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To study mitosis, biologists often look at certain cells. Remember, that mitosis occurs only in growing areas, so finding a good place to study it can be a challenge. Two specimens are commonly used by biologists to study mitosis: the blast of a white fish and the tip of the root of an onions. The white fish embryo is a good place to look at mitosis, because these cells quickly divide as the fish embryo is growing. The onion root is also a good place because this is the area where the plant is growing. Remember that when cells divide, each new cell needs an exact copy of the DNA in the parent cell. This is why mitosis is visible only in the cells that divide, such as the white fish embryo and the tip of the onion root. Mitosis can take several hours to complete. Scientists will make cell slides that should be subjected to mitosis to find a particular cell in any of the stages - prophase, metaphase, anaphase, telophase. Remember that most of the cells you see will be in the interphase, which is the rest state cells. Your task is to look at real slide photos and identify the stages of mitosis. Answer questions as you read the introduction and view the slides. You may want to print this page to answer the questions on it, or just answer questions (#1-5) on your own paper. Introduction: 1. Why is white fish used to study mitosis? 2. What are the four stages of mitosis? 3. How long does it take for mitosis to complete? Why will most of the cells you view be in the interphase? View Click Cells to view Whitefish Embryo Click to view Onion Root Tip 4. For each sketch list of specimens and label mitosis phases See 1 See 2 See 3 See 4 Whitefish Onion Shannan Muskopf October 31, 2020 This mitosis investigation was created during the 2020 pandemic for distance learning. In previous years, biology students saw the lab slides and analyzed cancer data and mitotic index. (Investigation: Mitosis and Cancer) This activity at home is only looking at the mitosis of onion cells and I'm going to add cancer and mitotic index as a separate activity. I used a microscope camera to take pictures of onion root slides where students can count the number of cells in each phase and use these numbers to calculate the amount of time spent in each. Students currently need to click link to a Google folder that contains the five photos, although we could eventually move them to something more interactive. You are welcome to download and use them in your own class or even add them to Google slides so that students don't have to leave this page. The activity contains introductory information on the types of cells that divide (embryos, meristems) and the phases of mitosis as a revision. Students are shown to identify phases the tops of the root. Then fills in a table that counts the number of cells in interphase, prophase, metaphase, anaphase, and telophase. A simple formula uses these numbers to calculate the time spent based on the known time it takes for these cells to complete the cell cycle (720 minutes). The tip of the onion root that shows the cells in mitosis. 1. _____ 2. _____

3. _____ 4. _____ 5. _____ 6. _____ 7. _____ 8. _____
 9. _____ 10. _____ 11. _____ 12. _____ 13. _____ 14. _____
 15. _____ 16. _____ 17. _____ 18. _____ 19. _____ 20. _____
 21. _____ 22. _____

Name: _____ Mathematical problems (show work) 23. What percentage of cells are in the interphase? 24. What percentage of cells are metaphased?
 Introduction: Mitosis can be observed in cells that are in a state of growth. In this lab, you will observe the cells and identify at what stage of cell division the cells are. To help you do this, let's review which features to look for at different stages. Also, remember, the interphase is not technically a part of Mitosis, but it is part of the cell cycle and many of the cells you will be looking at are in the interphase Identify each stage of mitosis on the chart below and describe what you would expect to see. Stage Features Distinctive Procedure: You will be given a slide of Allium, which is an onion root tip. Growth occurs when cells divide, so the root tips should have more cells in the cell division process. View the tip of the root under the microscope and look for organized cell blocks where the nuclei are clearly visible. (Most of the activity will take place at the tip of the root). Move the slide around until you find a good place that shows the cells at different stages of mitosis. Stage Outline Estimated Number of Cells Interphase Profaphase Anphasphase Callophase Analysis 1. Why is onion root a good specimen for studying mitosis? 2. Most of the cells in your specimen were at what stage of the cell cycle? 3. In allium, interphase lasts about 15 hours, and mitosis lasts 80 minutes. Assuming that each stage of mitosis same time period, how many old hours is a cell that is just starting anaphase. (Yes, you'll have to do some math here – show your work or explain your reasoning.) 4. Sketch a cell at any stage of mitosis. Label Label stage and label any cellular structures that are visible. Axis fibres and chromosomes must be visible. 5. Which stage of mitosis is the easiest (in your opinion) to see on the slide? What about it making it easier to identify?
 Identify?