PhyzJob: Potential Energy Rankings

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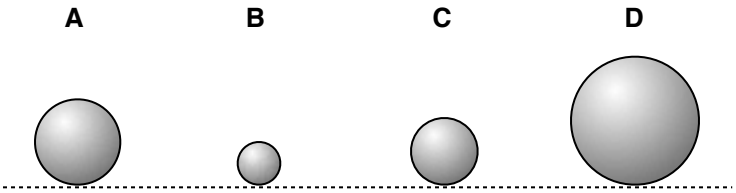
Instructions: In each scenario below, rank the items A B C and D from greatest to least gravitational potential energy. Make an equality/inequality sequence using ">" and "=" symbols only. All objects are made of the same material (have the same density) and diagrams are to scale.

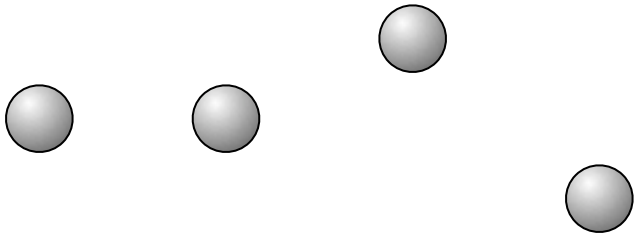
1. All objects the same height above Earth.

D > A > C > B



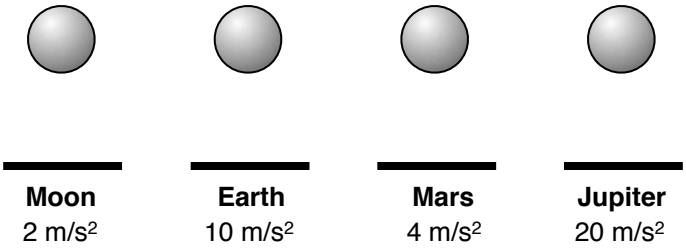
2. All objects have the same mass on Earth.

C > A = B > D



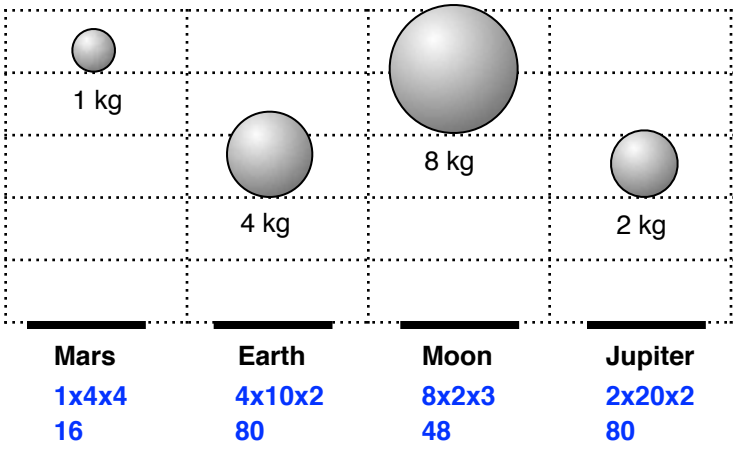
3. All objects have the same height and mass.

D > B > C > A



4. No guarantees.

B = D > C > A

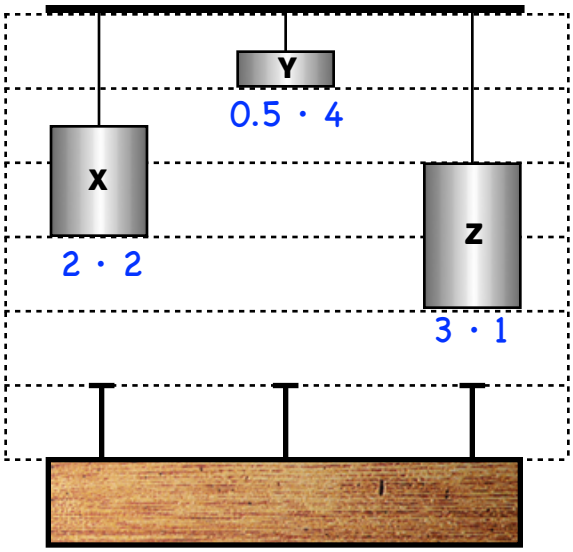


∀˙ B = D > C > ∀

5. Nail-Driver

Three metal cylinders are suspended above nails partially driven into wood. The arrangement is set here on Earth.

Cylinder X is 2 kg and is suspended 2 m above the tops of the nails.
Cylinder Y is 0.5 kg and is suspended 4 m above the nail tops.
Cylinder Z is 3 kg and is 1 m above the nail tops.



Which one will drive its nail deepest into the wood? (Fill in each blank with the correct letter.)

__. the heaviest one: Z (identify the heaviest one)

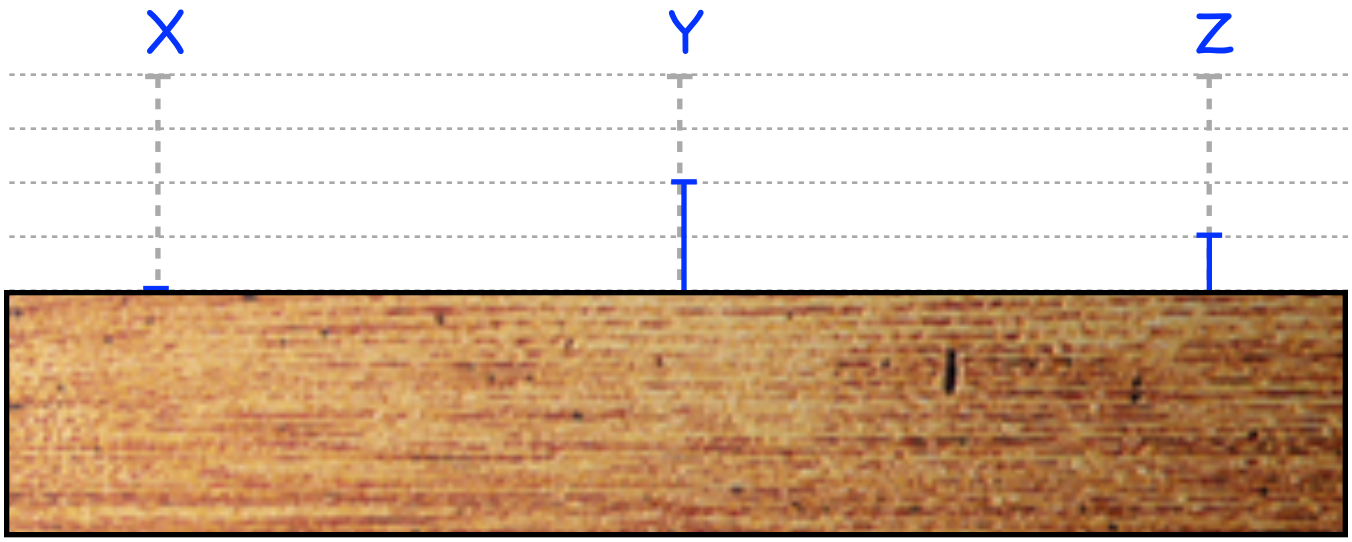
__. the highest one: Y

__. the one that will hit with the greatest speed: Y

√. the one with the most potential energy: X

__. all of these correctly describe the best nail-driver

Show the nails after they've been driven in by their respective cylinders on the enlarged illustration below. Dashed images show where the nails were prior to impact. The dotted lines are simply there for a relative scale.



2. X