

Ap biology your inner fish assignment



**ASSIGN
BUSTER**

The chapter speaks of all the necessities and struggles of uncovering fossils and the wonderful things discovered by them, such as the fact that Tackling is over of the first creatures that showed similarities between humans and fish with bone structure. PART 2: Dispute: Most living organisms fossil after death, so fossils in exemplary condition are easily found all over the world. A big misconception by many people is believing that one can find fossils anywhere from mountain tops, rivers, maybe even ones own backyard.

Fossils are very difficult to come by and it is not usual to find them in exemplary condition. Some conditions that are key to finding good fossils is whether or not the area has the erect age of rocks, whether the rocks of the area the right type to preserve fossils, and whether rocks are exposed to the surface. Logically, fossils do not ungrounded themselves: they must be dug up and brought out by hand thus exposure is a big part of finding fossils. There are many layers of rocks and what is found in each layer is definitely in a certain order.

What makes finding out the time a layer was formed so tricky is the fact that earth's crust can cause faults that shift the position of the layers, putting older rocks on top of the younger ones. If a person can distinguish which is which, one is a step closer to ending a fossil site. The exposure of a rock is very necessary because when they are not exposed, it really is a 'hit or miss' which could translate in a loss of resources and a failed expedition. Many fossil sites are buried under shopping malls or cities and often grass.

That is another reason they are hard to come by. The right exposure is often in places that are not occupied. It may be a raised area with slow erosion

that is the best bet considering there is nothing to bury them; ergo, a very good place for fossils are deserts such as Gobi Desert or arctic deserts. The great thing about arctic exerts is the fact that the temperature changes causing the rocks to cool and shrink in the winter and heat and expand in the summer. It takes a lot of components in order for a rock to form a fossil.

Some of those being: an organism must contain hard parts such as bones, teeth, cartilage, or shells; the organic material must be buried quickly in an oxygen-free environment protected from scavengers; and, conditions after burial must be debatable as the effects of heat and pressure that produce sedimentary rock may alter the composition and appearance of a potential fossil. A fish cannot withstand the temperatures of volcanic rock, even if they could, the bones could not withstand the heat that basalts, rhyolites, granites and other igneous rocks are formed.

Metamorphic rocks also would not work because they have undergone extreme pressure or heat for initial formation. As stated before, sedimentary rocks are potential rocks to hold fossils in. Examples of those rocks being: limestone, sandstones, siltstone and shale. Sedimentary rocks are formed by gentle processes of rivers, lakes, and seas which is a big benefit because many animals live in those environments. Chapter 2: Getting A Grip PART 1: Based on the last chapter and the picture for this one, this chapter will focus on the aspect of how a fish's bone structure is similar to that of a human and how that came about.

Readers will be 'getting a grip' of the fact that we are not all that different.

(c) Description: The chapter covers the ways fish structure is similar to our

own; the picture of the hand and labeling of bones and tendons goes along with the chapter because all that was needed to prove the theory that fish were our ancestors at one point was the discovery of the bones in the Digitalis's arm and wrist. A humans hand is almost exactly the same as the Digitalis's ' hand'. PART 2: Dispute: Humans and fish are nothing alike: we have hands with fingers, they have fins.

It's an alligator! It's a crocodile! It's a lizard! It's.. A fish? All educated guesses even preschoolers can notice. The discovery of Tackling has given many scientists something to think about. The first being that humans may after all be closely related to fish. When first hearing this theory, for anyone it is hard to believe. Humans have fingers and fishes have fins! They have gills and we have lungs! Many things point awards the fact that humans have nothing in common with fish until one looks at the bone structure of each and how exceptionally similar they are.

The reason for the similarity is because both species share a common ancestor. All animals with limbs have a common design. If a batwing were to be formed from a person's hand, make the fingers extremely long; a horse elongates the middle fingers and reduce and lose the outer ones; frogs elongate the bones of the leg and fuse several of them together. All in all, despite radical changes in what limbs do and what they look like, this underlying blueprint is always present.

