>> Deb Feickert: I'm going to take myself off the – your screen. The skeleton. Here we go. Again, a little bit of review for this, for us. All right. So, we're going to talk about - we've done this already in lab. We had two large scale in nature groupings when we talk about the skeleton. And the first is called the axial skeleton. Axial meaning central axis of the body. So, we've grouped these bones already. But here they are. Skull, vertebral column, and thoracic cage. We could also say thorax. Remember, that we can have different ways that we pronounce these words. Different ways that we might spell these words based on how it's being used. So, just a reminder that doesn't mean something different. It's just if I say the word thorax. Yes, Venessa, go ahead.

>> The slide show still on the first page. Like the intro page.

>> Deb Feickert: Hmm. All right. I don't know why that would be. Thank you, thank you for letting me know. Let's - you should be seeing - I'm going to go back and see what happens. So, here's our facing page. How about now?

>> It's still the same.

>> Deb Feickert: Is this true for everyone? Is this?

>> Yeah.

>> Yeah.

>> Deb Feickert: Okay. It's - okay. Here's what I'm going to do. I'm just going to - I'm going to stop. And restart. And see what happens. Okay. So, hold on.

>> Deb Feickert: Here we go. Look at. Okay. I'm going to try it again. What about now?

>> Yeah, it's fine.

>> It's good now.

>> Deb Feickert: Yay. All right. You know what, this is always, this is always the plan. Turn it off and turn it back on. I don't know. This is my - this is always my solution to all thing's technology. All right. So, thank you for raising your hand that. That's the best way to get my attention during a slide show. Thanks, Venessa. Okay. So, here we go. Axial skeleton. Central axis of the body. And groupings of bones. The skull, vertebral column, thoracic cage. What I was saying about that is the words are the same, mean the same things. Just how they're being used. So, when I use the word thoracic that is an adjective. It needs to be followed by a noun. Thoracic cage versus if I just say thorax. Thorax is the noun. So, I don't have to use the word cage. I could just say the thorax. So, remember, just different usages of words. They mean the same thing. So, what is happening with my axial skeleton? So, let's - this is a very general statement. We're going to give specific functions to each of these. We've already talked about some of them already. So, again a little bit of a review. But if we just talk in general, what is the axial skeleton

do? It's a framework. It's what the rest of our - the rest of our systems either sit upon or are found within. So, it's going to be a structural support system or protecting organs inside of my body cavities. That's very general. We'll get specific. It's also an attachment site for muscles, right. Skeletal muscles attached to the skeleton. And so, the axial skeleton, in particular, are going to be muscles that adjust my posture, assist with respiration, and stabilize that is attach. And give structural support to the other part of the skeleton called the appendicular skeleton. So, again remember what these bones are. We're talking about [inaudible] the vertebral column and thoracic cage. Vertebral column, thoracic cage. So, adjusting posture, assisting respiration should logically make some amount of sense. And it's all in the axial skeleton that we attach the appendicular skeleton and muscles that attach the appendicular skeleton to allow for movement. So, in this diagram, anything that's in this kind of tan color is our axial skeleton. So, always remember, remember, remember, remember the view, anterior view here. As I'm trying to define it. Any structure for the rest of the semester since we are working with print media, we need to know the view. So, here's an anterior view versus that posterior view. I'm going to show you a lot of figures today. And I'm just going to move those very quickly. But they'll be here later. These are the same figures you would find in your textbook. So, let's start with the skull. The skull its 22 bones that are interlocked. Meaning tightly connected by joints that we call sutures. And we talked about this in lab on Wednesday. We're going to come back to the sutures when we talk about joint specifically. For now, we've seen the sutures. We know the sutures. We love the sutures. So, what are these 22 bones? Here're the ones we discussed last week. Cranial bones. And here now are specific functions. The cranial bones enclose and protect the brain. There are eight of the 22 bones that are called cranial bones. Some of them are singular. Like the frontal bone, the sphenoid bone, the occipital bone, the ethmoid bone. There's just one of those. But some of them are right and left. So, our temporal bones and our parietal bones we have a right and a left. Then there are 14 facial bones that we're going to talk about after our break today. And those are going to form da-da-ta-da. The face. Right. Our cheeks, our nose, our palate, right. Rub tongue on the roof of your mouth is what we used to call that. That's our palate. The orifice, where the - or the eye sockets and the jaw or mandible all make up our face. There's 22, but we also have seven other bones that are associated with the skull. And those other seven bones they aren't interlocked by sutures. But they are associated with the skull. And so, we have six, we saw these last week's ear ossicles. Three on the left, three on the right that are inside the temporal bone. Those teeny tiny ear ossicles, the malleus, incus, and stapes. And we have one bone we'll at today called the hyaloid bone. And the hyaloid bone is the single bone that floats over a structure, an organ called the larynx. The larynx is what you used to call your voice box. And so, we will see the hyaloid today. So, here I'm [inaudible] quickly but I just want to show you these. This is what you should be looking at as you're looking at the bones in your atlas. But also, in your textbook. Because in the textbook it will show you a colorized version of the skull. And the importance of that is that I can see the bones

