***The male gamete – sperm cell. Produced in the testes.***

**1. Adolescence**

**2. Reproductive Systems**

**7.10 – Reproduction**

**3. Fertilisation & Implantation**

**What do I need to be able to do?**

•Describe the reproduction in plants, including flower structure, wind and insect pollination, fertilisation, seed and fruit formation and dispersal, including quantitative investigation of some dispersal mechanisms.

•Understand the importance of plant reproduction through insect pollination in human food security

•Describe reproduction in humans (as an example of a mammal), including the structure and function of the male and female reproductive systems, menstrual cycle, gametes, fertilisation, gestation and birth, to include the effect of maternal lifestyle on the foetus through the placenta

**Male**

**Penis –** fills with blood and stiffens (**erection**) and allows the male to release sperm inside the vagina **Sperm duct** – carries sperm from the tests to the penis.



**Nucleus** – contains ½ father’s **DNA**

**Tail** – helps it move to the egg

**Cytoplasm** contains lots of **mitochondria** to allow for maximum **respiration** to release energy for the sperm to move.

Happens between the ages of 9 and 14 in most people

**Puberty –** the physical changes that occur

**Adolescence -** the physical and emotional changes

**The purpose of the changes are to prepare our bodies to reproduce.**

The changes are caused by **hormones**



**Nucleus** – contains ½ mother’s **DNA**

***The egg cell is around 20 x larger than the sperm cell***

***The female gamete – egg cell. Produced in the ovaries.***

**Gland** – produces a nutrient fluid that keeps the sperm alive. The mixture of this fluid and sperm is called **semen**

**Testes** – produce the male **gamete**; sperm cells and the male sex **hormone**; testosterone

**Scrotum** – a bag of skin that holds the testes slightly outside of the body, at a lower temperature that is better for the sperm.

**Female**

**Oviduct** – tube connects the ovary to the uterus. **Fertilisation** occurs here.

|  |  |
| --- | --- |
| Girls | Boys |
| Breasts develop  | Testes & penis get bigger |
| Hips widen  | Shoulders widen  |
| Hair grows on legs and underarms  | Hair grows on face, chest, legs and underarms |
| Pubic hair grows |
| Ovaries produce the hormone oestrogen  | Testes produce the hormone testosterone  |
| Becomes attracted to someone else  |
| Become more concerned about appearance  |
| Might become more aggressive/emotional  |
| Ovaries start to release egg cells | Testes start to produce sperm cells  |
| Get taller |
| Periods start | Voice breaks  |

***Fertilisation***

During fertilisation, the nucleus of the sperm and the egg cell fuse together. The fertilised egg cell contains DNA from both parents.

Fertilisation occurs in the oviduct.

The cilia lining the walls of the oviduct ‘waft’ the fertilised egg cell towards the uterus

The cell implants itself into the lining of the uterus where it divides to form a ball of cells called an embryo



**5. Pollination**

**6. Menstrual Cycle**

**7. Development of a Foetus**

**Ovary –** contains egg cells. Produces the female sex **hormone** oestrogen

**Uterus** – where the **foetus** develops

**Cervix** – a ring of **muscle** that holds the foetus in place during **pregnancy**

**4. Seed Dispersal**

Seeds are spread far away from each other and the parent plant. This is called **seed dispersal.**

This is so they have space to grow and they are not in **competition** for **resources.**



The menstrual cycle prepares the uterus to receive a fertilised egg cell.

**Each cycle lasts 28 days.**

The cells in the embryo continue to divide and **specialise**, forming a **foetus**

**Gestation –** the duration of time that the woman is pregnant for. Usually 40 weeks in humans

|  |  |
| --- | --- |
| **Day** | **Event**  |
| 1-5  | ***The period – menstruation**** The blood rich lining of the uterus is lost from the body through the vagina
 |
| 5-13 | •Walls of the uterus start to thicken and become filled with blood, ready for implantation of a fertilised egg cell•An egg matures ready for fertilisation in the ovary  |
| 14 | ***Ovulation*** An egg is released from an ovary  |
| 14-16 | The egg moves down the oviduct ready to possibly be fertilised  |
| 22-28 | If the egg cell is not fertilised by day 21, the lining of the uterus breaks down ready to be shed at day 1 of the next cycle  |

|  |  |
| --- | --- |
| **Method of seed dispersal** | **Description** |
| Animals: internally | Seeds or fruit with seeds in are eaten, transported and **excreted** out in a different location |
| Animals: externally | Seeds get stuck to animals fur, are transported and then will drop off in a different location |
| wind | Blown by the wind to a different location |
| Water  | Float on water and **germinate** when reach the land |
| Explosion | Pods carrying seeds ‘pop’ or fall to the ground and break open, scattering seeds  |



Pollen (male **gamete**) needs to transfer from the anther to the stigma so it can travel down and **fertilise** the ovule (female gamete). This is called **pollination**

There are two ways that the pollen of a plant can reach

the stigma of another; wind and insects

***insect pollinated plants*** have brightly coloured petals and sweet tasting nectar to attract insects. The pollen sticks to the insect and is transported to another plant.

