Appendix

CoRe - Template Adapted for Topic Specific Knowledge for Teaching (TSKfT)				
Curriculum Saliency				
What are the big ideas for the topic?				
What do you intend the learners to know about this idea?				
Why is it important for learners to know this big idea?				
What concepts needs to be taught before teaching this big idea?				
What else do you know about this idea (that you do not intend learners to know yet)?				
What do you consider easy or difficult in teaching this big idea?				
Student Misconceptions				
What are the typical student misconceptions on this big idea?				
Teaching Strategies				
What effective teaching strategies would you use to teach this idea?				
What questions would you consider important to ask in your teaching strategies?				
Representations				
What representations would you use in your teaching strategies?				
Assessment				
What ways would you use to assess understanding of learners?				
Reflections				
What aspects of planning and teaching this big idea would you like to reflect on?				

Data collection programme for the lesson study research project.

Phases of data collection.	**Data collection process.**	**Type of data collected.**	**Start Time.**	**End Time.**
Step 1:goal setting phase	Explanation of CORE & propositional knowledge statements. All participants preview, understanding of the use of CORE & propositional knowledge statement.	Transcripts of the video recording provide data for the credibility of this study	5/7/2016	5/7/2016
Step 2: Planning phase	All participants submit their respective completed COREs & knowledge statements. Extensive discussions of the propositional knowledge statements & COREs by all the participants.	Initial submitted CORE & propositional knowledge statements provide individual data on the extent of all the participants' meiosis content knowledge before involvement in the lesson study. Transcripts of the video recordings provide data on the individual participants' meiosis content knowledge.	7/7/2016 14/07/2016 & 30/7/2016	30/07/2016
Step 3: observation of the of the initial meiosis lesson.	All participants received video tapes of the enactment of the initial meiosis lesson plan b the researcher participants' and its transcripts. They view it individually designing their respective transcripts.	An individual transcript of the initial meiosis lesson plan provides extensive data on the content knowledge and instructional strategies applicable in the transformation of it.	14/07/2016	19/08/2016
Step 4: Initial post-lesson discussion phase.	Feedback session by all the participants on the on the initial video tapped meiosis lesson plan. The feedback leads to a second collaboratively designed lesson plan including its teaching date by another teacher in the community of inquiry.	Transcripts of the video recordings of the post discussion phase including the analyses of the respective participants of the initial lesson provide in depth data on teachers' content knowledge and instructional strategies involved in its application before the lesson study activity.	20/08/2016	20/08/2016
Step 5: teaching of the research lesson. & observation of its videotapes.	Another teacher in the community of enquiry teaches the researched lesson plan whilst it is video tapped, provide the rest with its transcripts & video tapes. All participants individually view the video tapped research lesson & transcribe it. All participants complete the second set of propositional knowledge statements & CORE.	Individual transcripts of the enactment of the research lesson from the respective participants and transcripts' of the lesson cycle provide phase valuable data on whether there is improvement on the content knowledge and instructional strategies when involved in lesson study activity.	23/08/2016. 5/09/2016	23/08/2016 23/09/2016
Step 6: Final post lesson discussion phase.	In depth feedback discussions of the enactment of research meiosis lesson plan. Submission of the propositional knowledge statements & CORE by all the participants to the researcher participants. All participants take turns to discuss the benefits & (challenges) if any of using a Japanese Lesson Study.	Transcripts of the video recordings of the final post lesson discussions including the analyses of the respective participants of the initial lesson provide in depth data on teachers' content knowledge and instructional strategies involved in its application before the lesson study activity. Analysis of the initial and second propositional knowledge statements &COREs offers data on whether the lesson study as a professional activity was effective or not. Transcripts of the video recorded the reflection discussions provide extensive data on the benefits & (challenges) if any of using a Japanese Lesson Study.	05/11/2016	5/11/2016

Expected propositional knowledge statements

Cell division: Is a process which includes either meiosis with cytokinesis or mitosis with cytokinesis.

Interphase: Is a preparatory stage for cell division consisting of three phases, which are G1, S phase and G2. Series of events happen during interphase, which include growth and development of the cell, DNA replication, protein synthesis.

Cell cycle: Describes a series of highly organized events that occur during the life of a cell which include interphase and the events of mitosis.

Meiosis 1: events which happen in the nucleus of a cell which involve the behaviour of homologous chromosomes.