individually. My eyes drawn to different colors. And I can see which bones are forming sutures with which other bones. That is articulations. So, this - these views, these colorized versions are super important. This is nice because it separates them. My cranial bones from my facial bones. My cranial bones take the facial bones away from my facial bones. Here's a lateral view. I told you again, beautiful, beautiful, beautiful. I can see all the bones colored in a different way. Different color cones, different bones, different colors that form the orbit. Different color bones that I can see inside of the nasal cavity. And so, things that - some that we have already seen, these parts of the in red here of the ethmoid bone. Others that we'll see today. The vomer. The inferior nasal concha. Superior view with a view of the sutures. We say this view last week. But this is nice. Colorized for us. And then in the natural bone color. Posterior views. Same thing. That lambdoidal suture that we talked about. And again, pointing out the bones by color. And just another lateral view with a few more specific structures. Beautiful, beautiful, beautiful. Be taking a look at these while you're trying to figure out how the bones articulate with each other. And an inferior view. Don't forget the inferior view. There are, there're lots of structures that we can see again, by color, different color, different bone with an inferior view. The inferior view's going to be important. Vertebral column. We're going to, I think, I hope to get to you today. We have 26 bones in the adult vertebral column. 24 vertebrae. One sacrum and one coccyx. Again, plural with an e. Vertebra would be singular. A vertebra. 24 vertebrae. So, several specific functions of the vertebral column. We already know this one. It encloses and protects the spinal cord. We talked about that on day - I don't remember. One. It helps to support the weight of the skull. And the head, neck, and trunk. So, structural support in terms of the placement of the skull and then supporting the weight of the head, neck, and trunk. The vertebral column transfers our weight, our total weight, where you know most of our weight is from the trunk up to our lower limbs which is important because that's how we move. So, we need to have this transfer of weight to our lower limbs. And right vertebral column everybody sit up straight right now if you are hunching. Sit up straight. Helps maintain your upright body position. The vertebral column. So, we have regions of the vertebral column from proximal to distal. Okay. Review. Directional terms. We said proximal to distal or proximal and distal were terms that we use usually when we talk about appendages. And it has to do, the words have to do with point of attachment. So, the closer the point of attachment, something is more proximal. The further away from point of attachment something is more distal. And that is absolutely true. And we can - let's say elbow. We said the elbow is distal to the shoulder. But the elbow is proximal to the wrist. But the other places we can proximal and distal are any structures in our body with length. And we talked about that as well. And we said vertebral column is one of these examples. The vertebral column is long. It has basically a beginning and an end if we go from if we go from the top to the bottom of the vertebral column. The other place we're going to talk about proximal and distal would be the digestive tract. It has a beginning, the mouth, and an end, the anus. So, vertebral column proximal to distal. Here are

