

Connections to National and Michigan Standards and Expectations

Michigan High School Content Expectations

Physics

P2.1A

Calculate the average speed of an object using the change of position and elapsed time.

P2.2A

Distinguish between the variables of distance, displacement, speed, velocity and acceleration.

P2.2D

State that uniform circular motion involves acceleration without a change in speed.

P2.3a

Describe and compare the motion of an object using different reference frames.

P3.1A

Identify the forces acting between objects in direct contact or at a distance.

P3.2A

Identify the magnitude and direction of everyday forces.

P3.2C

Calculate the net force acting on an object.

P3.3A

Identify the action and reaction force from everyday examples of force in everyday situations.

P3.3b

Predict how the change in velocity of a small mass compares with the change in velocity of a large mass.

P3.4A

Predict the change in motion of an object acted upon by several forces.

P3.4B

Identify forces acting on objects moving with constant velocity (e.g., cars on a highway.)

P3.4C

Solve problems involving force, mass and acceleration in linear motion.

P3.4D

Identify forces acting on objects moving with uniform circular motion (e.g., cars on a circular track).

P3.4f

Calculate the changes in velocity of a thrown or hit object during and after the time it is acted on by the force.

P3.4g

Explain how the time of impact can affect the net force (e.g., air bags in cars, catching a ball).

P3.5a

Apply conservation of momentum to solve simple collision problems.

P4.1c

Explain why work has a more precise scientific meaning than the meaning of work in everyday language.

P4.1d

Calculate the amount of work done on an object that is moved from one position to another.

Continued...

National Science Content Standards

P4.2A

Account for and represent energy transfer and transformation in complex processes (interactions).

P4.2B

Name devices that transform specific types of energy into other types of energy (e.g., a device that transformed electricity into motion).

P4.2D

Explain why all the stored energy in gasoline does not transform to mechanical energy of a vehicle.

P4.3C

Explain why all mechanical systems require an external energy source to maintain their motion.

P4.3d

Rank the amount of kinetic energy from highest to lowest of everyday examples of moving objects.

Standard 1: Science as Inquiry

All students should develop:

- Abilities necessary to do scientific inquiry
- Understandings about scientific inquiry

Standard 2: Physical Science

All students should develop an understanding of:

- Motions and forces
- Conservation of energy and increase in disorder
- Interactions of energy and matter

Standard 5: Science and Technology

All students should develop:

- Abilities of technological design
- Understandings about science and technology

Standard 7: History and Nature of Science

All students should develop understanding of:

- Science as a human endeavor
- Nature of scientific knowledge
- Historical perspectives

Lesson 1

Analysis of Newton's Laws in Automobile Racing

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P3.3b

Predict how the change in velocity of a small mass compares with the change in velocity of a large mass.

P3.4A

Predict the change in motion of an object acted upon by several forces.

P3.4B

Identify forces acting on objects moving with constant velocity.

P3.4C

Solve problems involving force, mass and acceleration in linear motion.

P3.4D

Identify forces acting on objects moving with uniform circular motion (e.g., cars on a circular track).

P3.4g

Explain how the time of impact can affect the net force (e.g., air bags in cars).

P3.5a

Apply conservation of momentum to solve simple collision problems.

Lesson 2 Forces in Automobile Racing

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P3.2A

Identify the magnitude and direction of everyday forces.

P3.2C

Calculate the net force acting on an object.

P3.4A

Predict the change in motion of an object acted upon by several forces.

P3.4b

Identify forces acting on objects moving with constant velocity (e.g., cars on a highway).

P3.4D

Identify the forces acting on objects moving with uniform circular motion (e.g., car on a circular track).

P3.dg

Explain how time of impact can affect the net force (e.g., air bags in cars).

Lesson 3 The Study of Motion Using Artifacts from the Collections of **The Henry Ford**

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P3.4g

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Lesson 4 Ground Effects Innovations in Automobile Racing

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