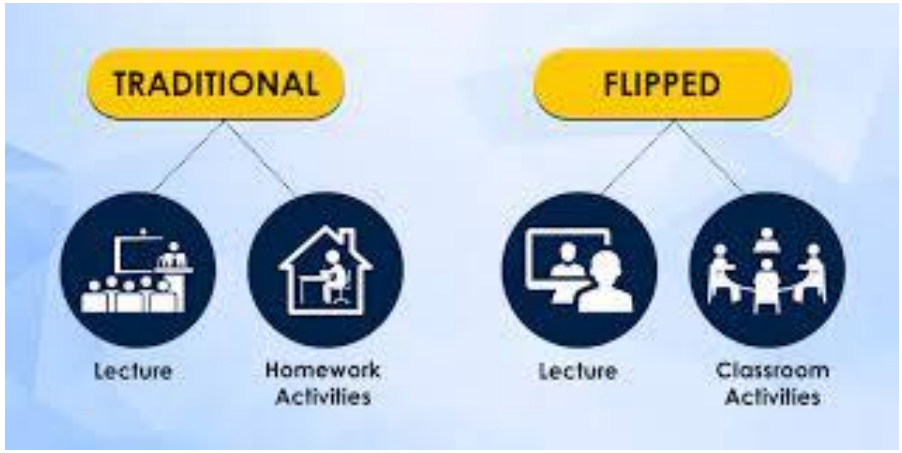
LC BIOLOGY UNIT 3: ACTIVE TEACHING METHODOLOGIES

Presenter: Naomi Pierce

https://thescienceteacher.ie/

FLIPPED CLASSROOM



A flipped classroom is an instructional strategy and a type of blended learning, which aims to increase student engagement and learning by having pupils' complete readings at home and work on live problem-solving during class time.

- Take down slides from teams
- Watch a video
- Read pages from the book
- Activities during class time

TEAM BASED LEARNING APPROACH

It is a student-centred, active and collaborative pedagogy that is most easily described as a form of flipped teaching with structure.

Individual accountability makes TBL different from group work

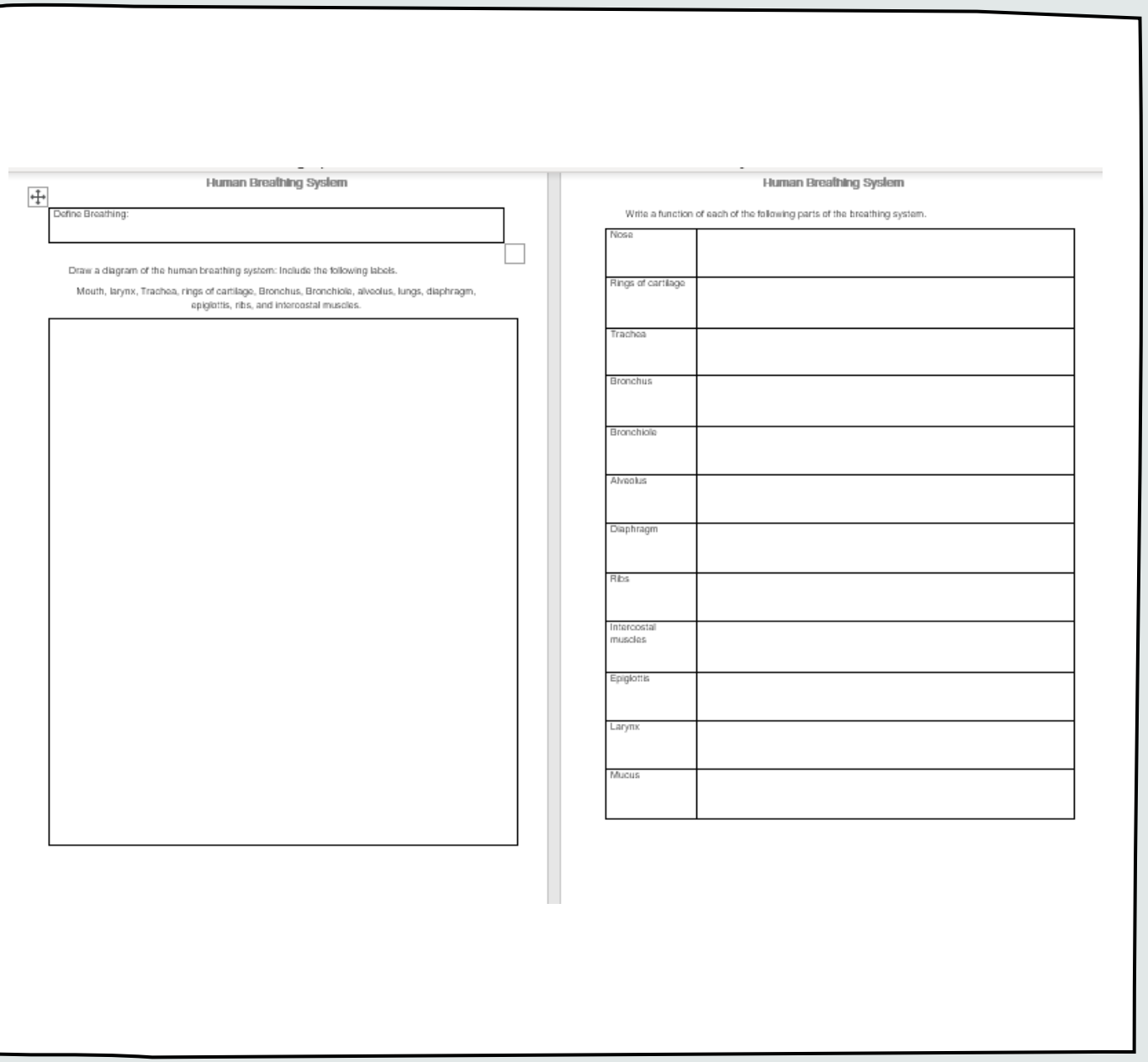
Group formation

Pre-class preparation

Readiness Assurance Test (iRAT and tRAT)

