describe the effect of balanced and unbalanced forces on a body

Forces on a Body

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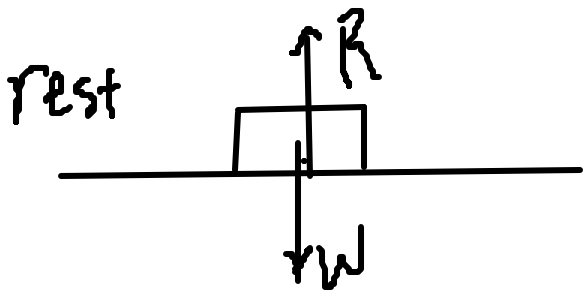
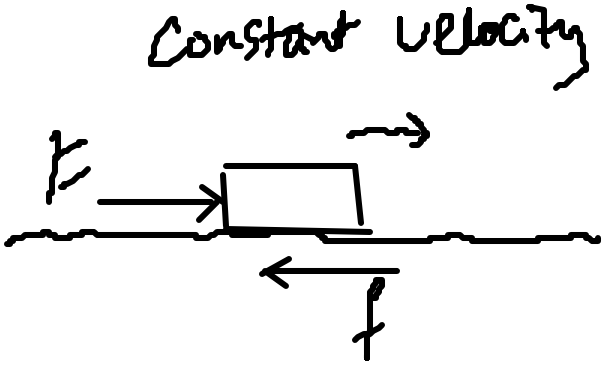
Balanced forces

