



# *Science Check-up!*

Next Generation Science Standards

English/Chinese Edition

GRADE  
**6-8**

INTERACTIVE LEARNING ONLINE



# ***Science Check-up***

**Next Generation Science Standards**

**Grade 6-8**

# **Teacher's Guide**

***English/Chinese Edition***

# **STEM-Smart**

## ***“Science Check-up”* Team**

### **Authors**

James A. Shymansky  
B.S. Physics Education, M.S. Physics, Ph.D. Science Education

John A. Dunkhase, B.S. Geology, Ph.D. Geochemistry

Kevin E. Koepnick  
B.S. General Science, M.S. Science Education

Matthew J. Harding  
B.A. Physics Education, M.A. Science Education

John Craven  
B.S. Education, B.S. Animal Science, M.S. Geology, Ph.D. Science Education

### **Production**

Senior Editor  
Julie Shymansky

Technical Editor  
Brock Shymansky

Photography/Videography  
Teresa Shymansky

Design Editor  
Malachi Rocca

Art Design  
Kimberlee Rocca

Programming Director  
Raina Conde

Copyright © Interactive Learning Online, LLC, Publisher 2023

All rights reserved. No part of this publication may be reproduced or transmitted in any form or by any means, electronic or mechanical, including photocopy, recording or any information storage or retrieval system without permission in writing from the publisher.

Interactive Learning Online, LLC. 2598 Quincy Road, NE, Solon, IA 52333. USA

## REVIEWERS

Len Annetta, Taft Distinguished Professor of Science Education, East Carolina University  
Chi-Chin Chin, Distinguished Professor of Science Education, National Taichung University of Education  
Chi-Jui Lien, Professor, National Taipei University of Education  
Craig Berg, Professor of Science Education, University of Wisconsin-Milwaukee  
Paul Burrage, Elementary Teacher, Palm Beach County, Florida  
Jenn Chidsey, Managing Director of Learning and Impact, Austin Texas  
Charlene Czerniak, Professor of Science Education, University of Toledo  
Pradeep Dass, Professor of Science Education, Northern Arizona University  
Carmen Fies, Associate Professor of Science Education, University of Texas-San Antonio  
Maureen Funk, Science Consultant, Princeton, Missouri  
Tracy Hogan, Associate Professor of Science Education, Adelphi University  
Andrew Miller, Curriculum Coordinator, Normandy Schools Collaborative, Missouri  
Eric Olson, Associate Professor of Science Education, State University of New York-Oswego  
Joanne Olson, Professor of Science Education, Texas A&M University  
Regina Peter, Director, Newmark Schools, Scotch Plains, New Jersey  
Nancy Romance, Professor of Science Education, Florida Atlantic University  
Jan Rutt, Elementary/Middle School Teacher, Columbus Junction, Iowa  
Tom Salinsky, Elementary Science Coordinator, Palm Beach County, Florida  
Sherry Southerland, Professor of Science Education, Florida State University  
John Tillotson, Associate Professor of Science Education, Syracuse University  
Pete Veronesi, Professor of Science Education, State University of New York-Brockport  
Shuhan Wang, President, ELE Consulting International

# ***Science Check-up***

## **English/Chinese Edition**

### **Grades 6-8**

\**Science Check-up: English/Chinese Edition--Grades 6-8* is an online supplement that focuses on the *Next Generation Science Standards* (NGSS) that upper elementary students encounter in their Jordanian curriculum. It is designed to help students better understand the science content learned and to prepare for tests.

\*Questions in the reviews feature immediate feedback for students, opportunities to *go back* and answer questions until they get them right, and a report, “*How did I do?*”

\*Teachers can generate single unit and all-unit tests on key science content and see tables of analytics and pie charts of responses on all questions in the reviews and tests to facilitate further instruction as needed.

\*Teachers have total control of student access to *Science Check-up* reviews. Individually assigned usernames and passwords allow students to access only those reviews enabled by the teacher. Teachers can select reviews by simply highlighting and clicking on the reviews listed in the settings on their teacher *dashboard* for each science unit.

### **Dual Languages**

\**Science Check-up* can be read in English or Chinese with a simple click of the *EN/CN* language buttons in the tool bar. Second language learners can use a built-in translation function to see and hear all text in both Chinese and English, enhancing both their science content knowledge and their language skills.