***wind pollinated plants*** have low mass, large surface area pollen so they can travel further in the wind and increase the chance of landing on a stigma of another flower

The **placenta** is the organ in which the blood of the foetus and the mother flows very close together. Here substances like O2, glucose and antibodies can **diffuse** from the mother’s blood into the foetus’ and waste products such as CO2 and urea can diffuse in the opposite direction for **excretion**



Seeds look different and have different features dependent on their dispersal method e.g. seeds that are dispersed by animals, externally – have prongs and hooks to attach to animal’s fur

|  |  |
| --- | --- |
| **Key term** | **Definition**  |
| Gamete | A sex cell  |
| Hormone | A chemical messenger that is transported in the blood stream  |
| Excreted | Elimination of waste matter |
| Fertilisation | The nucleus of the male and female gamete (sperm and egg or pollen and ovule) fuse together - combining the DNA of both organisms. |
| Germinate | The growth of a plant from a seed |
| Gestation  | The period of the development of a foetus  |
| Diffuse  | Movement of particles from an area of high concentration to an area of low concentration  |
| Foetus  | Stage in between foetus and baby.  |
| Respiration  | A chemical reaction to transfer energy from the chemical energy store in glucose by reacting it with oxygen  |
| DNA | A chemical that carries genetic information |
| Embryo | A ball of undifferentiated cells  |
| Pollination  | Fertilisation of an ovule by a pollen cell  |
| Dispersed  | Spread out far from original location  |
| Implantation | The fertilised egg cell buries itself into the wall of the uterus  |
| Cilia | Hair like projections from cells that sweep in unison |

**Link it**

**1.** Explain how smoking and drinking whilst pregnant can cause harm to the baby.

**2**. Which seed will travel furthest in the wind? Explain your answer, referring to forces

**3.** Explain why periods stop whilst you are pregnant.

**4.** Compare the similarities and differences between fertilisation in humans and pollination in plants

**5.** Explain what is occurring when the ‘waters break’ during early stages of labour.

**6.** When a pregnant woman is in labour, she experiences contractions – what is happening at this point?

**7**. Explain how identical and non-identical twins are formed.

**8.** 100 million sperm are released in every ejaculation. Considering only one sperm cell can fertilise the egg cell, why are so many released?

**9.** Females are born with all of the egg cells she’ll need stored in her ovaries. If she begins puberty at 11 and goes through menopause at the age of 53 – how many eggs has she released in her lifetime?

**10.** Why do you think women have 2 ovaries, when only 1 egg is released from an ovary each month?

**11.** Research how in vitro fertilisation is performed and why.

**Grasp it**

**Adolescence & Puberty**

1. Why do female’s breasts develop during puberty?

2. Why do females’ hips widen during puberty?

3. Which hormone causes the changes that occur in males?

4. Which hormone causes the changes that occur in females

5. Describe where these hormones are made.

**Reproductive Systems**

6.Why do sperm cells contain lots of mitochondria?

7. Why does the uterus have thick muscular walls?

8. Why are the testes held slightly outside of the body in the scrotum?

**Fertilisation & Implantation**

9. What would happen if a woman had one oviduct blocked?

10. Why do the gametes only contain half the DNA of the parent that it came from?

11. Explain how condoms work to prevent pregnancy.

**The Menstrual Cycle**

12. On which day of the cycle is the highest chance of getting pregnant?

13. What happens to the egg cell after it has been released, if it is not fertilised?

14. Why does the lining of the uterus wall build back up between days 5 and 13.?

**Pollination**

15. What is the difference between self and cross pollination?

16. How are plants adapted for inset pollination

17. Explain the impact that reducing numbers of bees will have on the growth of crops to eat.

**Seed Dispersal**

18. describe the adaptations that a seed that is dispersed by animals internally has,

**Know it**

**Adolescence & Puberty**

1. Between what ages so most people start puberty?

2. Describe the difference between puberty and adolescence.

3. Give 2 changes that only occur in females

4. Give 2 changes that only occur in males

5. Give 2 changes that occur in both males and females

**Reproductive Systems**

6. Name the tube that connects the ovary and the uterus

7. What is the function of the cervix?

8. What is ‘semen’?

9. Define the term ‘gamete’

10. Where are the male and female gametes produced?

**Fertilisation & Implantation**

11. What happens to the sperm and egg cell during fertilisation?

12. Where does fertilisation occur?

13. How does the egg cell reach the uterus?

**The Menstrual Cycle**

14. How long does the cycle last?

15. Why is it described as a cycle?

16. What happens on day 14?

17. How long does the period last?

18. What happens during the period?

**Pollination**

19. Name the male gamete of the plant

20. Name the female gamete of the plant

21. On what part of the plant is the male gamete held?

**Seed Dispersal**

22. Why does the plant want to disperse its seeds far from itself and from other seeds?

23. Describe how animals can help the dispersal of seeds for plants.

24. A coconut is a hollow seed. What type of seed dispersal is it best adapted for?