

Work Sheet - Doppler Effect and Sonic Booms

1. The pitch of a sound depends on the _____ of the sound waves that reach the _____.
2. In each case, tell whether the pitch rises or drops:
 - a. The source of a sound moves away from the observer, who stands still. _____
 - b. The source stays still and the observer moves toward the source. _____
 - c. The source and observer move toward each other. _____
 - d. The source stays still, and the observer moves away. _____
3. All the cases above are examples of the _____ Effect.
4. Give some uses of the Doppler Effect.

5. Draw 4 circles representing water wave fronts made by a boat (dot) moving left to right in each situation:

A. Boat moves slower than waves move.

B. Boat moves at the same speed as waves move.

C. Boat moves faster than waves move.

In the last drawing, use dotted lines to show the bow wave following the boat. Along this line, crest meets _____ for _____ interference. Circle the portion of another drawing showing this same kind of interference.

If the boat becomes a plane and the water becomes air, wall of compression waves in drawing B would be called the _____, and the bow wave in drawing C would be a 3 dimensional shock wave called a _____.

6. True or False?
 - _____ a. A sonic boom is heard only at the instant the plane breaks the sound barrier.
 - _____ b. Sonic booms follow all supersonic planes.
 - _____ c. The higher the altitude of the supersonic plane, the greater the intensity of the shock wave (sonic boom) experience on the ground.
 - _____ d. A supersonic plane must go through the sound barrier again as it slows down to Mach One.
 - _____ e. Bullets and whips can make sonic booms.
 - _____ f. Another sound barrier exists at a speed of Mach Two.