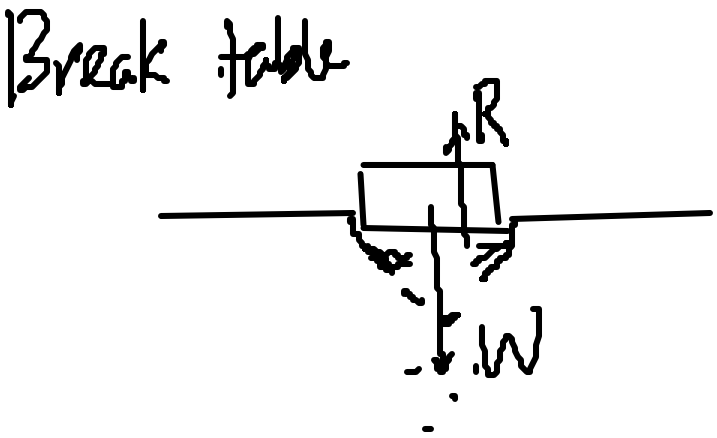


Reaction force from table
= weight of object

Force pushing
= friction

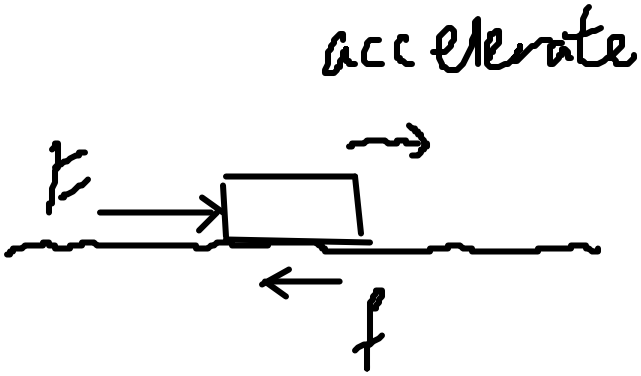


Unbalanced forces



Reaction from table
< weight of object

Force pushing
> friction

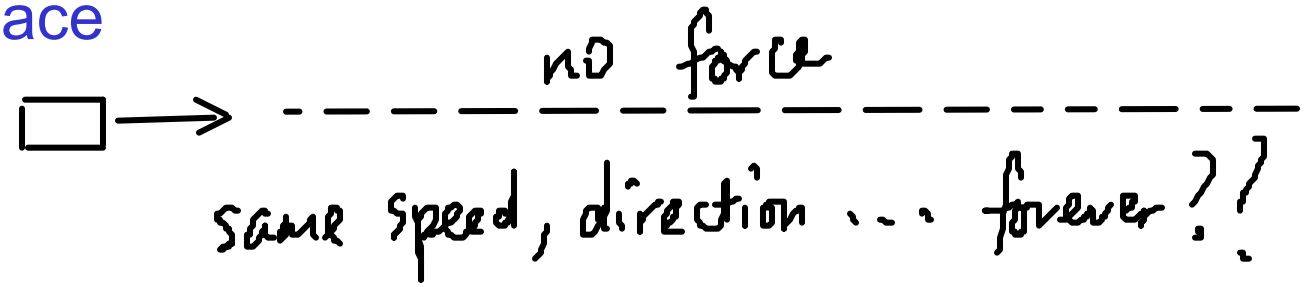


describe the ways in which a force may change the motion of a body

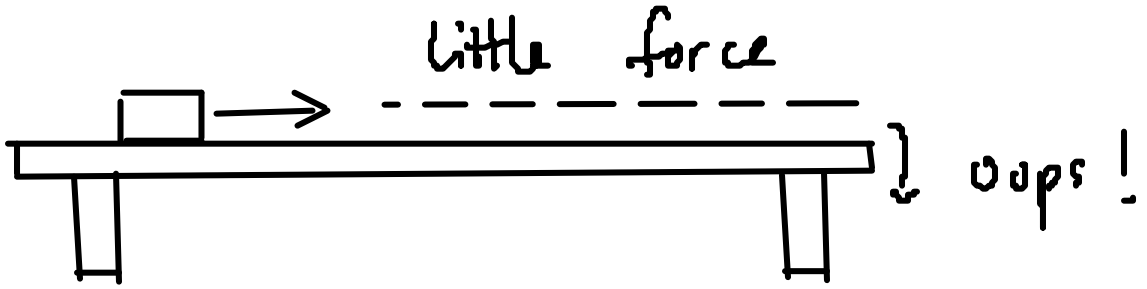
Force and Motion

Dr K M Hock

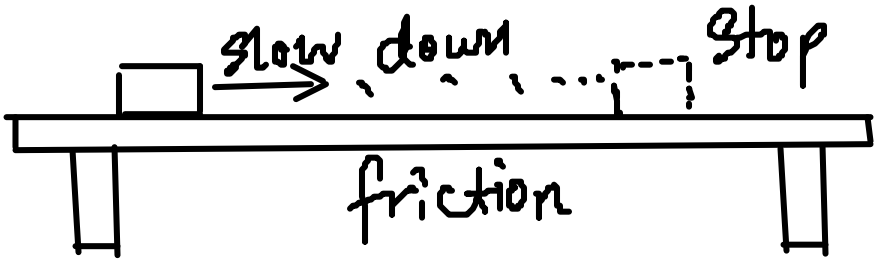
Outer space

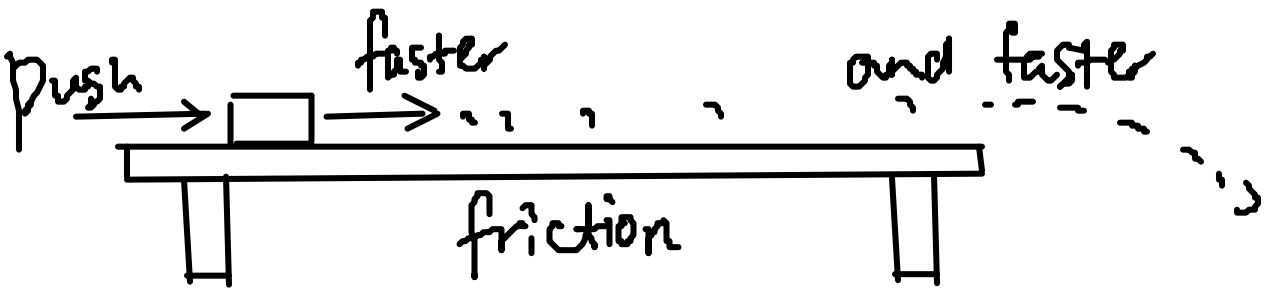


Oily table

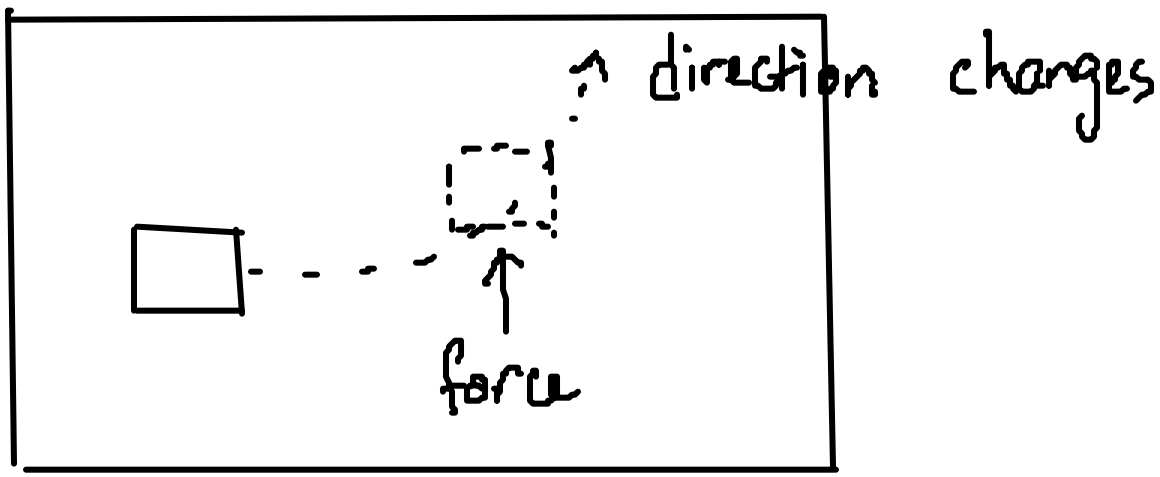


Normal table