Before Tackling was named, Fred Mullion and Bob Makes, professional fossil preparatory, scratched the fossil to get a better look at it and this is the moment they discovered a cube-shaped blob of bone different from any

other fin bone was a joint at the end that had spaces for four other bones. The following week, a wrist had been uncovered; they had found a fish with a wrist. When more had been revealed, the professionals found that Tackling had a shoulder, elbow and wrist with all the same bones of a human which implied that Tackling was capable of doing push ups.

Like s, Tackling can bend its elbow and wrist into the tort to a push up and it has massive crests and scars where large pectoral muscles would have attached meaning Tackling had the muscles to do so. With this capability, it is evident that Tackling was built to navigate the bottom of shallow streams and ponds or flop in mudflats along banks. Another fact proving the theory is that a human's elbow is a ball and socket joint where the radius and humerus meet; just as it is found in Tackling.

What proves the theory that humans were once related to fish is that the earliest creature to have the bones of our upper arms, our forearm, even our wrists and palms also had scales and fin webbing and all of our extraordinary capabilities arose from basic components that evolved in ancient fish and other creatures. Chapter 3: Handy Genes It is possible that this chapter will talk about the mutation of genes or evolution of genes to form different and new things or different adaptations on different organisms. C) Description: Post reading, it is evident that the sonic hedgehog gene was actually the focus of what helps with the forming of limbs and more specifically, digits. We learn that all development starts with a strip of tissue and if removed development stops where it is; regardless if there is an upper arm, an arm without hands or no arm at all. The sonic hedgehog (SSH) gene is dependent

of the zone of popularizing activity (ZAP) to form correctly because when the ZAP doubles, the result is a mirror duplicate image.

The ZAP allows growth and formation to occur; when growing limbs, if there no ZAP is present, it's likely nothing will grow or, if something does, it will be malformed. PART 2: Dispute: Each cell in a human body contains a unique set of DNA. This allows some cells to build muscle or skin and some cells to become arms versus fingers. When a body is broken down, it goes from cells, to chromosomes, genes, and DNA. Often, people believe DNA controls everything in the body: what is formed, how it is formed, when it is formed. But the truth is this responsibility is in the genes.

When a gene is turned on,' it makes a protein that can affect what the cell looks like and how it behaves (Subbing, 2008). When limbs are beginning to form, the ZAP directs the cells where to grow. The ZAP is the reason our pinky is different than our thumb. If a person has an extra ZAP, their limbs will duplicate in a mirror image. Neil Subbing, the author of Your Inner Fish, says, " Cells on the ZAP side formed digits. Cells on the opposite side often did not form digits; if they did, the digits were badly malformed. The conclusion was obvious.

Something was emanating from the ZAP that controlled how the digits formed and what they looked like" (Subbing, 2008). Many experiments took place hunting for the genes that control the ZAP. Andy McMahon, Phil Ingram and Cliff Tibia were the first to experiment. Tibia started working with flies to figure out the NNE that sculpts the body of a fly from a single-celled egg. McMahon and Ingram had also been working on this and the three labs

collaborated to discover the hedgehog gene. “ They noted that this gene made one end of a body segment look deterrent trot the other”).

The scientists all wanted to test this theory in different animals starting with chickens and lots of trial and error, they found the gene and named it Sonic hedgehog. So to much of everyone’s surprise, the Sonic hedgehog gene is responsible for the difference in limbs and growth, not DNA. The tibia group further proved this by wing the gene so they could see specifically where it is active and that place is the ZAP. As stated in the book, “... When you treat the limb with retention acid, a form of vitamin A, you get a ZAP active on the opposite side” (Subbing 2008).

What happened when the Sonic hedgehog gene was treated with retention acid? It is active on both sides Just as the ZAP did. Furthermore, a malfunctioning ZAP or a mutation in the Sonic hedgehog gene can cause not only major malformations in animals but humans also. All in all, the Sonic hedgehog gene is responsible as well as the ZAP for he forming of of limbs and distinction in fingers. Chapter 4: Teeth Everywhere I predict this chapter will be about adaptations based on the dispute statement and the picture.

There is a picture of DNA and light switches so it may have to do with how only certain animals/beings have certain genes to adapt to their environment. Such as humans’ teeth have flat teeth and sharp teeth because we’re omnivorous. Whereas herbivores have flat teeth and carnivorous organisms have sharp teeth to tear their food. (c) Description: While noticing the two (2) different shades of blue on this picture of DNA, it

must be tied to the talk about mammals and their combination of herbivore teeth and carnivorous teeth. This shows that the two types join.