\*The science content and questions in the *Science Check-up* reviews are intended to deepen understanding of the content and to give students that extra boost in confidence that they have learned what is needed to do their best on tests. Eighth grade teachers will find *Science Check-up* an especially useful tool for helping students prepare for the tests given at the end of Grade 8, but 6<sup>th</sup> and 7<sup>th</sup> grade teachers can also use selected reviews to capitalize on the power and fun of *Science Check-up* and to lessen the burden on 8<sup>th</sup> grade teachers to prepare for the tests at the end of fifth grade. The best way to use *Science Check-up* is for the Grade 6-8 teachers to plan together and select reviews that align with the topics they are teaching at their grade. The table on the following page shows the alignment of the NGSS and suggested *Science Check-up* reviews.

### **Science Check-up works!!**

Analyses of pilot study scores of 2,000 students using *Science Check-Up* showed an average gain of 22% in the number of students classified as proficient or advanced on their state science test!

## ***Science Check-up/Grade 6-8 NGSS Alignment***

<b>Unit 1: Nature of Science</b>	<b>Suggested Reviews</b>
Evaluating new evidence; Logical reasoning; Comparing methods and results; Models; Using technology; Scientific theory; Controlling experimental variables; Defending conclusions; ; Evaluating a procedure; Making predictions; Outcome variables	Review 1: Science is systematic Review 2: Best explanation Review 3: Science theories and laws
<b>Unit 2: Earth &amp; Space Science</b>	
Differentiating between weather and climate; Weather patterns; Heat transfer—convection; Chemical weathering; Rock cycle; Law of superposition; Earthquakes; Mountain building; Relative distance; Properties of the Sun; Planetary motion; Properties of planets; Solar system models; Eclipses; Moon phases	Review 1: Weather & climate—Not the same Review 2: How heat energy moves Review 3: Dynamic Earth Review 4: Rock cycle Review 5: The universe and us Review 6: Properties of the sun Review 7: Phases of the moon
<b>Unit 3: Physical Science</b>	
Friction; Gravitational force; Analyzing position-time graphs; Unbalanced forces; Electromagnetic spectrum; Sound waves Convert potential energy to kinetic energy; Energy transformations; Heat and phase changes; Heat flow; Magnetic properties; Atomic theory; Compounds; pH; Distinguishing between physical and chemical changes	Review 1: What is matter? Review 2: Mass and weight-not the same Review 3: Heating and cooling Review 4: Is it moving or not? Review 5: It takes a force Review 6: Gravity in action Review 7: Magnets, not magic Review 8: Energy and its forms Review 9: Sound energy Review 10: Light energy Review 11: How light behaves
<b>Unit 4: Life Science</b>	
Structural organization; Cellular processes—elimination of waste; Cell Wall; Nervous system; Reproductive system; Classification of organisms; Theory of evolution-fossil evidence; Theory of evolution-genetic; variation; Chromosomes; Genotypes; Comparing relationships; Food webs; Limiting factor; shelter, nesting sites and/or space; Carbon cycle; Photosynthesis—products	Review 1: Cellular life Review 2: Body systems Review 3: Inherited traits Review 4: Predicting traits Review 5: Heredity Review 6: DNA and heredity Review 7: Selection Review 8: Natural selection Review 9: Adaptation Review 10: Life evolves

# Using Science Check-up: The Teacher Dashboard

## Getting Started

Step 1. Login at <https://en-zh.stem-smart.com/ngss-m/login.php> and enter the temporary username and password assigned to you. Any browser will work, but Google Chrome works best.

Step 2. After logging in, your temporary username and password will take you to your “Let’s Get Started” page. On this page you may change your username and password if you wish. Be sure to write your username and password where you can find it.

STEM-SMART science

Welcome, AIDEN LOGIN

### Let's Get Started

Welcome to Stem-Smart! This page will help you in updating and setting up your account.

Step 1: Your Account

Update Account

Enter a new password if you would like. DO NOT enter a new password if you want your password to stay the same.

Username: AidenSkiles

Password: Leave blank or enter new

About You

Please enter your first name, last name and gender.

First name: Aiden

Last name: Skiles

Page Guide

Step 3. The “next” button will take you to your *teacher dashboard* where you can control everything. Students can only see and do the units and reviews that you have “enabled” and see and take unit test and all-unit tests AFTER you have “enabled” (opened and closed) them as well. You may make changes in things enabled at any time, but students must be logged-out and log back in to see the changes you’ve made.

Step 4. You can access all student accounts by clicking the **Student Accounts** tab in the toolbar at the upper right of your teacher dashboard. The following screen shot shows list of students assigned.

