

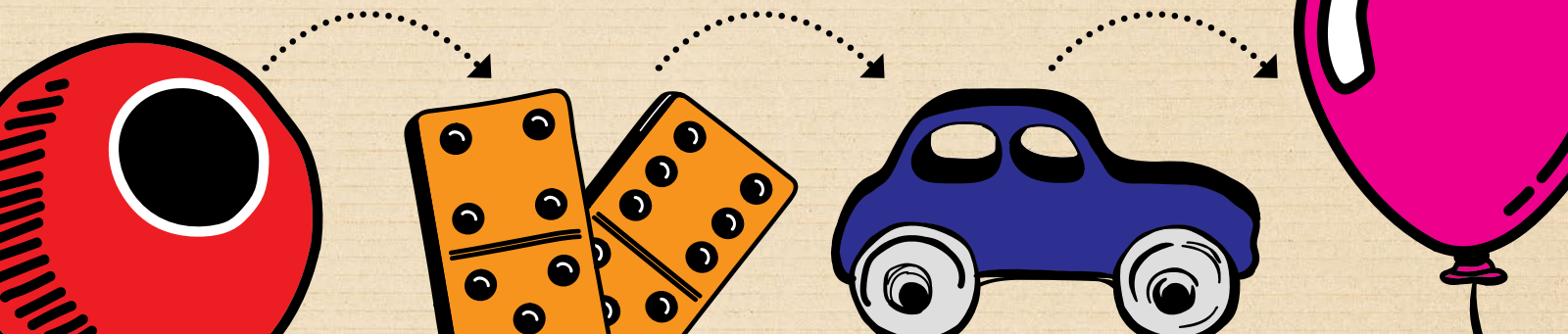


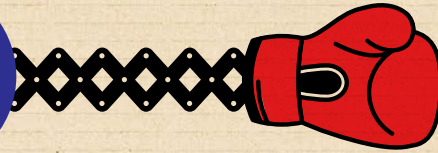
Feb 05 to May 17

ARUBE WHAT?

LESSON PLAN

CEFR LEVELS **A2-C2**
DURATION: **110-120'**





OBJECTIVE:

- To design and construct a Rube Goldberg machine that performs a simple task through a series of six steps.
- Students will develop creativity and problem-solving skills by designing and constructing a simple machine using easily accessible materials.

This challenge integrates concepts from science, technology, engineering, arts and mathematics (STEAM).

MATERIALS AND PREPARATION

Students are encouraged to use commonly-available household items and basic tools to construct their Rube Goldberg machines.

Ask students to bring some of these items from home, if they have them available: desk bells, balloons, dominos, balls (marbles, ping pong balls, etc.), tubes/pipes, toy cars or small vehicles, strings or threads, pulleys or levers (if available), cups or containers, books or blocks and tape. Any other everyday item will do, as long as it is safe to be used in class. Encourage teams to exchange materials!

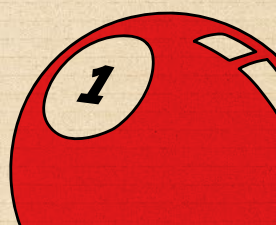
Students can also work on their Rube Goldbergs individually. Simply make sure that you adjust the lesson plan accordingly.

Each Rube Goldberg machine should perform one of the following tasks in at least 6 steps:

POP A BALLOON

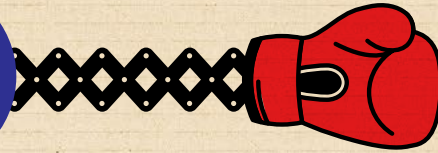
DROP A BALL

RING A DESK BELL



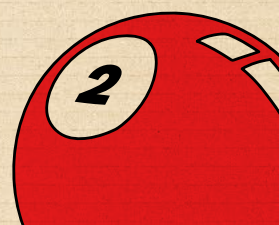
PRE-TASK

DURATION: 15'



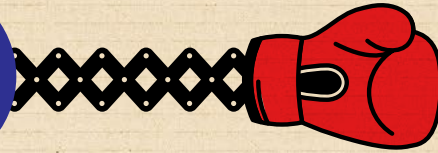
You may need to pre-teach the following words: step, task, perform, action, trigger, challenges, pop a balloon, ring a bell, reflect, and any other words your students may not have encountered before.