Meiosis II: Describes the events which occur in the nucleus of cells that are formed at the end of meiosis 1. The behaviour of chromosomes is the same as in meiosis I. However, single chromosomes each made up of two chromatids are involved, the genetic composition of the chromosomes is not the same.

Eukaryotic cells: Are cells with a distinct nucleus and contain organelles that have a distinct membrane

Centromere: Is a region on a chromosome at which the kinetochore assembles and at which a chromosome becomes attached to the microtubules of the spindle during meiosis.

Based on the position of centromere and length of chromosomal arms, the chromosomes are classified into three groups namely: **telocentric chromosomes, acrocentric chromosomes and metacentric chromosomes.**

Telocentric chromosomes the centromere is located at the proximal end (tip) of the chromosome.

Acrocentric chromosomes the centromere is positioned at one end of the chromosome in such a way that it produces a very short arm (p) and an exceptionally long arm (q).

Metacentric chromosomes have the centromere location at the centre.

Centrosome: Is the structure that is present in the cytoplasm of an animal cell that functions as microtubules organizing centre and it has a pair of centrioles

Centriole radiate from a centrosome of an animal cell composed of cylinder of microtubules

Aster: Is a star shaped system of microtubules radiating from the centriole present on either end of spindle in many cells during cell division.

Spindles are fibres attached to the centrioles, which hold the chromosomes during cell division.

Kinetochore a position of chromosome centromere to which the spindle fibres attach.

Karyotype a display of the chromosome pairs of a cell arranged by size and shape

Karyokinesis involves the division of the nucleus in eukaryotic cells

Cytokinesis involves the division of the cytoplasm.

Cell cycle highly regulated series of events occurring in a cell leading to its division this is repetition

Meiosis is a process of two consecutive nuclear divisions namely: meiosis I & meiosis II resulting in four daughter cells that are genetically different from parents and with haploid number of chromosomes.

Chromosome has two chromatids held by the centromere and has DNA. Its purpose is to package the long DNA by wounding it up around the histones so that it can fit into the nucleus.

DNA a model that protects the genetic material or genes by storing, replicating them and backing them up if anything happens.

Chromatid is a single strand of DNA that compacts a shortened form of DNA.

Crossing over is the actual breakage of genes at the chiasmata incomplete.

Bivalent are homologous chromosomes lying opposite each other or adjacent to each other forming a tetrad.

Tetrad is four chromatids or two sets of chromosomes during bivalency.

Dyad is one pair of a homologous replicated chromosomes synapsed at meiosis. Not reading well

Synapsis is homologous chromosomes lying lengthwise side by side.

Chiasmata point of contact between non- sister chromatids where the crossing over occurs.

Homologous chromosomes are similar in genes, size, shapes and the position of the centromere.

Haploid a cell that has a single set of chromosomes and it is represented by (n)

Allele is an alternative form of gene.

Locus is a specific place along the length of a chromosome where a gene is located.

Mutation is a sudden change in the genetic makeup of an organism.

Types of mutation involve genetic mutations that happen at in a single or few base pairing in a single gene. Examples are point mutations and frameshift mutation. Types two of mutations are chromosomal aberrations/ chromosomal that occurs during prophase1 of meiosis during crossing overs that involve deletion, duplication, inversions and translocation.

Non-disjunction is the failure of chromosomes to separate or split and result in more or less or no chromosomes in gametes

Phases of meiosis are prophase, metaphase, anaphase and telophase

Gene a basic unit of inheritance located in the locus of a molecular DNA, by which hereditary characteristics are transferred from parent to offspring.

Grade 12:	**Big idea A:** The process of meiosis cell division leads to formation of four daughter cells with haploid number of chromosomes.	
What you intend the students to know about this idea.	Meiosis is a process of two consecutive nuclear divisions namely: meiosis I & meiosis II resulting in four daughter cells that are genetically different from parents and with haploid number of chromosomes. Actively dividing eukaryotes cells pass through a series of stages (process) known collectively as cell cycle: two gap phases (G1& G2), S phase that involves synthesis and duplication. In synthesis, the DNA sequence determines the synthesis of proteins that determine their trait. Duplication is when the chromosomes condenses and double consisting of two chromatids held at the centre by the centromere. M phase in the cell cycle involves two nuclear and cytoplasmic divisions namely: meiosis I and meiosis II. Each includes a prophase, metaphase anaphase and telophase. Meiosis I:	

