Learn about: How surface area affects hydrodynamics

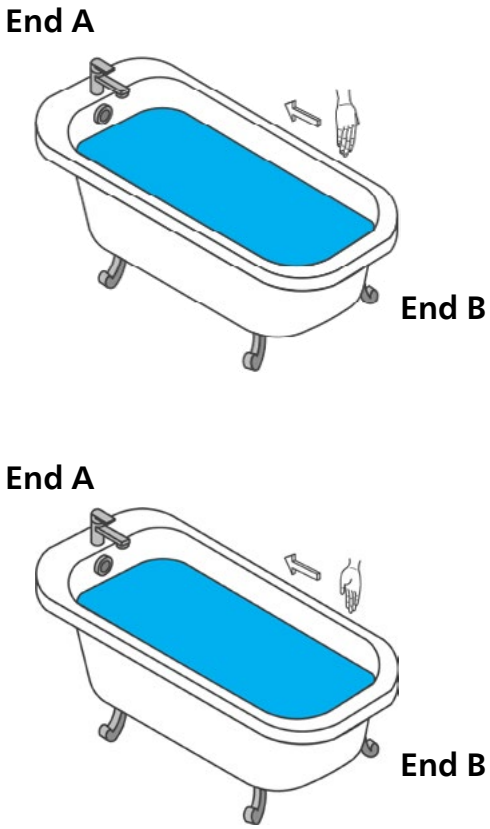
Splash Challenge

You will need:

- 1x bath or bucket
- 1x human hand
- 1x adult to supervise (and to splash)

What to do:

1. Place your open and flat hand in the water with the palm facing the opposite end. Stand the adult at the opposite end of the bath.
2. As fast as you can, keeping your hand open, palm towards the other end and fingers together, move your hand to the other end of the bath (towards the adult). Make sure your hand stays in the water when moving from one end to the other.
3. Allow the Adult to dry off if they have been splashed.
4. Place your hand in the water with your first finger facing the opposite end. Stand the now dry adult at the opposite end of the bath.
5. As fast as you can, keeping your hand open, the first finger towards the other end and fingers together, move your hand to the other end of the bath (towards the adult). Make sure your hand stays in the water when moving from one end to the other.
6. Allow the Adult to dry off if they have been splashed.



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Splash Challenge
Conclusion

When you carried out steps 1 to 3, you were creating a wide surface area that displaced more water, which would have caused a bigger splash, meaning it was not hydrodynamic. There was a large splash because there was a large amount of water being displaced by your hand, and most of it couldn't move away fast enough. In this case, more energy was needed to move through the water as there was a larger surface area, which meant more water had to be displaced.

When you carried out steps 4 to 6, you were creating a narrow surface area that displaced less water, which would have caused a small splash, meaning it was hydrodynamic. There was a small splash because there was a small amount of water being displaced by your hand, and most of it could move away fast enough. In this case, less energy was needed to move through the water as there was a small surface area, which meant less water had to be displaced.

Using this principle, boats have a thin front (like a knife-edge) to reduce surface area, which means there is less water to displace and less water resistance. This lessens the splash at the front of the ship, which makes them more hydrodynamic. Overall, this means that a sharp front bow allows boats to travel at faster speeds through the water.

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