Clarification lecture

Application Exercise



Human Breathing System

Define Breathing:

Draw a diagram of the human breathing system: Include the following labels.

Mouth, larynx, Trachea, rings of cartilage, Bronchus, Bronchiole, alveolus, lungs, diaphragm, epiglottis, ribs, and intercostal muscles.

Human Breathing System

Write a function of each of the following parts of the breathing system.

Nose	
Rings of cartilage	
Trachea	
Bronchus	
Bronchiole	
Alveolus	
Diaphragm	
Ribs	
Intercostal muscles	
Epiglottis	
Larynx	
Mucus	

BREATHING SYSTEM - TBL LESSON

- Students had to use book/PPT to complete the worksheet template.
- Pre - class preparation

Human Breathing System: MCQ 1

Q1: What is the larynx?

a) Back of the throat
b) Voice box
c) Entry point into the lungs
d) Another term for the pharynx

Q2: Microscopic structures in the nasal cavity that filter the air are called:

a) Hairs
b) Bronchioles
c) Cilia
d) Epiglottis

Q3: An alternative name for the trachea is the:

a) Windpipe
b) Alveoli
c) Bronchus
d) Pharynx

Q4: The muscles that allow you to breathe in and out are:

a) Intercostal muscles and tongue
b) Intercostal muscles and the diaphragm
c) Diaphragm and the trachea
d) Diaphragm and the tongue

Q5: What are alveoli?

a) Alveoli are tiny cells in the lungs.
b) Alveoli are tiny blood vessels.
c) Alveoli are tiny air sacs in the lungs.
d) Alveoli are where gas exchange occurs.

Q6: What is the function of the bronchi?

a) Allows air to pass into the lungs.
b) Tiny air sacs that deliver oxygen to the blood.
c) Large air sacs that deliver oxygen to the blood.
d) Delivers air to the alveoli.

Q7: What prevents the trachea from collapsing?

a) Thick layer of muscle.
b) Diaphragm
c) Skeleton
d) Rings of cartilage

Q8: How is the breathing system protected against infection?

a) Rings of cartilage
b) Mucus
c) Mucus and Cilia
d) Epiglottis

Q9: The function of the alveoli is:

a) To pass oxygen from the blood to the lungs
b) To pass carbon dioxide and water vapour from the blood into the lungs
c) To pass oxygen from the blood to the lungs and pass carbon dioxide and water vapour from the blood into the lungs
d) Gas exchange

Q10: What structure prevents food entering the trachea?

