CATEGORY	5	4	3	1
Egg Container ***(score = points received X 2)***	Eggs survive with no cracks; container meets all requirements	Eggs survive with small cracks but no mess; container meets all requirements	Eggs sustain large cracks with some mess; container meets all requirements	Eggs do not survive and make a big mess; Humpty Dumpty
Components of the report ***(score = points received X 1)***	All required elements are present and additional elements that add to the report (e.g., thoughtful comments, graphics) have been added.	All required elements are present.	One required element is missing, but additional elements that add to the report (e.g., thoughtful comments, graphics) have been added.	Several required elements are missing.
Procedures ***(score = points received X 1)***	Procedures are listed in clear steps. Each step is numbered and is a complete sentence.	Procedures are listed in a logical order, but steps are not numbered and/or are not in complete sentences.	Procedures are listed but are not in a logical order or are difficult to follow.	Procedures do not accurately list the steps of the experiment.
Data ***(score = points received X 2)***	Professional looking and accurate representation of the data in tables and/or graphs. Graphs and tables are labeled and titled.	Accurate representation of the data in tables and/or graphs. Graphs and tables are labeled and titled.	Accurate representation of the data in written form, but no graphs or tables are presented.	Data is not shown OR is inaccurate.
Calculations ***(score = points received X 4)***	All work is shown and the results are correct and labeled appropriately.	Some work is shown and the results are correct and labeled appropriately.	Some work and the results labeled appropriately.	No work is shown OR results are inaccurate or mislabeled.
Conclusion ***(score = points received X 2)***	Conclusion includes whether the findings supported the hypothesis, possible sources of error, and what was learned from the experiment.	Conclusion includes whether the findings supported the hypothesis and what was learned from the experiment.	Conclusion includes what was learned from the experiment.	No conclusion was included in the report OR shows little effort and reflection.
Drawings/Diagrams ***(score = points received X 1)***	Clear, accurate diagrams are included and make the experiment easier to understand. Diagrams are labeled neatly and accurately.	Diagrams are included and are labeled neatly and accurately.	Diagrams are included and are labeled.	Needed diagrams are missing OR are missing important labels.
Usage ***(score = points received X 1)***	One or fewer errors in spelling, punctuation and grammar in the report.	Two or three errors in spelling, punctuation and grammar in the report.	Four errors in spelling, punctuation and grammar in the report.	More than 4 errors in spelling, punctuation and grammar in the report.
			Total out of a possible 70 points	

Egg Drop Project

Goal
Design and build a container that will protect delicate cargo (an egg) under stressful landing and accident conditions.

Key Question
Based on the fragility of an egg, what materials and design concepts need to be considered to protect an egg during a drop from over 3 m?

Preparation
Collect Possible Materials
Construct a container to protect the egg from a fall off the top of the bleachers.

Required Materials

- Egg (provided by teacher)
- Measuring tape
- Stopwatch
- Container to protect egg

Construction

- The device must be of original design.
- It can be constructed of any school appropriate material that the team feels appropriate and can obtain, including material recycled from other products.
- Upon the initial release of the device, it must be able to fit within a 12" cube. Once the device is released, it may take any shape or size.
- There will be no physical contact with the device once it has been released.
- The egg must be put into the design on the day of the competition. The design must allow for easy opening and inspection of the egg. Opening and closing of the packages will be accomplished in the same period of time for all contestants (2 minutes).
- Repairs requiring additional materials will not be allowed once the competition has begun.
- No glass containers.
- Be prepared to clean up any mess, if necessary.

Suggested Materials
(just a sample of possible materials)

- 8 1/2 X 11 paper
- Tape
- Cardboard
- Balsa wood
- Rubber bands
- String
- Feathers
- Glue
- Straws
- Plastic wrap
- Bubble wrap
- Toothpicks
- Cotton balls
- Marshmallows

Reflect on These Questions…
1. Should your container be made rigid; or is it better if it collapses?
2. Should the egg be able to move, or should it be held immobile?
3. What types of materials or structures will absorb the shock of an impact?
4. How can it be designed to withstand multiple drops from successively greater heights?
5. What types of materials will contain the egg if it breaks?

Required Info to be Included in Lab Report

- Diagram of your egg and container with labeled materials
- Mass of container plus egg (in kg)
- Weight of container plus egg (in N)
- Acceleration of container during its fall (in m/s^2)
- Final velocity of the container immediately before impact (in m/s)
- Time of fall (in s)
- Force of impact (in N)
- Momentum of the container plus the egg upon impact (in kg m/s)
- Written section explaining how Newton's Three Laws of Motion relate to the egg drop project
- Reflection section (above)