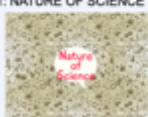
STEM-SMART science

Welcome, RENE MANAGE MY ACCOUNT | LOGIN

ENGLISH | SPANISH

Dashboard | **STUDENT ACCOUNTS**

### Teacher Dashboard

SECTIONS	ACTIONS
ALL UNIT TEST	<a href="#">View All Unit Test</a>
UNIT 1: NATURE OF SCIENCE	<a href="#">View Unit</a> <a href="#">View Unit Results</a>
	<a href="#">Generate Unit Test 1</a>
<a href="#">Settings</a>	<a href="#">Generate Unit Test 2</a>

Page Guide

**Step 5.** When students log in for the first time, they will be asked to update their name, username and password, but that’s all optional. Clicking on **Manage Account** allows you to reset student usernames and passwords to be those assigned by the school or in case a student forgets his or her username and password.

#	Student Name	Login Details	All Unit Test	Unit 1: Nature of science	Unit 2: Earth and Space Science	Unit 3: Physical Science	Unit 4: Life Science
1	Gerlach, Helmer	Username: UsernameChanged <a href="#">Manage Account</a>	No results	No results No QC results No results	No results No QC results No results	No results No QC results No results	No results No QC results No results
2	Feeney, Annamarie	Username: AnnamarieFeeney <a href="#">Manage Account</a>	No results	No results No QC results No results	No results No QC results No results	No results No QC results No results	No results No QC results No results

**Step 6:** STEM-Smart can be read in English and Chinese. The **Edit Language** link on home page tool bar allows you to select the text language for the reviews. If both languages are enabled, students can toggle between English and Chinese by clicking the EN or CN button at the top right of their screen. You may also choose to enable only one of the languages as well. The default for the Chinese is “Traditional,” but it can be changed to “Simplified” using “Google Translate” as needed.

**Language Settings**

Enable	Languages	Default
<input checked="" type="checkbox"/> Enabled	English	<input checked="" type="radio"/> Set as default
<input type="checkbox"/> Disabled	Chinese	<input type="radio"/> Set as default

Save Changes Cancel

### ***Deciding what students will see***

On the home page you can open and close any or all the STEM-Smart units, open and close any or all the reviews within a unit, generate individual unit and/or all-unit tests, and view student responses to the *Quick Checks* in the reviews and to the tests that you’ve generated.

#### ***A. Selecting a unit and enabling or disabling reviews in a unit***

**Step 1:** Click the **Settings** button under one or more of the units. Below is what you will see for Unit 1 when the settings link is clicked. The sample screen that follows shows that three of the five reviews have been enabled and will be open for student access. The default for all reviews in all units is “Disable All.”



### Teacher Dashboard

SECTIONS	ACTIONS
ALL UNIT TEST	<a href="#">View All Unit Test</a>
UNIT 1: NATURE OF SCIENCE	<a href="#">View Unit</a> <a href="#">View Unit Results</a> <a href="#">Generate Unit Test 1</a> <a href="#">Generate Unit Test 2</a>
 <a href="#">Settings</a>	



### Unit 1: Nature of science

[Enable All](#) [Disable All](#)

REVIEW	
Practices of Science	<a href="#">Review Enabled</a> <input checked="" type="checkbox"/>
Scientific Investigation	<a href="#">Review Disabled</a> <input type="checkbox"/>
Measurement and Analysis	<a href="#">Review Enabled</a> <input checked="" type="checkbox"/>
Evidence, Reason and Knowledge	<a href="#">Review Disabled</a> <input type="checkbox"/>
Let's Argue about It!	<a href="#">Review Enabled</a> <input checked="" type="checkbox"/>

### B. Generating All-Unit Tests

Step 1: Clicking on the **View All-Unit Test** allows you to create multiple tests of randomly selected items from the test item pools for each unit.

### Teacher Dashboard

SECTIONS	ACTIONS
ALL UNIT TEST	<a href="#">View All Unit Test</a>
UNIT 1: NATURE OF SCIENCE	<a href="#">View Unit</a> <a href="#">View Unit Results</a> <a href="#">Generate Unit Test 1</a> <a href="#">Generate Unit Test 2</a>
 <a href="#">Settings</a>	





(Step 4 continued): Clicking on the item number heading (e.g., "Q#4"), shows a copy of the test item and correct response and generates a pie chart showing the distribution of students' responses to the item.