	Prophase I is characterized by synapsis/pairing where homologous chromosomes lie lengthwise side by side resulting in tetrad or bivalent chromosomes. Each pair of the homologous pair comes from maternal and paternal parents. Students' need to know and understand this terms: Chromosome: has two chromatids held at the centre by the centromere and has DNA. Homologous chromosome involves a pair of similar chromosomes that have genes of the same characteristic at a corresponding locus. Gene a basic unit of inheritance, by which hereditary characteristics are transmitted from parent to offspring. Allele is an alternative form of gene. Locus is a specific place along the length of a chromosome where a gene is located. Genetic material exchange occurs between the homologous (non-sister) chromatids by crossing over at specialized regions called chiasmata. Crossing over is a process in which enzymes break, exchange parts and re-join the chromatids to produce new combination of genes. The resulting genetic recombination enhances the amount of genetic variation among the offspring of sexual partners. **Metaphase I** the tetrads/homologous chromosomes attach randomly to the same spindle fibers (microtubules) coming from the same pole. The pairs of homologue/tetrads align randomly at the centre of the cell. This random alignment of homologous chromosomes is another source of genetic variation in sexually producing animals. **Anaphase I** the homologous chromosomes separate leading to the sister chromosomes pulled to the same pole. This is reduction division because it reduces the number of chromosomes to half the diploid number in each daughter cell. For every tetrad, one chromosome is in a form of a chromatid pair called dyad, at each pole of the cell. **Telophase I** results in two daughter nuclei, each with half	

	the chromosomes present in parental nucleus. **Interkinesis** an abbreviated interface characterized by no replication of new genetic material since the dyads have two chromatids. **Meiosis II** resembles an ordinary mitotic division. The phases are referred to as prophase II, metaphase II, anaphase II and telophase II. During prophase II, the spindle apparatus forms and the chromosomes still have two chromatids associated at the centromere. Metaphase II the chromosome line up at the equatorial plane. The kinetochores of sister chromatids are attached to microtubules extending from opposite poles. Anaphase II the centromere breaks and allows chromatids to move to opposite poles with haploid number of chromosomes. Telophase II entails cytokinesis with the final product of four daughter cells that are haploid and each of them may directly function as a gamete (sex cell).	
Why is it important to know about this idea?	Cell division constitutes basis for genetics, reproduction, growth and development. To encourage the grade twelves to pursue careers in the fields of biotechnology and genetic engineering. DOE (2011).	
What else you know about this idea (that you do not intend the students to know).	The in depth knowledge of the following topics: human reproduction, genetics and inheritance and human evolution since meiotic cell division is their basis.	
Difficulties/limitations connected with the teaching of this idea.	Drawing of models of cell cycle, phases of meiotic divisions since their representations are idealistic. Learners' difficulty in conceptualizing the phases of the cell cycle and the movement of chromosomes during meiotic cell division. The cost of the tools applicable to design models representing the cell cycle and the meiotic cell divisions.	
Knowledge about the students' thinking which	Students' inability to differentiate between doubling (replication), pairing (synapsis), separation (disjunction), as	

influences your teaching of this idea.	well as determining whether these processes unfold in mitosis or meiosis or both. Difficulties in relation to scientific terms namely: chromosome, homologous chromosome, allele, locus and gene. DNA replication happens during prophase. Sister chromatids are homologous chromosomes. Homologous chromosomes separate during anaphase II of meiosis. Students' inability to know that the number of chromosomes is haploid at the end of meiosis I. Dikmenli (2010).
Other factors that influence you're teaching of this idea.	The sequence of the curriculum although restrictive guides which aspects to teach. Students' are taught the cell cycle and mitosis in grade ten according to the curriculum requirements. In grade eleven there is a gap where they curriculum framework prescribe the teaching of the cell cycle and meiosis in grade twelve. This gap creates a problem because learners forget. Furthermore, revising the grade ten work in an attempt to show the link between grade ten and the current grade twelve work takes up time that is not allocate in the curriculum framework.
Teaching procedures (and particular reasons for using these to engage with this idea.	**Individual terminology task** Students use the glossary from their textbooks and Henderson's dictionary of Biology to acquire relevant meaning to the identified scientific terms: meiosis, chromosomes, gene, DNA, allele, homologous chromosomes, locus, tetrad, dyad. This happens to ascertain misconceptions. **Think-Pair and Share in groups consisting of four members that are allocated specific roles:** **Projected slide of the cell cycle** to emphasize the S phase where replication or duplication of chromosomes unfolds. Students then use modelling clay to model a chromosome with two chromatids. Additionally model homologous chromosomes, use different coloured masking tapes to show genes, alleles are carried in the chromosomes in specific locus. **Videos:** students watch a video showing the phases of meiosis I and II cell divisions so that they can see how chromosomes change at different stages and why gametes have half chromosomes number and why halving is important.

