a place of mind

FACULTY OF EDUCATION

Department of
Curriculum and Pedagogy

Physics
Waves

Science and Mathematics Education Research Group

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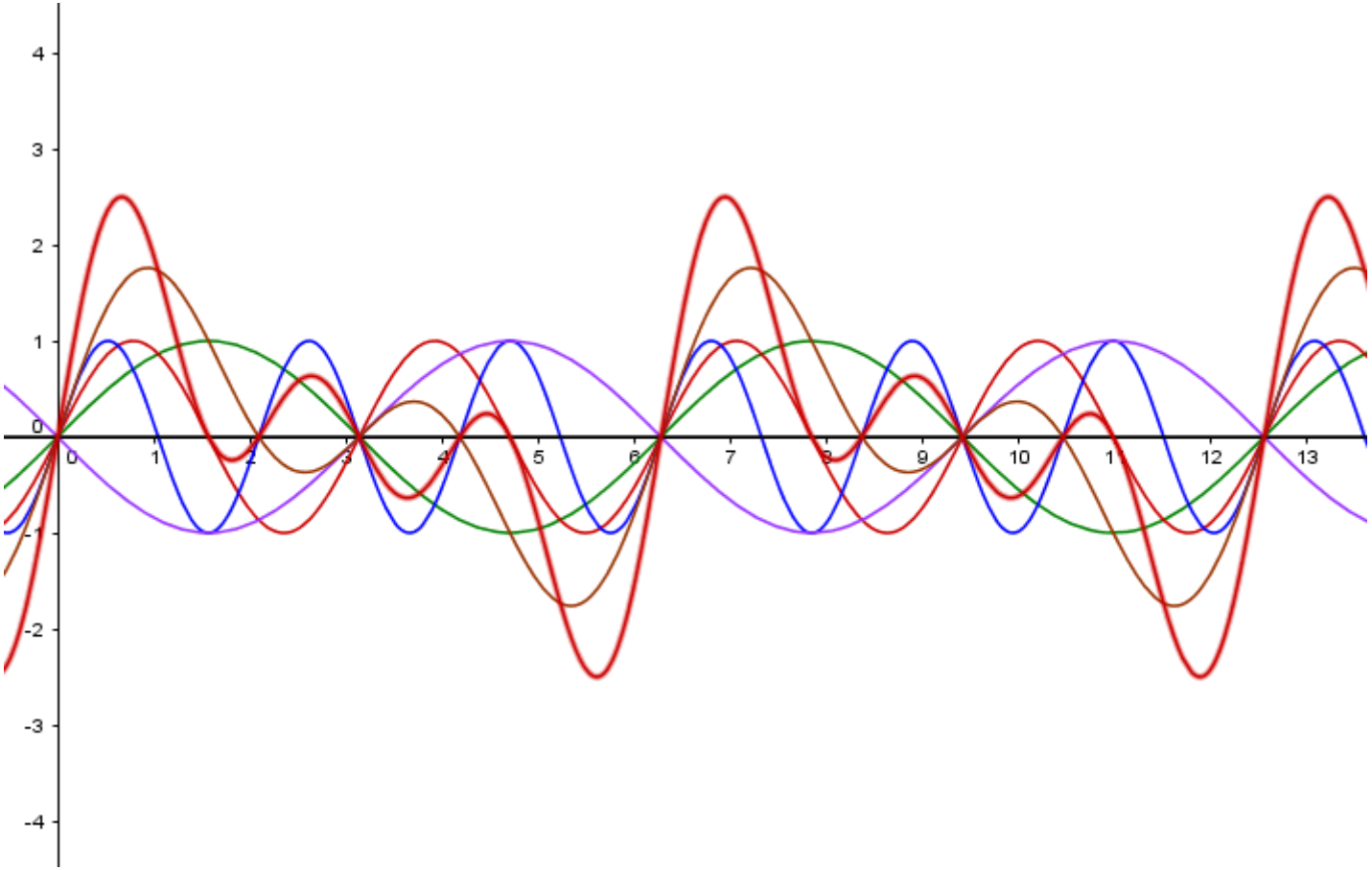
Waves

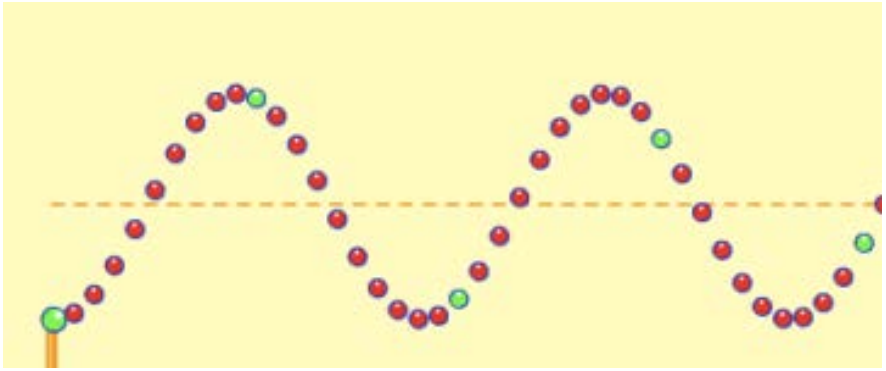


Waves

The following questions have been compiled from a collection of questions submitted on PeerWise (https://peerwise.cs.auckland.ac.nz/) by teacher candidates as part of the EDCP 357 physics methods courses at UBC.