That's really all I can see that standing for and as for the light switch, perhaps it's the switch in Neil Subbing of being able to see fossils considering he was having a hard time discovering them before and it's as if someone switched him on because now he spots them easily. PART 2:

Dispute: Teeth evolved through time, after bones, as they became a beneficial adaptation for protection against predation. Let's think about some of the features that come to mind when one looks at another's face. There's skin, ears, eyes, a mouth, teeth... All common things.

In school you spend so much time discovering the parts of your ears and eyes, how your skin functions and then your mouth. What's there to say about that? It leads to the esophagus to your stomach, small intestines, large intestines and then it's on its way out. But wait! Isn't there a key part in this process that's a bit important considering no person swallows their food whole? Teeth! Teeth are an extremely overlooked part of the body that play a big role in survival. There are many functions for teeth; plucking, cutting, tearing, holding, grinding, etc.

For animals, it's much the same yet the main reason is NOT to protect themselves but just be able to eat things perhaps the same size as them or smaller. The author Neil Subbing says himself, "Hard bones arose not to protect animals, but to eat them" (Subbing, 2008). Mouths are very limited with when it comes to space and if you're an organism without hands or

claws that can shred your pray before it gets to your mouth, you need to be able to get that creature to your mouth so you can tear it with your teeth.

If an animal is a carnivore, it's going to have sharp teeth, if it is an herbivore, it will have flatter teeth; all of these are suiting to an animal. If you're an herbivore, you don't need sharp teeth, Just as if you're a carnivore, you'll starve if you have flatter teeth. Teeth aren't a sudden adaptation, they always existed. A creature named trillionths is an animal discovered by Bill Amoral, Chuck Chaff and yours truly, Neil Subbing. They all went on an expedition to a beach in Nova Scotia were looking around at sandstones by the shore when they discovered the fossil.

Subbing stated, Looking at the teeth under a microscope gave me the biggest surprise: the cusps had little patches of wear. This was a reptile with tooth-to-tooth occlusion. My fossil was part mammal, part reptile" (Subbing, 2008). This is an example of one of the first omnivorous organisms that is estimated to be more than 200 million years old. Trillionths' teeth do not interlock. The inner upper teeth actually shear against the outer bottom teeth and this is how it chews. Each tooth in a mammal has a Job, incisors to cut food, canines to puncture, molars to shear and mash.

Never ever, were teeth formed to use as protection against predation.

Chapter 5: Getting Ahead Judging the look of this so called dorsal fin, this chapter may talk about how organisms such as sharks, somehow get ahead of their time and adapt in a way that they are prepared for future environmental changes. Or even perhaps a water organism after years being able to walk on land like a reptile or amphibian. My number one guess

however would be made based on the dispute statement, that humans start as embryos that have gill slits to breath while in the womb and through development, they lose those slits.

Though sharks, of course, never do. So this will be discussed and compared to our inner fish. (c) Description: The picture ties in well with the chapter because of the fact that the chapter talks a lot of how the human embryo changes as it grows. It's as if the embryo of a shark and human are extremely similar when in the womb and the human embryo goes from being so similar too shark and grows into a human. PART 2: Dispute: Humans and sharks both have four gill arches as embryos, but the germ layers and arches develop into unrelated structures in each organism.

As an adult you have three parts of your head: plates, blocks and rods. The plates as I'm sure you can figure out is the skull itself, the parts surrounding the brain. The blocks are pieces of skulls with arteries and nerves running through them and the rods make up our Jaws, some bones in the ear and others in our throat. Some cranial nerves have one job which is to attach to a muscle or organ or the nerve may go through nasal structures which takes information from their to our brain. The obvious would probably be our optic nerve and out acoustic nerve which is eyes and ears.

The largest nerves are the terminal and facial. They exit the brain and go wrought your body in branches and they carry information of sensation and action. But it all has to start somewhere, nobody starts life with a head.

