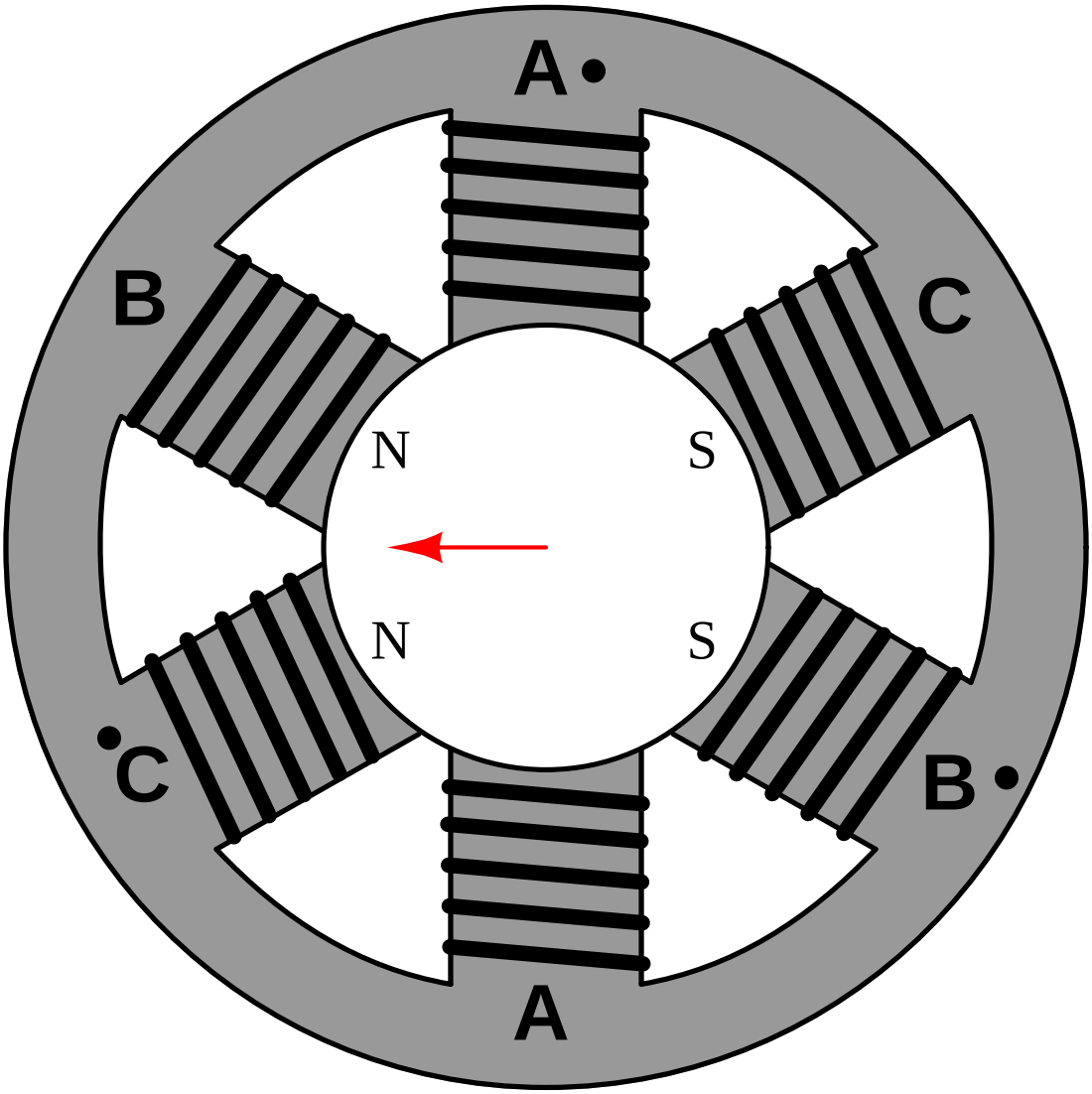
Question 1

Animation: three-phase electric motor

This question consists of a series of images (one per page) that form an animation. Flip the pages with your fingers to view this animation (or click on the "next" button on your viewer) frame-by-frame.

The following animation shows how three sets of electromagnet poles create a rotating magnetic field when energized by three-phase AC power. Relative strengths of the magnetic fields produced by each pair of poles are indicated by the size of the "N" (North) and "S" (South) letters. Here are some things to look for in this animation:

- What determines the direction of the vector arrow?
- Note when each pole pair (A and A', etc.) reaches its peak magnetic field strength.
- Is there any time where more than one pair of electromagnet poles is at its maximum field strength?


