**Data collection: observation 1 transcript**

**Lesson 1: Elijah A (School A)**

keys

Teacher utterances coded using deductive coding

Initiation moves : Closed-ended question

: Open-ended questions

Rejoinder moves : Eliciting and acknowledging 1

: Clarifying 2

: Extending 3

Learner utterances coded using deductive coding

Dialogic responses : Lengthy

: Detailed

: Deep understanding

: Descriptive

Authoritative responses : Short

: Limited

**Teacher:** Our discussion like I said last time will be on cell division,

now we discussed the cells in detail and some of the organelles found in the…

in the cell, but today I would like to concentrate on the nucleus because that’s

very relevant to our discussion.

Now, I told you what chromosomes are, you all know,

we also drew chromosomes but before they are visible and they become

chromosomes while they are in the nucleus, okay while they are in the

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nucleus, what do we call them? (initiation move, closed-ended question)

**Teacher:** When they are in the nucleus before cell division, they are seen as what?

(clarifying rejoinder move- reframing the question)2

**Learner1:** Cells (short/limited)

**Teacher:** No, the ones that are in the nucleus. I did give you a word and how we

describe them. (Extending rejoinder move- elaborating)

**Learner2:** Chromosomes sir (short/limited)

**Teacher:**  Found in the nucleus and they form, I will give you a clue, they form a…

yes! (extending rejoinder move- asking an extended question/ requesting clarification)3

**Learner 2:** DNA sir (short/limited)

**Teacher:** Okay DNA is part of the chromosome but they are not, we don’t call them

DNA when they are in the nucleus before the cell starts to divide.

They just form some kind of wave-like structure.

(extending rejoinder move- elaborating)3

**Learners:** Chromatin network. (short/limited)

**Teacher: Y**es, chromatin network. Very good!

(eliciting and acknowledging rejoinder move- affirming)1

**Teacher:** So one of the things that you find in the nucleus is a chromatin network that

then if the cell is going to divide, it forms into chromosomes, now just to

remind you. (Teacher draws the structure of a chromosome). That is a

structure of a chromosome basically, with a chromatid and a chromatid.

**Teacher:** This one is what? (initiation move- closed-ended question)

**Learner:** Centromere (short/limited)

**Teacher:** Yeah, that’s the centromere, separating/ connecting the 2 chromatids so this

forms a chromosome.

(eliciting and acknowledging rejoinder move- affirming)1

Now, as we were discussing before we could even talk about cell division,

why should cells divide? To give rise to more cells and to cause growth.

Because fact in sexual reproduction the sperm fertilizes the ovum or the egg

but we usually call it an ovum to form a zygote. Now it’s from this zygote that

these cells are formed. To form the entire organism, even if it’s a human being.

Big as human beings may be, they start as one cell, the zygote. Then this cell

should start dividing, give rise to more cells, more and more cells come up,

and then organs start forming until the whole organism is formed. So it starts

from one cell. Now then, the cells must divide to give rise to more cells, and

that is then what we call cell division, simple, as self-explanatory as it sounds.

Cell division means the cell is dividing. There are some organisms, whereby

that one cell divides into two and those two cells again are organisms, like the

*Amoeba* and other unicellular organisms, just divide into two. Then those two

are actually organisms on their own. Now, we have two types of cell divisions,

it’s mitosis and which one?

**Learners:** Meiosis. (short/limited)

**Teacher:** It’s meiosis and mitosis. Meiosis, I think I’ve mentioned before to you that it

is strictly for the formation of gametes, and then mitosis of any other cells that

are formed as a result of mitosis. Now before any cell divides, it

must prepare itself for cell division. So, the cell has to prepare before it starts

cell division, now then, the preparation should be in accordance with the cell

division, the main essence of cell division is how the chromosomes are going

to be divided into the daughter cells, once that is done then the preparation

itself must be related mainly to how the chromosomes will be divided because

that’s the main aim. Now I think earlier on I told you that each organism has a

a definite number of chromosomes in its cell in the nucleus. Human cells have

how many chromosomes? ordinary human cells,

(Initiation move- closed-ended question)

**Learners:** 46 (short/limited)

**Teacher:**  46, correct. And they exist in pairs, how many pairs is that, from 46,

(Initiation move- closed-ended question)

if you’re talking about the human ones?