You'd never think so but oddly enough, snacks and humans are more similar than realized Especially when it comes to the embryos of the two. There is a

pattern common to every skull on earth, whether it belongs to a shark, a bony fish, a salamander, or a human (Subbing, 2008). The pattern Subbing is referring to is the four arches.

The first arch for both the shark and the human forms the terminal nerves and the Jaw, only preference being, humans form two tiny ear bones: the malleus and incus. The hood, this is the bone that helps us swallow, forms in a shark's second arch as it does for humans but humans also form the third ear bone, the stapes. Third and fourth arch are crucial when it comes to survival because for sharks, this builds tissue that support their gills. The muscles we use to swallow and talk are what move the gills for a shark.

Another key thing formed in humans in the fourth arch is part of the larynx which is a key part of the respiratory system leading to the trachea, bronchus and then lungs, so they both form key things for receive oxygen. As noticed, sharks and humans are extremely similar as embryos and furthermore, parts of their embryo resemble many of the things that our arches form into from embryos. They may not function in an identical way but they're close enough to show that sharks' and humans' embryos often form similarly.

Chapter 6: The Best-Laid (Body) Plans Going by the recipe and the dispute statement, it's easy to predict this chapter will possibly talk about how every part of each scientist's work is key and every experiment should be looked at whether relevant or not. C) Description: In a way, every discovery a scientist made, it was a key ingredient to this huge recipe of science. Without one

scientist, your cookies would end up awful and missing a piece and that's what the recipe is telling us.

Of course you can change the ingredients, maybe a certain scientist discovered something else before someone else did and do you get a different outcome but regardless without that scientist and discovery, your cookie won't be complete. That's how the cookie crumbles. PART 2: Dispute: Scientists work in isolation: it is counter-productive to repeat another scientist's experiments or to consider research that is not directly related to the organism you are studying. When teachers give an assignment in class they often say you can work with partners but if you want to work alone you can, but whoever does that?

No one. Almost 9 times out of 10, a student works with enough. Cooperation and joint effort always gets something done faster and that's something scientists are familiar with. If they want something done, they seek help and answers. A good example of this is Karl Ernst von Baer because he couldn't afford incubators to work with chicken eggs so Christian Pander did what he could to help him and they ended up discovering together that all organs of a chick can be traced back to one of the three germ layers like the human embryo.

This told all scientists: "No matter how different the species look as adults, as tiny embryos they all go through the same stages of development" (Subbing, 2008). Who says another scientist's research can't be handy? When von Baer compared all embryos, he decided they all look more similar to each other rather than the adult to their species and that's when Ernst

Hackle claimed the embryo of a human went through a fish, a reptile and a mammal stage (Subbing, 2008). Though people took von Baer more seriously and Hackle was said to be comparing apples and oranges, the help of von Baer led Hackle to this observation.

The embryos of different species of course aren't identical but of course they are profoundly similar. But what makes these embryos form into such different things? Do only certain cells have the power? Do all of them? That's where the questions started: which cell is capable of building an organism? Hans Spemann, a German embryologist, was on the hunt for the answers with his first experiment being taking his daughter's hair and pinching the cell until it was apart. This cell formed two whole salamanders which gave him the conclusion: one egg can become more than one individual.

Hillman formed an experiment where she took a small piece of one embryo and grafted it to another and this formed two beings again. They had discovered the Organizer based on information from each other and coming up with new ideas. Fly growth isn't all that relevant is it? You may not think so but it was extremely important when trying to figure out what gene has a part in development. In a fly, there may be mutations. Mike Levine, Bill McGinnis, Matt Scott and Tom Kauffman all did the same experiment to try and figure this out.

They always say two is better than one but scientists must be in abundance at the time. Nothing wrong with going over something twice because you may find something that someone else didn't. Or what you find can be validated with another trial. In this case, they validated that there's a piece

of DNA that is identical in all species and they called it the Hoax gene and it's a gene that shows up in every organism with a body. Is the gene is toyed with, it can alter the entire body plan and mutate it. If it weren't for the collaboration of von Bare and Pander, this may not have been discovered for years.