	The video is viewed per phase. For example, after viewing prophase I the video pauses then the learners in their groups need to use clay, wool, small buttons, coloured masking tape to model the structure of chromosomes during this phase. Furthermore, discuss by describing what happens and answer questions based on the specific phase. Students' discussions need to involve reasons for cross over and random assortment of chromosomes during metaphase I. Students apply this process all the phases of meiosis I. **Meiosis II**: students' in their groups built two models per phase depicting the arrangement of chromosomes in meiosis I and II. Furthermore, students in their different groups discus the differences between them. For example, Metaphase I the model need to depict homologous chromosomes at the equator whilst the metaphase II model has to have chromosomes with two chromatids at the centre of the cell.

	Watching of the different phases of the meiosis from the **video** instils relevant scientific knowledge and a sense of sight is stimulated leading to students' not forgetting. **The use of dictionaries** and glossary from the textbooks help reinforce relevant scientific concepts. When students' **build models** depicting the different phases of meiosis I it is a strategy to ascertain whether they have acquired relevant scientific knowledge and senses of sight, touching seeing and hearing are effective in promoting learning. Especially since throughout the different procedures, the teacher circulates between the different groups for assessment and reinforcement. **Written task** are performed by individuals so that a teacher is able to assess whether the learners acquired relevant scientific or if there are areas that need reinforcement.
Specific ways of ascertaining students' understanding or confusion around this idea.	**Comparing of the models task:** this is the task where learners build models of each phase as they unfold in meiosis I and II and compare them in their various groups whilst the teacher moves from group to group ascertaining whether relevant scientific language is applicable and if the students know the process of meiosis cell division. Loughran , Berry & Mulhall (2014).

Loughran , Berry & Mulhall (2014).

Name: _____

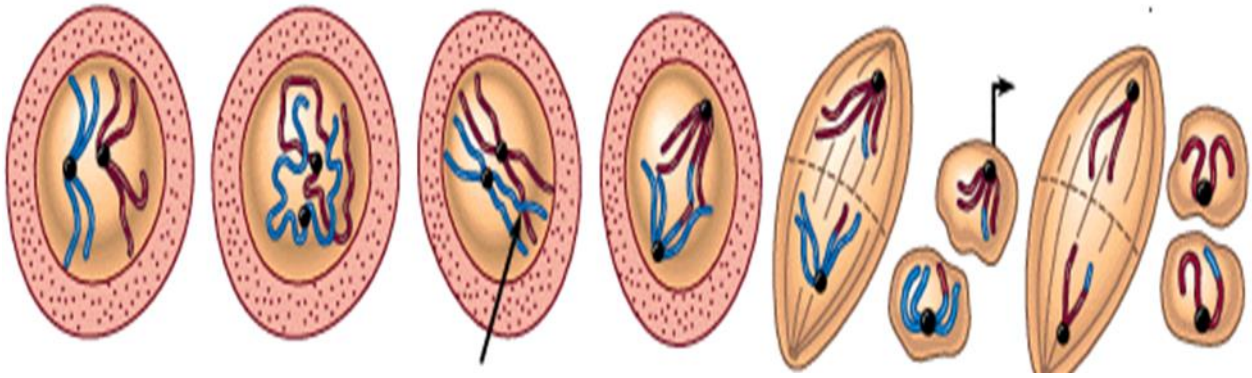
Title: participant researcher/participant_____

Second phase propositional knowledge statements for the topic meiosis.