a) Rings of cartilage
b) Epiglottis
c) Pharynx
d) Larynx

BREATHING SYSTEM - TBL LESSON

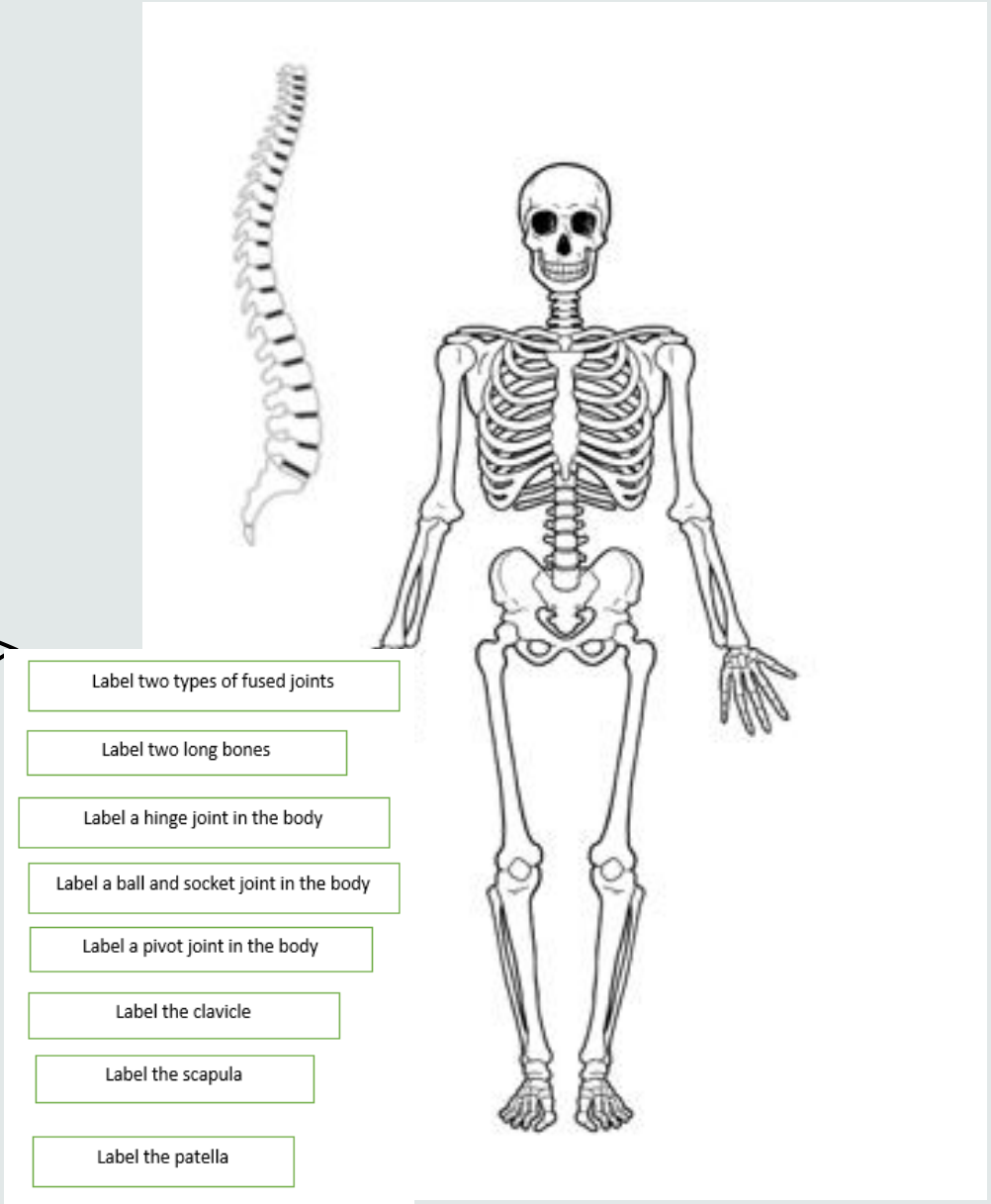
- iRAT
- Confidence rating
- tRAT
- Clarification lesson

SKELETON - STIMULUS TO ENGAGE

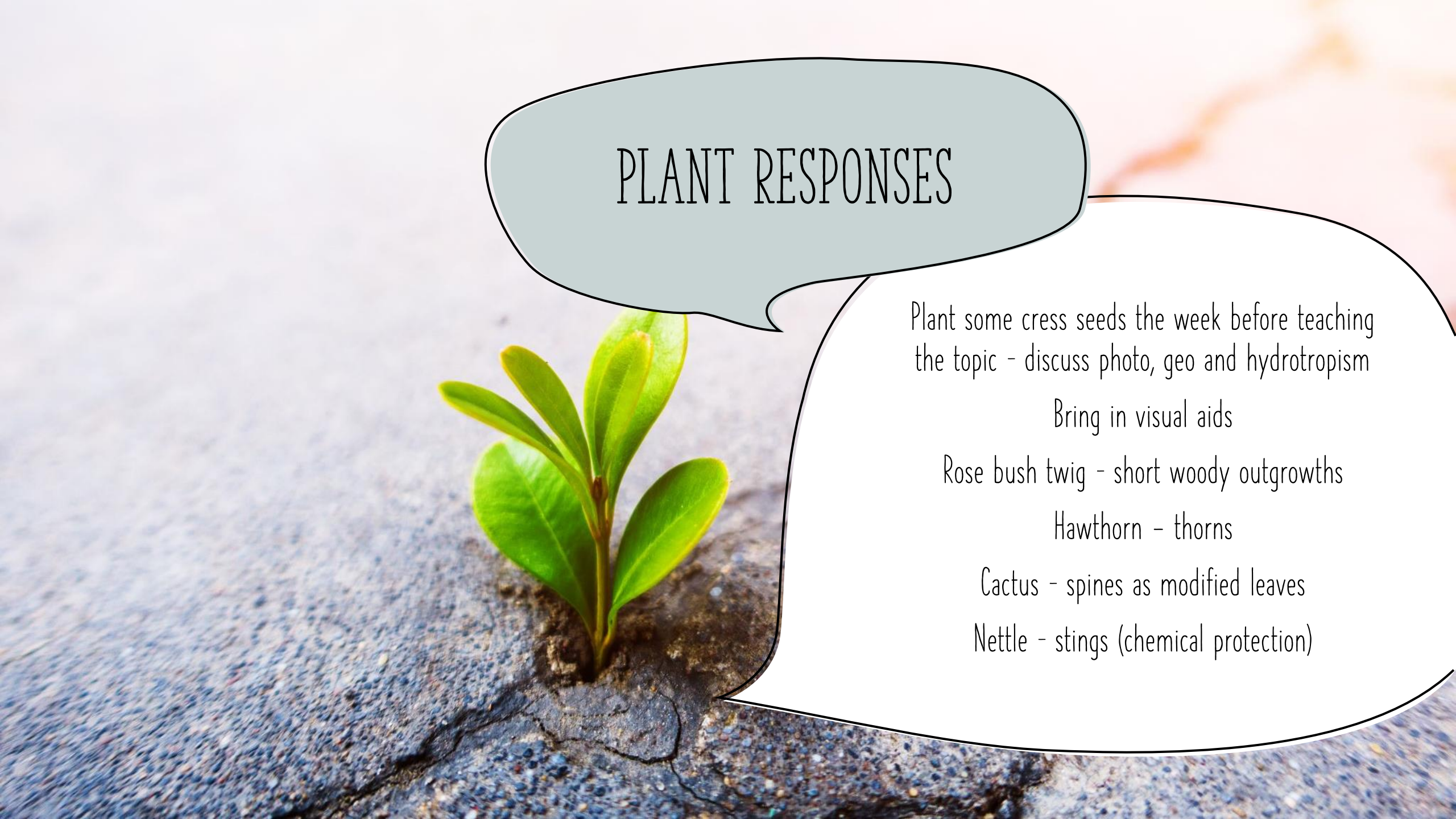
- Bone in acid
- Acid dissolves the minerals
- Left with a rubbery structure

