FUNDAMENTAL SCIENCE SKILLS

Self-Guided Interactive Learning Modules

version 2.5

For WINDOWS & MAC OS

User Guide

Physics Curriculum & Instruction

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version 2.5

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To order a lab pack license of FUNDAMENTAL SCIENCE SKILLS, or to obtain information on our other software titles, please contact:

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System Requirements
To install FUNDAMENTAL SCIENCE SKILLS on your computer, 105 MB of available hard drive space is required. **Your monitor's screen resolution must be set to 1024 x 768 or higher to prevent interface cropping.**

WINDOWS:
Windows XP/Vista/7/8

MACINTOSH:
Mac OS X 10.4 - 10.9

Technical Support
If problems are encountered installing or using FUNDAMENTAL SCIENCE SKILLS software, or if you have questions or comments, please contact:

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INTRODUCTION

Fundamental Science Skills is a unique program that utilizes the computer as an instructional tool to its fullest extent. The program contains interactive learning modules that teach vital skills students need early-on in a physics or physical science course.

Each module presents an interactive self-guided lesson providing virtual one-on-one instruction. Topics include: measurement apparatus used in the lab, graphing skills, interpreting graphs, error analysis, understanding the process by which a scientific model is formulated, common student misconceptions, and developing an intuitive sense for the magnitude of various physical quantities when powers of 10 are involved. The topics were selected based upon instructor input of basic skills students were in most need of improving, and basic areas where students lacked understanding.

Each learning module is comprised of the following components (common student misconception modules follow a slightly different format):

1) *Introduction Screen*: A thorough introduction to the topic is given so that no prior instruction is necessary.

2) *Usage Screen*: Students are taught the skills required to meet the learning objective along with information on how to use the interactive simulations.

3) *Practice Screen*: Students practice with graphic-rich interactive simulations that provide immediate feedback on how well the student is performing. Students are presented with many different practice opportunities allowing as much practice as necessary to master the objective.

4) *Exam Screen*: The on-screen exam tests if the student fully understands and has mastered the learning objective. The exam is automatically scored with the results shown on-screen along with the option to print-out the results for submitting to the instructor. Exams use randomized data so the instructor can be assured the student's work is not plagiarized.

The learning modules and highly intuitive interface allows first time users to immediately use the modules with no preliminary time investment. This user guide provides essential information you need to get up and running as quickly as possible, and is written with the intent to minimize reading time and get you acquainted with the software in a matter of minutes. Complete documentation pertaining to individual learning modules is built into the software.

INSTALLING *FUNDAMENTAL SCIENCE SKILLS* SOFTWARE

INSTALLATION

WINDOWS:
Double-click on the **Fundamental Science Skills v25 PC Install.exe** file. The on-screen instructions will guide you through the complete installation. Launch FUNDAMENTAL SCIENCE SKILLS by selecting it from the Windows Start menu. (Or double-click on the **Fundamental Science Skills.exe** file from within the FUNDAMENTAL SCIENCE SKILLS folder installed on your hard drive.)

MAC OSX:
Drag the **Fundamental Science Skills Mac OSX** folder to a selected location on your hard disk where you want the program to be installed. To start the program, double-click on the **Fundamental Science Skills** file inside this folder. For quick access, you can place an alias of the *Fundamental Science Skills* file onto your desktop.

Important Note: Screen Resolution

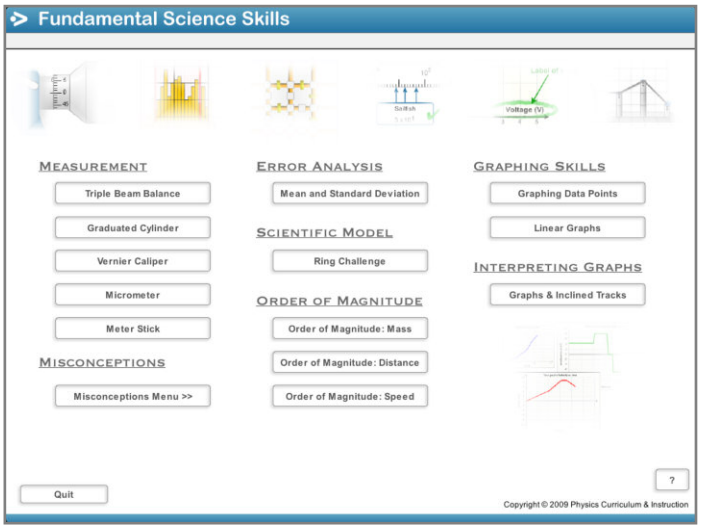
When running FUNDAMENTAL SCIENCE SKILLS, be sure that your monitor's screen resolution is set to 1024 x 768 or higher. A screen resolution setting of 800 x 600 or lower will cause cropping to the FUNDAMENTAL SCIENCE SKILLS interface.