the three or the five regions. We have what are called the cervical vertebrae. The cervical region seven vertebrae. We have a thoracic region. 12 vertebrae. We have a lumbar region. Five vertebrae. So, forevermore let's do a little side note. Because what do we say if we know what region - what the definition of a region is we'll know where to look for structure. So, whenever we hear the word cervical, we are going to think neck. Neck. Whenever we think thoracic or thorax, we're going to think chest. Whenever we think lumbar, we're going to think lower back. Sacral. One sacrum. So, the sacrum is actually five fused vertebrae that now become one bone. The sacral bone. Sacrum. And then lastly coccygeal or one coccyx. Again, these are three to five fused vertebrae that we call the coccyx. So, here are our terms for our five regions of the vertebral column. And we'll be hopefully be looking at these bones today. So, this is what it looks like. We have an anterior view. Note your view. Versus a lateral view. And so, here we have a division of the seven cervical, the 12 thoracic, the five lumbar, one fused sacrum, and one fused coccyx. When we look at the vertebrae we're going to see - when you look at this in your lab book, there are a whole bunch of structures we need to know. So, these again, are nice diagrams that will help us with this when we're looking for them. Always note your view. Superior view. We won't run through them today. We're going to look at them in lab. The posterior view. Lateral view. It's telling me which vertebrae I'm looking at. L meaning lumbar. L1, L2, L3. This is - we talked about it last week. This is cervical one, C1 which is called the atlas. And the atlas is important - they're all important. But the - we talked about it because this is the vertebra that articulates with the occipital bone of the skull. This is cervical two called the axis. And the atlas and axis articulate like so. And this will - we'll show it today, allows for this movement called a pivot. A rotation. It's a pivot joint which allows for our rotation movement. So, if you look right now, look to the right. Then look to the left. That's [inaudible] by these two bones, the atlas, and axis. This is the fused sacrum. So, this is what we're meaning by individual vertebra that have been fused into one bone. And the fused coccyx. Posterior view of those bones. Thoracic cage or again, thorax. What are we looking at? Two primary functions. We know this already. Talked about it. It's protecting - okay now this is a specific - we talked about this before. Specific function. So, we aren't going to say protects internal organs. We're going to say protects heart, lungs, thymus gland, other structures we would find within the cavity like the serous membranes. The nerves and blood vessels that pass through the thoracic cage. And again, an attachment site for muscles now very specifically of respiration, positioning the vertebral column, right. So, that we get that upright body position. And muscles that allow my pectoral girdle and upper limb to move. Pectoral meaning shoulder. So, this is my attachment site for the pectoral girdle upper limb at the thoracic cage. So, here is what we're looking at. Bone called the sternum. And again, it has a length. This bone has a length to it. And so, it has a proximal to distal region in this order. Most proximal is called the manubrium. Then the body. And most distal is the xiphoid. We'll take a look at it in a second. And 12 pairs of ribs. So, we have seven what are called true ribs, five false ribs, and two of the pairs of false ribs are called