**Learners:**  (distinct noise of learner discussion)

**Teacher:** Okay, how many pairs are in 46? (Initiation move- closed-ended question)

**Learners:** 24 (short/limited)

**Teacher:** 24?, 24 then x 2 is 48

(Clarifying rejoinder move- revoicing and reframing question)2

**Learners:** 23 (short/limited)

**Teacher:** So in this case, we have 23 pairs of chromosomes, in other words, they exist in

pairs. Now when the cell enters the preparatory stage, we call that interphase.

That’s what we call it. Inter means in between, so interphase occurs between 2

divisions between the previous one and the next one. During the interphase,

some of the things that happen are that the chromosomes double up, and they

become double, the process that results in chromosomes becoming double is

known as replication. That is the situation where the chromosomes make a

copy of themselves, so the number of chromosomes then doubles up. Now,

remember I said that every organism has a characteristic number of

chromosomes, so if it doubles up it becomes x2, and that can only occur when

the cell is dividing it is going to undergo cell division. It’s not a normal thing

that happens in every cell unless the cell is going to divide during the

interphase the replication takes occurs. Now, chromosomes carry genes, and

the gene is a small portion of DNA, so it's also correct when we say that

chromosomes replicate we are also saying that the DNA is because

chromosomes carry the DNA. So DNA also does what, replicate. Now, why

should the chromosomes double up in number? Because during the cell

division which is going to take place before we even come to it the number of

chromosomes must be maintained in the daughter cells, in other words, let’s

say that this is a human cell and it is in interphase preparing for cell division

then from 46 when the chromosomes double up, they become what? From 46,

they become what? (initiation move, closed-ended question)

**Learners:** 92 (short/limited)

**Teacher:** And then this cell is going to divide and produce two cells so in that case each

one of those daughter cells will have what? after cell division after cell

division, how many chromosomes will be in each cell?

(initiation move, closed-ended question)

Of the doubling up they become 92 then that 92 should be divided equally

amongst the two cells that are going to form and they will be 46 in each cell

phone so it goes back to?

**Learners:** 46 (short/limited)

**Teacher:** The same number of chromosomes that the human cell is supposed to have

now is very important then it's going to reduce replication doesn't occur then

it won't be a human cell. As this is the human cell, this is the chromosome

the number that should be maintained, Do you understand?

**Learners:** Yes

**Teacher:** Okay, so now the processes of mitosis or stages we call phases. The phases

that we shall be discussing in the next few periods are the cell division does

not start stop start again and stop it is a process that is continuous when the

the cell starts dividing it goes on continuously until you have two daughter

cells, but there are certain occurrences that are observed in each of the phases

as we have explained what happens in the interphase. And then the

chromosomes, before the cells divide, they are not clearly visible because they

appear as a chromatin network it's just the network of fiber like cotton, but

then when the cell is about to divide the chromosomes shorten and become

thicker and therefore they can be seen if you apply colour to it, in other

words, you apply a dye then the chromosomes will be seen, clear. That’s

where they get their name from chromosomes, chromo for colour. Now we

said the chromosomes exist in pairs and we call those pairs homologous pairs

of chromosomes, during mitosis one important issue is when replication takes

place the number of chromosomes is doubled, remember when we talk about

cell division, we emphasize a lot of chromosomes that's what is important it is

the entire aim of cell division oh by the way there is a question that I must ask

you. Let me ask you this question children.

Elijah Lesson 1 Episode 2

**Teacher:** What do you think happens if you remove the nucleus of a cell?

(initiation move, open-ended question)

What’s the obvious thing that will happen?

**Learner 1:** The cell will die (short/limited)

**Teacher:** Not immediately, (Extending move- canvasing opinion)3

It will not die immediately, there is something that can never happen as long

as you carefully remove the nucleus, what happens to the cell?