Top view



identify forces acting on an object and draw free body diagram(s) representing the forces acting on the object (for cases involving forces acting in at most 2 dimensions)

Free Body Diagram

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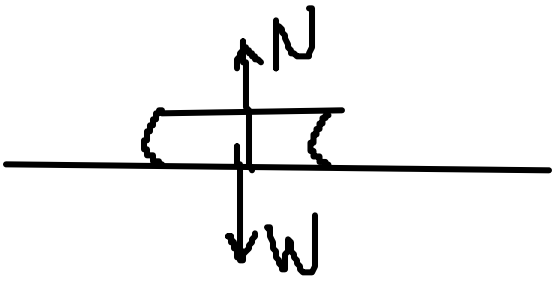
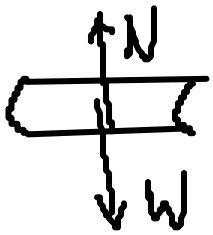
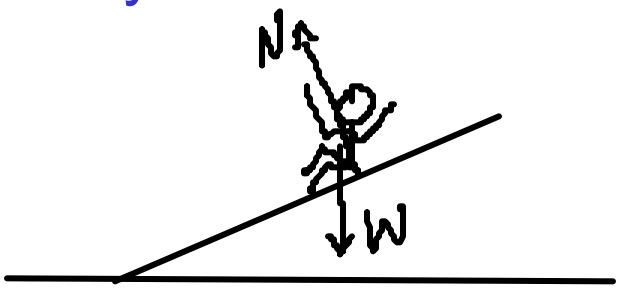
What are the forces on the book ?

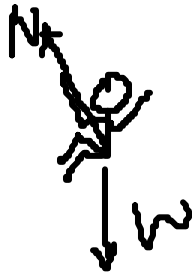


show only body & forces on it

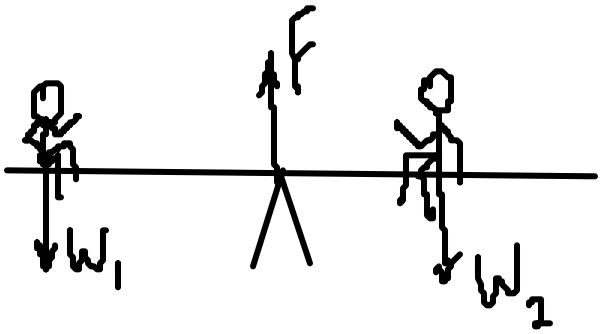


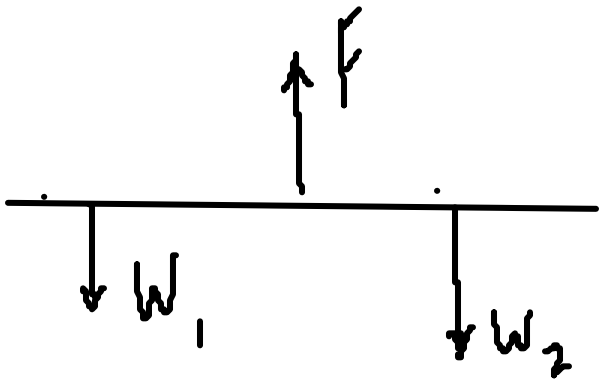
on the boy?



