Unit Plan Part II Template

Use the table below to complete part 1 of your Unit Plan Assignment.

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| Objective | Possible Teaching Strategies | Final Choice | Rationale |
| Students will be able to explain how and why larger cells have more demands placed on them than regular cells | * Power point presentation with guided notes * Student centered: show students varying sizes of cells and have them come up with ideas of what would happen to the cell if they were to continue to get larger. * Teacher centered: give students examples of the varying affects that larger size could have on the cell and have them decide if it is true or false. | * Student centered: show students varying sizes of cells and have them come up with ideas of what would happen to the cell if they were to continue to get larger. | This teaching strategy allows the students to use prior knowledge or think creatively to come up with ideas on what will eventually happen to cell. This method of teaching would be better than just lecturing because the students get to actively take place in the lesson. |
| Students will be able to calculate surface area to volume ratios if given measurements of a hypothetical cell | * Power point with guided notes on the steps to solving each part of the equation. * Teacher centered: taking sample practice problems and showing the students step by step how to work out the problem on the board. * Student centered: assign students practice problems in class and then have them come up to board and explain to the class what they did. | * Teacher centered: taking sample practice problems and showing the students step by step how to work out the problem on the board. | Doing any type of math can be difficult for students to understand. Although this is not high level math I think it would be best to show them step by step first how to do the problem and then let them do it on their own. Using this strategy would also allow for student participation in helping to answer problems. |
| Students will be able to identify the surface area to volume ratio as an inverse relationship and why this is an issue for the cell | * Guided notes on how this affects the two problems the cell has with getting large * Teacher centered: give a short lecture outlining the inverse relationship and then ask the students why they believe this would cause problems for the cell. * Student centered: students will list out the problems of a cell getting too large and then relate that back to the surface area to volume ratio and see where the problem lies. | * Teacher centered: give a short lecture outlining the inverse relationship and then ask the students why they believe this would cause problems for the cell. | This relates back to the two previous objects. With this being a more abstract idea it would be best for the teacher to explain it first and then have the students make connections to what they learned previously. |
| Students will be able to analyze why cancer cells are a danger to us and how they differ from normal cells | * Power point with lecture about cancer and the disruptions it causes. * Teacher centered: shows students pictures of normal cell cycle and cancer cell cycle and have them explain differences. * Student centered: as a class students will share what they know about cancer. Then we will try to relate that back to what we know about regular cells. | * Student centered: as a class students will share what they know about cancer. Then we will try to relate that back to what we know about regular cells. | Unfortunately most students today have had some type of exposure to cancer. Having them share what they know about cancer is a good way to start a discussion about the topic. After having a short discussion then as a class we can brainstorm why they are so dangerous based on what we know about cells already. |
| Students will be able to understand where daughter cells come from | * Power point explaining the outcomes of cell division * Teacher centered: show picture of a single cell and then picture of cells after cytokinesis have students decide if they cells would all be the same. * Student centered: have students use resources such as text book or internet to come up with their own definition of a daughter cells. | * Teacher centered: show picture of a single cell and then picture of cells after cytokinesis have students decide if they cells would all be the same. | Visual representation seems to be one of the best ways for students to learn especially with things as microscopic as cells. All though presenting the material like this may be tricky for students to understand that those cells are virtually the same, it is a good way to introduce the topic of cell division. |