SKELETON - RELAY RACE

- Print and Laminate skeleton on A3 paper
- Students work in small groups
- Relay activity to label assigned parts of the skeleton
- 17 labels in total
- Timed activity!



PLANT RESPONSES



Plant some cress seeds the week before teaching the topic - discuss photo, geo and hydrotropism

Bring in visual aids

Rose bush twig - short woody outgrowths

Hawthorn - thorns

Cactus - spines as modified leaves

Nettle - stings (chemical protection)

STOMATA IMPRESSIONS

leaf imprint using nail varnish to investigate stomata distribution.

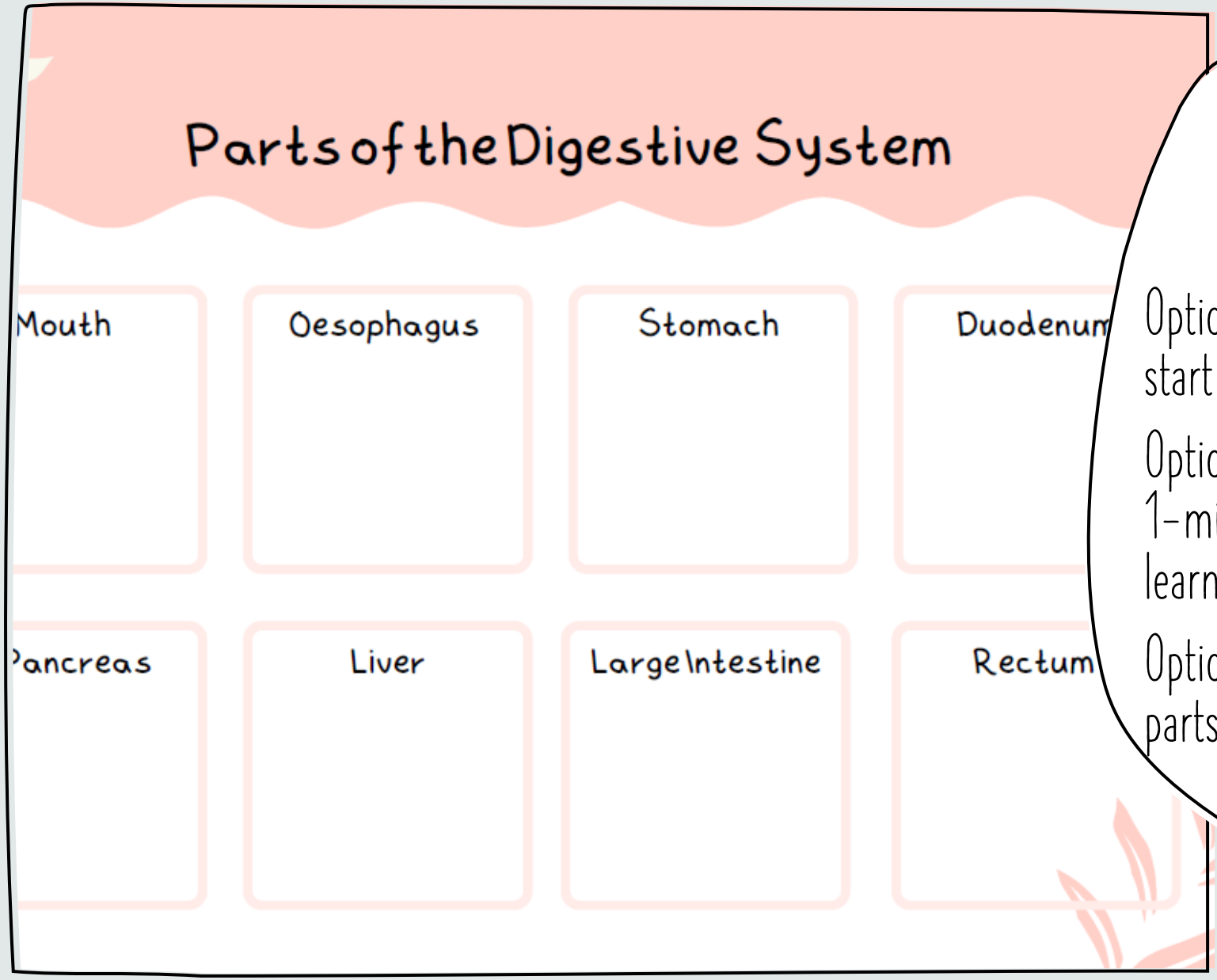
TASK CARDS

Fungi and Monera

Students complete them in pairs (using white boards)

Allows for AfL

Made on canva - used for any topic.



