

Physics Lab – Virtual Ripple Tank

Virtual lab can be found at: <http://phet.colorado.edu/en/simulation/wave-interference>

Part I: Determine the speed of waves in water.

1. *Design Your Procedure* – What would you do to figure out the speed of waves in water? Describe the steps you would take and the virtual tools you would use to figure this out. You should have a clear, step-by-step description that anyone in the class would be able to follow. (No numbers in this section, just a description.)
2. *Collect Your Data* – What data did you collect using the procedure you created in #1? How many times did you collect data to be confident in your accuracy? The data should be clearly organized in a way that matches your procedure.
3. *Make Your Calculations* – What calculations do you need to make on the data you collected? Show the equations you use and your answer for the speed of waves in water. Pay attention to significant digits.
4. *Check Your Results* – “Doing good science” requires that a researcher’s results can be independently checked by other researchers. Compare your answer for the speed of waves in water with that of a classmate and record both numbers.
 - Why might your numbers be different?
 - Should everyone get the same number or is it okay to have different numbers?
 - What is the percentage difference between your numbers? Is it “significant”?

Part II: Investigate ripple patterns.

5. *Play With The Ripple Tank* – Observe the different ripple patterns you get with changes to the waves and the ripple tank. For example:
 - See what happens with one faucet vs two faucets.
 - Turn the faucets on and off.
 - Change the frequency and amplitude of the drops.
 - Add a barrier with one slit or two slits and move the barrier left and right.
 - Change the width and spacing of the slits in the barrier.
6. *Create An Interesting Ripple Pattern* –
 - Set the frequency near the middle of the scale.
 - Set the amplitude near the right end (the high end) of the scale.
 - Add a barrier and put it at 6.2 cm (check the “Barrier Location” scale).
 - Set the slit width to 2.5 cm or higher.
 - You may choose the other variables as you like – one faucet or two, one slit or two, any faucet spacing, any slit separation, etc. But be careful, because the next step is...
7. *Draw Your Ripple Pattern* – Pause the ripple tank. Using a colored pencil for the crests and a dark pencil for the troughs, draw the ripple pattern. Pay attention to where the colors are brightest and where they are dim.

Part III: Identify wave behaviors.

8. *Reflection* – Circle an area of your diagram that shows wave reflection and label this area “reflection”.
9. *Diffraction* – Circle an area of your diagram that shows wave diffraction and label this area “diffraction”. Below the diagram, describe what “diffraction” means.

10. *Constructive Interference* – Mark a point on your diagram that is an example of constructive interference. Below the diagram, describe what “constructive interference” means.
11. *Destructive Interference* – Mark a point on your diagram that is an example of destructive interference. Below the diagram, describe what “destructive interference” means.

Bonus: What’s Out There?

12. Describe what is just beyond the right-hand side of the ripple tank and support your hypothesis.