S2 Biology Peebles High School

booklet number

always take the booklet with your number on it

you are responsible for this booklet in class

Species Survival

Pupil Booklet

  read information  think

  mini white board activity work sheet

 work in your jotter group work

 Highlight

Underlined Headings should be written into your jotter with the date

  ICT Practical work Homework

 **In the Species Survival unit you will learn about the roles of REPRODUCTION and BEHAVIOUR in ensuring the survival of animal species.**

**Reproduction**
Reproduction is vital to the success of a species. For a species to survive it must be able to produce more offspring than it loses though old age, disease, and predation. Living things can reproduce in different ways – **asexual reproduction** and **sexual reproduction**.

**Asexual Reproduction**

A bacterium reproduces by asexual reproduction. When a bacterium reproduces it simply copies its nucleus and then divides in half - we call this process cell division. You learned about this in the Cells unit, to the right is a reminder.

This means in asexual reproduction there is only one parent and all the offspring are identical to that parent and to each other.

Asexual reproduction can grow populations very quickly.

Yeast also reproduce by asexual reproduction. You can see yeast reproducing below by forming “buds”. These buds will eventually form separate but identical cells.

 You may be able to see this happening under a microscope.

 Draw a labelled diagram of what you see.

Now Update your Glossary

**Asexual Reproduction in Animals**

In the animal kingdom there are very few examples of asexual reproduction. The fact that animals have complex bodies makes it difficult for them to break into two or grow a bud. There are some examples amongst the simple animals.

One good example is the Hydra which lives in freshwater ponds and streams. The Hydra shows budding similar to that of yeasts. An adult Hydra will develop a swelling on the side of its body. This will grow into a daughter bud. Eventually this daughter will grow tentacles and start to feed itself by catching small water animals. At this point it breaks off from the mother.

bud

hyrda

hyrda

 Watch the short film about asexual reproduction in Hydra.

 Make a series of simple labelled drawings to show the stages of asexual reproduction in Hydra.

 The offspring produced by asexual reproduction are genetically identical to each other and the parents. They are called **clones**.

Now update your glossary

Sexual reproduction

Most animals (and flowering plants) reproduce by what we call sexual reproduction. In sexual reproduction, there are two parents and all the offspring are different from each other. The parents produce sex cells which combine to form a fertilised egg in animals (or a seed in plants). The DNA in the offspring is a mixture of both parents

Sexual reproduction is very important because it **creates variation in the offspring**. Variation is important because it create individuals with new combination of genes. These combinations of genes may give the individuals useful characteristics such as **resistance to disease**, **tolerance to drought** and other useful characteristics. The more variation there is in a population the more likely it is to be able to be able to survive changes in the environment.

 Copy the following table to compare asexual and sexual reproduction. Complete it using the word bank.

|  |  |  |
| --- | --- | --- |
| feature | asexual reproduction | sexual reproduction |
| number of parents |  |  |
| variation in offspring  |  |  |
| advantage |  |  |
| sex cells (gametes) needed |  |  |

Word bank

Two No Yes

better survival chances if environment changes

Yes populations can grow quickly

No One

Sexual Reproduction In Humans

The Gametes

Sexual reproduction requires two type of sex cell (**gametes**), one from the mother and one from the father. The reproductive systems are responsible for producing the **gametes** and ensuring they get together. The **gametes** are specialised cells that have features to allow them to do their job.

Copy the egg and sperm diagram below. Beside each one write a description of the **function** and the **features** it has to allow it to carry out its function. Include a comparison of their size.

Sperm

Size = 0.05mm



 **NB** the mitochondria are where respiration happens so the more mitochondria, the more energy is released.

Egg

nucleus

Size = 1.5mm

stored food



cytoplasm

membrane

Male and Female  Reproductive Systems

Collect the two diagrams and use classroom resources (text book / video) to complete the parts and their functions.

Now update your glossary

 Fertilisation & Embryo Development

Find out the following information as you watch the short films.

Fertilisation Film Questions

1. How often is an egg released from an ovary?

2. How long does the egg live for after release?

3. What is fertilisation?

4. Where does fertilisation take place?

5. What does the sperm release to breakdown the outer layer of the egg?

6. What is the name of the cell that forms from the fertilised egg?

Trimester Films

For each age (in weeks) of the developing baby make a note of its length (cm) and weight (kg).

Work in groups and use this information to draw graphs of the growth of the baby.

Ask your teacher for the HELP SHEET if needed.

Life Support & Protection

 Watch the short film.

 Collect the diagram of the developing baby. Add the remaining labels to the diagram and complete the missing words in the paragraph.

Threats to the developing baby

There are many substances that can cross the placenta and harm the developing baby. Your class will learn about three examples of these threats. You will research one and prepare a poster or leaflet to explain it to your classmates. Your classmates will do the same for the other two.

 Research task - your teacher will give you a full explanation of this task.

Sexual Reproduction Success Rates

Humans and other mammals use internal fertilisation. This means that the sperm and the egg meet inside the female’s body. Their young also develop inside and the parents give care for a long period of time. These features of reproduction reduce the risks and so increase the success rate. Humans and other mammals therefore only need to release a few eggs. Birds have internal fertilisation, but the young develop outside the body in an egg. The number of eggs they release must be greater due to the increased risks and therefore lower survival rate. In fish, fertilisation is external. Sperm and eggs are released into the water. The chances of fertilisation are low. In addition, the young receive no care from the parents. These features lead to high risks and a low survival rate. Because of this low success rate fish must release their gametes in very high numbers.

 In your jotter do the following tasks.