- Show students a row of dominos, a ball, two pens, and a plastic cup. Tell them that you need to toss the plastic cup using these materials. Invite the class to contribute with ideas.
- Once you have come up with enough ideas, explain to the class that you have just created the simplest Rube Goldberg machine! Ask students what a Rube Goldberg machine is (Answer: Rube Goldberg machines perform simple tasks through a series of different steps. Examples of tasks include popping a balloon, turning on a light switch, ringing a bell, etc.)
- Show students an online video of a Rube Goldberg machine. Explain that they will make a similar, but much simpler, machine.
- Divide students into teams.
- Tell teams that they will make one machine of their own. Each team picks a slip of paper from a jar with the tasks (Drop a ball, Ring a desk bell, Pop a balloon). If you have decided to assign the tasks, tell each group what their task is.
- Tell teams that their submissions will be ranked based on the following criteria:
 - a. Creativity and originality
 - b. Execution and functionality of the machine
 - c. Clear cause-and-effect reactions



TASK

DURATION: 100'



INSTRUCTION

Duration: 5'

Tell students that their machines must perform their task in 6 steps.

Ask concept-checking questions:

- a. What is your task?
- b. In how many steps should your machines perform the task?

Distribute the worksheet.

IMAGINE (IMAGINE IT! STAGE)

Duration: 20'

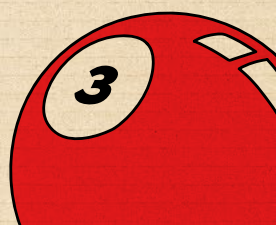
Ask students to brainstorm on the following questions:

- What is the task of your machine?
- How many steps will you design?
- What materials will you use for each step?

Step 1, Step 2, Step 3, Step 4, Step 5, Step 6

- What action will trigger the 2nd step?
- What action will trigger the 3rd step?
- What action will trigger the 4th step?
- What action will trigger the 5th step?
- What action will trigger the 6th step?

Monitor students and provide help when needed.



DESIGN (DESIGN IT! STAGE)

Duration: 15'

Instruct students to sketch a plan of their machine, including each step and the materials required for each part.

Monitor students and provide help when needed.

Once the designs are ready, move on to the next step.

BUILD (TIME TO BUILD IT! STAGE)

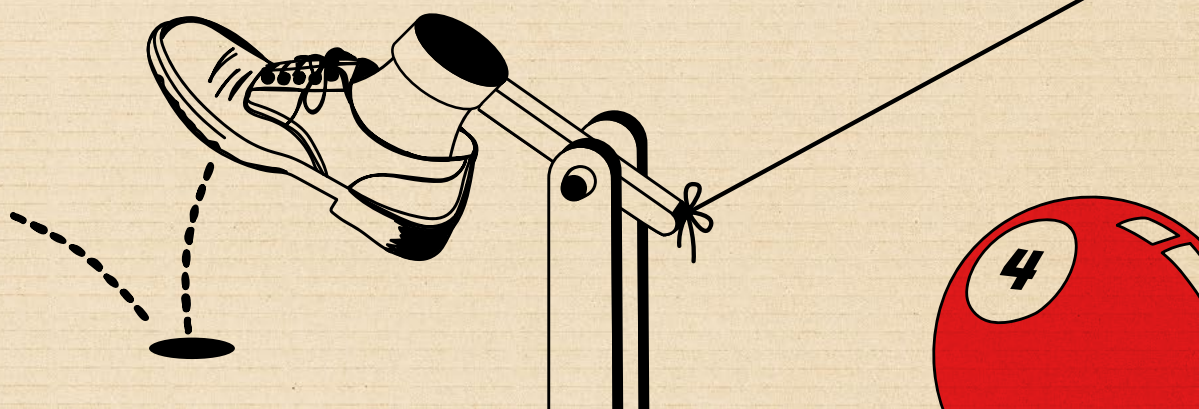
Duration: 30'

Instruct each team to gather their material in 5 minutes and start building their Rube Goldberg machine, step by step.

