

Name: _____
Blk: _____ Date: _____

Science 9

Notes on Sexual Reproduction

Sexual reproduction brings non-identical gametes together to form new organism - it occurs in **3** stages:

1. **Mating** - the process by which gametes are brought together at same place and same time
2. **Fertilization** - process by which egg and sperm join to form a new organism
3. **Development** - the process by which an organism develops as an embryo

Two Methods of Fertilization:

1. External

2. Internal Fertilization

In order for either of these methods to produce a successfully developing embryo, certain conditions must be met:

- Embryo must have enough **nutrients**.
- **Temperature** must not be too cold or too hot.
- There must be enough **moisture** so that embryo does not dry out.
- Embryo must be **protected** from predators and items in environment that can potentially harm it.

External Fertilization:

In external fertilization, sperm and egg join outside parents

Advantages:

Very little **energy** required to mate

Large numbers of **offspring** produced

Offspring can be spread widely in the environment

->**less competition** between each other and parents

Disadvantages:

Many gametes will not **survive**

Many eggs will not be **fertilized**

Offspring are often not **protected** by parents, so many of them die



Ex: [Frog Eggs](#)

Internal Fertilization:

In internal fertilization, sperm and egg join **inside** parents, embryo is nourished inside **mother**

Advantages:

Embryo **protected** from predators

Offspring more likely to survive, as many species will **protect** their them while they mature

Disadvantages:

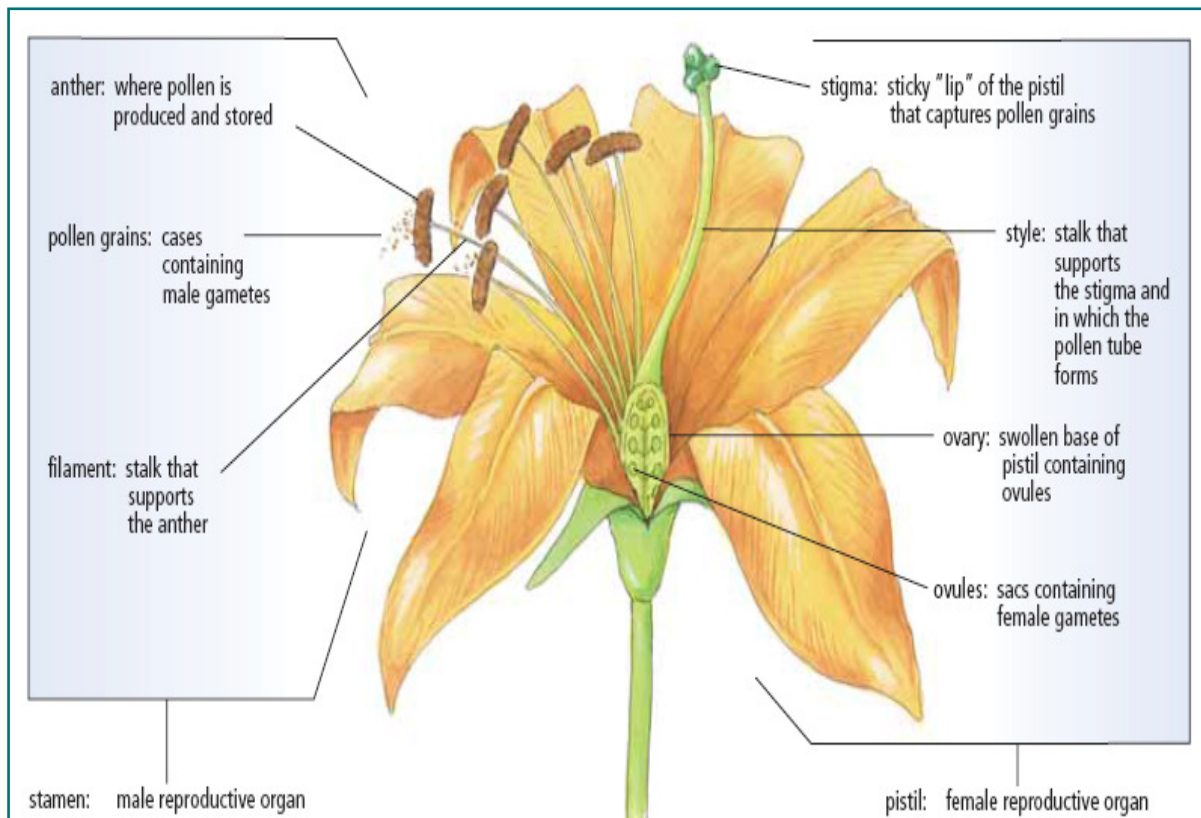
Much more **energy** required to find mate