| Students will be able to explain how DNA gets copied and transferred from parent cells to new cells. | * Guided notes on DNA copying and where the DNA comes from * Teacher Centered: Show a model of a cell and its contents. Visually go through how the DNA copies itself to be transferred to new cells * Students centered: students will use white boards to come up with their own model of how they think DNA is copied and moved. | * Students centered: students will use white boards to come up with their own model of how they think DNA is copied and moved. | Instead of using a regular lecture this allows the students to use their creativity to come up with their own understanding of how DNA gets copied. Instead of just telling them this is how its’ done end of story. We can come up with modifications to their theories. |
| Students will be able to distinguish the difference between chromosomes and chromatids | * YouTube video on chromosomes becoming chromatids * Teacher Centered: show students the different phases of mitosis and have them choose when chromosomes are chromosomes and when they are considered chromatids * Student centered: students will find pictures of chromosomes and chromatids. Then they will teach their peers about what the differences are | * Teacher Centered: show students the different phases of mitosis and have them choose when chromosomes are chromosomes and when they are considered chromatids. | This strategy allows the students to decide what they think chromosomes and chromatids are, with teacher guidance. Once they get a visual representation of what the difference is, they will get a definition as well. |
| Students will be able to explain how cell growth is regulated, by explaining what cyclin is. | * Guided notes giving a definition of cyclin and its effects on the cell. * Teacher centered: probe students (through questioning) to come up with different factors that may control growth. * Student centered: students work in pairs to come up with their own definition of cyclin, then discuss as a class to come up with a working definition. | * Teacher centered: probe students (through questioning) to come up with different factors that may control growth. | This strategy allows the teacher to see what prior knowledge students have about regulation of anything. It also uses the teacher as a guide to make sure students are going in the right direction, while also slowly introducing the concept. |
| Students will be able to identify each of the stages of the cell cycle: G1 phase, S phase, G2 phase, M phase. In addition explain what occurs during each stage | * Guided notes with a diagram of the cell cycle * Teacher centered: show students a diagram of the cell cycle then ask students to come up with ideas of what occurs in each phase * Student centered: give students the names of each stage and have them draw their own diagram of the cell cycle then compare their drawing to the real cell cycle. | * Student centered: give students the names of each stage and have them draw their own diagram of the cell cycle then compare their drawing to the real cell cycle. | Students will have to figure out logically which order makes sense. This strategy lets students have control and allows them to present their ideas to the class. As a class we can then decide which model correctly matches the model given in the book. |
| Students will be able to identify prophase, metaphase, anaphase and telophase and distinguish what is different in each phase | * Video going through the cell cycle highlighting each of the different phases. * Teacher centered: show slides of each of the stages, explaining what is occurring during each stage and/or having the students predict what will happen in the next stage. * Student centered: assign a students to different groups and give each group one of the phases. Each group will present their stage to the rest of the class. We will make and overall list then for the changes in each stage | * Teacher centered: show slides of each of the stages, explaining what is occurring during each stage and/or having the students predict what will happen in the next stage. | Instead of having a power point with just pictures and words this strategy has the students look at pictures as the teacher explains what is occurring. Having the students make predictions forces them to actively engage in the lecture. |
| Students will be able to define cytokinesis and understand why this concludes mitosis. | * Guided notes defining cytokinesis * Teacher centered: walk through the cell cycle and explain why this finally separation is important to end mitosis * Student centered: students will have to decide if telophase is the final step of mitosis or if another step is necessary. They will need to give supporting evidence for their answer. | * Student centered: students will have to decide if telophase is the final step of mitosis or if another step is necessary. They will need to give supporting evidence for their answer. | This strategy leaves the decision in the students’ hands and makes them investigate which is the correct answer and find supporting evidence to back up their answer. This also works on the science literacy skill of problem solving. |