It's crucial for scientists to work together and perform an experiment more than once for the validity and possibility of finding something they previously missed. New information relevant or not is very key. Chapter 7: Adventures in Bodybuilding Muscles, tendons and ligaments are key things when it comes to the physical function and movement of the body. Perhaps this chapter will talk about how those things are formed and how straining things too much could damage them and injure oh. (c) Description: As always, the predictions aren't nearly spot on but the chapter does speak of how the body itself is formed.

The first block in the picture may be an example of bone or muscles formed and each strand is a mixture of molecules and cells and further broken down would be all the DNA and what not and messages being sent to other cells so they know what are doing. The picture is a cluster of a certain type of cell that forms either a muscle, bone or organ. PART 2: Dispute: All tissues in the human body are made of similar cells that connect to each other in similar fashion. Grade science, about, you learn about the atom and now atoms tort molecule that work with cells.

The teacher at the time may not have specified what the molecules do and that job is to hold cells together as a glue so that they can form structure

and communicate with each other. There are a variety of molecules holding together those cells. In most cases, there's a rivet in the membrane of a cell that can connect to another certain type of cell. This way bone cells are with bone cells and skin cells are with skin cells. The way that these cells form together in different forms ND patterns, distinguishes what the cells are going to create; the reason limbs and so on look so different is the way the cells are arranged deep inside. Tissues have all kinds of different cells, which attach to one another in different ways: some regions have strips or columns of cells; in others, cells are randomly scattered and loosely attached to one another" (Subbing, 2008). This shows that many cases, cells stick together in all types of ways rather than one similar fashion and one type of cell. One thing Neil Subbing did was test students on identifying organs on a slide by knowing how the cells are arranged and what is between them which is molecules. Molecules that make cellular arrangements possible are the molecules that make bodies possible. The molecules between bone cells is a mineral called hydroxylation and a protein called collagen" (Subbing, 2008). Hydroxylation is what determines how strong your bones are when compressed and collagen is what determines the strength of your bones when pulled. Between all your joints is cartilage; without it, movement would be painful with bones moving against each other so raw. What happens to form cartilage is a molecule called proteoglycan swells up with water and it combines with collagen to build cartilage. All types of cells stick together to build different things.

Subbing states: " Teeth are very hard and, predictably, there is lots of hydroxylation and relatively little collagen between the cells in the enamel.

Bone has relatively more collagen, less hydroxylation, and no enamel. Consequently is it not as hard as teeth. Cartilage has lots of collagen and no hydroxylation, and is loaded with proteoglycans. It is the softest of tissues in our skeleton. One of the main reason our skeleton look and work as they do is that these molecules are deployed in the right places in the right proportion” (Subbing, 2008).

As a whole, it takes more than one type of cell and more than one type of pattern to form a human body. Chapter 8: Making Scents Going by the title of the chapter and noticing the dispute talks of smell and scents, this chapter will likely be talking about how versatile the genes and structures of the olfactory sense is throughout many species. (c) Description: I feel as though the suitcase symbolizes the olfactory genes that are useless so they’re ‘packing their bags’ so to say and just hitching a ride through evolution.

It could also be the giveaway statement: We carry a lot of baggage in our noses or, more precisely, in the DNA that controls our sense of smells. In this chapter it mentions how humans, whales and dolphins all have olfactory genes that are useless in their sensory but they’re still there as sort of a ‘silent record of evolution’ in mammals. PART 2: Dispute: There are two genes dedicated to olfactory sense and they are similar in all organisms capable of detecting smell. Think about all the odors you’ve smelled in your entire life. Now think of having a gene for every scent. That’s a lot is it not? That’s precisely how olfactory genes work.

In order for a person to smell something, the receptors in the nerve cells of your mucus lining must have an odor molecule attach to it so it can send

signal to your brain that you're smelling that. Author, Neil Subbing, says, "The lock is the odor molecule; the key is the receptor on the nerve cell" (Subbing, 2008). As you can imagine, you can obviously detect an odor in the air but how different is that than detecting an odor in water? Much! And that's why organisms such as lampreys and hagfish have one nostril that leads to a sac and that sac fills with water that they can extract an odor from.