Fewer zygotes produced, resulting in less offspring

More **energy** required to raise and care for offspring

Pollination:

Most plants transfer male gametes as **pollen**. Pollen can be carried by wind or other organisms.



Name: _____

Blk: _____ Date: _____

Science 9 Notes on Sexual Reproduction Continued

Embryonic Development

Embryonic development is the early development of an organism - in humans, it is the first two months after fertilization

Stages:

End of the first week - ball of cells called **morula**

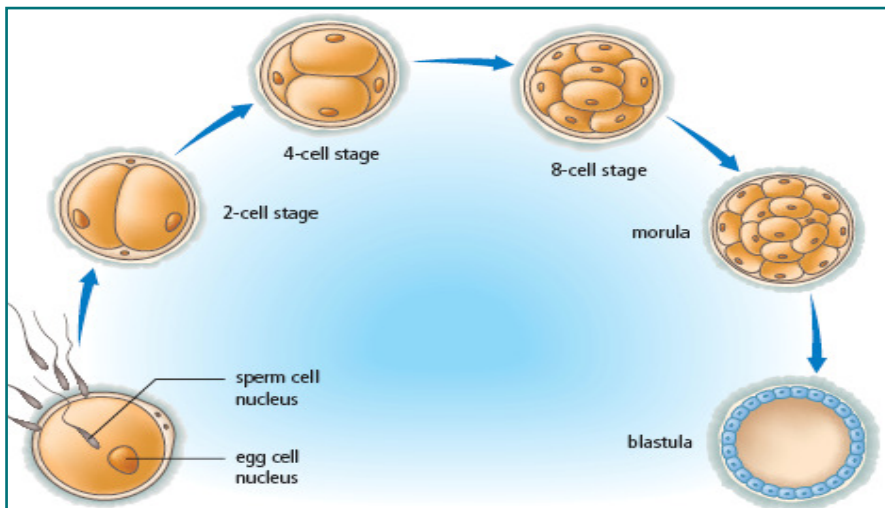
End of second week it is a hollow ball called a **blastula**

Cells at this stage are stem cells, and have the ability to develop into any kind of cell

In the next stage the embryo is known as a **gastrula** and develops

3 layers:

1. **ectoderm** (skin, nerves),
2. **mesoderm** (muscles, bones), and
3. **endoderm** (lungs, liver, digestive system lining)



Fetal Development:

The cell layers now differentiate into the organs and tissues of a baby - this is divided into 3 trimesters.

First Trimester (0-12 weeks)

Organ systems begin to develop and form.

Bone cells form.

Second Trimester (12-24 weeks)

Rapid growth from 12-16 weeks.



Third Trimester (24+ weeks)

Continued growth, especially of **brain**.

Fat begins to deposit at 32 weeks to keep baby warm at birth.



Sexual Reproduction Advantages and Disadvantages:

Advantages	Disadvantages
<ul style="list-style-type: none">• Very little energy required to find a mate (external fertilization).	<ul style="list-style-type: none">• More energy generally required to find a mate (internal fertilization).
<ul style="list-style-type: none">• Greater numbers of offspring can repopulate an area after a disaster (external fertilization).	<ul style="list-style-type: none">• Fewer offspring produced, so if the number of predators increases a population will decline (internal fertilization).
<ul style="list-style-type: none">• More protection is given to the embryo and more parental care is given to offspring (internal reproduction).	<ul style="list-style-type: none">• Gametes, embryos, and offspring are unprotected and are often preyed upon (external fertilization).
<ul style="list-style-type: none">• Offspring are genetically different from their parents, so they may survive new diseases or other threats that appear in a population.	