floating ribs. And we'll see why in just a second. Then lastly, attaching the ribs to the sternum we have what are called costal cartilages. So, side note. This word costal, forevermore, forevermore when I see the costal, I'm going to think rib. Costal means rib. So, the costal cartilage is okay, here we go. Here's some histology. When we're seeing histology, we might expect to have to answer questions on an exam about histology. All semester. So, costal - it tells me what it is. It's some sort of cartilage. And in fact, it's hyaline cartilage connective tissue. Remember, it's okay to use this abbreviation on your tests. It's okay to put CT on your tests. Hyaline cartilage connective tissue is connecting the ribs to the sternum. So, here's what it looks in total. Right. All of those ribs. 12 pair. Ooh, interesting. 12 pair of ribs. 12 thoracic vertebrae. Ribs attach posteriorly to thoracic vertebrae. That will be important to us in the lab, in particular. So, here are my ribs. Here's my sternum. Proximal to distal we have manubrium, body, xiphoid. And then here's that hyaline cartilage connective tissue attaching the ribs to the sternum. So, what did we say? We have 1, 2, 3 - oh, so it's counted. It's numbered over here. Never mind. One through seven are called true ribs because they have costal cartilage that attaches directly to the sternum. Eight, nine, and ten are false ribs because they're costal cartilage attaches by way of number seven to the sternum. And 11 and 12 we can see don't' have any costal cartilage. They're floating. Floating ribs. 11 and 12. This is what a rib looks like. This disarticulated. So, we're going to take a look at a rib. And this is an attachment of a rib to a thoracic vertebra. A rib attaches to a thoracic vertebra in two positions. We'll look at that in lab. And that's the axial skeleton. What? Okay. Appendicular skeleton next. Our second large grouping. So, appendicular skeletons' job helps me to change my position in the external environment. What does that mean? Movement. So, my appendicular skeleton brings about movement in my environment. So, here's what we're looking at. We'll talk about these bones beginning on Wednesday. So, bones at the upper and lower limbs. And the girdles of the bones that attach the limbs to the axial skeleton. So, that weird girdle means circling. And what we'll see is the girdle kind of circles the axial skeleton as it attaches to it. If you think of an old-timey old fashion girdle, right. Before there were Spanks. There were – people wore girdles. And they were really tight rubber material that ladies would pull on to hold everything in. Oh, my gosh. Sounds awful. But what's happening? A girdle then in our skeleton is holding the appendicular bones onto the axial bones. So, now in the tan, we're seeing the appendicular skeletal bones. So, this is an appendage. This is its girdle. This is an appendage. This is the girdle. So, you can see what it means by surrounding. Right. Here it starts here and surrounds the axial skeleton. It starts here and surrounds the axial skeleton for the attachment of the limbs. So, let's start with the pectoral girdle. That's my shoulder. So, the girdle itself is made up of two bones. An S-shaped bone called the clavicle. They used to call it a collar bone. And a flattened bone called the scapula which is your shoulder blade. And the clavicle is the bone that articulates with the axial skeleton. And in particular, it articulates with the manubrium of a sternum. So, this is amazing. The only place where your arm is attached to the rest of your body is this little skinny bone called

the clavicle attaching to the sternum, the manubrium of the sternum. So, what is the job of the pectoral girdle, or what are the jobs of the pectoral girdle? It's the point of attachment for the bones of the arm and hand. Okay. So, this is where the arm and hand attach to the axial skeleton. That's its job. Here are the bones of the upper limb. We're just going to kind of run through them. List them. Show some diagrams. Because of course, we're going to talk about them in lab. So, here are the bones of the upper limb. It's called the - and I'm going to in parenthesis explain to you which bone this is, so you can picture it. So, we have a - and remember, bilateral. Both sides. So, we have a humerus, an ulna, and radius. These are the bones of the forearm. The bones of the wrist are called carpals. And then the bones of the hand and these are in the order that you see them here. Meta means next to. So, next to the carpals are the bones of the hand. The metacarpals. And then the phalanges are the bones of the fingers. So, humerus. This is going in - also, this is moving from proximal to distal. Proximal to distal. Humerus, ulnar, radius, carpals, metacarpals, phalanges. This is what the clavicle looks like. This is why we say S-shaped. Well, that's not a true S because one curve is bigger than the other curve. But you see this kind of S-shape. What am I seeing here? This is the beauty of this diagram. It shows me where it's located. This is the attachment point. This is it. This is the only place there're having this attachment onto our axial skeleton of the upper appendage. Crazy. Scapula. It's showing me the location. It's the posterior right shoulder blade. It's not actually attached to the axial skeleton. The scapula is held in place with a whole bunch of muscles that help to stabilize the joint. Rotator cuff muscles. This the humerus. Right. So, I'm seeing - again, always know your view. Anterior view. Diagram actual bone. Posterior view. Diagram actual bone. Posterior view. The radius and ulna. Make this note. Now, we'll make it several times. The ulna is the medial bone. Remember, SAP. I'm giving you information in standard anatomical position. Medial versus lateral. So, the ulna is medial. The radius is lateral in the forearm. This is the specific movement that the radius can make or the ulna which is called pronation. We'll talk about it when we talk about joints and movement with muscle - with muscles at joints. And then we have the, right, these are called the carpals. Bones of the wrist. Metacarpals. Bones of the hand. And phalanges. Bones of the fingers. Pelvic meaning hip girdle and lower limb. So, let's start with the girdle. Supports and protects - now, a little bit different. We have an additional function here on the pelvic girdle. Whereas the pectoral girdle, its job was to attach the upper limb to the axial skeleton. The pelvic girdle's also attaching a limb. But it also has some structural support and protection features. And remember, we're not just saying protect. We're not just saying support. We have to say support the lower viscera and fetus in females. Or protects lower viscera and developing fetuses in females. Let's be specific about what we're saying that's being supported, protected. It consists of two - the girdle consists of two what we call os coxae bones. This is plural. Take the e off. Os coxa. I have a right os coxa and a left os coxae. And they are again, fused bones called the ilium, ischium, and pubis. We'll take a look at that more - in more detail in lab. So, right its first job is supporting and protecting lower

