EXTRA WAVE TOPICS

Name _____

The Sound Barrier

Speed of Sound in Air:

The speed of sound in air is 343 m/s or about 770 miles per hour.
Normal planes cannot go faster than this speed because of the *sound barrier*.

Sound Waves --- compression zones

Sound is a *longitudinal wave*.
It is made of pieces called *compressed zones*.

Sound Barrier

When a plane flies close to the speed of sound, it begins *catching up* with the sound waves it is let off.
The compression zones build up and create a *wall of air* that the sound must break through.

For an object to move faster than the speed of sound, it must *break through* the sound barrier.

Sonic Boom

An extremely loud sound made when an object breaks through the sound barrier.

If you ever see a military jet fly by, you can hear the sonic boom as it passes.

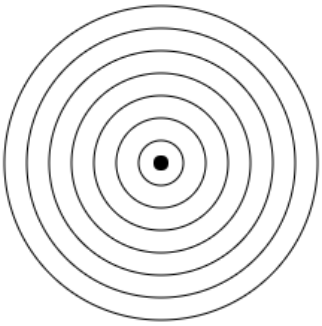
A jet plane breaking the sound barrier:

EXTRA WAVE TOPICS

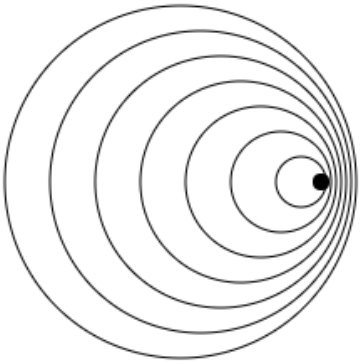
Name _____

Diagrams of Sound Waves made by Moving Objects

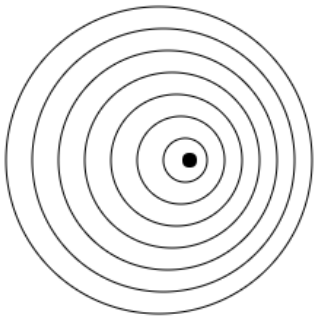
Stationary Object



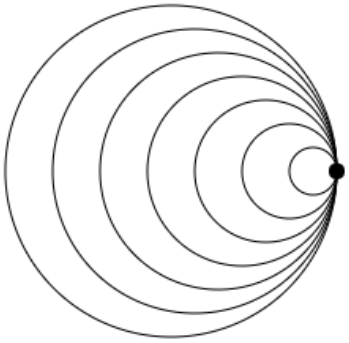
Approaching Sound Barrier



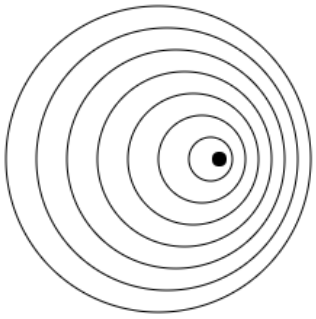
Very Slight Doppler Effect



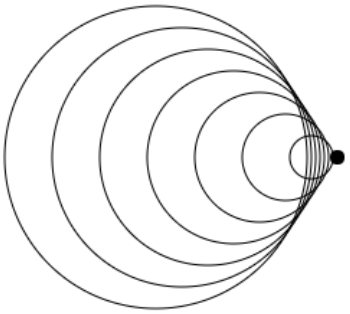
Breaking Through Sound Barrier



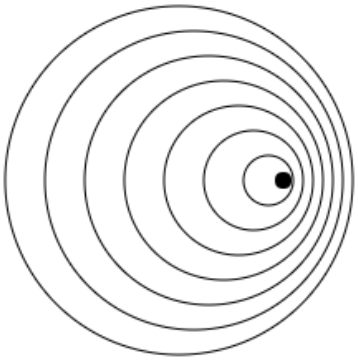
Doppler Effect



Moving Faster Than Sound



Stronger Doppler Effect



EXTRA WAVE TOPICS

Name _____

A problem:
Could a stealth plane ever fly at 1000 miles per hour? Why or why not?

Another problem:

Two facts you should no:
- Commercial jets are not capable of flying through the sound barrier.
- In the temperate zone of the northern hemisphere (where most people live), most winds blow west to east.

A flight from NYC to London is about 7 hours 20 minutes,
A flight the other way, from London to NYC, is about 8 hours 20 minutes, about an hour longer.

You tell this to a friend, and explain that all flights to the east are FASTER because of the wind.

Your friend states, "That's stupid. The wind shouldn't affect the speed of a plane! Why don't they just push the engines harder to make up for the wind going against them? Just like you would in a car, the wind would never make your car go slower because you could always just push harder on the gas. They should do the same thing in a plane!"

Your friend is tragically misinformed.

Explain why they can't just do that.