TASKS

* COPY AND COMPLETE the following table using the words **internal** and **external**

|  |  |  |
| --- | --- | --- |
| animal group | site of fertilisation | site of development |
| mammals |  |  |
| birds |  |  |
| fish |  |  |

* LOOK at the table below. It shows the number of eggs fertilised and the survival of offspring for four different animals.

|  |  |  |  |
| --- | --- | --- | --- |
| animal | average number of eggs fertilised at one time | average number of surviving offspring | percentage survival rate |
| dog | 5 | 4 | ? |
| human | 1 | 1 | ? |
| bird | 4 | 3 | ? |
| trout | 1000 | 20 | ? |

* CALCULATE the percentage survival rate for each animal and PRESENT this information as a table

NB to calculate percentage survival rate

 average number of surviving offspring X 100

 average number of eggs fertilised

* DESCRIBE the relationship between the number of eggs fertilised and the percentage survival rate
* EXPLAIN the differences in survival rates. You may need to read the paragraph on Sexual Reproduction Success Rates again.

Now update your glossary

Behaviour

In the Ecosystems unit you learned about animal and plant **adaptations**. For example the thick fur of polar bear allows it to survive the cold conditions of its habitat. The **behaviour** of an animal can also help it to survive.

Choice Chamber Investigation

A choice chamber is a piece of equipment that allows you to study the effect of differences in an **environmental** factor on the **behaviour** of an animal.



Your teacher will show you how to set up and use the choice chambers to investigate the effect of **light/ dark** and **dry/damp** conditions on woodlice.



It will be similar to the one shown here.

This allows the woodlice to choose between 4 sections.

1. dry and light 2. dry and dark

3. damp and light 4. damp and dark

WRITE A REPORT of your Investigation [see next page for guidance].

* AIM- To find out the effect of light/ dark and dry/damp conditions on woodlice behaviour
* METHOD – draw a diagram and write a step by step description of what you did
* RESULTS – record your observations in a table e.g.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| condition | dry and light | dry and dark | damp and light | damp and dark |
| number of woodlice after \_\_\_\_ mins |  |  |  |  |

* CONCLUSION – Describe your results. Explain how this helps the woodlice to survive.
* How could you make your results more reliable?

The brown shrimp is found all around our coastline. Like the woodlouse it also shows changes in behaviour according to different environmental factors.

Look at the data below, it shows brown shrimp activity and changes in their environment over a 48 hour period.



In small groups discuss two conditions necessary for shrimp to feed and how their behaviour helps them to survive.

 Make a note about this in your jotter

Innate & Learned Behaviour

There are two main categories of behaviour - **Innate & Learned**

Innate behaviour is something that an animal can do from birth. It is **instinctive/in-born** and does not have to be taught. Learned behaviour is **taught** or acquired through **experience**.



Adult herring gulls will regurgitate their food when they are pecked on the red spot on their beaks by herring gull chicks.

The monarch butterfly has a bright orange colour and an unpleasant taste to birds. As a result of feeding experiences, birds avoid eating orange butterflies as they have learned to associate their colour with the unpleasant taste.

 Migration is the long-range seasonal movement of animals. It is an evolved, adapted response usually in response to a seasonal trigger e.g. change in length of daylight.

Migration example - Barnacle geese spend the winter in Scotland on the Solway coast near Dumfries and the summer in Svalbard Island in the Arctic circle, over 3,500 miles away. Svalbard Island does not have enough food in the winter but has fewer predators than the Solway coast in the summer.

Honey bees are born with the ability to perform a set of movements called a waggle dance when they have found food. The dance tells other bees in the hive the direction and distance to the food. It saves the other bees wasting time looking for food.

Draw a table in your jotter and divide each of the above underlined examples into INNATE or LEARNED behaviour.

|  |  |
| --- | --- |
| INNATE BEHAVIOUR | LEARNED BEHAVIOUR |
|  |  |



Now update your glossary

**NB** Many behaviours have innate and learned components.

Migration

Migration is truly magnificent. It can involve vast distances with many dangers on the way. However, it provides the species with a better chance of survival by allowing them to reach better conditions for feeding, breeding or avoiding predators.

 TRUE / FALSE activity

On one side of your mini-whiteboard write the word ‘True’, flip it over and write the word ‘False’ on the other side. As your teacher shows you the power point presentation decide if each statement is True or false.

Your teacher may show you some short films on Migration.

Habituation

A snail will withdraw its body into its shell when it is tapped. This withdrawal response is instinctive and helps it to avoid predation.

The above withdrawal response stops if the snail’s shell is tapped repeatedly, but the snail is not attacked by a predator. This is called [**habituation**](http://www.bbc.co.uk/education/guides/z2fwxnb/revision/2#glossary-zp9rjxs)**.** It allows animals to avoid wasting energy by responding to repetitive harmless **stimuli**. The results of an experiment on Habituation are shown below.



*  Collect a piece of graph paper and draw a line graph of the results.
* Get your graph checked by your teacher and stick it into your jotter.
* Write a Conclusion for this experiment. Include an explanation of what Habituation is and how it is a survival advantage to the snail.

**TIME TO DO SOME REVISION….**

* Update you glossary & highlight the key words in your Learning Outcome Checklist.
* Use the Standard Grade Biology Text Book [Third Edition] pages 123 – 129 and pages 138-139.
* Test Question Practice Booklet available.
* Use a variety of **study techniques** to revise for the test e.g.
	+ Flashcards – look on http://www.hns.org.uk/bio/
	+ Make a mind map of the learning outcomes.
	+ Get someone at home to test you on the learning outcomes.