NB: **propositional knowledge is knowledge of an object, a fact or specifically in relation to this study a process and a propositional knowledge statement is a declarative statement that is made or written by someone to show his or her knowledge of that object, a fact or process. The object can be abstract or real. We use words to describe that abstract object or concept.**

Instructions:

All the participants including the main participant need to use the provided propositional knowledge statements framework to individually declare their knowledge of the process of meiosis.



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Grade 12:	**Big idea A:** The process of meiosis cell division leads to formation of four daughter cells with haploid number of chromosomes.	
What you intend the students to know about this idea.	Meiosis is a process of two consecutive nuclear divisions namely: meiosis I & meiosis II resulting in four daughter cells that are genetically different from parents and with haploid number of chromosomes. Actively dividing eukaryotes cells pass through a series of stages (process) known collectively as cell cycle: two gap phases (G1& G2), S phase that involves synthesis and duplication. In synthesis, the DNA sequence determines the synthesis of proteins that determine their trait. Duplication is when the chromosomes condenses and double consisting of two chromatids held at the centre by the centromere. M phase in the cell cycle involves two nuclear and cytoplasmic divisions namely: meiosis I and meiosis II. Each includes a prophase, metaphase anaphase and telophase. Meiosis I: Prophase I is characterized by synapsis/pairing where homologous chromosomes lie lengthwise side by side resulting in tetrad or bivalent chromosomes. Each pair of the homologous pair comes from maternal and paternal parents. Students' need to know and understand this terms: Chromosome: has two chromatids held at the centre by the centromere and has DNA. Homologous chromosome involves a pair of similar chromosomes that have genes of the same characteristic at a corresponding locus. Gene a basic unit of inheritance, by which hereditary characteristics are transmitted from parent to offspring. Allele is an alternative form of gene. Locus is a specific place along the length of a chromosome where a gene is located. Genetic material exchange occurs between the homologous (non-sister) chromatids by crossing over at specialized regions called chiasmata. Crossing over is a process in which enzymes break, exchange parts and re-join the chromatids to produce new combination of	

	genes. The resulting genetic recombination enhances the amount of genetic variation among the offspring of sexual partners. **Metaphase I** the tetrads/homologous chromosomes attach randomly to the same spindle fibers (microtubules) coming from the same pole. The pairs of homologue/tetrads align randomly at the centre of the cell. This random alignment of homologous chromosomes is another source of genetic variation in sexually producing animals. **Anaphase I** the homologous chromosomes separate leading to the sister chromosomes pulled to the same pole. This is reduction division because it reduces the number of chromosomes to half the diploid number in each daughter cell. For every tetrad, one chromosome is in a form of a chromatid pair called dyad, at each pole of the cell. **Telophase I** results in two daughter nuclei, each with half the chromosomes present in parental nucleus. **Interkinesis** an abbreviated interface characterized by no replication of new genetic material since the dyads have two chromatids. **Meiosis II** resembles an ordinary mitotic division. The phases are referred to as prophase II, metaphase II, anaphase II and telophase II. During prophase II, the spindle apparatus forms and the chromosomes still have two chromatids associated at the centromere. Metaphase II the chromosome line up at the equatorial plane. The kinetochores of sister chromatids are attached to microtubules extending from opposite poles. Anaphase II the centromere breaks and allows chromatids to move to opposite poles with haploid number of chromosomes. Telophase II entails cytokinesis with the final product of four daughter cells that are haploid and each of them may directly function as a gamete (sex cell).	

Why is it important to know about this idea?	Cell division constitutes basis for genetics, reproduction, growth and development. To encourage the grade twelves to pursue careers in the fields of biotechnology and genetic engineering. DOE (2011).
What else you know about this idea (that you do not intend the students to know).	The in depth knowledge of the following topics: human reproduction, genetics and inheritance and human evolution since meiotic cell division is their basis.
Difficulties/limitations connected with the teaching of this idea.	Drawing of models of cell cycle, phases of meiotic divisions since their representations are idealistic. Learners' difficulty in conceptualizing the phases of the cell cycle and the movement of chromosomes during meiotic cell division. The cost of the tools applicable to design models representing the cell cycle and the meiotic cell divisions.
Knowledge about the students' thinking which influences your teaching of this idea.	Students' inability to differentiate between doubling (replication), pairing (synapsis), separation (disjunction), as well as determining whether these processes unfold in mitosis or meiosis or both. Difficulties in relation to scientific terms namely: chromosome, homologous chromosome, allele, locus and gene. DNA replication happens during prophase. Sister chromatids are homologous chromosomes. Homologous chromosomes separate during anaphase II of meiosis. Students' inability to know that the number of chromosomes is haploid at the end of meiosis I. Dikmenli (2010).
Other factors that influence you're teaching of this idea.	The sequence of the curriculum although restrictive guides which aspects to teach. Students' are taught the cell cycle and mitosis in grade ten according to the curriculum requirements. In grade eleven there is a gap where they curriculum framework prescribe the teaching of the cell cycle and meiosis in grade twelve. This gap creates a problem because learners forget. Furthermore, revising the grade ten work in an attempt to show the link between grade ten and the current grade twelve work takes up time that is not allocate in the curriculum framework.

