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Spin, Float and Investigate







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Spin, Float and Investigate

A turn around a centre



THE IDEA

A spinning top turns around its shaft. A coin can spin on its edge. A top spins around a shaft. Both turn, but their shapes and contact with the table differ.

Describe what moves and what stays near the same place. A single push does not keep either object spinning forever.

CHECK YOUR THINKING

Which observation describes spinning?

A Turning around a centre

B Sliding only in a straight line

A. Spinning means turning. An object can also slide while it turns.

A RELATED EXAMPLE

Centre or off-centre?

Where the shaft sits can change the motion. Compare two matching cardboard discs. One shaft passes through the centre; the other is off-centre. The off-centre disc reaches farther on one side. It is harder to balance evenly. A careful test keeps the discs, surface and starting push as similar as possible.

Spin, Float and Investigate

Why a spinner slows



THE IDEA

The table and air resist motion. Contact with the surface and air resistance take energy from the moving spinner. It slows and may wobble before stopping.

A smoother surface can change the spin, but one trial cannot prove that it always lasts longer.

CHECK YOUR THINKING

Does one long spin prove a rule?

A No; compare several similar trials

B Yes; one result is always enough

A. Starting pushes and small differences can change results. Repeated trials give stronger evidence.

A RELATED EXAMPLE

Read three trials

Look for a pattern, not just the best score. In a supplied classroom test, the centred disc spins for 8, 9 and 8 seconds. The off-centre disc spins for 3, 4 and 3 seconds. The centred disc lasts longer in every trial. This supports a conclusion about these discs under these conditions.

Spin, Float and Investigate

Same material, different result



THE IDEA

A steel nail sinks. An empty steel bowl can float. The nail is compact. A hollow bowl spreads its weight over a larger volume and keeps water out.

Water pushes upward on both. A floating bowl pushes enough water aside for this upward push to balance its weight.

CHECK YOUR THINKING

What matters besides the material?

A Shape and whether water can enter

B Only the object's colour

A. Shape changes how much water an object can push aside before it goes under.

A RELATED EXAMPLE

A blur is not a new shape

A spinning square can look round at its edges. Its corners sweep through a circular path. When it turns quickly, the changing views blur together. Coloured areas may also look blended. Stop the spinner and inspect it again. The square has not physically turned into a circle, and the colours have not become new paint.

Spin, Float and Investigate

A boat sits lower with a load



THE IDEA

More weight needs more upward push. Adding blocks makes the boat sink farther into the water. It pushes more water aside as it settles.

If water pours over the rim, the boat may no longer stay afloat. A wide shape helps, but it does not give unlimited carrying capacity.

CHECK YOUR THINKING

Why does a loaded boat sit lower?

A The water has become heavier

B It must push more water aside

B. The extra weight needs a larger upward push from the water.

A RELATED EXAMPLE

Change the shape, keep the foil

A cup shape can hold space inside. In this pictured test, a compact foil ball sinks while an open foil cup floats. The cup is kept upright and dry inside. Real foil balls may trap air, so not every ball sinks. Predictions need testing; pictures show one result, not every possible result.

Spin, Float and Investigate

Stay within the evidence



THE IDEA

A test gives information about one design. A wide model boat holds 4 matching blocks in every trial. Water enters when a fifth is added. A narrow model holds 2.

For this classroom comparison, choose a boat for 3 blocks and explain your evidence. These results apply to the two tested models.

CHECK YOUR THINKING

Which tested boat is supported for 3 matching blocks?

A The narrow boat

B The wide boat

B. Three is below the wide boat's tested limit of four, but above the narrow boat's limit of two.

A RELATED EXAMPLE

Materials change when wet

A paper boat is not unchanged by water. Dry paper can hold a folded shape. As ordinary paper takes up water, it can soften and its folds may lose strength. A quick floating test does not tell us how long the boat will last. Duration is another useful observation.

ONE LAST CHALLENGE

Does the same movement always do the same job?

A spinning top turns for play. A wheel turns on a cart.



THE REVEAL

No. Both turn, but their jobs differ.

The cart’s wheels help it travel. The top is designed to spin in place for a time.

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