Use the table below to complete part 2 of your Unit Plan Assignment.

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| Objective | Possible Assessment Strategies | Final Choice | Rationale |
| Students will be able to explain how and why larger cells have more demands placed on them than regular cells. | * Informal assessment: evaluate students understanding based on the ideas that they come up with and the next day review material and see how students answer questions. * Formal assessment: give a short quiz over information at the end of class or beginning of class the next day | * Informal assessment: evaluate students understanding based on the ideas that they come up with and the next day review material and see how students answer questions. | Since the students came up with the ideas presented to the class it would not be fair to give them a quiz right away, the better way to asses them would be the next day to see what they took away from the previous days discussion. |
| Students will be able to calculate surface area to volume ratios if given measurements of a hypothetical cell. | * Informal assessment: as students answer questions about how to get to the correct asses their understanding of the process * Formal assessment: quick quiz at the beginning of class the next day | * Formal assessment: quick quiz at the beginning of class the next day | After taking time to go through the process and steps to do the problems in class, a small quiz at the beginning of class would be a good indicator of students understanding from the day before. It would also serve as another form of practice before the test. |
| Students will be able to identify the surface area to volume ratio as an inverse relationship and why this is an issue for the cell | * Formal assessment: have students take a brain pop the next day before lecture starts. * Informal assessment: evaluate students on their reasoning during discussion, then ask questions during the next class period as a review and gage student understanding. | * Informal assessment: evaluate students on their reasoning during discussion, then ask questions during the next class period as a review and gage student understanding. | Due to student participation in lecture doing an informal assessment would be the best way to gage student understanding and decide what needs to be reviewed. Doing a formal assessment may only show that they can recall the information but cannot give an explanation for it. |
| Students will be able to analyze why cancer cells are a danger to us and how they differ from normal cells | * Formal assessment: students will take a true false quiz whether an something is present in a cancer cell or normal cell or both * Informal assessment: based upon what students know evaluate their understanding of cancer and then during the next class after discussion evaluate what they learned through review. | * Informal assessment: based upon what students know evaluate their understanding of cancer and then during the next class after discussion evaluate what they learned through review. | Due to the discussion portion of the lecture evaluating students prior knowledge and then acquired knowledge after the discussion is the best way to judge their understanding of the overall topic. Formal assessment questioning could be saved until unit exam. |
| Students will be able to understand where daughter cells come from | * Formal assessment: have students write a formal definition of a daughter cell at the beginning of class the following day and turn in. * Informal assessment: evaluate students based upon their reasoning of why the cells are the same. | * Informal assessment: evaluate students based upon their reasoning of why the cells are the same. | Having students due pure recall for this objective would not show if they just memorized the information or if they actually understood the information. By listening to their reasoning you can judge how well they understand the material based on the supporting evidence they give. |
| Students will be able to explain how DNA gets copied and transferred from parent cells to new cells. | * Formal assessment: quiz on the process of DNA getting copied * Informal assessment: evaluation of the drawings that students come up with after receiving background information. | * Informal assessment: evaluation of the drawings that students come up with after receiving background information. | Given that the students will already be doing drawings in class it would be easy to evaluate their progress and provide more helpful feedback than just returning a quiz score. |
| Students will be able to distinguish the difference between chromosomes and chromatids | * Formal assessment: definition quiz on chromosomes and chromatids * Informal assessment: after going through the lecture and having the students guess which is which, have them bring a drawing in to class the next day. One picture of a chromosome the other of a chromatid | * Informal assessment: after going through the lecture and having the students guess which is which, have them bring a drawing in to class the next day. One picture of a chromosome the other of a chromatid | Even though students are actively participating in class by guessing which is which, it would be difficult to evaluate if they are understanding the differences or just making good guesses. Once they know for sure which is which, drawing a picture representation of them will give them a firm picture to keep in their mind come test time. |
| Students will be able to explain how cell growth is regulated, by explaining what cyclin is. | * Informal assessment: evaluate students answers to questioning to decide how in depth to go in explaining topic * Formal assessment: brain pop at the beginning of class the next day as a refresher of the day before. | * Formal assessment: brain pop at the beginning of class the next day as a refresher of the day before | For this topic it would be best to evaluate the students based on how they could answer questions on a brain pop. This is something that will require memorization and the best way to gage their understanding is through recall. |
| Students will be able to identify each of the stages of the cell cycle: G1 phase, S phase, G2 phase, M phase. In addition explain what occurs during each stage | * Informal: based on the drawings done on the white boards evaluate student understanding. * Formal assessment: take a fill in the blank brain pop the next day | * Informal: based on the drawings done on the white boards evaluate student understanding. | During lecture students will be creating their own drawings of the cycle after being given the different phases. Going around to evaluate the students and correct or give feedback for them to make corrections is more impactful than just a quiz. |
| Students will be able to identify prophase, metaphase, anaphase and telophase and distinguish what is different in each phase | * Formal: having students take a short quiz identifying the different stages by picture * Informal: review the next day in class and see if the students can point out the differences by looking at just a picture and not knowing the phase. | * Informal: review the next day in class and see if the students can point out the differences by looking at just a picture and not knowing the phase. | This is the ultimate test to see if the students understood what we went over the day before. Most importantly it will give them another picture to reference back to on the unit exam. |
| Students will be able to define cytokinesis and understand why this concludes mitosis. | * Formal: short brain pop with a simple explanation of cytokinesis. * Informal: evaluate students evidence used to support the conclusion they come to. | * Informal: evaluate students evidence used to support the conclusion they come to. | Since the students are doing most of the leg work to come up with evidence having a quiz would seem cruel and somewhat redundant. |

Use the table below to complete part 3 of your Unit Plan Assignment.

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| Science Laboratory Skill | Related Objective(s)? | Teaching Strategy? |
| Slides to identify the different phases of mitosis and calculate time spent in each stage. Practices microscope skills. | * Students will be able to identify prophase, metaphase, anaphase and telophase and distinguish what is different in each phase * Students will be able to analyze why cancer cells are a danger to us and how they differ from normal cells | Onion root tip lab. Have students look at onion root tip under the microscope, students will compare the cycle time they get for the normal cell cycle with the cell cycle of cancer cells |
| Growing cells to observe restrictions placed on the cell | * Students will be able to identify the surface area to volume ratio as an inverse relationship and why this is an issue for the cell. * Students will be able to calculate surface area to volume ratios if given measurements of a hypothetical cell. * Students will be able to explain how any why larger cells have more demands placed on them than regular cells. | Students will grow live cells in lab to see how growth is controlled based on the surroundings |

Use the table below to complete part 4 of your Unit Plan Assignment.