Teaching procedures (and particular reasons for using these to engage with this idea.	**Individual terminology task** Students use the glossary from their textbooks and Henderson's dictionary of Biology to acquire relevant meaning to the identified scientific terms: meiosis, chromosomes, gene, DNA, allele, homologous chromosomes, locus, tetrad, dyad. This happens to ascertain misconceptions. **Think-Pair and Share in groups consisting of four members that are allocated specific roles:** **Projected slide of the cell cycle** to emphasize the S phase where replication or duplication of chromosomes unfolds. Students then use modelling clay to model a chromosome with two chromatids. Additionally model homologous chromosomes, use different coloured masking tapes to show genes, alleles are carried in the chromosomes in specific locus. **Videos:** students watch a video showing the phases of meiosis I and II cell divisions so that they can see how chromosomes change at different stages and why gametes have half chromosomes number and why halving is important. **The video is viewed per phase.** For example, after viewing prophase I the video pauses then the learners in their groups need to use clay, wool, small buttons, coloured masking tape to model the structure of chromosomes during this phase. Furthermore, discuss by describing what happens and answer questions based on the specific phase. Students' discussions need to involve reasons for cross over and random assortment of chromosomes during metaphase I. Students apply this process all the phases of meiosis I. **Meiosis II**: students' in their groups built two models per phase depicting the arrangement of chromosomes in meiosis I and II. Furthermore, students in their different groups discus the differences between them. For example, Metaphase I the model need to depict homologous chromosomes at the equator whilst the metaphase II model has to have chromosomes with two chromatids at the centre of the cell.

	Watching of the different phases of the meiosis from the **video** instils relevant scientific knowledge and a sense of sight is stimulated leading to students' not forgetting. **The use of dictionaries** and glossary from the textbooks help reinforce relevant scientific concepts. When students' **build models** depicting the different phases of meiosis I it is a strategy to ascertain whether they have acquired relevant scientific knowledge and senses of sight, touching seeing and hearing are effective in promoting learning. Especially since throughout the different procedures, the teacher circulates between the different groups for assessment and reinforcement. **Written task** are performed by individuals so that a teacher is able to assess whether the learners acquired relevant scientific or if there are areas that need reinforcement.
Specific ways of ascertaining students' understanding or confusion around this idea.	**Comparing of the models task:** this is the task where learners build models of each phase as they unfold in meiosis I and II and compare them in their various groups whilst the teacher moves from group to group ascertaining whether relevant scientific language is applicable and if the students know the process of meiosis cell division. Loughran, Berry & Mulhall (2014).

	make the topic to be interesting
what questions would you consider important to ask in your teaching strategies?	- Definations of terms such as: ~~wheat~~ Allele, gene, tetrad, chromosomes, DNA and locus, in order to prevent misconcephons
Presentations what presentations would you use in your teaching strategies?	- I would use projected slide so that they can view, while I explain to them what was not understood by the learners, especially the cell cycle
Assessment what ways would you use to assess understanding of learners?	- Give them a task, using materials such as clay, wool, string and beats, so that they can make models showing different stages or phases of meiosis I and meiosis II - With clays they would build or make homologous chromosomes, strings would represent genes and beats would be a centromere. - Allow them to critisize others based on the models they have built, so that