A
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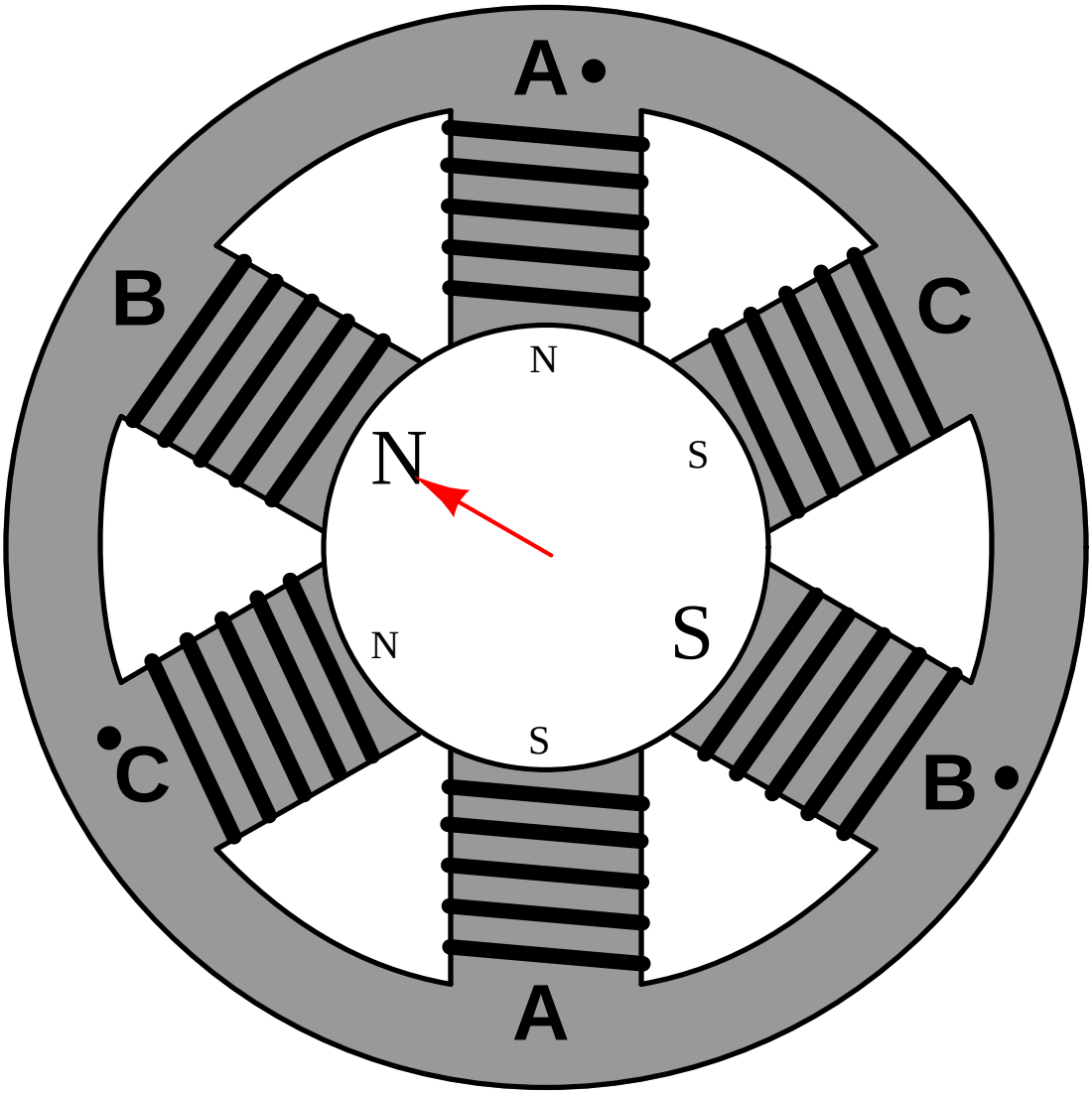
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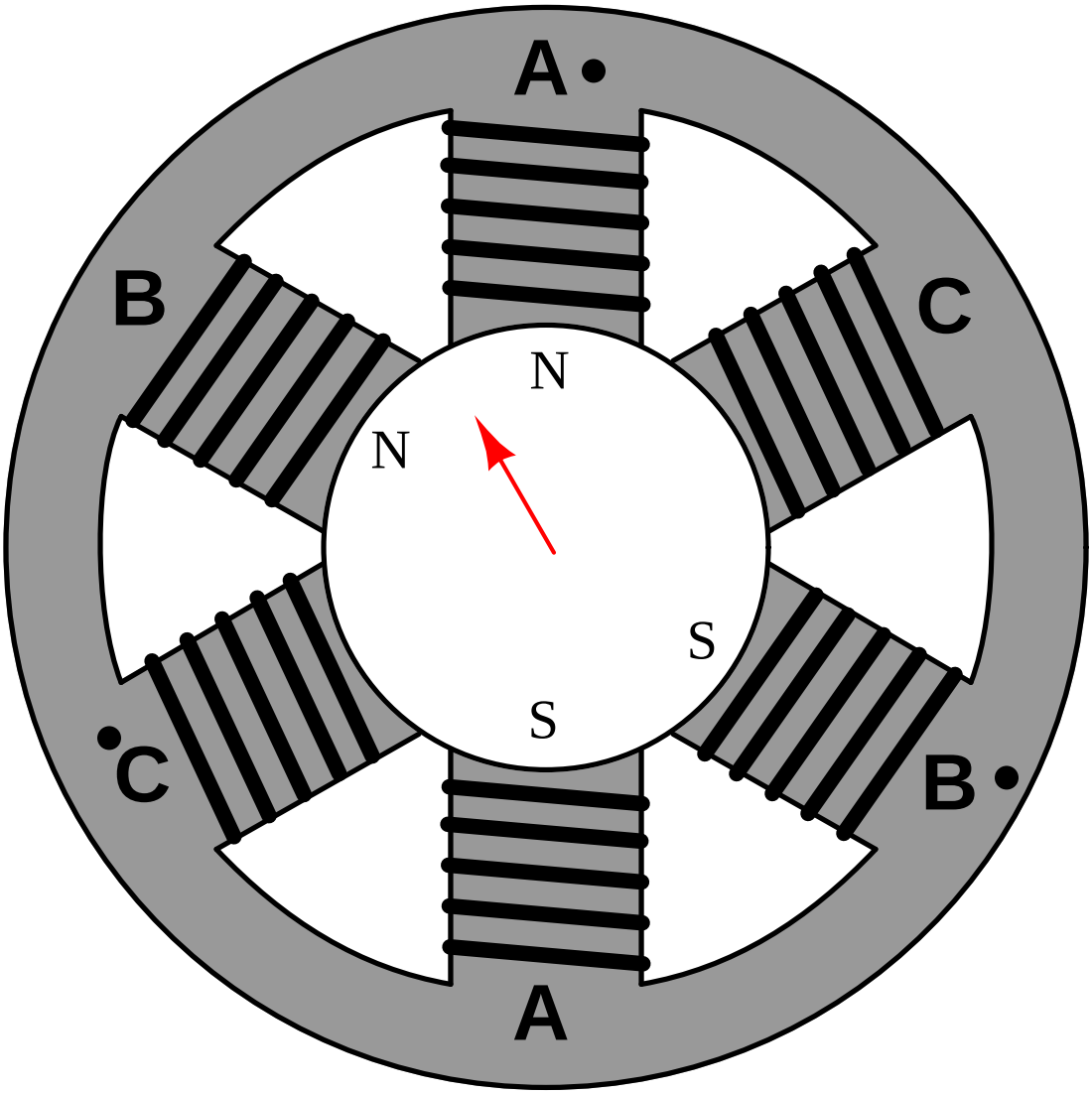