LAB PACK / NETWORK INSTALLATION

For those schools purchasing a Lab-Pack License, FUNDAMENTAL SCIENCE SKILLS may be run on multiple computers at one building or one campus as specified by the license agreement. The software may be installed on a network, provided that the number of computers running the software at any given time does not exceed that specified in the license agreement. The software may also be installed on stand-alone computers, provided that the number of computers with installed software does not exceed that specified in the license agreement.

Fundamental Science Skills Overview

When Fundamental Science Skills is started up, the *Learning Module Main-Menu Screen* appears with buttons displaying the names of all the various modules. The Common Student Misconception modules appear on a separate menu screen which is accessed by clicking on the *Misconceptions Menu* button.



Learning Module Main-Menu Screen

A learning module may be started by clicking on one of the buttons. The following modules are included:

Measurement Apparatus
- Triple-Beam Balance
- Graduated Cylinder
- Vernier Caliper
- Micrometer
- Meter Stick

Graphing Skills
- Graphing Data Points
- Linear Graphs

Interpreting Graphs
- Graphs & Inclined Tracks Game

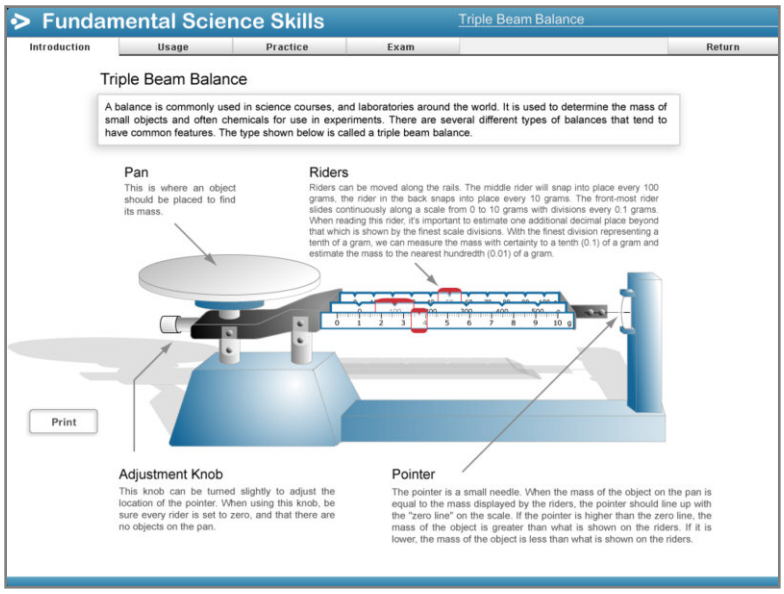
Error Analysis
- Mean and Standard Deviation

Formulating a Scientific Model
- Ring Challenge Game

Order of Magnitude (Powers of 10)
- Order of Magnitude: Mass
- Order of Magnitude: Distance
- Order of Magnitude: Speed

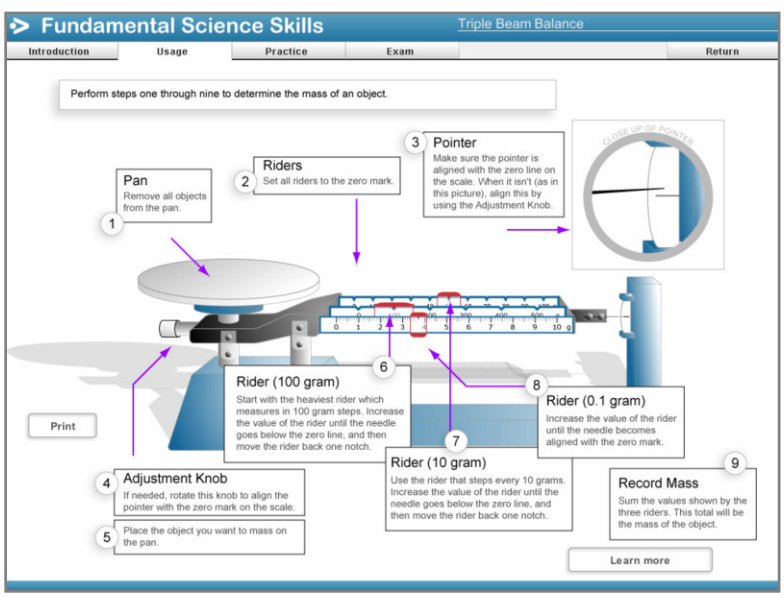
Common Student Misconceptions
- Motion from Different Viewpoints
- What is your Weight in Space?
- Weight in a Moving Elevator
- Are Heavier Sleds Faster?
- Are Shorter Paths Faster? (Crossing a Flowing River)
- Motion of a Thrown Object
- Heavier Objects in Collisions
- How Quickly Do Things Fall?

