

SECTION OVERVIEW

Spiral Mechanics (Algebra-Based)

Model 1: 1D Constant-Force Particle Model

01. Introduction

02. Model Specifics

03. Kinematics

01. Concepts and Principles

02. Drawing Motion Diagrams in 1D

03. Drawing Motion Graphs in 1D

04. Tabulating Motion Information - Motion Graphs

05. Analyzing a More Complex Motion

06. Symbolic Analysis

07. Addendum

01. Algebraic Signs

02. Deriving the kinematic relationships

08. Activities

01. Selected Answers For Kinematics

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04. Dynamics

01. Concepts and Principles

02. Drawing Free-Body Diagrams

03. Calculating the Force of Gravity near the Surface of the Earth

04. Analyzing a More Complex Scenario

05. Hints and Suggestions

06. Activities

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05. Conservation

01. Concepts and Principles

02. Analysis Tools

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04. Analysis Tools 3

05. Activities

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Model 2: The constant-force particle model

01. Model Specifics

02. Kinematics

01. Concepts and Principles

02. Drawing Motion Diagrams

03. Drawing Motion Graphs

04. Tabulating Motion Information & Doing The Math

05. Hints and Suggestions

06. Activities

01. Selected Answers For Kinematics

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03. Dynamics

01. Concepts and Principles

02. Drawing Free-Body Diagrams

03. Applying Newton's Second Law

04. Choosing a Coordinate System

05. Activities

01. Selected Answers For Dynamics

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04. Conservation

01. Concepts and Principles

02. Analysis Tools

03. Analysis Tools 2

04. Activities

01. Selected Answers For Conservation

Model 3: The Particle Model

01. Model Specifies

02. Kinematics

01. Concepts and Principles

02. Using the Calculus

03. Using the Calculus Another Example

- 04. Circular Motion
- 05. Circular Motion 2
- 06. The Kinematics of Circular Motion
- 07. Activities

04. Conservation

- 01. Concepts and Principles
- 02. Applying the Impulse-Momentum Relation
- 03. Elastic Potential Energy
- 04. Applying Newton's 2nd Law to a Spring-Mass System
- 05. Potential Energy Functions
- 06. Activities

3.3: Dynamics

- 01. Concepts and Principles
- 02. Time-Dependent Forces
- 03. Applying Newton's Second Law to Circular Motion
- 04. Activities

Model 4: The Rigid Body Model

01. Model Specifics

02. Kinematics

- 01. Concepts and Principles
- 02. Pure Rotation
- 03. Rotating and Translating
- 04. Activities

03. Dynamics

- 01. Concepts and Principles
- 02. Calculating the Rotational Inertia
- 03. Applying Newton's Second Law in Translational and Rotational Form - I
- 04. Applying Newton's Second Law in Translational and Rotational Form - II
- 05. Applying Newton's Second Law to Rolling Motion
- 06. Rotational Inertia of Common, Uniform Solids
- 07. Activities

04. Conservation

- 01. Concepts and Principles
- 02. Applying the Work-Energy Relation including Rotation - I
- 03. Applying the Impulse-Momentum Relations (Linear and Angular) - I
- 04. Activities

Thumbnail: Roller coaster "Blue Fire" at Europa Park. Image used with permission (CC SA 3.0; Coaster J).

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