Worksheet: Basic concepts of sound and its propagation

Grade: **Date:**

Name: **School:**

Circle the appropriate answer:

I. Sound from a metal gong:

1. How does the sound from the metal gong reach our ear?

a. Through the hitting metal rod
b. Through the vibration of the metal gong and air around the metal gong
c. Through the vibration of the metal gong
d. Through air

2. Why does sound from the metal gong abruptly damp when it is touched by hand?

a. Sound goes to the hand and enters the body
b. Hand stops vibration of the metal gong
c. Hand stops vibration of air around the metal gong
d. Do not know

3. Based on your observations of the ringing metal gong why do you think sound is produced in all material objects?

a. Movement of air
b. Vibrating objects
c. When one object hits another object
d. Do not know

II Sound from a bell (Alternate suggestion):

1. When you ring the bell how would the sound reach you?

a. Through the hitting metal clapper
b. Through the vibration of the curved surface of the bell and air around it
c. Through the vibration of the curved surface of the bell
d. Through air

2. Why does the sound of a ringing bell abruptly damp when the outside surface is touched by hand?

a. Sound goes to the hand and enters the body

b. Hand stops vibration of the outside curved surface of the bell

c. Hand stops vibration of air around the curved bell surface

d. Do not know

3. Record your answers in the worksheet. Based on your observations of the ringing bell how do you think sound is produced in all material objects?

a. Movement of air
b. Vibrating objects
c. When one object hits another object
d. Do not know

III. Chiming spoon:

Procedure:

1. Tie the thread around the spoon handle as shown in the figure 1. given below.

2. Wrap the ends of the string around your fingers.

3. Gently swing the spoon so that it bangs into the edge of a table as shown in the Fig. 2.

4. What does it sound like?

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5. Now, gently insert your index fingers into your ears.

6. Lean over, swing the spoon so it bangs against the table edge again as shown in the Fi.g 3.

7. What is/are the change/s you noticed from the previous report?

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8. Wrap the string around your fingers several more times to make the hanging section shorter. Repeat steps 3–7. Record any changes you noticed in your previous notes.

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9. Try gently banging the spoon against different surfaces (metal, wood, plastic) to hear if it sounds any differently.

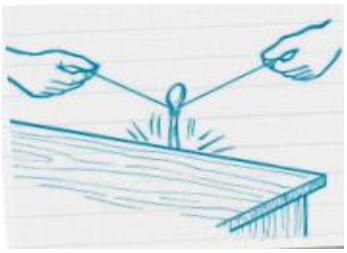

Figure 1: Depicts how the thread is tied to the middle of the spoon.

Figure 2: Depicts how the thread's end is kept inside the ear.

IV. Making sound using a ruler:

Procedure:

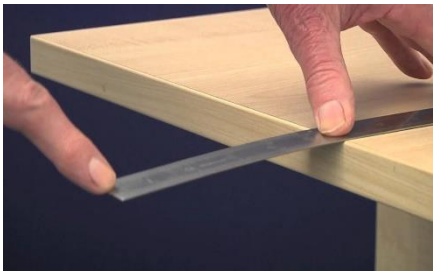

Figure 3: Depicts how the ruler is to

1. Take the ruler and place it so one-half is on the table and the other half is over the edge of the table as shown in the figure. Firmly hold half of the ruler on the table with your hand (hold it tightly).
2. Use your other hand to push up on the part of the ruler hanging over the table.
3. Change the protruding length of the ruler by varying the length as 6 cm, 10cm, 15 cm and 20 cm. and repeat the step 2.
4. Observe the vibration and sound the ruler is making and record your observations below.

   - Sound is produced greatest in ….....cm
   - Sound is produced least in ……cm
   - Greatest vibration is seen in…….cm
   - Least vibration is seen in……...cm
   - Greater the vibration……the sound (lesser/greater/no change)
   - Lesser the vibration …….....the sound (lesser/greater/no change)

5. Relate the effect of the rapid and slow movement of the ruler to air in the atmosphere. What is your conclusion from this?

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V: Sound involves propagation of vibrations

Procedure:

1. Suspend a thread with a ping-pong ball at arm's length using a clamp of the burette stand Make sure that ping pong ball is suspended without any obstruction.
2. Gently strike a tuning fork with rubber mallet and gently bring it towards the ping-pong ball without touching the ball.
    - The ball ……..(moves lesser/moves greater/ did not move)
3. Again gently strike a tuning fork with rubber mallet and gently bring it towards the ping-pong ball until it just barely touches it.
    - The ball ……..(moves lesser/moves greater/ did not move)
4. Again gently strike a tuning fork with rubber mallet and touch the ping-pong ball.
5. The ball ……..(moves lesser/moves greater/ did not move)
6. Why do you think the ping-pong ball moved?

Figure 4: Depicts the movement of the ball by the vibration of the

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7. What else did you notice/ observe in the tuning fork with your eyes or ears?

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8. Can we see sound move objects? ..... (Yes/No).
9. Gently hit a tuning fork with a rubber mallet and bring it to the edge of a steel tumbler filled with water.
10. What did you feel when you touched the tuning fork after you hit it?

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11. What did you observe happening to the water?

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12. What made the surface of the water to move or vibrate?

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VI. **Making a Telephone**

1. Make a small hole in the bottom of two paper cups.
2. Tie the thread through the holes; tie each end to a washer so that the string will not slip through.
3. Have a friend hold one cup; you hold the other end.
4. Keep the thread very loose and take turns talking into the cup and listening. Why do you think these phones do not work?
   a. The vibration of the thread is not strong enough
   b. It hinders the vibration of the air inside the cup
   c. The cup stops vibration of the air
   d. Do not know

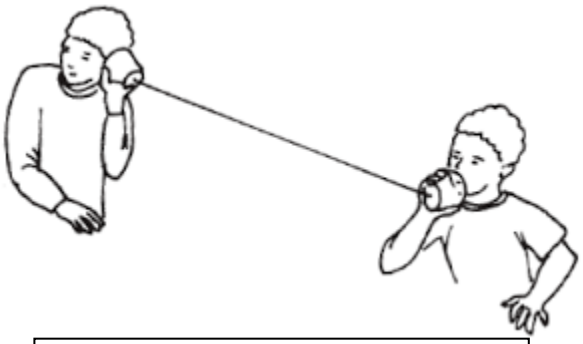

Figure 5: Depicts the cup-telephone.

5. Gently pull the string until it is tight. Take turns talking into the cup and listening. Be sure that you keep the thread taut. Why do you think these phones work now?
   a. The vibration of the thread is strong enough
   b. The air inside the cup is vibrating more
   c. The cup gives additional vibration to the thread
   d. Do not know

6. While one speaks through the cup and another listens to it, have another students cut the thread. Why do you think these phones do not work?
   a. Vibration of air inside the air is stopped
   b. Vibration of the thread is stopped
   c. Vibration of the air outside the thread is stopped
   d. Do not know.
7. Describe to your partner what you think is happening and why. Then, report to the class.
8. How is the sound traveling to your friend listening to you?
   a. Vibration of the thread
   b. Vibration of air outside the cup
   c. Vibration of air outside the thread
   d. Do not know