Name: _____

Blk: _____ Date: _____

Science 9

Notes on Sexual Reproduction

Sexual reproduction brings non-identical gametes together to form new organism - it occurs in ____ stages:

1. _____ - the process by which gametes are brought together at same place and same time
2. _____ - process by which egg and sperm join to form a new organism
3. _____ - the process by which an organism develops as an embryo

Two Methods of Fertilization:

1. _____

2. _____

In order for either of these methods to produce a successfully developing embryo, certain conditions must be met:

- Embryo must have enough _____.
- _____ must not be too cold or too hot.
- There must be enough _____ so that embryo does not dry out.
- Embryo must be _____ from predators and items in environment that can potentially harm it.

External Fertilization:

In external fertilization, sperm and egg join outside parents

Advantages:

Very little _____ required to mate

Large numbers of _____ produced

Offspring can be spread widely in the environment

-> _____ between each other and parents

Disadvantages:

Many gametes will not _____

Many eggs will not be _____

Offspring are often not _____ by parents, so many of them die

Internal Fertilization:

In internal fertilization, sperm and egg join _____ parents, embryo is nourished inside _____

Advantages:

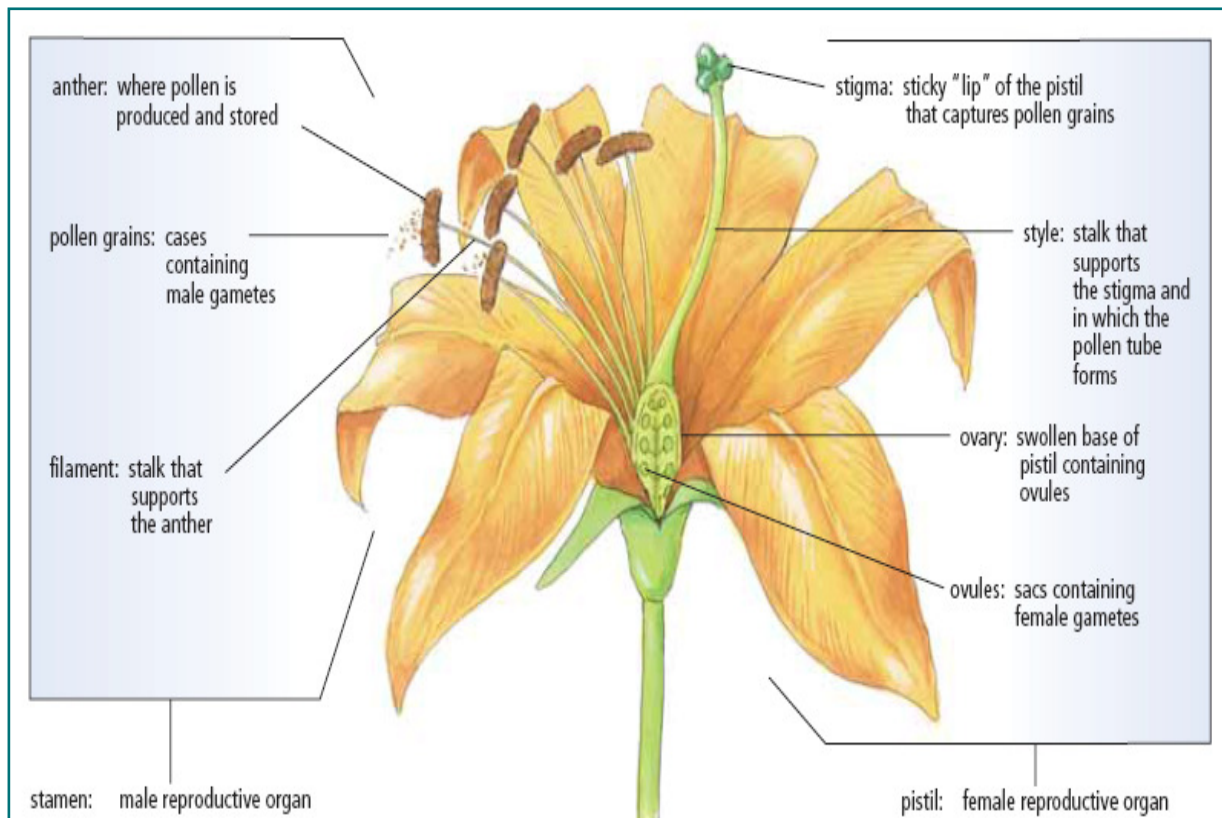
Embryo _____ from predators
Offspring more likely to survive, as many species will _____ them while they mature