DIGESTIVE SYSTEM - ONE MINUTE REFLECTIONS

Option 1: Give students this template at the start to assess prior knowledge.

Option 2: Give at the start and after part set a 1-min timer and students summarise their learning.

Option 3: At the end use to summarise the key parts.

LEARNING LINKS

Linking learning from a couple of chapters.

Allows students to make connections within their learning.

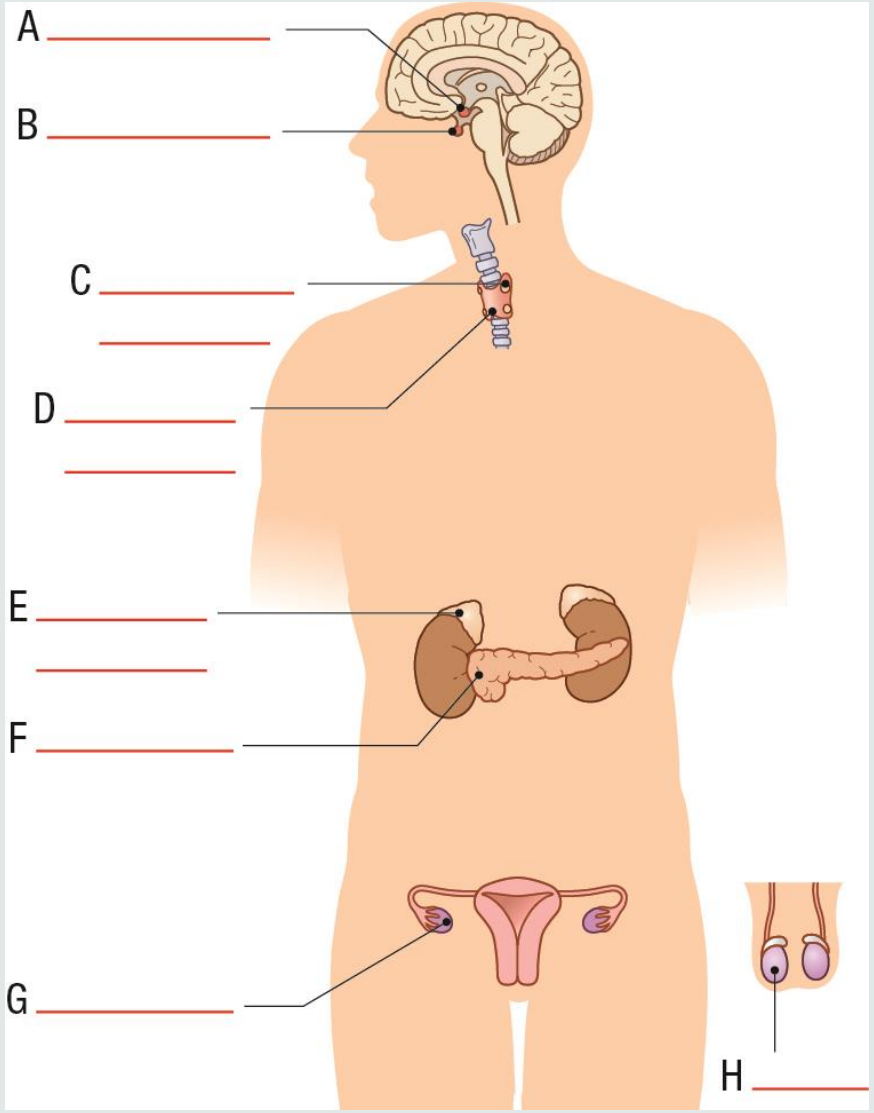
E.g. Enzymes, Food, Human Nutrition

E.g. Endocrine system and Nervous system

E.g. Endocrine System and Plant Responses

ENDOCRINE SYSTEM

- Make students become active in their learning
- Use PPT/Notes to label up endocrine glands and associated hormones
- Set a timer
- Discuss the hormones
- Finish the class with afl questions



Ms. Pierce - Biology

The Senses

Sense	Organ	Stimulus

Rods:

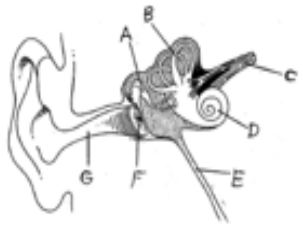
Cons:

Short Sightedness:

Correction:

Long Sightedness:

Correction:



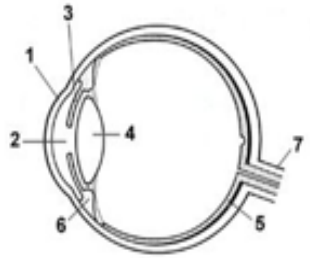
Outer ear:

Middle ear:

Inner ear:

A		
B		
C		
D		
E		
F		
G		

The Eye



	Name	Function
1		
2		
3		
4		
5		
6		
7		

Ear Disorder:

Cause:

Symptom:

Treatment:

Accommodation:

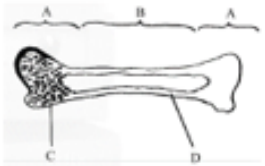
GRAPHIC ORGANISERS

Axial vs Appendicular

Skeletal System

Functions:

-
-
-



A		
B		
C		
D		
	Cartilage	
	Red bone marrow	
	Periosteum	

Joints Examples

-
-
-

Disorder:

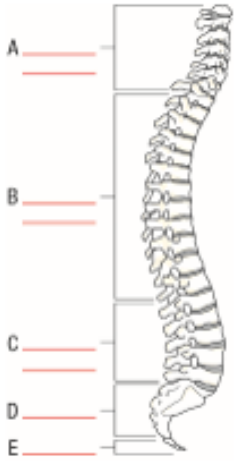
Cause:

Prevention:

Treatment:

Joint	Example

L.S of the Knee



Ligaments:

Tendons:

Osteoclasts:

Osteoblasts:

Bone Formation:

GRAPHIC ORGANISERS

Ms. Pierce: Biology

Kingdom Monera: Overview

Bad Bacteria: Good Bacteria:	Bacterial Nutrition	Antibiotics	Reproduction Endospores
Shapes	Bacterial Structure (and organelles)		

MONERA - VIDEO AND TEMPLATE SHEET

Used at the start or end of the chapter

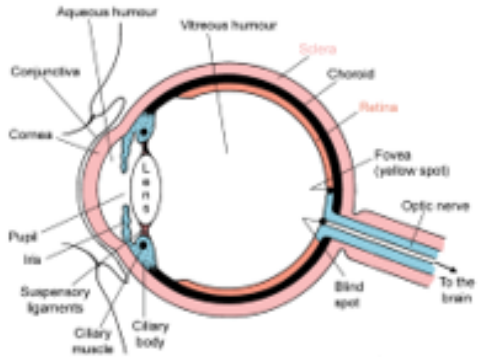
https://www.youtube.com/watch?v=ORB866QSGv8

EYE STRUCTURE VIDEO WITH QUESTIONS

Stimulus to engage

https://www.youtube.com/watch?v=VK-x-8-JMwY

Ms. Pierce – Biology The Senses - Eye



Part of the Eye	Function
Cornea	
Aqueous Humour	
Vitreous Humour	
Optic Nerve	
Iris	
Lens	
Retina	
Muscles	
Sclera	

NERVOUS SYSTEM

Set up a row of dominoes 1cm apart, along the length of the ruler. .

Using your finger or a pen, gently push the first domino. If you push too gently, nothing will happen to the 'nerve'. If the push is strong enough, the first domino will topple the second, then the third and so on to the end of the line.

This 'trick' demonstrates the following features of nerve action:

- There is a minimum threshold that the stimulus must reach before the message is carried.
- The 'all or nothing' law is obeyed. Once the first domino is triggered to move, all the others follow suit - once one falls, they all fall.
- The type of stimulus does not affect the transmission of the message. It doesn't matter if you push the first domino with your finger, a pen or your elbow. No matter what is used to push the first domino, the result is the same. This may help students realise that all stimuli are transmitted in the same way and that it does not matter what their source is.
- The strength of the stimulus does not weaken. The third domino falls in the same way as the tenth or the thirtieth.

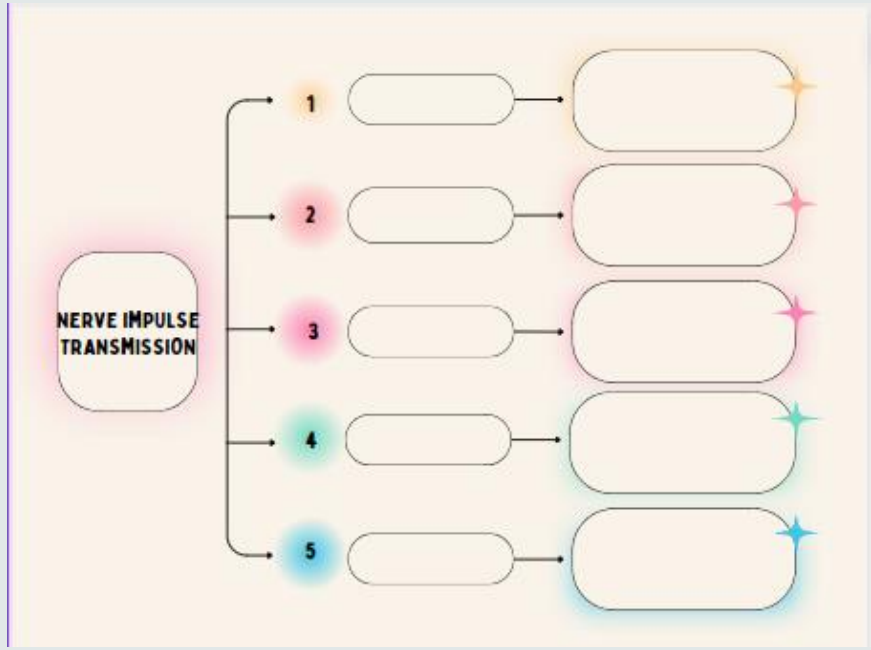
NERVOUS SYSTEM

Transmission of Nerve Impulses - Flow Chart

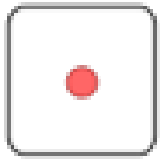
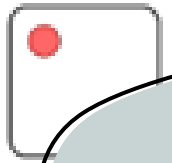
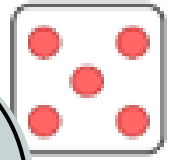
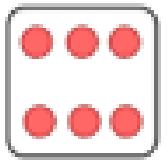
Have students read the information and the steps involved in how the message travels between two neurons and convert this information into a simple flow chart.