	Locus - is a position found on the structure of a chromosome Allele - is an alternative form of a gene Gametogenesis - refers to the production of gametes.
why is it important for learners to know this big idea?	- So that they can be able to explore different fields of study or careers.
what else you know about this idea (that you do not intend learners to know yet?)	- That there is a link between the process of meiosis, reproduction, genetics and evolution
Difficulties in teaching this ideas	- The stages that are involved in meiotic division and presenting them. - Cell cycle.
	Student misconceptions
what are the typical student mis-conceptions on the big idea?	- Student think that the Centromere, which is the structure that holds chromatids together is always in the centre
what effective teaching strategies would you use to teach this idea?	- ~~Ask~~ seek learners prior knowledge regarding the topic and introduce the building of models in order for them to participate and also to

Curriculum Saliency	
What are the big ideas for the topic?	- The process of meiosis cell division where a diploid number of chromosome end up being haploid and the four daughter cells which are genetically different are formed
What do you intend the learners to know about the ideas?	- That meiosis is divided into meiosis I and meiosis II - In meiosis I, the cells produces 2 daughter cells which are haploid and in meiosis II, four daughter cells which are also haploid and are genetically different. - Both meiosis I and II have these stages: prophase, metaphase, anaphase and Telophase. - The learners should know terminology such as gene, locus, homologous chromosome ~~and~~ allele, gametogenesis. - gene - a small piece of DNA which carries a certain trait - Homologous chromosome - is a pair of chromosome one from the parental and one from maternal

Date:

Surname and name:

<u>Investigating the effectiveness of a Japanese lesson study as a collaborative professional development activity for teachers at school level.</u>

1. What is your understanding of teacher professional development?

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2. Is teacher professional development vital in South Africa?

Yes ☐ or No ☐

Give reasons for your answer.

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3 Currently what type of professional development activities have you participated in as an individual teacher?

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The goal setting and planning phase involved all the participants together with the content knowledge expert discussing and individually completing the CORE and initial propositional knowledge statements.

4.1 Mention which aspects of goal setting and planning phase were good and why?

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4.2 in the next professional development activity that applies Lesson Study what changes would you want to see in goal setting and planning phase

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The goal setting and planning phase involved all the participants together with the

content knowledge expert discussing and individually completing the CORE and initial propositional knowledge statements.

4.3 Discuss what was **beneficial** and **challenging** to you as an individual during the discussion and completion of the initial CORE and propositional knowledge statements in relation to meiosis.

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4.4. Indicate whether your second **CORE and propositional knowledge statements** were different from the initial ones.

Yes ☐ No ☐

Give reasons for your answer

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The study involved enactment of two lesson plans that were video tapped and individually observed by all the participants at their respective places within a specified period.

4.5. Is it a good practice for teachers to take turns teaching a lesson plan they have collaboratively designed whilst observed by the other teachers?

Yes ☐ No ☐

Give reasons for your answer

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The post- lesson discussion phases involved the collaborators, content expert and the observed teachers giving feedback on the enactment of the research lesson plans and the effectiveness of the instructional strategies applicable in the entire process.

4.6. Use a **mark (x)** on the **block(s)** indicating the different roles applicable in this study;

Observer ☐ content expert ☐ observed teacher ☐

Indicate according to your role(s) the good aspects during the post-lesson discussions.

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Indicate according to your role(s) the bad or challenging aspects during the post-lesson discussions and how can those be improved?

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5. Can the Japanese Lesson Study be useful as a teacher professional development activity in South Africa?

Yes ☐ No ☐

Give reasons for your answer

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Oral questions:

- ✓ What sort of content and skills did you encounter in this lesson study professional development program?
- ✓ What messages about teaching and learning did you understand from this Lesson Study program?
- ✓ How would you describe the level and quality of interaction that you encountered?
- ✓ Can you describe any 'new' learning from the program?
- ✓ To what extend have you found the program useful?

For administrative use only:
Reference no: D2017 / 049
enquiries: Diane Buntting 011 843 6503

GAUTENG PROVINCE
REPUBLIC OF SOUTH AFRICA

GDE RESEARCH APPROVAL LETTER

Date:	15 June 2016
Validity of Research Approval:	15 June 2016 to 30 September 2016
Name of Researcher:	Xulu P.S.
Address of Researcher:	43 Maranti Street; Elspark; Germiston; 1428
Telephone / Fax Number/s:	073 208 8495; 011 863 8910
Email address:	Khesox@gmail.com
Research Topic:	An investigation of effectiveness of Japanese lesson study as a collaborative professional development programme at school level.
Number and type of schools:	ONE Secondary School
District/s/HO	Ekurhuleni South

Re: Approval in Respect of Request to Conduct Research

This letter serves to indicate that approval is hereby granted to the above-mentioned researcher to proceed with research in respect of the study indicated above. The onus rests with the researcher to negotiate appropriate and relevant time schedules with the school/s and/or offices involved. A separate copy of this letter must be presented to the Principal, SGB and the relevant District/Head Office Senior Manager confirming that permission has been granted for the research to be conducted. However participation is VOLUNTARY.

