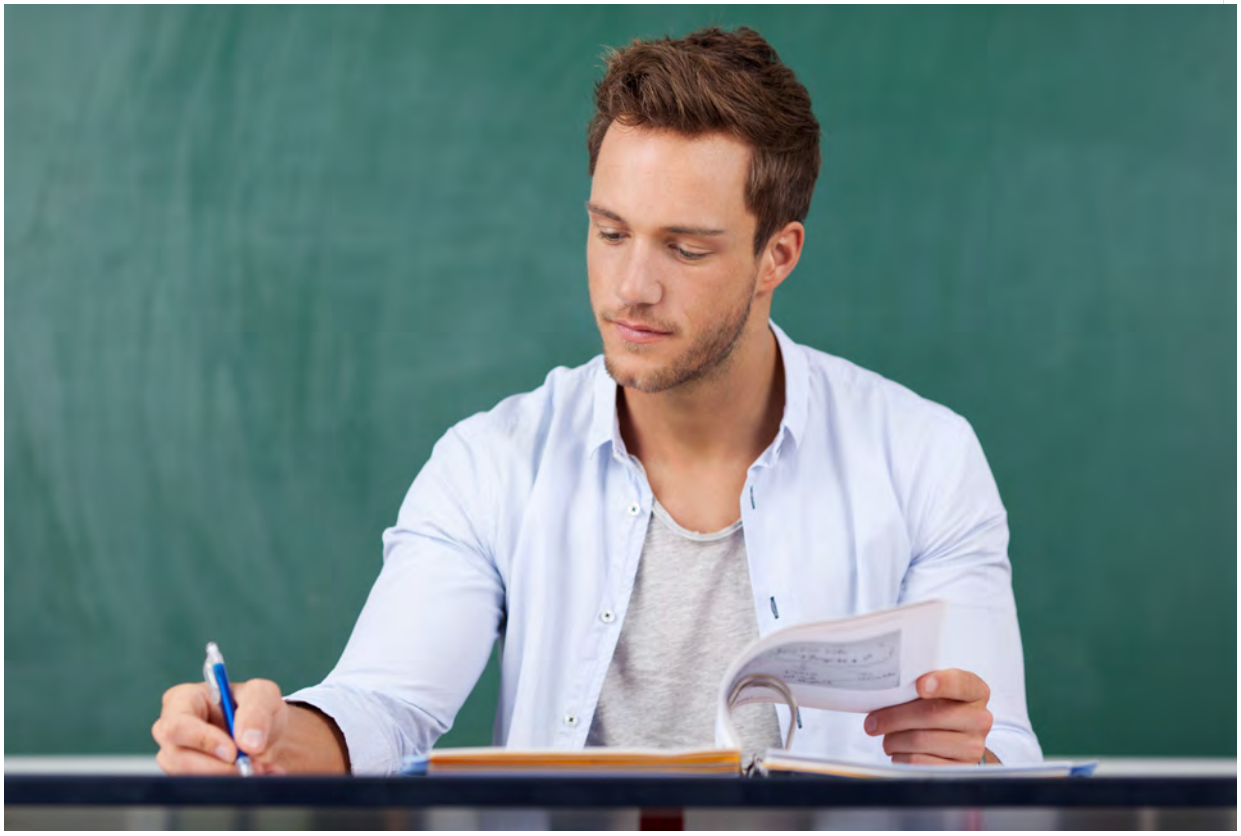
Assessment tasks

6.1
Formal assessment



Name: _____ Date: _____

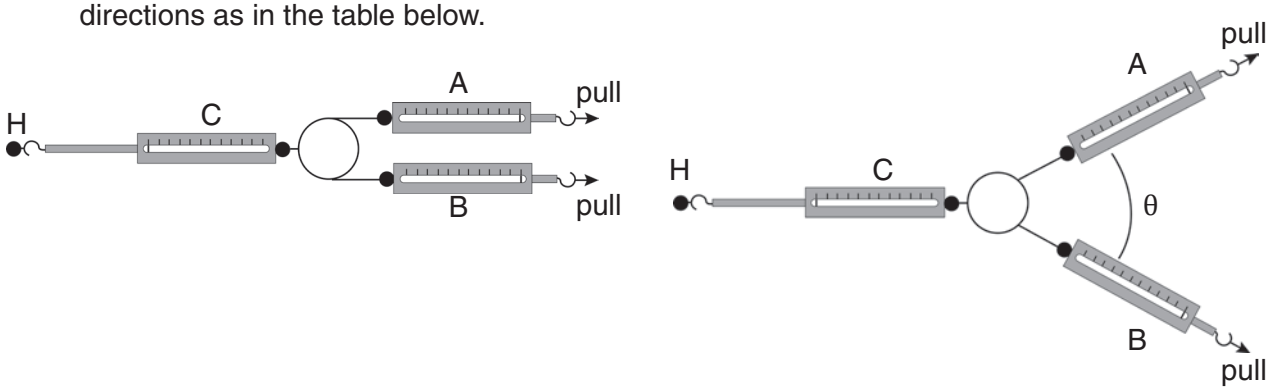
Experiment

Use spring balances to demonstrate the relationships between the resultant and the equilibrant.

Aim: Demonstrate the relationship between the resultant force and the equilibrant force.

Apparatus and requirements:
- Three spring balances
- Three short pieces of string
- A metal ring
- A4 paper

Method:
1. Tie the pieces of string to the metal ring.
2. Tie a spring balance to the end of each of the strings.
3. Name each spring balance A, B or C.
4. Draw a big cross on the sheet of paper. It will serve as the set of axes. Mark the set of axes as north, east, south and west. (This serves only as reference; not actual directions.)
5. Place the metal ring so the centre point of the ring is at the origin of the set of axes.
6. Let three learners each pull one spring balance as indicated in the following diagrams, with directions as in the table below.



The learner handling spring balance C must change the magnitude and direction of the pulling force each time until the metal ring is centred again over the origin of the set of axes.

Results:
Complete the following table for each of the situations.
Each time, draw a diagram of the forces to scale.

Situation	Spring balance A	Spring balance B	Spring balance C	Resultant of scales A and B	Equilibrant of scales A and B
1	5 N north	5 N north			
Sketch					

Situation	Spring balance A	Spring balance B	Spring balance C	Resultant of scales A and B	Equilibrant of scales A and B
2	3 N north	5 N north			
Sketch					
3	3 N north	3 N north			
Sketch					
4	3 N north	3 N west			
Sketch					
5	3 N north	3 N east			
Sketch					
6	3 N west	3 N east			
Sketch					

Situation	Spring balance A	Spring balance B	Spring balance C	Resultant of scales A and B	Equilibrant of scales A and B
7	8 N west	4 N east			
Sketch					
8	3 N west	7 N east			
Sketch					

Conclusion:

1. How did you determine the resultant each time?

_____

_____

2. Which spring balance represents the equilibrant each time?

_____

3. How does the magnitude of the resultant compare to that of the equilibrant for each situation?

_____

4. How does the direction of the resultant compare to that of the equilibrant for each situation?

_____

5. What happens to the magnitude of the resultant when the angle between the spring balances A and B is increased from 0° to 180°?

_____

_____

_____

6. What happens to the magnitude of the equilibrant when the angle between the spring balances A and B is increased from 0° to 180°?

_____

_____