The learning modules are designed to be self-explanatory and self-guided, permitting students to work through them independently. When a module is first opened up, the *Introduction* screen is displayed containing information that introduces the student to the topic.



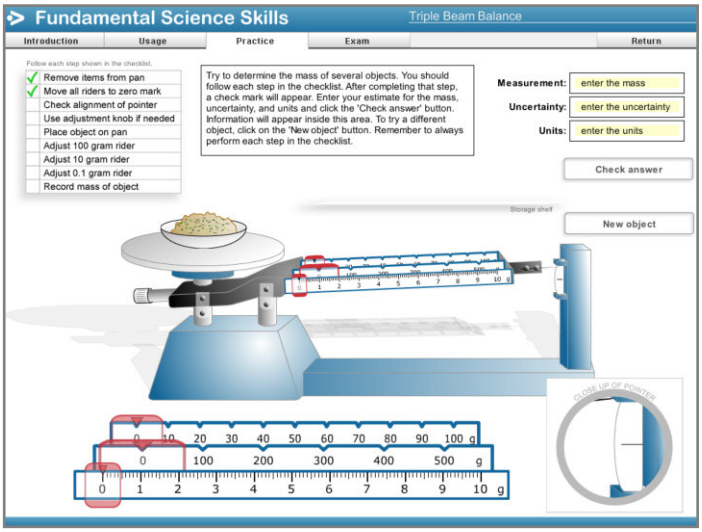
Triple-Beam Balance *Introduction* Screen

The navigation tabs across the top of the screen give access to the various components contained within the module. The student progresses through the navigation tabs in order from left to right. Following the *Introduction* screen is the *Usage* screen, which teaches necessary skills along with information on how to use the interactive simulations on the screens that follow.



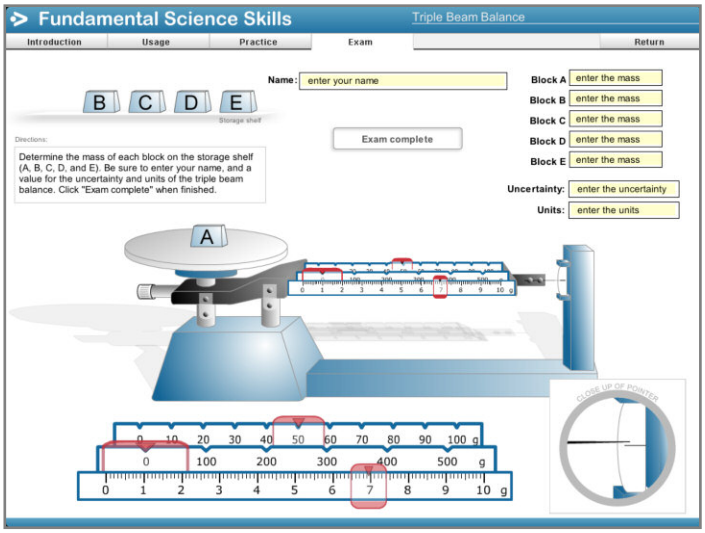
Triple-Beam Balance *Usage* Screen

On the *Practice* screen, students practice with interactive simulations that provide immediate feedback on how well the student is performing. Many different practice opportunities are available, allowing as much practice as needed to fully learn the objective.



Triple-Beam Balance *Practice* Screen

When students feel confident they fully understand the objective, they can move onto the *Exam* screen. The on-screen exam tests if the student truly understands the learning objective. The exam is automatically scored with the results shown on-screen, along with the option to print-out the results for submitting to the instructor. Exams use randomized data so that no two exams are exactly the same. The student's name must be entered prior to having the exam scored and cannot be changed after the results are displayed. Clicking the *Return* tab at the top of the screen returns the user to the main menu screen.



Triple-Beam Balance *Exam* Screen