viscera developing fetus. But it's also point of attachment for the lower limb. So, this is my second job of the pelvic girdle. And it consists of - lower limb consists of the femur, which is the bone of the thigh. Patella which is the knee cap. Tibia and fibula which are the bones of the leg. Tarsals are bones of the ankle. And there's that prefix meta. Next to the tarsals are the metatarsals which next to the ankle is the foot. And again, that word phalanges is also used for bones of the toes. So, the lower limb. The lower appendage. Femur. Patella. Tibia and fibula. Tarsals. Metatarsals. Phalanges. Lower limb attached by way of the pelvic girdle. So, here is the pelvic girdle and the two os coxae bones. So, here is a left os coxa, right os coxa. Here is their location. Where are they attaching to the axial skeleton? At the sacrum. They're attaching to the axial skeleton at the sacrum. We said that they are fused. We'll see it in lab. But I just want you to see that these three fused regions. Here's the ilium. Here's the ischium. Here's the pubis. And those three regions together are called an os coxa. So, a lateral view. This is nice too. I want you to see. This has colorized the three regions of the bone for you. So, ilium, ischium, pubis. I like that. And then this stretcher called the acetabulum is the attachment point for the femur. All right. Medial view. So, remember medial's going to mean more toward the midline of the body. Here is the longest bone in the body, the femur. Anterior and posterior views. Here's the patella. Anterior and posterior views. The tibia and fibula of the leg. Again, let's make a note. Tibia is medial. Fibula is lateral. Tibia is medial. Fibula is lateral. We'll talk about that again in lab and the importance of that. Posterior view. And the bone's called the tarsals. Metatarsals. Bone of the foot. Remember, tarsals are ankle. Metatarsals are foot. And phalanges again, are the toes. So, this is our right foot superior view, looking down at the top of my foot. And we'll [inaudible] those in detail in lab. That's why we're not spending too much time right now. So, we already have this. I printed this out for you last week. We're going to keep this page handy so that we can - if we're looking for a structure and we can't find it; we have the definition of the structure in front of us. So, again, I'm not going to spend a lot of time on this, except to say two things. For each of these groupings, I am going to want to know the name of it for lab. But for lecture, I have to know the definition and the function. So, if I said to you, asked you to tell me which bone feature is a pointed extension from muscle attachment? You should be able to say spine. So, this is the definition. And this is the function. So, the functions are always going to be either that - that bone feature is for muscle attachment or it's going to form a joint. Or it's going to be for tendon or ligament attachment. That's what the bumps and the indentations on the bone are for, for the most part, is attachment of something. We have a couple other functions we'll see in a minute. But, these we don't - I'm not going to spend time on. But these are in your lecture outline. If you don't get - have a lecture outline, you can go back and fill in your notes later. Your depressions, right. So - whoops. [inaudible] come back one too many clicks. So, what do we have? Again, we've seen some of these words already. We've looked at fossa last week. Right. A shallow pocket. What it's there for? It's most often going to form a joint or an articulation. We looked at a sulcus. A groove. Now, something a