The following conditions apply to GDE research. The researcher has agreed to and may proceed with the above study subject to the conditions listed below being met. Approval may be withdrawn should any of the conditions listed below be flouted:

CONDITIONS FOR CONDUCTING RESEARCH IN GDE

1. *The District/Head Office Senior Manager/s concerned, the Principal/s and the chairperson/s of the School Governing Body (SGB.) must be presented with a copy of this letter.*
2. *The Researcher will make every effort to obtain the goodwill and co-operation of the GDE District officials, principals, SGBs, teachers, parents and learners involved. Participation is voluntary and additional remuneration will not be paid;*

2016/06/15

Office of the Director: Education Research and Knowledge Management ER&KM)
9th Floor, 111 Commissioner Street, Johannesburg, 2001
P.O. Box 7710, Johannesburg, 2000 Tel: (011) 355 0506

3. *Research may only be conducted after school hours so that the normal school programme is not interrupted. The Principal and/or Director must be consulted about an appropriate time when the researcher/s may carry out their research at the sites that they manage.*
4. *Research may only commence from the second week of February and must be concluded by the end of the THIRD quarter of the academic year. If incomplete, an amended Research Approval letter may be requested to conduct research in the following year.*
5. *Items 6 and 7 will not apply to any research effort being undertaken on behalf of the GDE. Such research will have been commissioned and be paid for by the Gauteng Department of Education.*
6. *It is the researcher's responsibility to obtain written consent from the SGB/s; principal/s, educator/s, parents and learners, as applicable, before commencing with research.*
7. *The researcher is responsible for supplying and utilizing his/her own research resources, such as stationery, photocopies, transport, faxes and telephones and should not depend on the goodwill of the institution/s, staff and/or the office/s visited for supplying such resources.*
8. *The names of the GDE officials, schools, principals, parents, teachers and learners that participate in the study may not appear in the research title, report or summary.*
9. *On completion of the study the researcher must supply the Director: Education Research and Knowledge Management, with electronic copies of the Research Report, Thesis, Dissertation as well as a Research Summary (on the GDE Summary template). Failure to submit your Research Report, Thesis, Dissertation and Research Summary on completion of your studies / project – a month after graduation or project completion - may result in permission being withheld from you and your Supervisor in future.*
10. *The researcher may be expected to provide short presentations on the purpose, findings and recommendations of his/her research to both GDE officials and the schools concerned;*
11. *Should the researcher have been involved with research at a school and/or a district/head office level, the Director/s and school/s concerned must also be supplied with a brief summary of the purpose, findings and recommendations of the research study.*

The Gauteng Department of Education wishes you well in this important undertaking and looks forward to examining the findings of your research study.

Kind regards

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Dr David Makhado

Director: Education Research and Knowledge Management

DATE: 2016/06/15

Office of the Director: Education Research and Knowledge Management ER&KM)
9th Floor, 111 Commissioner Street, Johannesburg, 2001

Wits School of Education

WITS UNIVERSITY

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21 June 2016

Protocol Number: 2016ECE015M

Student number: 442736

Dear Pearl Sibongile Xulu

Application for ethics clearance: Master of Science

Thank you very much for your ethics application. The Ethics Committee in Education of the Faculty of Humanities, acting on behalf of the Senate, has considered your application for ethics clearance for your proposal entitled:

To investigate the effectiveness of lesson study as a professional development process

The committee recently met and I am pleased to inform you that **clearance was granted.**

Please use the above protocol number in all correspondence to the relevant research parties (schools, parents, learners etc.) and include it in your research report or project on the title page.

The Protocol Number above should be submitted to the Graduate Studies in Education Committee upon submission of your final research report.

All the best with your research project.

Yours sincerely,

MMaseko

Wits School of Education

011 717-3416

cc Supervisor - Dr. Eunice Nyamupangedengu

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