

Physical Science 303 - Extra Credit Assignment

1 Topics

We have covered several topics in the class by now. In this assignment for the extra credits, you are encouraged to design an experiment based on the boxes we have available for our labs. The list of topics (and not restricted to) is

1. Kinematics: finding acceleration due to gravity, verifying any of the three kinematical equations
2. Vector: verifying a particular physical quantity is scalar or vector
3. Force: verifying the law of inertia, *finding force law (Hooke's law) for spring*
4. Work & Energy: verify work-energy theorem

2 Guidelines

For an idea, please consult the previous activity sheets we worked during the class. You are encouraged to chalk out the corresponding theory by conducting your own research using internet and talking to peers and TAs.

It is advisable to write down all the steps corresponding to the activity and draw the related diagrams. Once done, you can send me the snapshots. I will finalize the document and publish it in the class.

3 Boxes

1. BOX 1
 - (a) 2 stopwatches
 - (b) 3 circular discs of varying sizes
 - (c) 1 XYZ transparency
 - (d) 1 protractor
 - (e) 1 small ball bearing
 - (f) 1 large ball bearing
 - (g) 5 colored springs (Red: 25N; Blue: 30N; Yellow: 35N; White: 40N; Green: 50N)
 - (h) 1 pendulum clamp
 - (i) 1 piece of foam
 - (j) 9 metal pieces (3 brass; 3 steel; 3 aluminum)
 - (k) 1 plastic box w/colored cubes
 - (l) 9 metal blocks (3 iron; 3 brass; 3 aluminum)
 - (m) 1 graduated cylinder
 - (n) 1 overflow can
 - (o) 1 acrylic beaker (100mL)
 - (p) 2 5N push & pull springs (green)
 - (q) 1 1N weight
 - (r) 1 2N weight

- (s) 1 3N weight
- (t) 1 friction block
- (u) 1 wooden block
- (v) 2 10N push & pull springs (beige)
- (w) 1 super pulley w/rod
- (x) 1 pair of scissors
- (y) 1 ruler

2. BOX 4

- (a) 1 dropper popper
- (b) 1 hand generator & wire
- (c) 1 small light bulb box
- (d) 3 red banana plugs (1 ft.)
- (e) 3 black banana plugs (1 ft.)
- (f) 1 large rubber ball
- (g) 1 small rubber ball
- (h) 1 tennis ball
- (i) 1 ping pong ball
- (j) 1 racquetball
- (k) 2 slinkies
- (l) 1 piece of foam
- (m) 2 stopwatches
- (n) 1 protractor
- (o) 3 pieces of PVC pipe
- (p) 3 cylindrical wood pieces

3. BOX 6

- (a) 1 metal box w/bars sticking out (aluminum, copper, steel, & glass bars)
- (b) 2 plastic cups
- (c) 1 metal cup
- (d) 1 container of lead shot
- (e) 1 container of copper BBs
- (f) 1 bimetallic strip
- (g) 1 blue thermometer
- (h) 1 infrared thermometer
- (i) 1 2N weight
- (j) 1 pyramid weight
- (k) 1 hot pad
- (l) 1 student bell jar w/syringe
- (m) 1 atmospheric mat

- (n) 1 small inflated balloon
- (o) 1 plastic beaker (50mL)
- (p) 1 funnel
- (q) 1 ping pong ball
- (r) 2 stopwatches
- (s) 3 cylindrical metal pieces (brass, steel, aluminum)
- (t) 1 glass beaker (100mL)

4. BOX 7

- (a) 1 red pulley
- (b) 2 plastic fences
- (c) 2 metal fences
- (d) 2 photogate & photogate wires
- (e) 1 timer
- (f) 1 red cart
- (g) 1 blue cart
- (h) 4 weight bars (250g)
- (i) 1 5N push & pull spring (green)
- (j) 1 10N push & pull spring (beige)
- (k) 1 protractor
- (l) 1 ruler
- (m) 2 stopwatch
- (n) 1 super pulley
- (o) 1 piece of foam

5. Mass Box

- (a) 2 mass hangers
- (b) 3 500g masses
- (c) 3 200g masses
- (d) 3 100g masses
- (e) 3 50g masses
- (f) 2 20g masses
- (g) 2 10g masses

6. Individual Items

- (a) Human dynamics cart with rope
- (b) PASCO Track (Box 7)
- (c) Bathroom scale
- (d) Large graduated cylinders (1L, 2L)
- (e) Hot plate (Box 6)
- (f) Desk lamps (incandescent & CFL)

- (g) Triple beam balance
- (h) Cardboard track
- (i) Calculator
- (j) 50 lbs. spring scale
- (k) White board & markers
- (l) Graph paper (upon request)
- (m) Projector (upon request; can reserve)
- (n) Liquid nitrogen (upon request; must request at least 24 hours in advance)
- (o) Large tables
- (p) Measuring tape