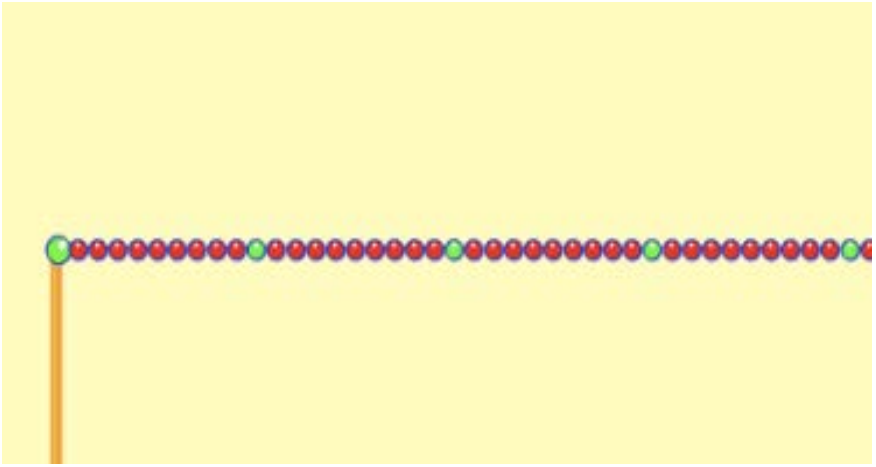
Waves Problems I

Consider the snapshot of a wave:

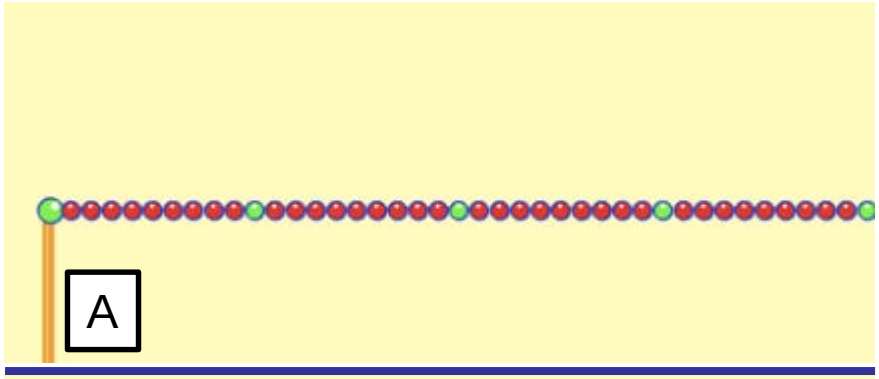


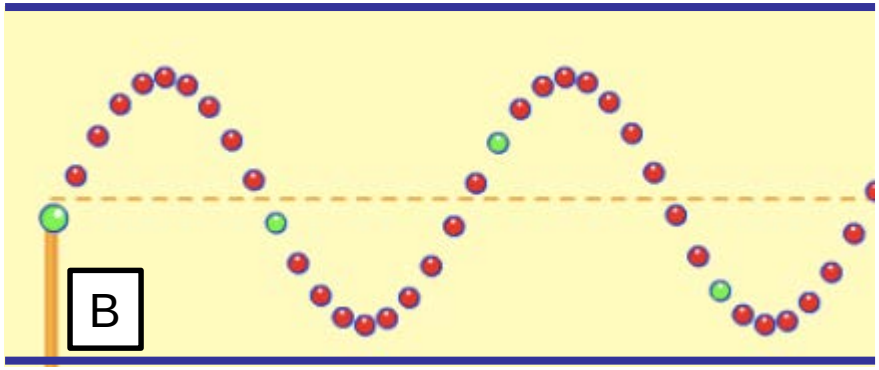
Which of the following could be superimposed (added) on the above wave in order to achieve the following "wave"?