little bit different than articulation or muscle attachment. A sulcus is usually an area for a blood vessel would sit. So, again, words that we'll encounter in lab. Every time we use them, we'll know more of the definition. And lastly, we have openings and chambers. It's a little bit different on openings and chambers. Because openings and chambers are probably there for passageway of some sort. We talked about foramen a lot last week. It's a hole. What's it there for? Blood vessels and nerves. We called these soft tissues. We saw fissure, right. Superior orbital fissure was a narrow slit or a gap or a crack. Again, what's going to go through there? Vessels, nerves. We know what the orbit is. It's a deep socket. It's the definition for the eyeball. And we saw meatus as well. We said that's just an entrance. And that entrance is going to be so nerves can pass through or soundwaves, external auditory meatus. Sinus lastly, we saw. Concealed hollow cavity. And there are other jobs. But for now, we're going to say lightens the bone. Here're some other things I want to say to you. What do we know? That the architecture that is the design, the form, the function - or the form, excuse me. Of a bone. And the surface features directly relate to the function of the bone. So, what do we know? This we can say about the skeleton. What is the skeleton do? It protects vital organs and soft tissues. Vital organs; heart, lungs, digestive organs, brain, spinal cord, soft tissues. Again, nerves, blood vessels. The skeleton allows for movement and leverage by forming joints and proving muscle attachment. The skeleton supports our body weight. The skeleton allows for passage of soft tissue or soundwaves. The skeleton and we'll talk about this more on Thursday is a mineral reserve including calcium, phosphorus, sodium, and potassium. We said already that the matrix of bone along with collagen fibers includes calcium and phosphorus predominantly minerals that help make it up. So, we're reserving these minerals in our bone. So, these are the - this - the way the bones are designed, allows for these functions. But here're some specialized functions. So, this is an important word. Specialized functions. So, some bones have special unique form that they have specialized functions along with the functions we just mentioned. So, let's talk about it. The female pelvis is quite wide compared to the male pelvis. And its specialized function? You know this. Right. Childbirth. So, that wide female pelvis it's very specialized in its form so that there's more - there's room for childbirth. The male skeleton in general is heavier than the female skeleton. You know this. Why? What's attaching to the male skeleton, skeletal muscles which in general are heavier than female muscles. In general. I don't know. If you're working out. Weight training. That might not necessarily be true. You have arches hopefully in your feet. There's a reason. That helps with your balance, so you don't fall over. It helps to absorb shock. And it helps with correct posture. So, that's why people with - that don't have arches, flat feet, have a lot of trouble with shock absorption in particular. So, then they often have a lot of pain in their legs and hips because they're not getting shock absorption. The patella. The kneecap is a fulcrum. The word fulcrum means it's a support that a lever pivots on. What is the level at the patella? It's the muscles that cross the joint which are very large, very heavy muscles. So, it needs a little extra support, structural support. The patella. And you already know about our ear ossicles.