(Clarifying rejoinder move- requesting clarification)2

**Learner 2:** It stops functioning (short/limited)

**Teacher:** when you say it stops functioning, what function are you referring to

(extending rejoinder move- asking an extended question)3

**Learner 2:** It's cell division. (short/limited)

**Teacher:** What about cell division?

(extending rejoinder move- asking an extended question/

requesting elaboration)3

**Learner 2:** The cell division stops functioning. (short/limited)

**Teacher:**  What are you saying? What happens, the obvious thing that happens when

you remove the nucleus? (extending rejoinder move- requesting elaboration)3

**Learner 3:** It will live for a short time, and die after a number of days. (Lengthy)

**Teacher:** But one thing that can never happen when you remove the nucleus?

(extending rejoinder move- challenging to extend ideas)3

**Learners:** Cell division won’t take place (short/limited)

**Teacher:** Cell division won’t take place.

(eliciting and acknowledging rejoinder move- affirming)1

The first thing that will stop is cell division. We’re 100% sure that won’t take

place, so why? (extending rejoinder move- asking an extended question/

requesting elaboration)3

**Learner 1:** Because there is no nucleus.(short/limited)

**Teacher:** Yes because there is no nucleus it won't take place why?

(extending rejoinder move- asking an extended question/

requesting elaboration)3

**Learner 2:** Because the cell division occurs in the nucleus. (descriptive)

**Teacher:** so why? (extending rejoinder move-elaboration)3

**Learner 3:** The nucleus is the largest cell organelle. (descriptive)

**Teacher:** So why? Okay, I agree with you cell division won't take place because you

have removed the nucleus so definitely cell division stops,

but why does cell division stop or not take place when you remove the

nucleus? (Clarifying rejoinder move- requesting clarification)2

**Learner 4:** Sir I'm not sure if I'm right about this but doesn't the nucleus control

everything that goes in and comes out. (Lengthy and descriptive/ detailed/

deep understanding of content)

**Teacher:** No, no, no (Negative evaluation)

**Learner 5:** In the chromatin network they are chromosomes, there are no chromosomes

present for cell division to take place. (Lengthy and descriptive/ detailed/

deep understanding of content)

**Teacher:** Once you remove the nucleus? Okay, okay fine very good!

(Clarifying rejoinder move- requesting confirmation)2

Now, didn't we say that the reason for the cells to divide, the biggest reason is

to divide and to transfer the chromosomes to the daughter cells, that is our

main emphasis here during mitosis that's the chromosomes are being taken

into daughter cells in equal numbers as the mother cell? Therefore, if you

remove the nucleus nothing will be taken to the daughter cells because you

have removed the nucleus and thus have removed the chromosomes. So now,

once you remove the nucleus cell division stops playing because you have

removed the organelle that is supposed to be playing the biggest role in cell

division. So, one important thing that mitosis does as it divides the mother said

to form two daughter cells that will be like each other and the mother

cell genetically the same, and therefore DNA must be shared equally.

However, people do not have similar DNA except for identical twins, even if

you are a brother and sister the DNA will be close but it will not be exactly the

same. So now, that is the entire essence of mitosis. During mitosis which

okays through phases, we will mention those phases for now; the first phase is

prophase followed by metaphase, anaphase, and then last one is telophase. So

As I said our main interest, every time we discuss mitosis our main interest

we are biased to watch what happens to the chromosomes because even when

we were discussing interphase we were talking about what happens to the

chromosomes. Discuss how the cell prepares itself for cell division in terms of

the number of chromosomes and how many chromosomes will be in each

daughter cell. So we will be discussing prophase, metaphase, anaphase, and

telophase. And you are expected to know how to draw each phase and

describe what happens at every phase. You may also be expected to identify

the drawings representing different phases of mitosis. So let us start with the

first phase, now we discussed the cells recently, and I'm assuming your

memory of the structure of the cell is still very fresh. So we have a cell

membrane, does the nucleus have a membrane?

(Initiation move, closed-ended question)

**Learners:** yes it does. (Short/limited)

**Teacher:** yes, it does, so during prophase, the nuclear membrane disappears. And from

now, remember, the chromatin network has unwound and becomes shorter and

thicker, and at this point, we no longer call them the chromatin network

we call them what? (Initiation move, closed-ended question)

**Learner 1:** chromosomes

**Teacher:** yes we called them chromosomes now, and they scatter around the cytoplasm

and the nucleus because we no longer have the nuclear membrane. We have

centrioles that start moving to the opposite, no we have this terminology from

geography used on the globe like the North Pole South Pole, and the equator

so even here (pointing at the center of the cell) we call this the equatorial

region or the Equator. And these are the poles, but we don't call them the north

pole and the South Pole because there is no north and south, so the centrioles

start moving towards the opposite poles of the cell while the chromosomes are

scattered around during prophase. That is the prophase, the next phase which

we shall discuss this when our next lesson is on metaphase.