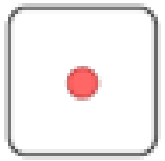
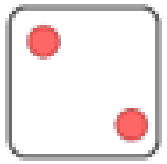
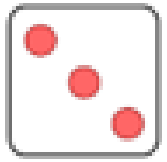
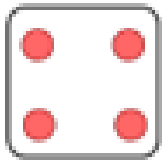
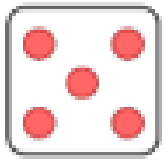
Research Task

Having students, individually or in pairs, research the effects of various drugs on the nervous system is a good way of getting them to understand the importance of the synapse to the transfer of nervous messages (since many drugs affect this process). This will also highlight the risks, and explain some of the dangers, of taking drugs (legal or illegal).



ROLL IT RECAP

	1. State a function of a root.	2. State a phl			a in which of the vascular s mainly
	7. State one way in which a transverse section through a monocotyledonous stem differs from a dicotyledonous one.	8. Give a location of a meristem in a winter twig.	9. Where in a young root would you find tissues xylem and phloem?		
	13. Give one main function of the leaf.	14. Name two gases that enter or leave the leaf.	15. Mention one way in which xylem is adapted f the transport of wate		
	19. How does the vein arrangement in the leaves of dicot plants differ from that in monocots?	20. Flowers are the organs of which type of reproduction in the plant?	21. Name one process causes water to mov upwards through a pl		
	25. Where would you expect to find xylem and phloem in a leaf?	26. True or False. Parallel leaf veins are characteristic of monocotyledonous plants.	27. State a function of *Ground* tissue.	28. State a fun *Dermal* tissue.	stem.	30. What is a meristem?

https://www.pdstbiology.com/files/index.php/f/5062

Print and laminate on A3 Paper

Print 3/4 boards covering all of plants and colour code them.

Use as an end of unit revision activity.

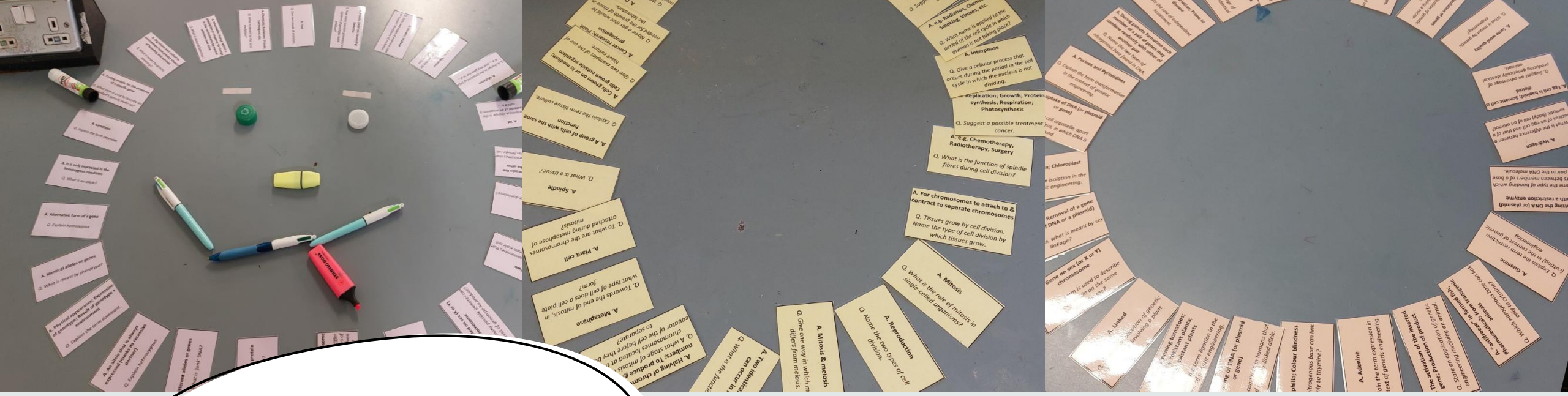
SHOW - ME BOARD AFL

Iquizzes on PDST biology

https://www.pdstbiology.com/files/#/HOME/08%20Games%20for%20Assessment%202019/iQuiz/iQuiz%20Challenges

What is the function of the cilia in the trachea?