They transmit soundwaves. Very special job. Our sinus cavities. We mentioned [inaudible] helps lighten the bone. But it also helps to clean, warm, and humidify air. We mentioned this last week in lab because of the mucus membranes that line them. It's a very special job. That sacrum is fused. Why? Because what's attaching to it? My pelvic girdle and lower limb. I don't want my pelvic girdle- think about the other vertebrae. They are not fused. And there's a lot of movement that you can [inaudible] move at your vertebral column. You don't want movement at your sacrum. Because they - your sacrum is where your lower limbs attach. So, we don't want a lot of movement in between the vertebrae there. We want a nice strong structural support so that when we're sitting or standing, our lower extremities are held in place. We don't want to fall over. We're going to finish with bone disorders. So, in many of our systems from now on, we'll talk about some disorders that might occur in the system. Here're some common bone disorders. Rickets. What is rickets? It's where there's not enough calcium deposited in the bones. And this is important. Primarily in children. And that's usually from a vitamin D deficiency. Remember, we talked about last time. We need vitamin D so that calcium and phosphorus can be absorbed in our bones. So, if we aren't getting enough vitamin D those minerals are not being absorbed into our bones. And so, what happens? Our bones are soft. Because it's the mineral deposit that makes the bones hard. And if they're soft they bend. And so not only do the bones bend but then I get a delay in growth of bone. Because there isn't mineral being deposited. And my muscles are weak. Because my muscles attach to the bones. And my muscles are expecting hard strong bones. So, now I don't have a strong enough support to make my muscles strong. Right. Bowed legs often are an indicator of rickets. Not always. But often. Osteo. Osteo, osteo, osteo. Always means bone. Osteomalacia is also a reduced calcification. But now not in children. In pregnant women. So, why would I have reduced calcification if I'm pregnant? Where's the calcium going to? The fetus. So, if I am not also making sure that I am getting enough calcium, this is why in more developed countries, people take prenatal vitamins. So, that they do not - they are making sure that they're getting the supplements they need for healthy growth not only of the fetus but so that they don't lose their particular health in terms of in this case bone health. So, same thing is going to happen. Soft bones. Muscle weakness. Bending of bones in the mother. Ugh. This one is just the worst. Osteoporosis. Poor. Holes. What's happening? I'm going to get brittle and weak porous bones. So, my bones - my bones already have holes. But the holes are going to get bigger. And that's because, and we'll talk about these cells next class. We already know what our osteoblasts do. Osteoblasts lay down bone. Osteoclasts break down bone. And this is happening continuously in healthy bone where I'm having reformation of bone all the time. If I'm working out, I'm exercising, my osteoclasts are breaking down some bone while my osteoblasts are building up more bone. Making my bones stronger. But after menopause especially, in women my osteoblasts, right, all of my cells start to die off. And my osteoblasts aren't as active anymore. Because they're coming from my precursor cells, my stem cells. But my osteoclasts gosh darn it are still active. Just as active as

they ever were. So, my osteoblasts aren't laying down bone, but my osteoclasts are breaking down bone. Yes, my bones get homes in them. Big holes. No good. And so often when we hear osteoporosis, is right, we hear about you know some - an elderly mature. I'm going to say mature. A mature gal is walking, out for her daily walk. Because she's taking care of herself. She's out for her daily walk. And she falls down and breaks her hip. And then she's in trouble. But in fact, what actually probably happened, is that her hip broke, and that caused her to fall down. Because of osteoporosis. Brutal - brittle. Yeah, brutal, brittle, weak porous bones. Take care of your bones. Make sure you're eating correctly. This is throughout the semester. Eat correctly. Get out in the sun a bit. Not a lot. But a bit. Exercise. Because exercise keeps your bones strong. And lastly, osteomyelitis. Osteomyelitis is a bacterial infection. From the inside out. So, I don't normally have bacteria in my bones. But this often follows a fracture. So, I have a bone that has broke you know a compound fracture of the bone shows through the skin. I'm going to get bacteria. And so, in children, this is most often the long bones, right. Accidents. Hey, mom and dad watch this. I built a ramp on some bricks. And I'm going to jump it. This is what my now 32-year-old son said to me one day when he was about eight. Yeah. Fracture of both the, of both the radius and ulna. Again, no good. In adults that most often affects vertebrae. What? Here's why. So, this is not because of a fracture. This is because the vessels that drain the urinary bladder, have direct vessel attachment to my vertebrae. And if I have a urinary tract infection, I can get an infection in my vertebrae. What the? Oh, my golly. Okay. So, bones, bones, bones. We love the bones. We'll stop our lecture here. I, of course, am recording. And we'll make this available as soon as I caption it. I'm going to stop the share. Stop the recording. And we're going to take 10 minutes and - or a little more than 10. We're going to be back at 9:10. Thanks, everyone.