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| Science Literacy Skill | Related Objective(s)? | Teaching Strategy? |
| Problem solving | * Students will be able to define cytokinesis and understand why this concludes mitosis. | Student centered: students will have to decide if telophase is the final step of mitosis or if another step is necessary. They will need to give supporting evidence for their answer |
| Analyze data | * Students will be able to identify prophase, metaphase, anaphase and telophase and distinguish what is different in each phase. * Students will be able to analyze why cancer cells are a danger to us and how they differ from normal cells | Onion root tip lab. Have students look at onion root tip under the microscope, students will compare the cycle time they get for the normal cell cycle with the cell cycle of cancer cells |

**Unit Plan Overview (Part 5)**

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| **Day** | **Objective** | **Teaching Strategy** | **Assessment Strategy** | **Notes** |
| 1 | Students will be able to explain how any why larger cells have more demands placed on them than regular cells | Student centered: show students varying sizes of cells and have them come up with ideas of what would happen to the cell if they were to continue to get larger. | Informal assessment: evaluate students understanding based on the ideas that they come up with and the next day review material and see how students answer questions. | Use some type of organizer for student ideas, bring copies of study guide to class. |
| 2 | Students will be able to calculate surface area to volume ratios if given measurements of a hypothetical cell | Teacher centered: taking sample practice problems and showing the students step by step how to work out the problem on the board. | Formal assessment: quick quiz at the beginning of class the next day | This objective and objective #3 may be taught in the same day |
| 3 | Students will be able to identify the surface area to volume ratio as an inverse relationship and why this is an issue for the cell | Teacher centered: give a short lecture outlining the inverse relationship and then ask the students why they believe this would cause problems for the cell | Informal assessment: evaluate students on their reasoning during discussion, then ask questions during the next class period as a review and gage student understanding. | This day could be used as a lab day if objectives are combined |
| 4 | Students will be able to analyze why cancer cells are a danger to us and how they differ from normal cells | Student centered: as a class students will share what they know about cancer. Then we will try to relate that back to what we know about regular cells. | Informal assessment: based upon what students know evaluate their understanding of cancer and then during the next class after discussion evaluate what they learned through review. | Will be represented in onion root tip lab as well |
| 5 | Students will be able to understand where daughter cells come from | Teacher centered: show picture of a single cell and then picture of cells after cytokinesis have students decide if they cells would all be the same | Informal assessment: evaluate students based upon their reasoning of why the cells are the same. | Power point with pictures only |
| 6 | Students will be able to explain how DNA gets copied and transferred from parent cells to new cells. | Students centered: students will use white boards to come up with their own model of how they think DNA is copied and moved. | Informal assessment: evaluation of the drawings that students come up with after receiving background information. | White boards and markers for students |
| 7 | Students will be able to distinguish the difference between chromosomes and chromatids | Teacher Centered: show students the different phases of mitosis and have them choose when chromosomes are chromosomes and when they are considered chromatids. | Informal assessment: after going through the lecture and having the students guess which is which, have them bring a drawing in to class the next day. One picture of a chromosome the other of a chromatid | Power point with pictures only |
| 8 | Students will be able to identify each of the stages of the cell cycle: G1 phase, S phase, G2 phase, M phase. In addition explain what occurs during each stage | Student centered: give students the names of each stage and have them draw their own diagram of the cell cycle then compare their drawing to the real cell cycle | Informal: based on the drawings done on the white boards evaluate student understanding. | White boards and markers for students |
| 9 | Students will be able to identify prophase, metaphase, anaphase and telophase and distinguish what is different in each phase | Teacher centered: show slides of each of the stages, explaining what is occurring during each stage and/or having the students predict what will happen in the next stage. | Informal: review the next day in class and see if the students can point out the differences by looking at just a picture and not knowing the phase. | This day could be used as a lab day |
| 10 | Students will be able to define cytokinesis and understand why this concludes mitosis. | Student centered: students will have to decide if telophase is the final step of mitosis or if another step is necessary. They will need to give supporting evidence for their answer. | Informal: evaluate students evidence used to support the conclusion they come to. | Could be used as a second lab day |
| 11 | All | Review day, students will have study guide given to them at the beginning of the unit, can use this day to ask questions or revisit ideas | N/A | Make sure to have all power points and lay outs of lab |
| 12 | All |  | Unit Exam | Have exams ready with different forms of the exam |