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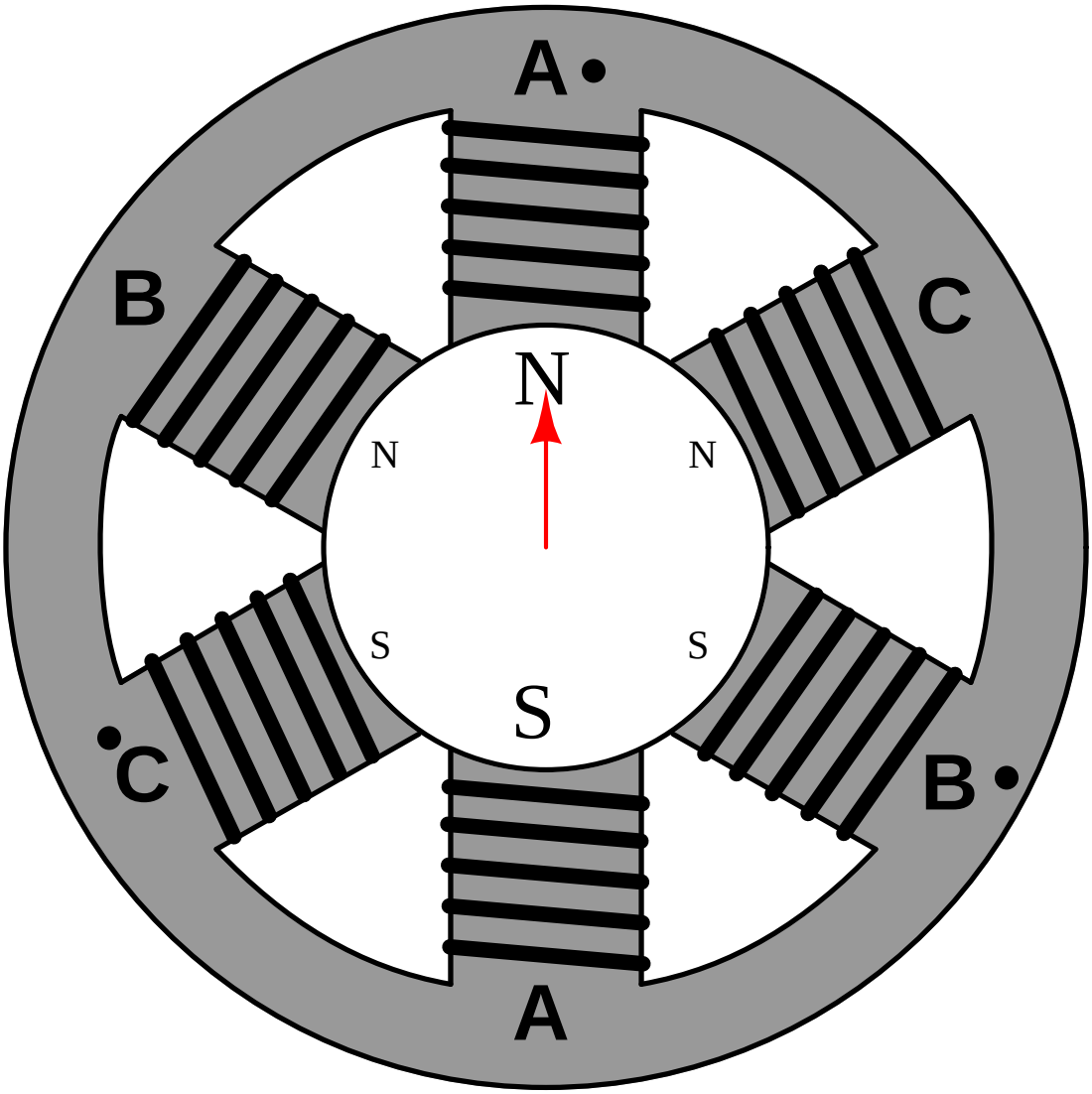
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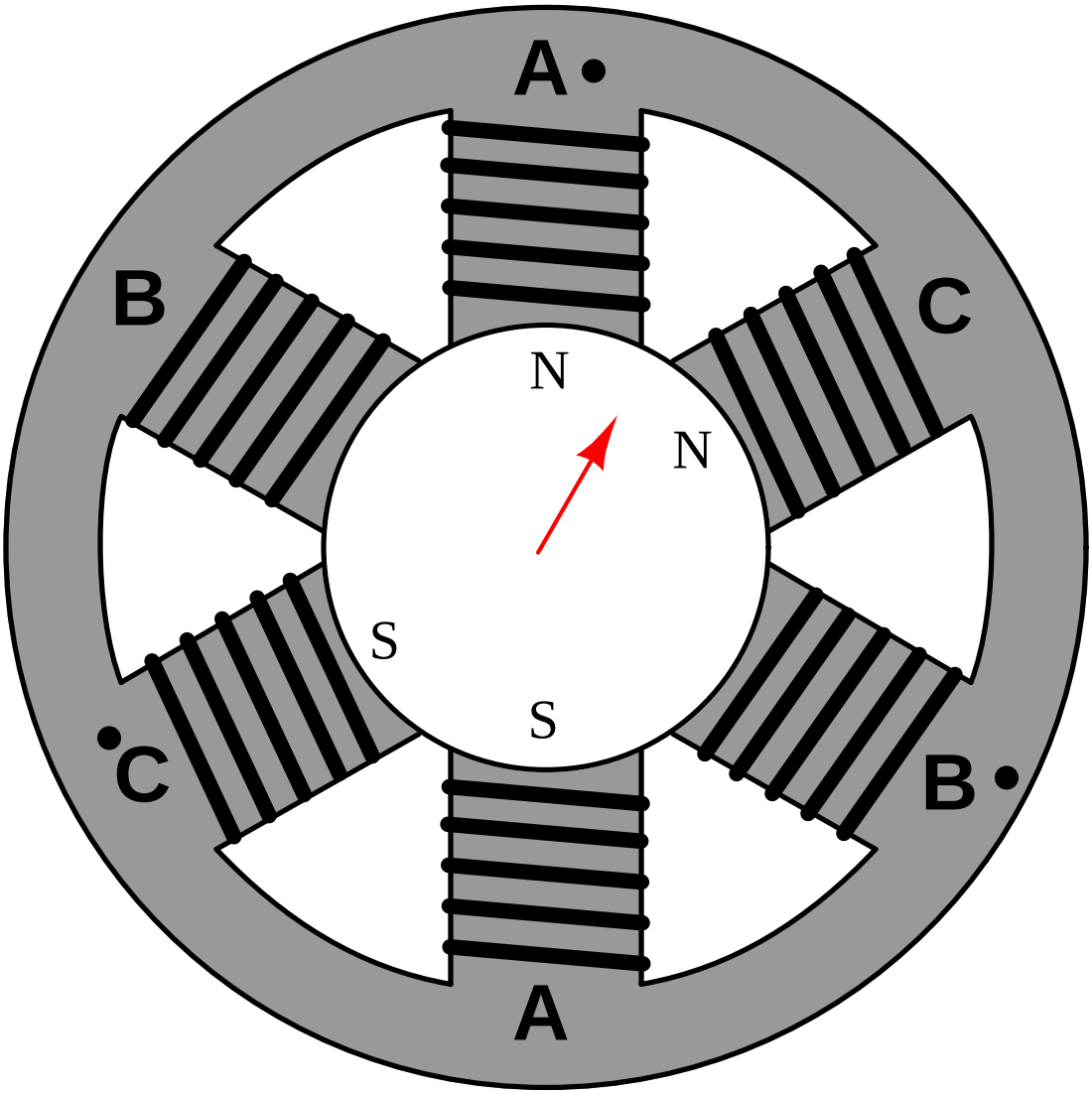
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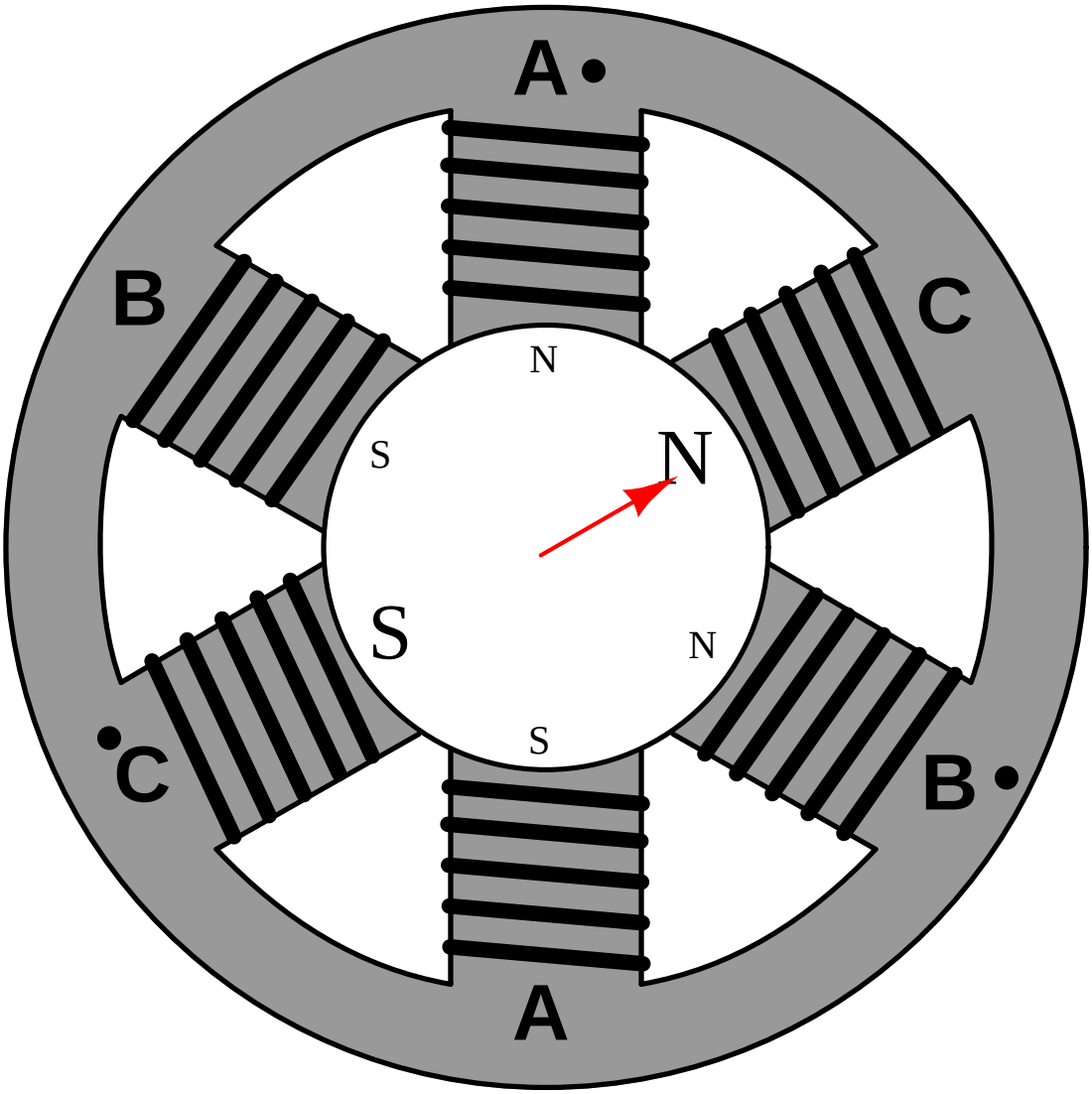
