol, citric acid, hydrogen peroxide etc.

**SAFETY MEASURES WHEN USING CHEMICALS**

1. Put on your lab. Coat
2. Adhere to manufacturer’s instructions.
3. Wear protective gloves.
4. Any spills of chemical must be carefully cleaned.
5. Never smell any chemical.
6. Avoid direct contact with any chemical.
7. All chemical containers should be well labeled.
8. Avoid unnecessary contact of chemical with each other.