By Stacey Longley

Investigation report

Planning

Aim
I want to find out how the speed of a wave changes as it travels through water of different depths.

Factors
The factors what I think will affect in my investigation are:
- Height of drop
- Depth of water

A fair test
To do a fair test I must only change one factor at a time.

The factors that I will keep the same are:
- The equipment
- Number of times
- Height of drop

The one factor that I will change is the depth of water.

Prediction
I predict that the shallower the water the slower the wave, the deeper the water the faster the wave.
I think this because if the water becomes deeper the wave will travel a lot faster. Likewise if the water becomes shallower the waves get slower.
- Shallower water means shorter wavelengths which mean slower speeds.
- Deeper water means longer wavelengths which mean faster speeds.

The speed of water depends on two things:
1. The frequency of the wave
2. The wavelength

Speed = frequency * wavelength

Apparatus
I will use,
- Water
- 5cm deep plastic tray
- Stop watch
- 50cm ruler

Diagram

Method
I will set up my investigation as shown above. First of all I will fill the plastic tray with 1cm depth of water and measure the length of the tray to see how far the wave will travel. I will then lift the end of the tray by 2.4cm every time and drop it gently to create a small wave. I will let the wave travel to the far end of the tray and use the stop watch to time how long it takes to go to the other end and back three times. (This means the wave will travel six times the length of the tray). I will repeat this by using water that is 1.5cm, 2cm, 2.5cm and 3cm deep.

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Results

Water depth (cm)	Distance travelled (m)	Time taken (seconds)	Speed (m/s)
1cm	(Average)	(15.13)	(0.85)
1st	2.4	6.50	0.36
2nd	2.4	6.43	0.37
3rd	2.4	6.60	0.36
1.5m	(Average)	(11.94)	(1.07)
1st	2.4	5.14	0.46
2nd	2.4	5.12	0.46
3rd	2.4	5.04	0.47
2cm	(Average)	(11)	(1.17)
1st	2.4	4.74	0.50
2nd	2.4	4.68	0.51
3rd	2.4	4.74	0.50
2.5cm	(Average)	(9.92)	(1.13)
1st	2.4	4.90	0.58
2nd	2.4	5.12	0.56
3rd	2.4	4.86	0.52
3cm	(Average)	(9.07)	(1.43)
1st	2.4	3.97	0.60
2nd	2.4	3.86	0.62
3rd	2.4	3.73	0.64

Analysis

Looking at my results I can see a pattern because I have discovered that the deeper the water the quicker it took for the waves to happen. This shows that the deeper the water the slower the speed. I noticed that the speed of the waves was quicker in 1cm depth of water than in 2cm and 3cm depth of water.

In my investigation I found out that until a certain point the wavelength took quicker to travel. After that point the wavelength began to increase in speed.

I think this because my results show that e.g. at 1cm the speed is 0.85m/s and at 1.5cm the speed is 1.07m/s. As it gets to 2cm the speed is 1.17m/s and at 2.5cm the speed is 1.13m/s. This shows that the speed of the wave is increasing.

My results match my predictions accurately as I predicted that the change in the wavelength of the waves will cause the change in speed. This is what my results show.

Evaluating my evidence

I think that the way I carried out my investigation was correct, I got similar results to what I predicted.

In my investigation my results are fairly accurate as I carried out my investigation carefully.

If I had to use my results as evidence, I think they show that the deeper the water the longer the speed. The shallower the water the quicker the speed.

If I did my investigation again, I would improve it by;

- Measuring the exact amount of water
- Measuring the exact cm every time
- Making sure the timing is accurate