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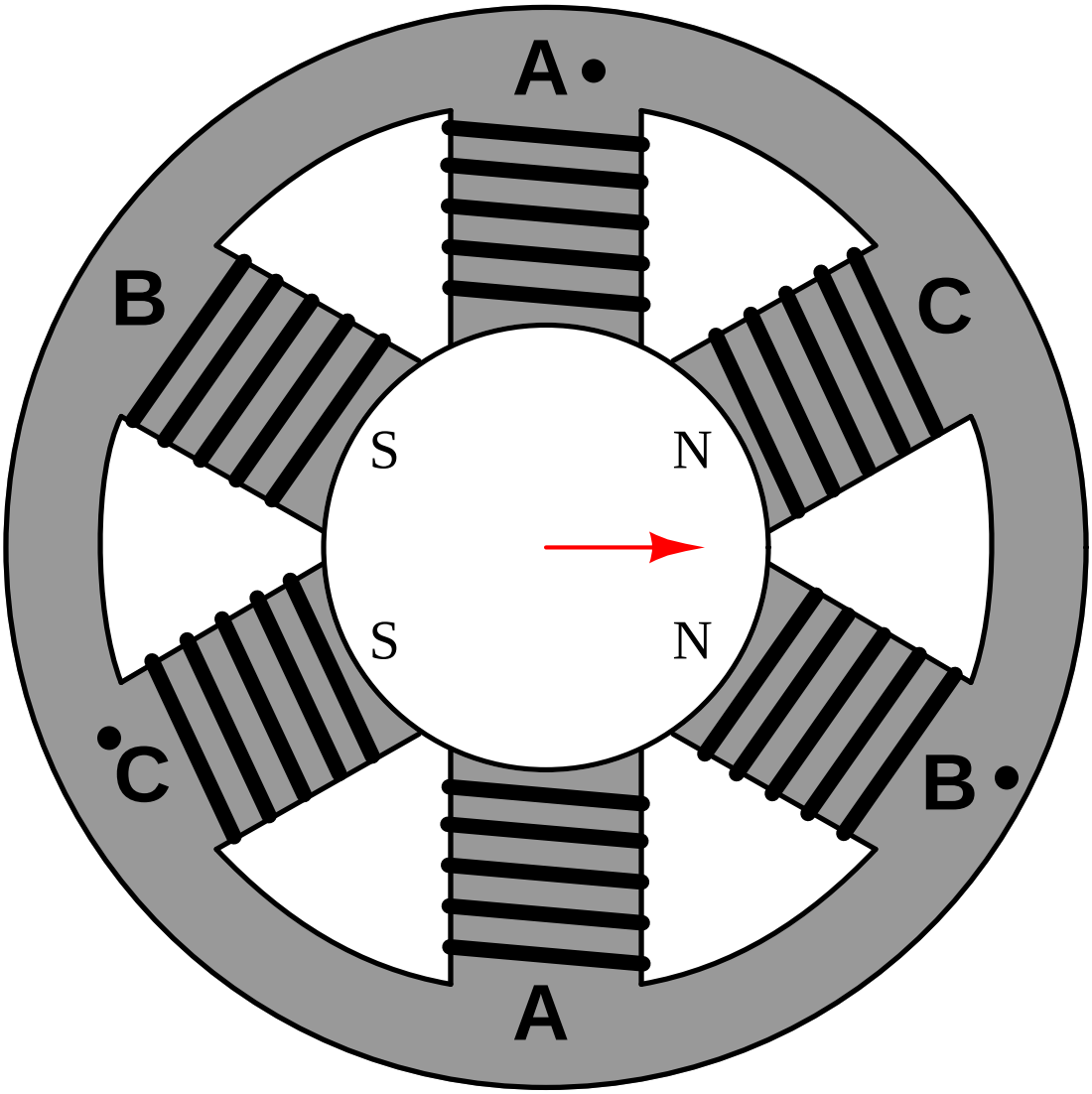
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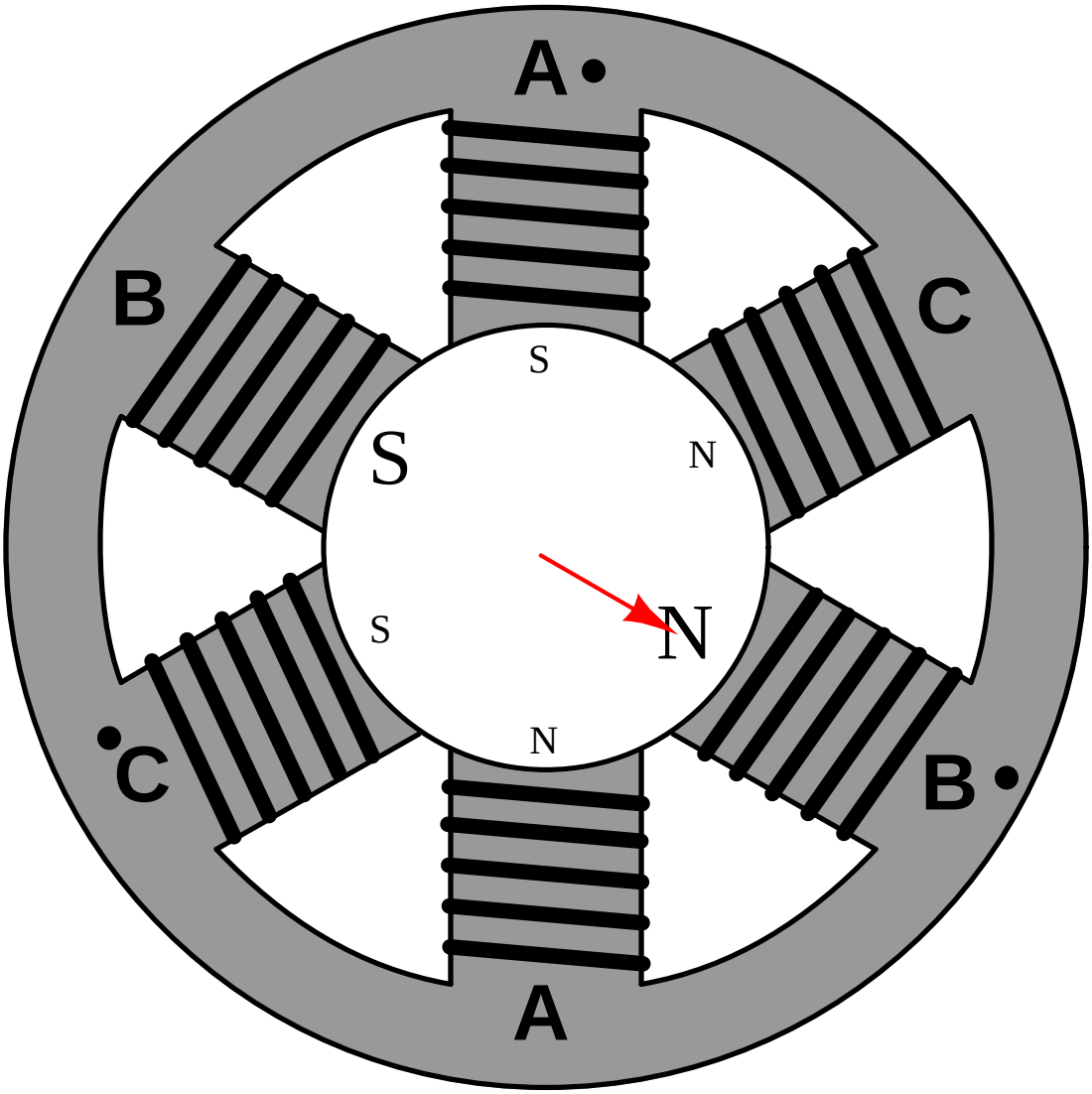
