hello everyone
the title of the unit unit 2 module aim
structure and composition of the earth's
crust mental and core
part 2 module number eleven
my name is kimberly fiona afonso so in
this particular module
we are going to study in details about
the crust
the mantle and core and to know
what is the composition of the internal
structure of the earth
what is present in the crust the mantle
and core
at the end of this module you will be
able to summarize the divisions of the
earth's interior
and their compositions in the previous
module we had learned
that based on the densities within the
earth
the seismic waves will either reflect or
reflect
at various depths when there is an
abrupt change in the velocity of the
primary waves and the secondary waves
this abrupt changes will denote there is
a change in the medium
so we have two major discontinuities in
the earth one is the moho discontinuity
which occurs between the crust and the
mantle and the second at 2
900 kilometers depth occurring between
the mantle and the core
accordingly the earth is divided into
the crust the mantle and the core
now let us take a look at the crust
this is the outermost layer of the earth
consider yourself eating an apple
you have the apple in front of you the
skin of the apple
is equivalent to the layer of the earth
which is called as a crust
it is that thin so this crust
has an average thickness of around 35
kilometers
below the continents whereas if you were
standing at the base of the ocean
this crust would be around five to eight

kilometers thick
and 60 to 75 kilometers if you are below
a mountain
so the where then the thickness of the
crust depends upon
which part of the continent you are
lying on
the continental crust is then divided
into two major layers
you have the upper layer and the lower
crust
let us take a look at the upper crust
this uppermost layer of the crust
is between is having the densities from
2.2 to 2.7 grams per centimeter cube
and it is made up of mainly sedimentary
rocks and sediments like sandstones and
shales
it is also called as a granite layer
because they are mainly made up of
granites
gneisses and related igneous and
metamorphic rocks
sometimes you'll not be able to see
everywhere this granite layer
however you'll be able to see it only in
those places where the overlying
sedimentary layer
like of sandstones or shales have been
eroded away through
agents of erosion and through the
process of weathering
since this layer is mainly made up of
silicates of aluminium and potassium
it is referred to as SiAl which means
silica and aluminum and it is the
dominant component
the boundary between the upper crust and
the lower crust is sometimes referred to
as Conrad Discontinuity
and it is variable in nature and missing
at some places
the lowermost crust has a density of
around 2.8 to 3.3 grams per centimeter
cube
in this particular layer the p waves
attains a higher velocity
compared to the layer that's above it
this layer is referred to a basaltic

layer
made up of basic minerals that are dark
and heavy
that are rich in magnesium silicates
hence it is referred to as
sima which means silica and magnesium
as you know that the crust now is
divided into upper layer and the lower
layer
the upper layer has a lower density
whereas the lower layer
is made up of basaltic layer which it
has a higher density
therefore your p-waves has a higher
velocity in this particular region
the oceanic crust is an extension of
this lower most layer
making it the top layer in the oceans
and having an average density of three
grams per centimeter cube
as you can see in this diagram the thing
in the orange is the SiAl
the topmost layer of the crust and below
it in black is your SiMa
so this particular lower most layer
occupies the top most layer
above the oceanic crust as you can see
the top layer
of the ocean crust is also black so
therefore it's an extension of the lower
layer
the average density of the continental
crust is around 2.7 grams per centimeter
cube
whereas of the oceanic crust is around 3
grams per centimeter cube
and below the SiMa or the basaltic layer
you have the occurrence of the moho
discontinuity that varies depends upon
whether you're on the ocean your
continent or on a mountain top
below that lies your mantle this is the
same diagram which is showing you in a
proper picture form
where you can see that your top the gray
the top gray is your crust
and below that you have your orange
which is your mantle
you can see as you move from the surface

to the interior at 2900
kilometers take a look at the figure
to your right
the p waves has a sharp drop in the
velocity
from 13 to almost eight whereas your S
waves here goes to almost zero
so indicating a different kind of layer
and your next discontinuity which is
your mentle core discontinuity
or the guttenberg discontinuity so the
mantle
the mantle extends from the lower
boundary of the crust
to a depth of 2900 kilometers
it has been divided also into the upper
mantle and the lower mantle
data suggests that the density increases
from 3.3 grams to 5.7 grams per
centimeter cube
to the base of the crust there is a
layer called as a asthenosphere
that is also lying within the uppermost
part of the mantle
and it's around 100 kilometers to 500
kilometers depth
and is believe the source of all
volcanic activity
the mantle is considered to be of the
rock type peridotite
and how do we know this it's basically
from the evidence of the xenoliths that
are brought by the magma
to the surface by magmatic eruptions
this xenoliths are basically
rocks that have not really melted but
just been emplaced and
caught up while the magma was erupting
from greath depths to the surface
showing us the depth of a mantle
finally we go to the core
the core boundary starts begins at 2900
kilometers
at the core mantlel boundary which was
also called as a Guttenberg or the
Oldham discontinuity
and this extends till the center of the
earth that is to 6378 kilometers deep
the core is further divided into the

inner core and the outer core
the outer core is liquid we can rightly say so
because the s waves are not transmitted through the zone
and your p waves become very sluggish and there is a
reduction in the velocity whereas your inner core is made up of
mostly solid metallic body
there is a discontinuity between the outer core and the inner core and that is referred to as Lehmann discontinuity
the core is made up of iron and small amounts of nickel and sulfur how do we know this
is basically because of seismic wave velocity experiments that are carried out
and also from the composition of iron meteorites that are thought to be remnants of the other plants that were broken down
during collisions so this iron meteorites
are basically stuff that were differentiated from a
parent body which differentiated into your crust mantle and core
and this was not stable and due to collision it broke apart
so this iron meteorites when they fall into the onto the ground and we examine it we can know that the composition of the
core is made up of mainly dominant iron with some amounts of nickel and sulfur
finally we come to this diagram which shows you
in whole the number on the topmost is first is a continental crust that is seen in brown
the two is the oceanous ocean crust which is seen in blue
then you have the upper mantle followed by the lower mantle
then you have an orange you have the core which is the outer core
and six is your inner core the A the

the letter a denotes your Mohorovicic discontinuity that occurs between the crust and the mantle
and B is your Guttenberg discontinuity which occurs between
the Mantle and the core and you have the Lehmann discontinuity is a discontinuity between the outer core and the inner core
which separates the liquid from the solid
this is another image depicting the same
and in the next module we will learn how we differentiate the earth based on mechanical properties of the structures of the earth's interior
so this was basically made up of your compositional layering wherein you have the crust which was divided into the upper crust and the lower crust
the upper cruct SiAl the lower crust SiMa followed by a mantle which is made up of peridotitic rock
and it is divided into upper and lower mantle and finally you have the core
which is dominantly made up of iron some amounts of nickel and sulfur and it's divided into outer core and inner core
this is your reference thank you