

Great Ball Contraption

Your task for this unit is to design and build a great ball contraption (GBC).

In order to complete this task successfully, all of the rules must be followed and all of the components of the assignment must be complete. You must complete the five steps listed below in the order presented. **After each step, you will need to get a teacher to initial this sheet to mark the work as completed before moving on to the next step.**

Additionally, all written components of the assignment must be submitted using proper writing conventions (no point form answers).

1. Textbook:
 - a. assigned Check Your Learning
2. Exploration:
 - a. please explore what types of systems and subsystems have already been used – these should help inspire your design
3. Design:
 - a. please design your GBC using orthographic drawings.
4. Explanation:
 - a. systems and subsystems
 - b. efficiencies
5. Build:
 - a. must match your design
 - b. adhere to the requirements

At the end of the project (just before the testing of your build), all of your work must be submitted in a neat and organized manner in order for it to be assessed.

Suggested Timeline:

Exploration: 3 days

Design: 5 days

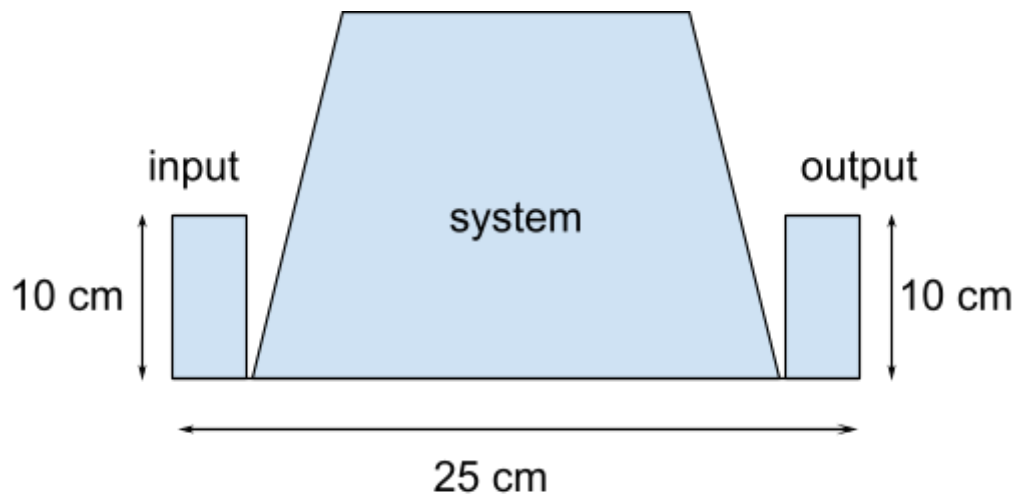
Explanations: 3 days

Build: 8 days

Test: 1 day

Requirements:

- input height: 10 cm
- output height: 10 cm
- GBC must fit within a 25 cm x 25 cm square
- input and output must be at the edge of the design - fit against another GBC
- move a standard marble from input to output



Materials*:

- Lego
- cardboard
- glue
- scissors

*You may find that you need to supplement these materials. Please get approval before doing so.

Assessment:

Exploration (10)	<ul style="list-style-type: none"> • a thorough investigation of systems that have already been built • pictures of relevant designs • description of the design features of three systems related to your build 	
	1 2 3 4	
Design (15)	<ul style="list-style-type: none"> • use of detailed orthographic drawings • appropriate use of labels • legible (e.g. use of a ruler, neat printing) • clear connection to designs found during the exploration 	
	1 2 3 4	
Complexity (5)	<ul style="list-style-type: none"> • the design includes several simple machines and subsystems 	
	1 2 3 4	

Systems (15)	<ul style="list-style-type: none"> • clear and comprehensive description of the systems and subsystems included in the GBC • clear and comprehensive description of the mechanisms within the subsystems 	
	1 2 3 4	
Efficiency (20)	<ul style="list-style-type: none"> • clear and comprehensive description of where energy is lost, transformed, or transferred within the system • a thorough explanation of design features meant to improve efficiency 	
	1 2 3 4	
Vocabulary (10)	<ul style="list-style-type: none"> • consistent and appropriate use of scientific vocabulary (e.g. force, input, output, side effect, system, subsystem, mechanism, transferred, transformed) 	
	1 2 3 4	
Build (25)	<ul style="list-style-type: none"> • adheres to all stated requirements • consideration of aesthetics • based on the submitted design 	
	1 2 3 4	