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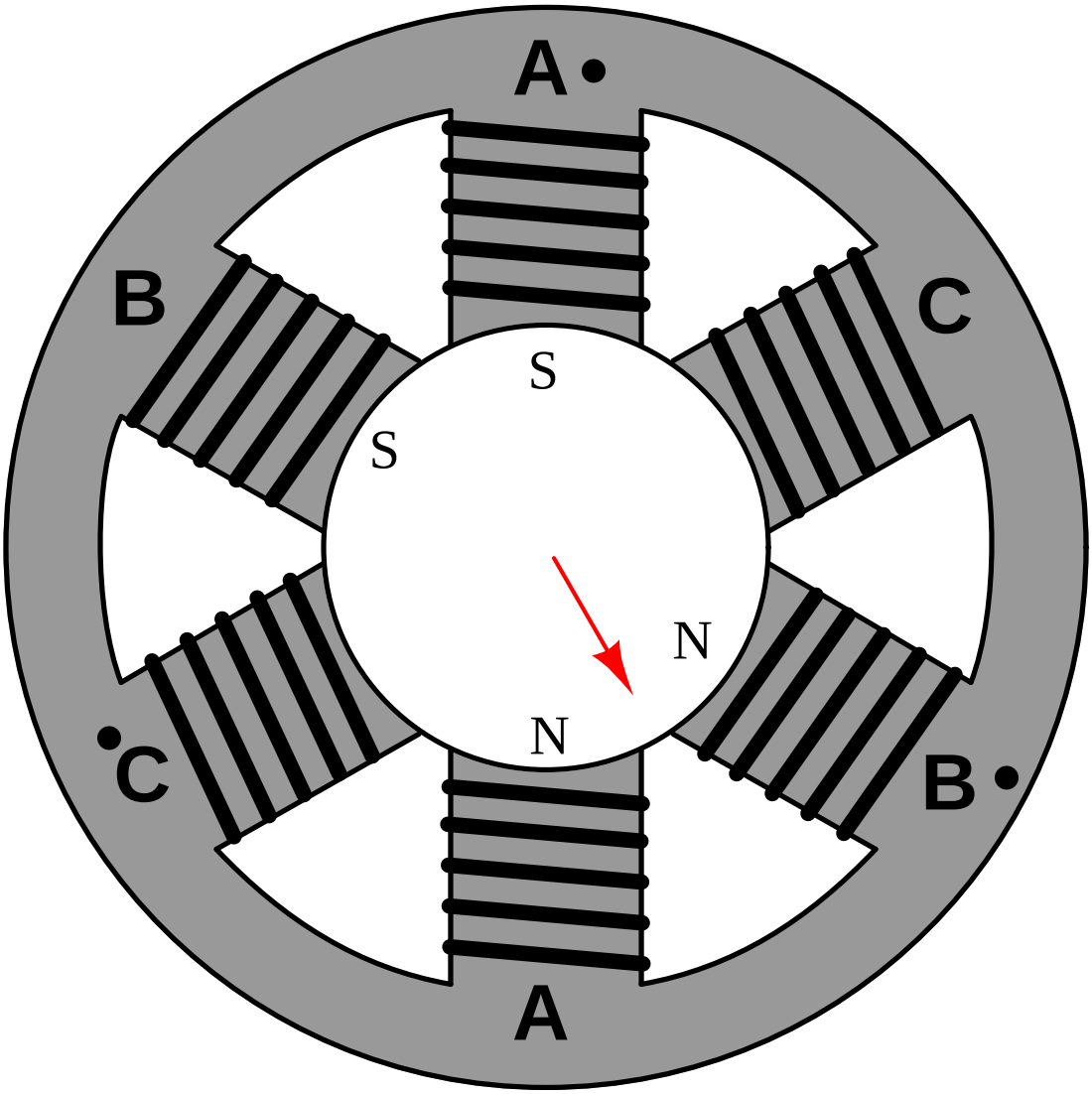
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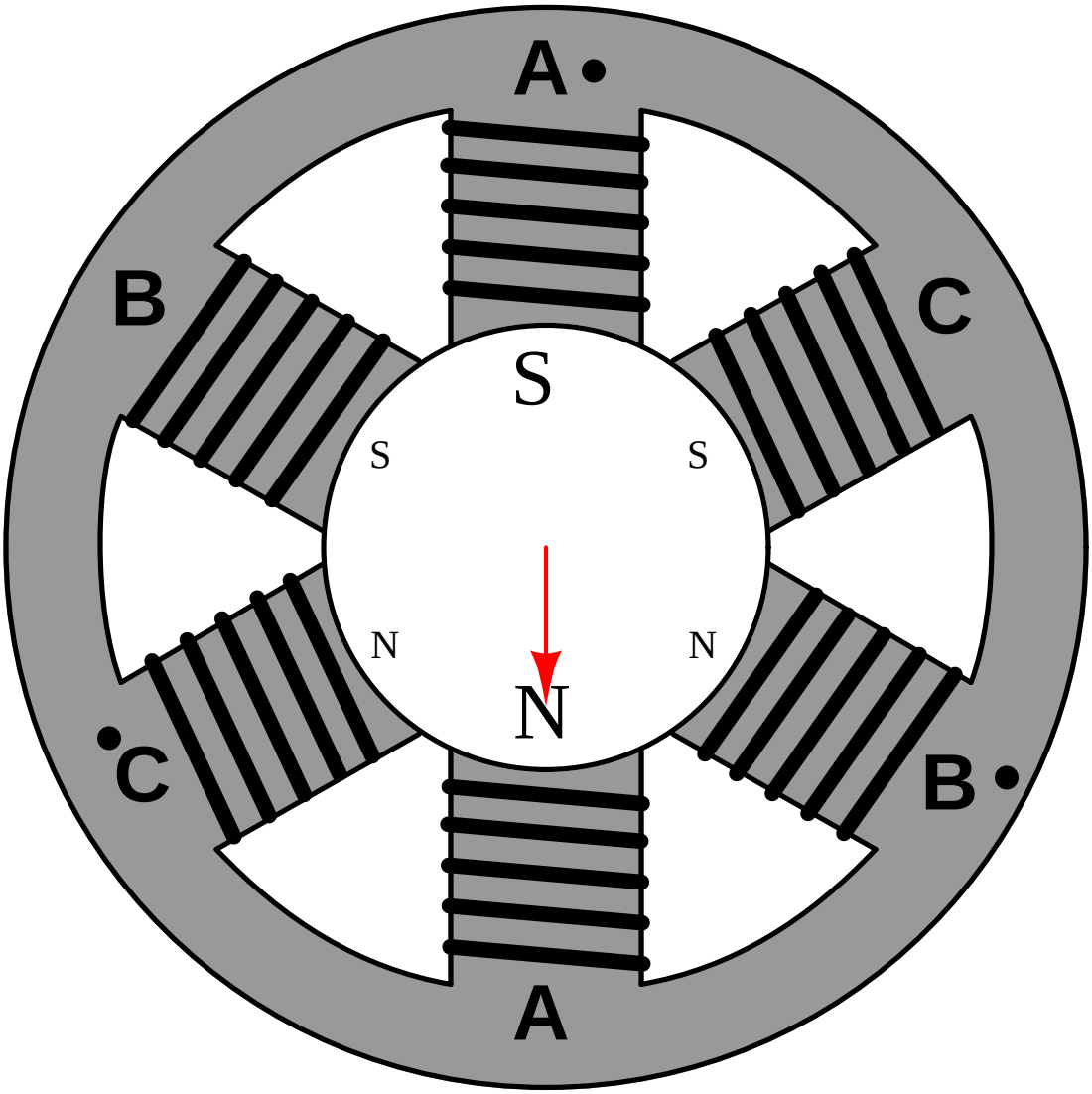
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