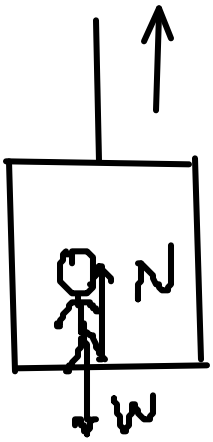


on the seesaw?





on the man?

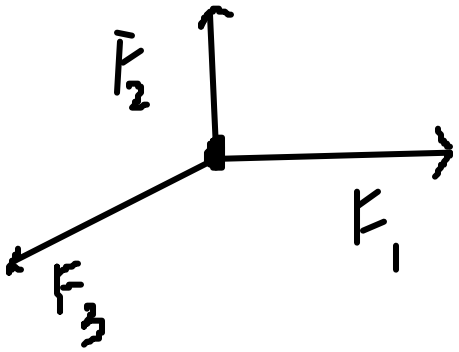


solve problems for a static point mass under the action of 3 forces for 2-dimensional cases (a graphical method would suffice)

Balanced Forces

Dr K M Hock

E.g.

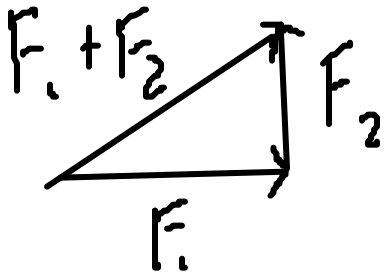


sum of F_1 , F_2

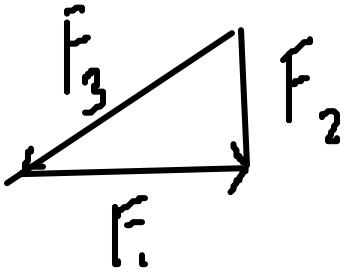
must be equal,

opposite to F_3

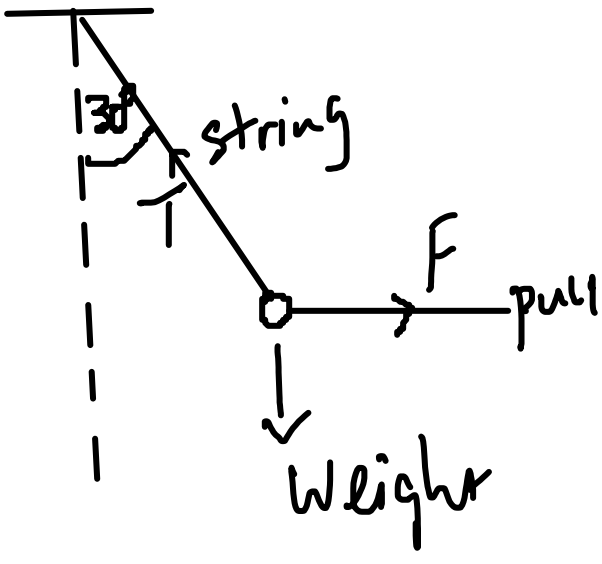
If replace $F_1 + F_2$ by F_3



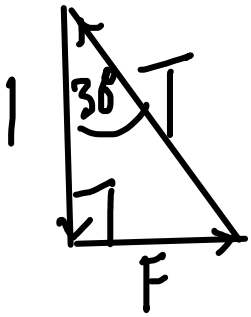
can get
closed triangle:



E.g. If weight = 1 N, find F.



draw



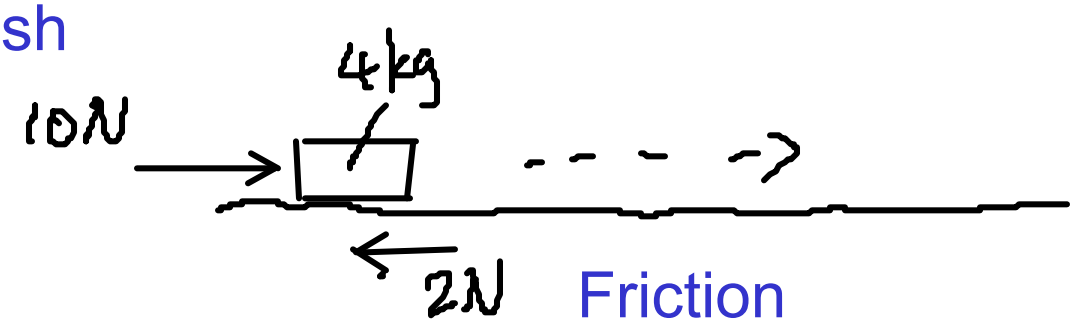
$\frac{F}{1} = \tan 30° = \_\_\_$.