Disadvantages:

Much more _____ required to find mate
_____ zygotes produced, resulting in less offspring
More _____ required to raise and care for offspring

Pollination:

Most plants transfer male gametes as _____. Pollen can be carried by wind or other organisms.



Name: _____

Blk: _____ Date: _____

Science 9 **Notes on Sexual Reproduction Continued**

Embryonic Development

Embryonic development is the early development of an organism - in humans, it is the first two months after fertilization

Stages:

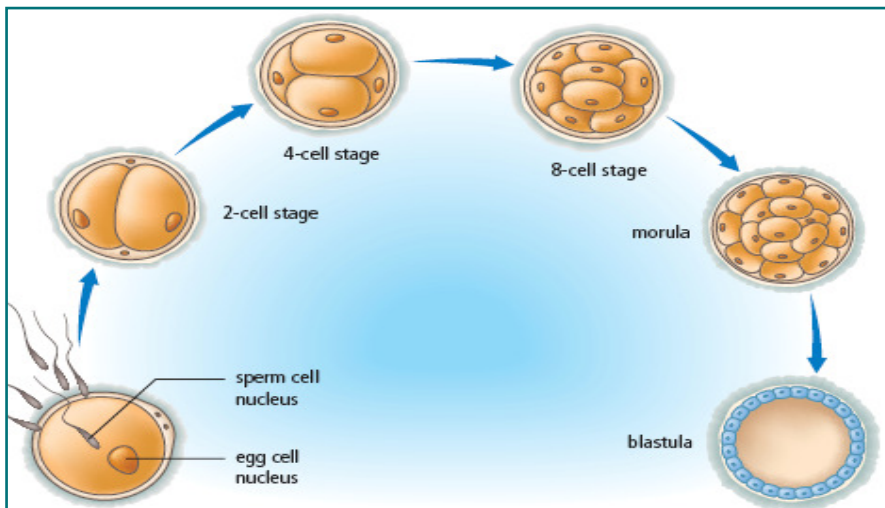
End of the first week - ball of cells called _____

End of second week it is a hollow ball called a _____

Cells at this stage are stem cells, and have the ability to develop into any kind of cell

In the next stage the embryo is known as a _____ and develops _____:

1. _____ (skin, nerves),
2. _____ (muscles, bones), and
3. _____ (lungs, liver, digestive system lining)



Fetal Development:

The cell layers now differentiate into the organs and tissues of a baby - this is divided into _____ trimesters.

First Trimester (0-12 weeks)

_____ systems begin to develop and form.

_____ cells form.

Second Trimester (12-24 weeks)

_____ growth from 12-16 weeks.



Third Trimester (24+ weeks)

Continued growth, especially of _____.

_____ begins to deposit at 32 weeks to keep baby warm at birth.



Sexual Reproduction Advantages and Disadvantages:

Advantages	Disadvantages
<ul style="list-style-type: none">• Very little energy required to find a mate (external fertilization).	<ul style="list-style-type: none">• More energy generally required to find a mate (internal fertilization).
<ul style="list-style-type: none">• Greater numbers of offspring can repopulate an area after a disaster (external fertilization).	<ul style="list-style-type: none">• Fewer offspring produced, so if the number of predators increases a population will decline (internal fertilization).
<ul style="list-style-type: none">• More protection is given to the embryo and more parental care is given to offspring (internal reproduction).	<ul style="list-style-type: none">• Gametes, embryos, and offspring are unprotected and are often preyed upon (external fertilization).
<ul style="list-style-type: none">• Offspring are genetically different from their parents, so they may survive new diseases or other threats that appear in a population.	