Question A. Match each scientific instrument to its name and the properties that we use to measure them by selecting an item in the drop down lists.



Scientific Instruments: Thermometer, Scale, Graduated Cylinder

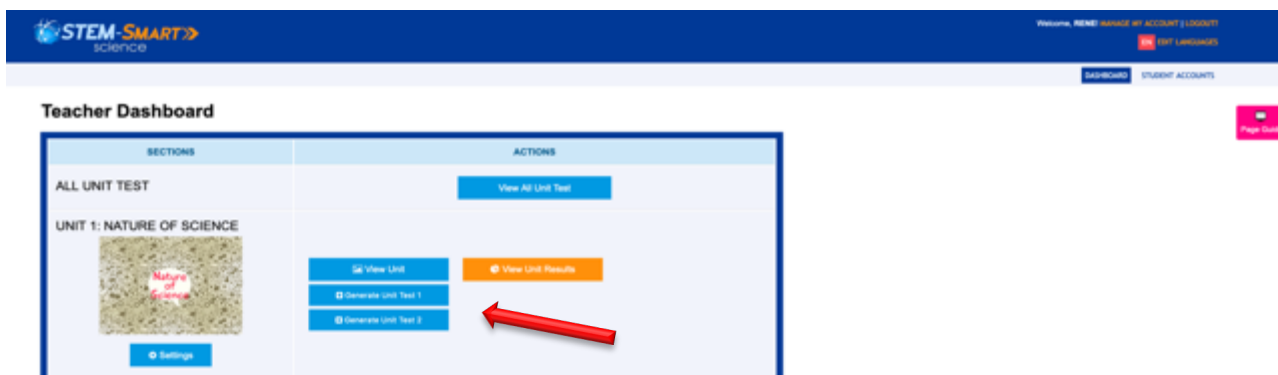
Properties: Temperature, Weight, Volume

Correct Answer: THERMOMETER-TEMPERATURE-SCALE-WEIGHT-GRADUATED CYLINDER-VOLUME



### C. Managing the Units

Step 1: Clicking on the **Generate Unit Test** tabs on your dashboard allows you to create up to **two** tests of randomly selected items for that unit. As with the all-unit test, you will be asked to select the number of items.



STEM-SMART SCIENCE

Teacher Dashboard

ALL UNIT TEST: View All Unit Test

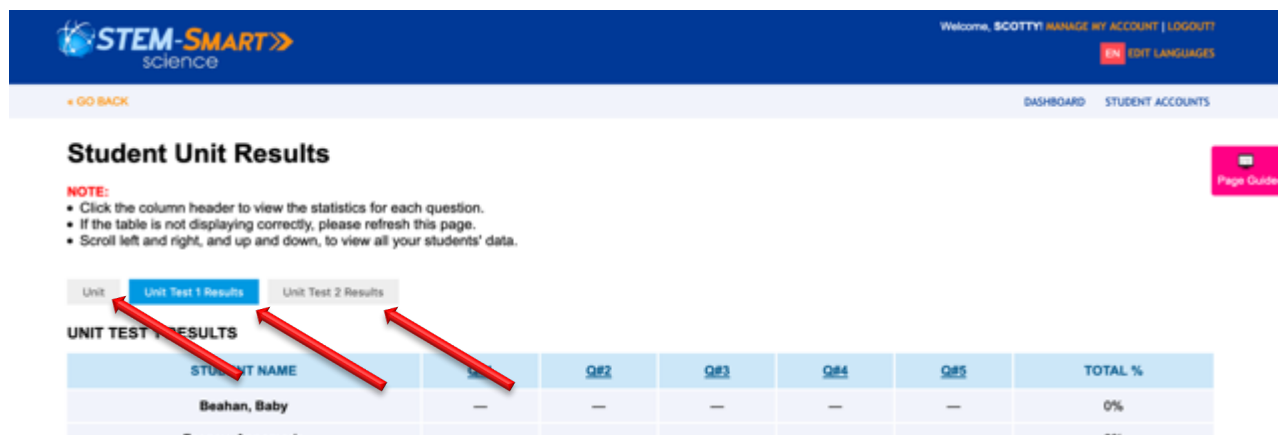
UNIT 1: NATURE OF SCIENCE

View Unit, View Unit Results, Generate Unit Test 1, Generate Unit Test 2

**Step 2:** After creating a unit test, you have the option to view the unit itself, view the unit tests, view the unit test results, and enable (or disable) the tests.



