Huygens' Principle Lab

1. Open the **VHuygens** program.
2. Go to the **Wave Front Refraction** tab.
3. Set the Following values for the program.
4. For the incoming ray set: velocity to 15, the wavelength to 50, the number of wave fronts to 6 and adjust the Angle of incidence to be 45.
5. For the refracted velocity, set the wave velocity to be 10.
6. Hit the start button until all 6 wave fronts have hit the boundary then hit stop. (You can also drag the time slider to speed the process up.)
7. Measure and record the angle and wavelength of both the reflected and refracted wave.
8. Do the reflected wave properties make sense? Explain.
9. Use the refracted values to verify Snell's law for as many of the ratios as possible. (Show calculations.)
10. What is the index of refraction for these two materials? i.e. $n_{green:red}$.
11. Repeat this procedure for when the incoming speed is slower than the refracted speed. Change all the values so they are different then in the first part of lab. Ensure you use a small value for Angle of incidence (~20°)
12. Record the appropriate values and verify that Snell's law works. What is the new $n_{green:red}$?
13. Using Snell's law, calculate what the critical angle is. Use the program to verify your answer.

Summary:
From what you have just learned, if the frequency of the incoming waves below is 75 Hz, find

a) Speed of the incoming ray.
b) Speed of the refracted wave.
c) Verify Snell's law in as many ways as possible.
d) $n_{green:red}$
e) Critical angle