- To warm air
- To help breathing
- To stop colds and flu
- To trap particles

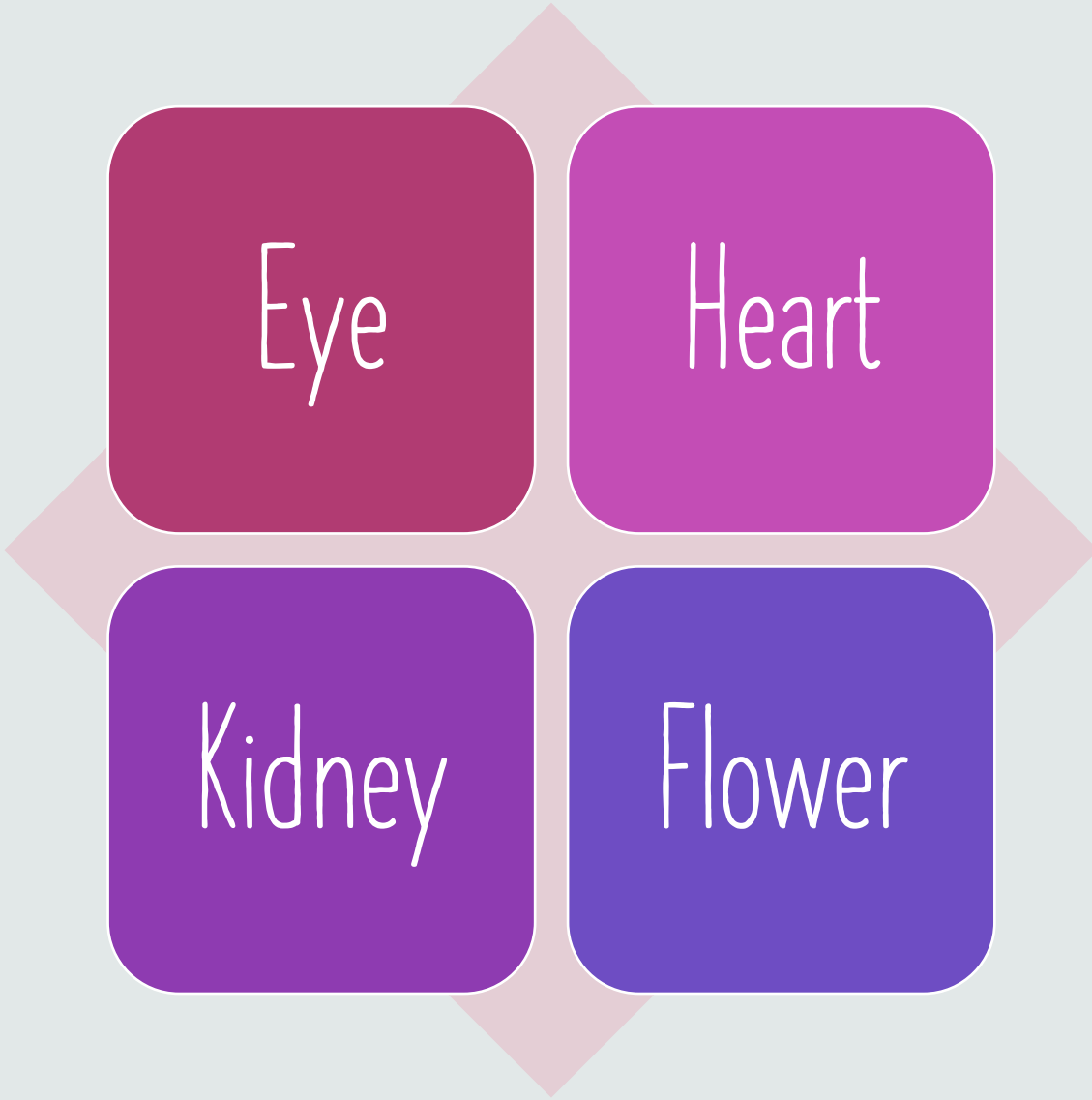


FOLLOW ME ON ACTIVITIES

https://www.pdstbiology.com/files/#/HOME/08%20Games%20for%20Assessment%202019/Follow-Me%20EQ%20Quiz

PDST biology

DISSECTIONS



Carefully dissect your insect-pollinated flower and use sellotape to stick each part into the boxes below. Stick this sheet into your book.

Male part of the plant

Stamen

Anther

Filament

Pollen

Female part of the plant

Carpel

Stigma

Style

Ovary

Ovule

Not regarded as ‘male’ or ‘female’

Petal

Sepal

QUESTIONS

1. What is the name of the male gamete?
2. Where is the female gamete located?
3. What is produced after the male and female gametes fuse?
4. Touch the stigma. Explain how it is adapted for its function
5. Draw out a flow chart to show the steps involved in plant sexual reproduction. Include each floral part from your dissection. *Start with the anther.*
6. What features of this flower suggest it is pollinated by insects?
7. Why is pollination a significant process for humans?

HUMAN REPRODUCTION

Video of baby born inside amniotic sac

https://www.youtube.com/watch?v=q9IJuFD9ZHE

THE KIDNEY

- Ask students to describe the journey of a water molecule from the mouth to the urinal.
- They must sketch, label and annotate each major organs involved.
- Provide students with key terms that are appropriate to the syllabus e.g. large intestine, urethra, artery, oesophagus, filter, kidney tubules, renal artery, bladder and ureter.

	Present in … Y or N			
	Blood	Filtrate	Urine	Explanation
Glucose	*Y*	*Y*	*N*	*All glucose is reabsorbed back into the blood as it is a useful molecule for cells. It is used in respiration.*
Urea				
Amino acids				
Water				
Ions e.g. Na^+ and Cl^-				
Protein				

1. Describe how the table above would be different for a person suffering from:
    1. diabetes.
    2. high blood pressure.


THANK YOU
Any Questions....