Two scientists, Linda Buck and Richard Axel, wanted to find out what gene it is that gives us the ability to smell. They previously noticed that odor receptors have molecular loops that help convey information so that's the structure they looked for in genes. It was also known that in order for this gene to be active, it had to be in olfactory tissue so that's where they started looking and lastly, they assumed if different chemicals stimulate different smells, there must be many of these genes and they were right. They found a huge amount of these genes, so many that 3 percent of our entire genome is devoted to detecting different doors" (Subbing, 2008). The number of genes varies by organism: in much older creatures like Jaijlers fish, the genes are very few. Up the scale of time, bony fish have more, amphibians and reptiles have more than that and mammals have the most over a thousand. Two aquatic animals have a noticeably large amount of useless olfactory genes: whales and dolphins.

It's been discovered that the reason behind that is they're nasal passage isn't for smell, it's for breathing so the genes are doing absolutely nothing for them. There's an amount in humans that are also useless because we have color vision. With vision, your sense of smells is deemphasized and so less

more olfactory genes are functionless and that's all our extra baggage.

Chapter 9: Vision The book *The Metamorphosis* is about a boy who wakes up transformed as an insect and knowing anything about insects is they have unbelievably creepy bug eyes.

I think this chapter will discuss the different capabilities of sight in many species and why some have color and other don't. It may go on to talk about the various structures of different species' eyes. (c) Description: The only link really with the book is that Walter Gearing found the switch for eye placement through experimentation on flies and moving the eye gene different places. PART 2: Dispute: All organisms with vision have similar eyes and similar vision genes. There's just something so appealing about eyes.

But then you realize how terrifying a bug's eye is and suddenly they aren't so appealing. Imagine walking about with fly eyes. There's so many variations of eyes aesthetically when it comes to mammals, birds, and insects but it goes much deeper than that. When light passes through the cornea to the retina, the light receptors send signals to our brain that we can see as images. The retina gathers light by light-gathering cells: sensitive and insensitive. Sensitive cells record only in black and insensitive cells record in color.

Compared to the 3 percent of olfactory cells, humans have a huge 70 percent of sensory cells in our body which really emphasizes the importance of our eyes. More than this, when a molecule absorbs light, it becomes two things: vitamin A and protein called opsins. When opsins break off, they start a chain that leads to a neuron that sends an impulse to the brain and we're able to see; it takes one opsins to see black and white and three to see

in color. Since there are three different light receptors, there's three different genes, two of which most mammals have and the third is practically a combination of the two.

This is nothing like what invertebrates see. A well known invertebrates is worms and what happens for the worm to see if there's numerous folds in the tissue that had projections from it to see a larger area. When a worm is seeing, they see from their eye and also part of their nervous system which has options and cellular structure like a vertebrate does. A scientist, Mildred Hose, was noticing mutations in fruit flies that had no eyes ND she had seen it in many flies and soon after mice as well and some humans had the problem as well.

Another scientist, Walter Gearing, after the eyeless gene was discovered, started experimenting with this gene and putting it in weird places on a fly to see if it would develop an eye there. Every place the gene was, an eye formed so Gearing began trading that gene in mice and the mice formed a fly eye. This is when Gearing realized eyeless and Pax 6 controls development of eyes though they won't form the right eye, just the eye of the organism the gene was taken from so eye genes are universal. Chapter 10: Ears This chapter could possibly discuss the connection between ears and eyes and how sensitive they are of each other.

Because of the elephant in the snow globe, there's a possibility elephant ears will be a part of the reading. (c) Description: The snowplows image, as mentioned in the chapter, is a much larger version of the gel sac in the ear. When you shake up the snowplows, the "snow" is a bunch of nerves that

have hairline projections that bend to send impulse back to our brain. PART 2: Dispute: In humans, eyes and ears function independently of one another; sensation in one does not affect sensation in the other. Everyone has seen a drunk person.

They're seen at parties, on TV, in movies, etc. They're noticeably off balance and incomprehension but it's all with scientific reason. Inside a person's ear is a gel filled sac and inside the gel are all nerves with projections that bend. When the projections bend, they send an impulse to the brain that registers as a sound, acceleration or a tilting of the head. When a person consumes alcohol, alcohol has high amounts of ethanol whereas our gel filled sac does not. Ethanol flows throughout the bloodstream when a person drinking and