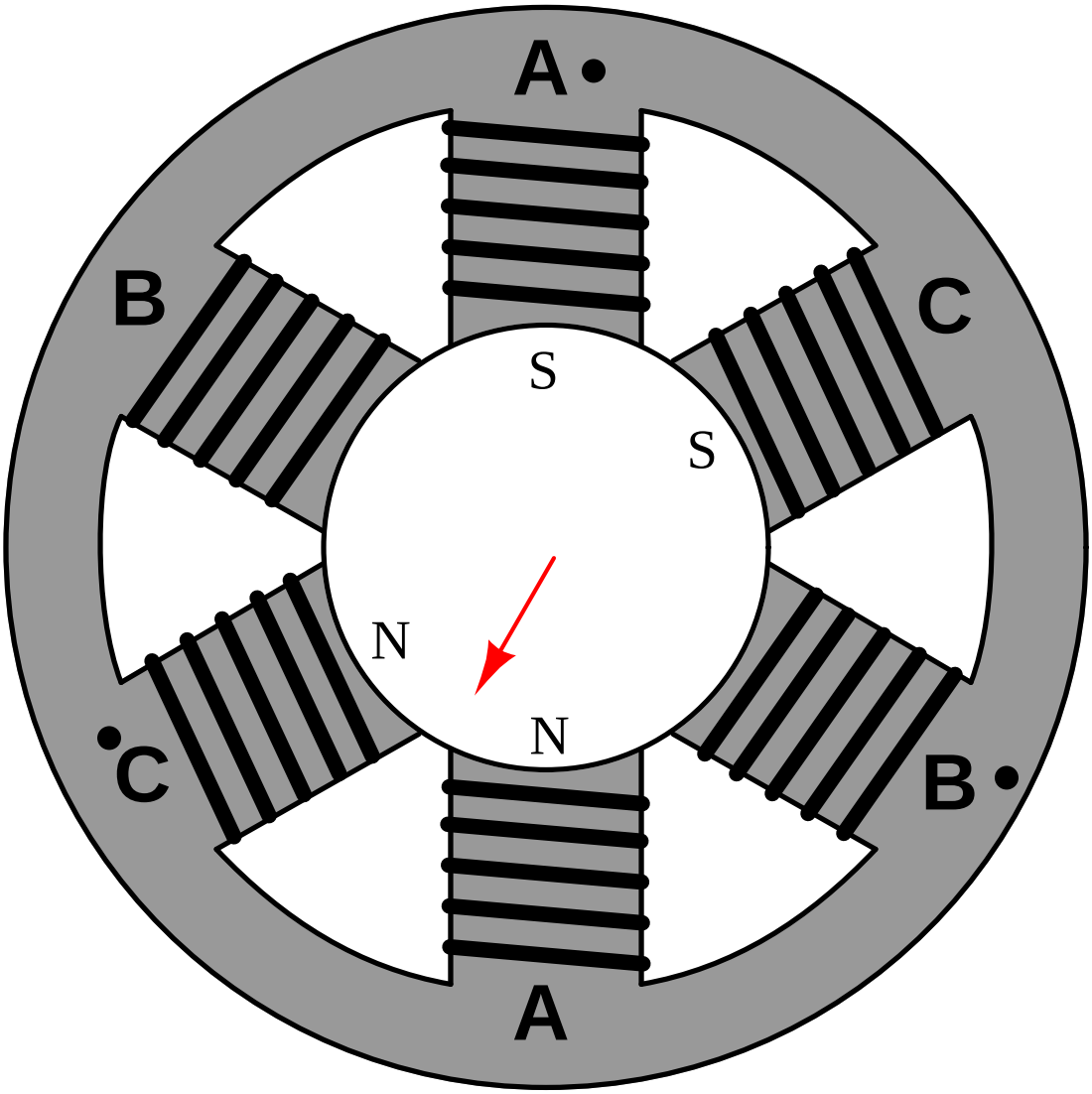
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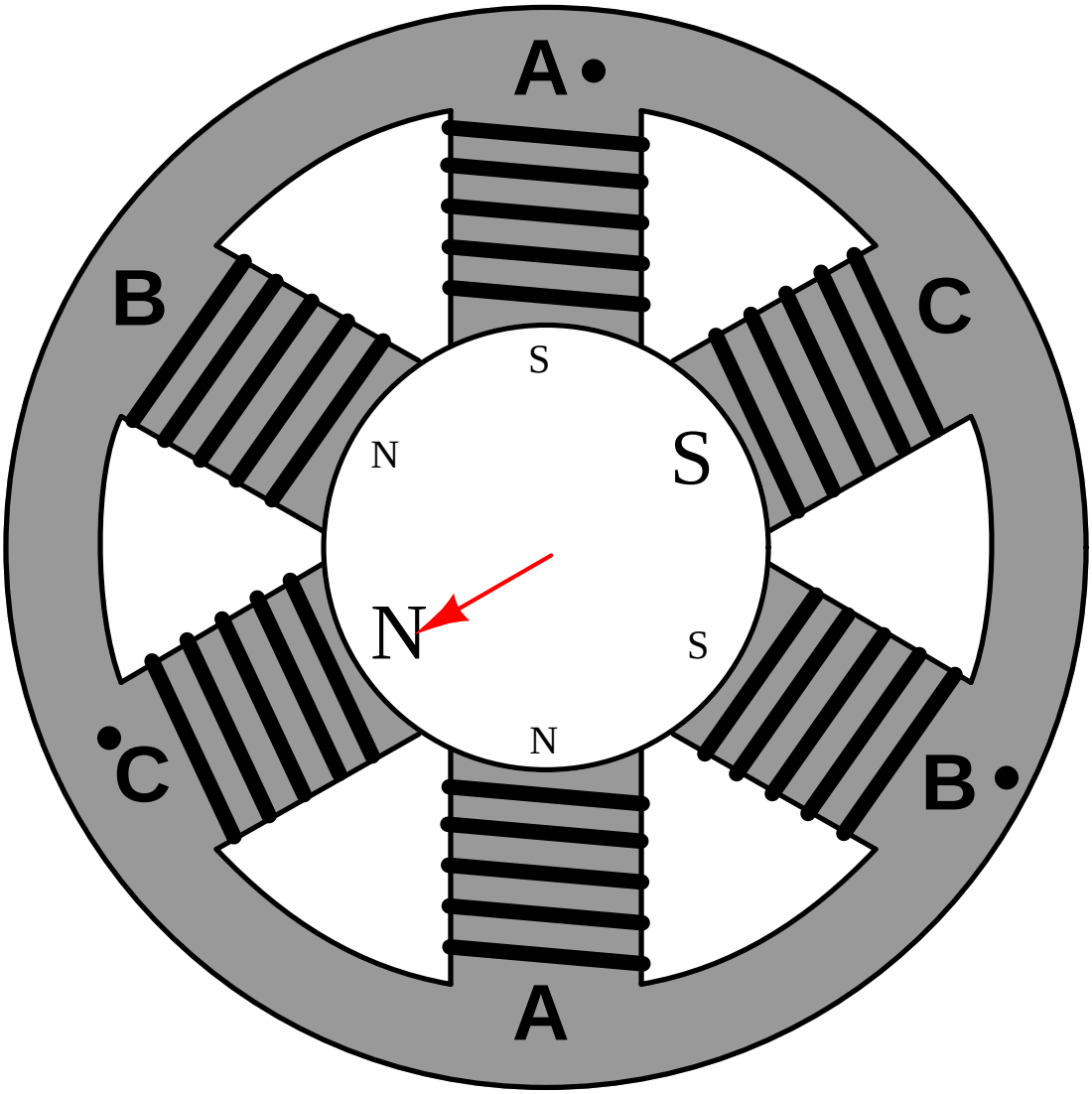

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Answer 1

Note how each pole pair (A and A', B and B', C and C') develops its peak magnetic field at different times.

Notes 1

The purpose of this animation is to let students study the evolution of the rotating magnetic field and reach their own conclusions. Similar to experimentation in the lab, except that here all the data collection is done visually rather than through the use of test equipment, and the students are able to "see" things that are invisible in real life.