Remind them to experiment and have fun while trying to create a successful sequence.

Monitor students and provide help and ideas when needed.

What should I do with students who finish earlier? Make sure that everybody in class is on the same page. Encourage early finishers to consider what barriers they may come across and ask them to establish a clear cause-and-effect relationship between each action.



TEST (DOES IT WORK?! STAGE)

Duration: 15'

Ask students to make their first attempt.

Is it successful?

Ask them to go back to their worksheet and go through the Test it! stage.

Monitor groups and provide help when needed. Ask students to make any changes before moving forward.

REFLECT (REFLECT ON IT! STAGE)

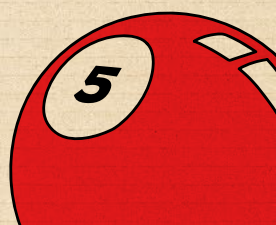
Duration: 15'

Ask students to reflect on their progress and their design. You can take photos and videos of the machine performing the task during this stage or during the follow-up activity.

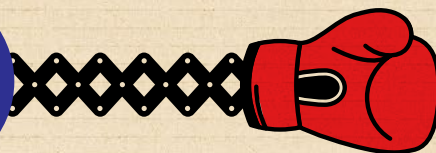
Take 3 photos and 1 video of each design along with the submission form and forward them to epcompetitions@expresspublishing.co.uk.

All submissions must be accompanied by clear photos and videos in high resolution.

The videos should show the machine performing the task.



EXTENSION ACTIVITY



PRESENT (PRESENT IT! STAGE)

Duration: depends on class size

Each team should present their machine and its function to the class. The presentation should include a brief explanation of the design process, the challenges faced and how they overcame them. If you haven't already taken photos and videos of the machines for your submissions, now is the time to do it! Remember that the video should show the machine performing the task.

Encourage the participants to enjoy the process, embrace challenges and have fun while exploring the principles of simple machines!

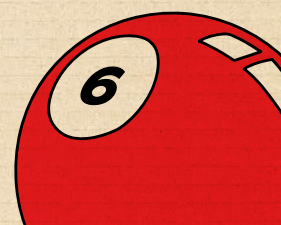
Failure is success in progress!

- Albert Einstein

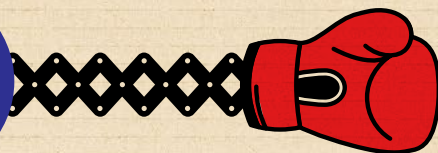
DOWNLOAD THE STUDENT'S
WORKSHEET

DOWNLOAD
THE SUBMISSION FORM

[SEE THE TERMS AND CONDITIONS](#)



FAQs



Who can join?

Students up to 17 years old in teams of up to 5 people or individually.

How can I send my students' submissions?

Send three photos and a video in high resolution (the video should show the machine performing the task) along with the submission form (separate for every submission) via email to epcompetitions@expresspublishing.co.uk until May 17, 2023.

When will winners be announced?

The three winning submissions will be announced on June 5, 2024.

What is the prize?

An Amazon gift card will be given to the top three submissions (€100 for the first prize and €50 for the second & third prize). In case a team wins a prize, all team members are rewarded. Additionally, winners will receive a certificate of achievement and their project will be displayed on our social media accounts. Each participant will receive a certificate of participation.

Based on what criteria will you rank submissions?

We will rank all submissions based on the following criteria:

- Creativity and originality of the design
- Execution and functionality of the machine
- Clarity of the cause-and-effect chain

