

- [2.2.E.a] Describe the force(s) that keep an object traveling in a circular path.
[2.2.B.b] Compare and describe the gravitational forces between two objects in terms of mass and distance.
[2.2.C.a] Recognize changing magnetic fields can produce electrical current and vice versa.

Chapter 9: Pages 122 – 132 *TEXTBOOK (Conceptual Physics; Paul G. Hewitt)*

Chapter 12: Pages 168 – 179 *TEXTBOOK (Conceptual Physics; Paul G. Hewitt)*

Chapter 36: Pages 562 – 574 *TEXTBOOK (Conceptual Physics; Paul G. Hewitt)*

Define the following terms:

1. Rotation (9.1)
2. Revolution (9.1)
3. Centripetal force (9.3)
4. Centrifugal force (9.4)
5. Magnetic field (36.2)

Answer the following questions:

1. Does a child on a merry-go-round revolve or rotate around the axis of the ride?
2. At a given distance from the axis, how does linear speed change as rotational speed changes?
3. Which state in the United States has the greatest linear speed as Earth rotates around its axis?
4. Explain why the faster Earth spins, the less a person weighs whereas the faster a space station spins, the more a person weighs.
5. What would be the difference in your weight if you were five times farther from the center of Earth than you are now? Ten times farther?
6. Explain the Inverse Square Law.

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7. Calculate the force of gravity on a newborn baby (mass = 4-kg) and the planet Mars (mass = 6.4×10^{23} kg) when Mars is at its closest to Earth (distance = 8.0×10^{10} m).
8. Calculate the force of gravity on a newborn baby (mass = 4-kg) and the doctor delivering the baby (mass = 75-kg) who is 0.3 meters away during delivery.
9. Referring to Problems 6 and 7, which object has a greater force on the baby: the doctor or Mars? Explain...
10. Jupiter is about 300 times as massive as Earth but an object on its surface would weigh only 2.5 times as much as it would on Earth. Explain...(hint: think about mass and distance)
11. What is a magnetic field and what is its source?
12. What is a magnetic domain?
13. If a current-carrying wire is bent into a loop, why is the magnetic field stronger inside the loop than outside?
14. What kind of field surrounds a stationary electric charge? A moving electric charge?
15. Why will the magnetic field strength be further increased inside a current-carrying coil if a piece of iron is placed in that coil?