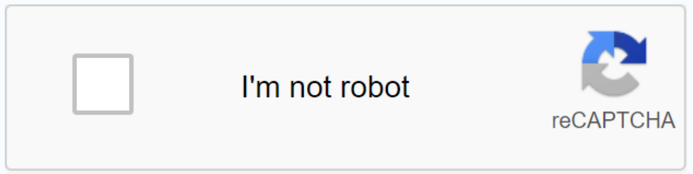


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# Waves unit 1 worksheet 3 key

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To start class, I passed Unit 1 Checkpoint #2 the previous day and spent time talking about the parts that many students struggled with. This usually consists of writing mathematical models and calculating slopes. I told them that when writing mathematical models they need to make sure to replace x and y variables with variable names and replace m and b with corresponding numbers and appropriate units. For the slopes, I show them to the X and y axes and ask them how much each box on the x axis represents and how much each box on the y axis represents. When they see that they are not 1 for each box, they recognize their mistakes in calculating the run rise. Student samples are shown below. Once we finished discussing the checkpoint yesterday, we moved on to discuss and focus on the mathematical model. I use the checkpoint as something for the basis of the next discussion. I wrote a note on the board and asked the students to write these ideas in their notebooks throughout our discussions. I have students participating in the discussion because I reveal mathematical models and like to have students write these concepts as a note for them to use as a reference. Students begin by stating what are the 3 ways we can determine the veer of what we already knew or read from the textbook the previous night. After multiple student volunteers, the list contains the following three definitions: slope position vs. time graph, change of position during time intervals, and speed in the given direction (or speed + direction). I asked them if they thought that velocity and speed were the same thing and I got mixed answers, but I usually have students who say that direction the main difference. The goal is to have students focus on math models and where it comes from. I have students thinking back to the checkpoint and to Dune Buggy Lab and what time graph vs. positions look like. I painted the line with a positive slope as a reminder. From there, we review the model we come with that: final position = velince x time + initial position. After we selected letters to represent positions, velined and time, I wrote similarities in the symbol and be sure to stress that f and i are to distinguish between the final and initial positions. Then I went through how to rearrange the equation as in the Constant Velin Mathematics Model Note. I showed them a circle how to easily rearrange the similarities similar to the idea below: I finally asked them if we used the same equation to speed. When they say no, I ask them if they see one in the reading and they usually come up with the equation: average speed = total distance/time. I told them that it is equal to the similarity of velocity, the only difference that velocity has direction so that it can be positive or negative and the speed has no direction so that it has no sign. By the end of this section of lesson, student notes should look like Constant Directional Mathematics Model Notes, which they can use to help them in the next section of lessons. I showed students two guided practice problems after we discussed the mathematical models they would use so that students had references on how to set up their work. I told the students that the minimum amount of work I should see is similarities in symbols, similarities to replaced numbers and answers with units surrounded. I chose each of these problems because they helped students to see the difference between speed and velice and serve to help students check that the unit matches. My approach is shown in the Mathematical Model Notes Picture of Constant Vection below and video, Troubleshooting Guided Problems with Constant Velined Mathematics Models. I use these two problems for different reasons. The first problem helps students see that there is a difference between speed and velination even when calculating. The second problem helps students see how important it is to have a corresponding unit and remind them how to change. I use guided problem solving to help them see my thought process in how I'm going to solve problems to help them because they start their own set of practice problems. After the students finished the problem of guided practice with me, I told them they would work with their desktop to complete Worksheet #3 Constant Velocity Calculation. I make sure to stress that they will be credited for showing their work by placing the similarities they choose to use in symbols, calculating the answers that are and use the right units for their answers. If students don't have any questions, I tell them they can start working in their group. I have students working with their groups so they can get some time to practice with the models we develop. As a working student, I walked around to see if there were any questions that their group members could not answer with with 1 Packet of #3 work. When students call me to ask questions, I always ask if they ask their group members for help first before asking me. I did this because I thought it was important for students to use their friends as a resource in the classroom because that is the skill they will use long after high school. At the end of the class, I had students take their learning targets. When they look at their learning targets, I ask them to write 1 question on the Post-it note that they must answer before they take the test. I have students doing this for a number of reasons. Firstly, I want to know what areas I need to focus on in any review the next day. Secondly, I need a list of student-generated questions for other students to answer in other activities in their next lesson. Finally, I want to create resources that answer all student questions from all my classes so that when they complete the activity in the next lesson, they have answers to all questions. Thank you for your participation! Participation!