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RESOURCE AREA FOR TEACHING

Name:_____   Date:_____

Project/Unit: Design a Noise Cancelling Device   Lesson: 2

Use various materials to design and build three different sound capsules according to the criteria and constraints below.

Criteria (Design Requirements)	Constraints (Design Limitations)
• All capsules contain a weight when tested • Weight should be in a fixed position in the capsule, unable to bounce around • Capsules stay intact after each test • Capsules should land such that the defined bottom strikes the ground first for each test • Capsules should fall straight down when released	• All capsules must be built using only the materials provided • All 3 capsules must be made with different materials (not all made with same stuff!) • *Each* capsule must be built with a minimum of 5 different materials <u>in addition</u> to adhesives and/or fasteners • No parachutes or wings! This will interfere with them dropping freely onto testing area.

When the noise capsules are built, use this protocol to test the capsules for sound output:
1. Determine how the capsules will be dropped, who on the team will do the dropping, what the drop signal will be, and where to place the sound measuring device (keep it there for all tests!), and who records the sound measurements.
2. Drop the each capsule three times and record the measurements for each capsule in the data table below.

Data Table: Noise Capsule Sound Output Tests			
	Materials Used	**Sound Output (dBA)**	**Average dBA** [(Sum of values) **/** 3]
Capsule 1		1: _____ 2: _____ 3: _____	
Capsule 2		1: _____ 2: _____ 3: _____	
Capsule 3		1: _____ 2: _____ 3: _____	

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Read and discuss the following items with your group:

Analysis and Discussion

- Examine the data and identify any patterns. Is there a pattern in the data for a particular capsule? What about patterns in data between different capsules?

- Identify the capsule with the smallest sound output (decibels).

- Discuss the relationship between the *smallest* average sound output and the materials used to build that capsule. What unique characteristic may have affected the value of the sound output for the capsule?

- Now answer the question above for the capsule having the *largest* sound output.

- Based on your findings, which material appears to be ideal for transmitting sound? Absorbing sound? Reflecting sound?