



EduTrend Contents

EDUTECH · ENGINEERING · MIDDLE SCHOOL

Egg Drop Protector

Design a device that protects an egg from a two-metre drop

Ages 11–14

Level: Intermediate

60 minutes

Groups of 3 · up to 30

Activity 03

Inside: activity at a glance · step-by-step session plan · facilitator notes · 3 student worksheets · assessment checklist

ACTIVITY 03 · AT A GLANCE

Egg Drop Protector

Teams design a device from limited materials that protects a raw egg dropped from two metres. They research how cushioning and slowing the impact reduce force, sketch and choose a design, build, test and score results on survival and mass. Teams then explain their design using force and impact ideas.

Learning outcomes

By the end of the session students can:

- apply ideas about impact force;
- use criteria and constraints;
- score designs fairly;
- evaluate trade-offs such as mass versus protection.

KEY WORDS

impact · force · cushion · crumple zone · mass · trade-off

CURRICULUM LINKS

Science: forces and motion. Maths: scoring and ratios. Design: packaging.

1**ASK**

Who needs what?

2**IMAGINE**

Many ideas

3**PLAN**

Sketch and choose

4**BUILD**

Make a prototype

5**TEST**

Measure against criteria

6**IMPROVE**

Redesign and retest

Materials (per group)

- Raw egg (in a zip bag)
- Straws, card, paper, rubber bands, tape
- Kitchen scale
- Metre stick
- Worksheets 1, 2 and 3

Before the session

- Put each egg in a sealed zip bag.
- Prepare drop zone with a plastic sheet.
- Set scoring rules.
- Print worksheets.

SAFETY

Eggs stay in sealed bags. Teacher or adult drops from a stable step. Wash hands after handling eggs.

ACTIVITY 03 · SESSION PLAN

Step by step

A score such as “survived = 10, minus 1 per 10 g of device” makes the mass trade-off real.

Time	What happens	Say or ask
0–8 min Ask	Explain criteria and scoring.	<i>“What breaks an egg?”</i>
8–18 min Imagine and plan	Sketch and choose.	<i>“How will it slow the egg?”</i>
18–38 min Build	Build and weigh.	<i>“Can you make it lighter?”</i>
38–50 min Test	Drop tests and scores.	<i>“Why did it survive?”</i>
50–60 min Evaluate	Explain with force ideas.	<i>“What would you change?”</i>

CHALLENGE CARD (print or copy onto the board)

Design, build and test a lightweight device that protects an egg from a two-metre drop, and evaluate it using force ideas and a score.

ACTIVITY 03 · FACILITATOR NOTES

The engineering know-how in brief

When a falling object stops, a force acts on it. Stopping more gradually, over a longer time or distance, reduces the force. Cushions and crumple zones work this way.

Engineering involves trade-offs. A heavier device may protect better but costs more material. Scoring rules make these trade-offs explicit.

Common ideas to listen for

- “More padding is always best.” Mass counts too.
- “Parachutes stop the egg.” They only reduce speed.
- “A survived egg means a perfect design.” Consider mass and cost.

Adapting the activity

Support

Provide a list of proven features to choose from.

Stretch

Estimate impact speed from the drop height.

WORKSHEET 1

Design choice

Name: _____

Class: _____ Date: _____

Compare two designs.

Design choice

Design	How it protects	Estimated mass (g)
A		
B		

WORKSHEET 2

Test and score

Record results.

Test and score

Team	Mass (g)	Survived?	Score
1			
2			
3			
4			
5			
6			

WORKSHEET 3

Evaluation

Explain using force ideas.

Why our design worked or failed

FOR THE TEACHER

Assessment checklist

Use during the session. One sheet covers up to eight students; copy as needed.

Student	Applies force ideas	Balances trade-offs	Evaluates with evidence

Suggested codes: W = working towards · E = expected · G = greater depth

ABOUT THIS ACTIVITY

Egg Drop Protector is a sample activity from the EduTrend Contents Edutech Engineering programme (middle school, level: intermediate). Every activity in the programme follows the same format: a practical challenge, a clear session plan, facilitator notes and ready-to-print worksheets, so that teachers, club leaders and parents can run it without extra preparation.

Full 15-, 20- and 32-week programmes are available from EduStore at edutrend.org.

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