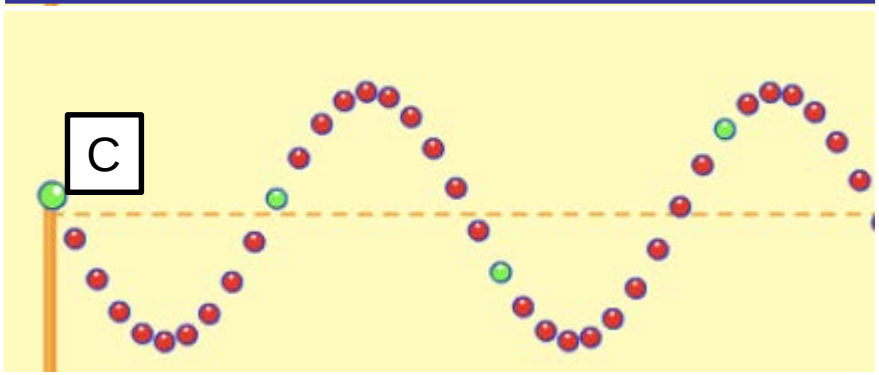
(Options are on the next slide.)

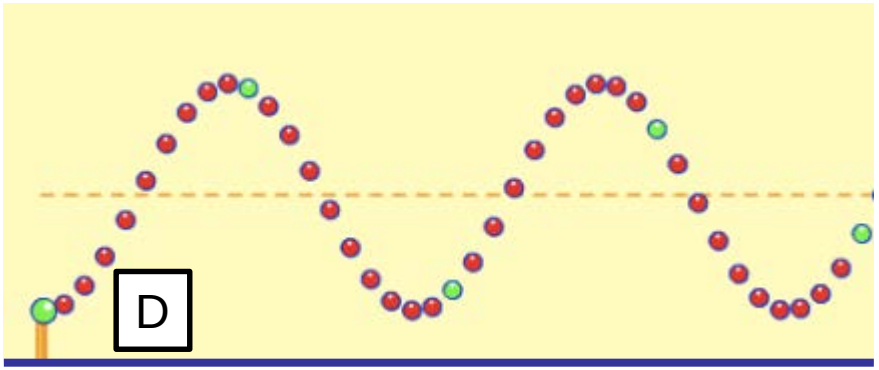


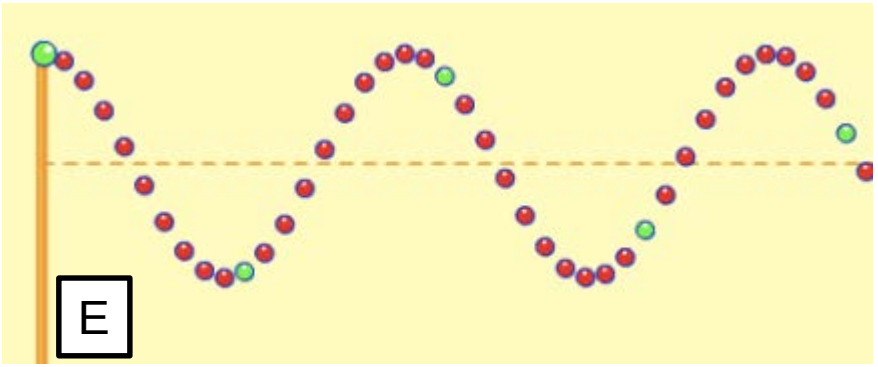
Waves Problems I (cont.)











Solution

Answer: E

Justification: The **principle of superposition** is sometimes stated as:

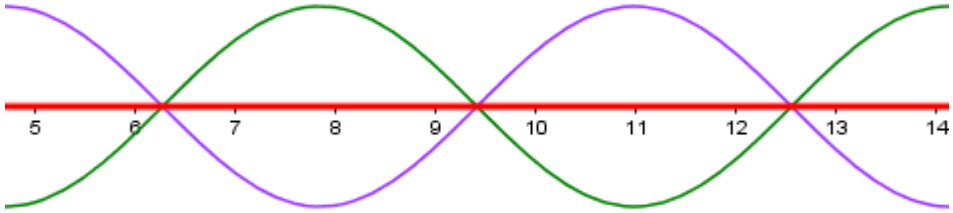
> When two waves interfere, the resulting displacement of the medium at any location is the **algebraic sum** of the displacements of the individual waves at that same location.

We are looking for a wave that would produce destructive interference. **Destructive interference** is a type of interference that occurs at any location along the medium where the two interfering waves have a displacement in the opposite direction.

Thus, **E** is the correct answer.

Solution continued

Answer: E



In our case, the two waves (given wave and option E) have the same displacements but in opposite directions. We can see this if we note the positions of the green-colored balls (particles) that move as the wave passes. When we superimpose these two waves having equal and opposite displacements, the resulting displacement (red line) is canceled by the effect of one another.

Thus, **E** is the correct answer.

Try it out for yourself: http://phet.colorado.edu/sims/wave-on-a-string/wave-on-a-string_en.html