recall and apply the relationship resultant force = mass × acceleration to new situations or to solve related problems

Force and Acceleration

Dr K M Hock

Push



Resultant force = 10 − 2 N causes acceleration

$F = m a$

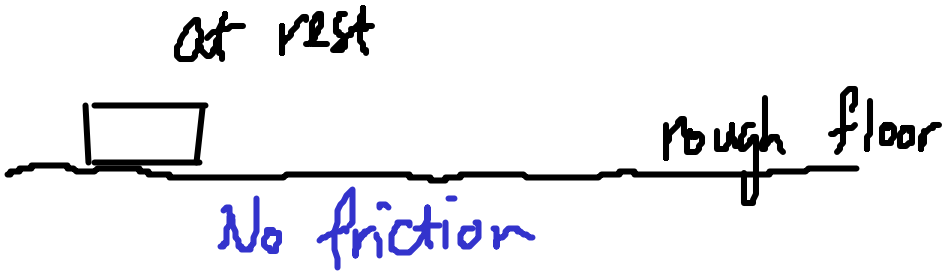
e.g. $a = \frac{F}{m} = \frac{8}{4} = 2\ m/s^2$

explain the effects of friction on the motion of a body

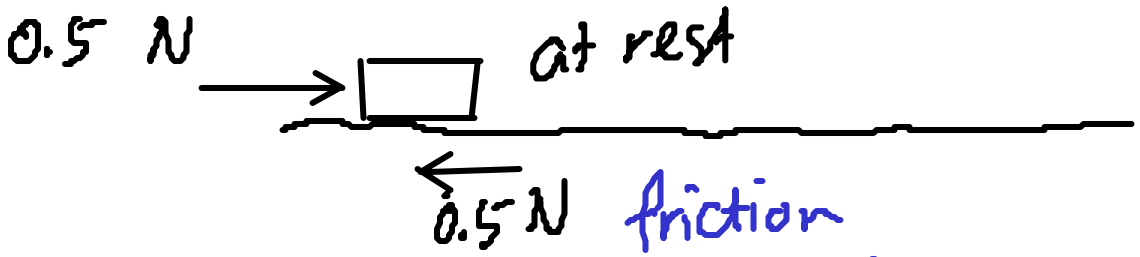
Friction

Dr K M Hock

No force

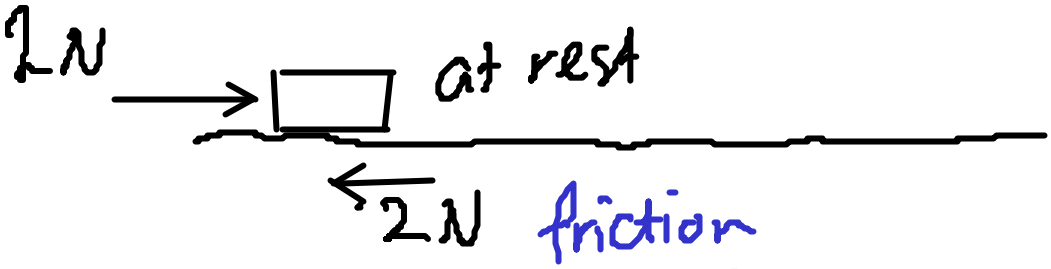


Small force



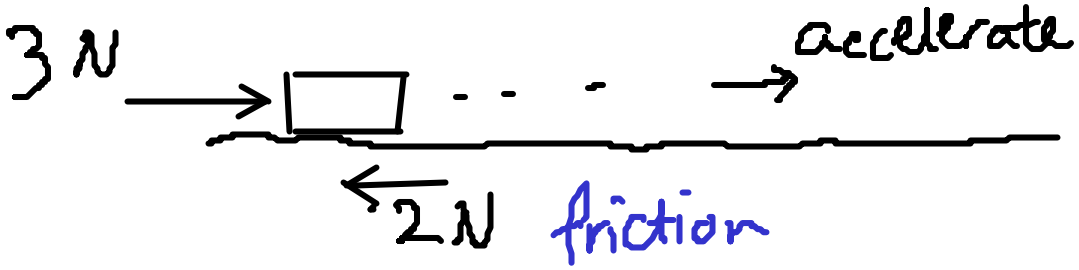
- balances force exactly

bigger force



- biggest floor can give

even bigger force



reduce to same as friction