

the Dc Motor

KS3 Physics · Follows the national curriculum

Name _____ Class _____ Date _____

1. Worked example

What is the motor effect?

Step 1 · Ingredients

A wire carrying a current, placed in a magnetic field.

Step 2 · Effect

The wire feels a force: the wire's own magnetic field interacts with the magnet's field.

Answer: A current-carrying wire in a magnetic field feels a force

Check: No current, or no magnetic field → no force.

2. Now try one with the steps

Why does a coil of wire between two magnets turn?

Step 1 · Two sides

Step 2 · Forces

Step 3 · Result

Answer:

3. Practice

Show your working. The marks tell you how much is expected.

1. What is the motor effect? [1]

2. Name the main parts of a simple D.C. motor. [2]

3. What energy transfer happens in an electric motor? [1]

4. Why does the coil in a motor turn? [2]

5. Give two ways to make a motor spin faster. [2]
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6. Give one way to reverse the direction a motor spins. [1]
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7. What is the job of the split-ring commutator? [2]
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8. What is the job of the brushes? [1]
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9. Both the current and the magnets' poles are reversed. Which way does the motor turn? [1]
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10. A motor takes in 500 J of energy and transfers 350 J to its kinetic store. What is its efficiency, percentage? [2]
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11. Why does a motor get warm when it runs? [2]
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12. What would happen to a motor's coil without a commutator? [2]
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13. A motor spins at 600 rpm with 1 A and 1200 rpm with 2 A. Assuming the pattern continues, what is its speed at 1.5 A, in rpm? [2]
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14. Name four appliances that contain an electric motor. [2]
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4. Before you hand it in

"The commutator reverses the magnets."

The commutator reverses the current in the coil every half turn.

"Both sides of the coil are pushed the same way."

The current is opposite in the two sides, so the forces are opposite and make it rotate.

"A motor turns electricity into motion with no waste."

Some energy is always dissipated and sound.