**Step 3:** After students have finished a unit and it has been disabled (closed), clicking on **View Unit Results**, takes you to **Student Unit Results** screen that are the same as the “all unit” tests (See Section B.4 above).



#### D. Translation and Audio Features

**\*Text translation:** If both languages are enabled, students can toggle at any time between English and Chinese by clicking on the “Select Language” tab. **The default is set for “Traditional Chinese.”** A sample translation is shown below.

Go Back to Dashboard


Select Page

Select Language


English

Chinese

### Review 3: Science Theories and Laws



The process of science has one big objective: to try and understand and make sense of the universe and nature. If we understand how the natural world works, it can help us survive and have better lives. So, how do scientists do that? Well, first of all, they use their curiosity to carefully look at all the interesting things in nature that surround us. Whether it's looking at little bugs through a hand lens or at distant planets through a telescope, observing nature is usually the first step in understanding how the universe works. After lots of careful observations of a natural phenomenon, sometimes scientists recognize a pattern and then try to explain the cause of that pattern.



[返回到主選單](#)  
[選擇頁面](#)  
[選擇語言](#)

### 單元3：科學理論與定律



科學的過程有一個大目標：嘗試和理解宇宙和自然。如果我們瞭解自然界是如何運作的，它可以幫助我們生存並擁有更好的生活。那麼，科學家是怎麼做到的呢？好吧，首先，他們利用好奇心仔細觀察我們周圍的自然界中所有有趣的東西。無論是通過放大鏡觀察小蟲子還是通過望遠鏡觀察遙遠的行星，觀察自然通常是理解宇宙如何運作的第一步。在對自然現象進行大量仔細觀察後，有時科學家會發現出一些模式，然後試著去解釋這種模式的原因。

\*Specific text translation with audio: To see or hear a translation of only a single word, sentence or section of Chinese text, the “Google Translate” function on Google Chrome can be used or the Google Translate plugin needs to be added to their browser at:

<https://chrome.google.com/webstore/detail/google-translate/aapbdbdomjkkjkaonfhkkikfgjllcleb?hl=en>

**\*NOTE:** When text is displayed in Chinese, two Google Translate icons will appear in the toolbar. The Traditional text can be changed to Simplified text by clicking on the left icon as shown below.



[返回到主選單](#)  
[選擇頁面](#)  
[選擇語言](#)

### 單元3：科學理論與定律

科學的過程有一個大目標：嘗試和我們瞭解自然界是如何運作的，它可以好的生活。那麼，科學家是怎麼做到的呢？好吧，首先，他們利用好奇心仔細觀察我們周圍的自然界中所有有趣的東西。無論是通過放大鏡觀察小蟲子還是通過望遠鏡觀察遙遠的行星，觀察自然通常是理解宇宙如何運作的第一步。在對自然現象進行大量仔細觀察後，有時科學家會發現出一些模式，然後試著去解釋這種模式的原因。

Chinese (Traditional) Chinese (Simplified) X

Google Translate

The translation of the Traditional or Simplified Chinese can then be done by highlighting a word, a sentence or a section of text on the screen and clicking on the Google Translate icon near the highlighted word or sentence(s). A sample of a Google Translate operation is shown below.



[返回到主選單](#)  
[選擇頁面](#)  
[選擇語言](#)

### 單元3：科學理論與定律

科學的過程有一個大目標：嘗試和我們瞭解自然界是如何運作的，它可以好的生活。那麼，科學家是怎麼做到的呢？好吧，首先，他們利用好奇心仔細觀察我們周圍的自然界中所有有趣的東西。無論是通過放大鏡觀察小蟲子還是通過望遠鏡觀察遙遠的行星，觀察自然通常是理解宇宙如何運作的。在對自然現象進行大量仔細觀察後，有時科學家會發現出一些模式，然後試著去解釋這種模式的原因。

Chinese

科學的過程有一個大目標：嘗試和理解宇宙和自然。如果我們瞭解自然界是如何運作的，它可以幫助我們生存並擁有更好的生活。

ENGLISH

The process of science has one big goal: try and understand the universe and nature. If we understand how nature works, it can help us survive and have a better life.

TRANSLATE THIS PAGE OPEN IN GOOGLE TRANSLATE

Clicking on the translation icon produces a box that contains the word or sentence(s) in English and Chinese. Clicking on the “speaker” icons in the box will produce audios of both translations.