



Getting Started with the TI-Nspire™ Navigator™ System in Secondary Science

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Materials for Workshop Participant*

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Getting Started with the TI-Nspire™ Navigator™ System in Secondary Science

Workshop Loan List

- TI-Nspire™ CX CAS Navigator™ 30-user system
- 30 additional TI-Nspire™ CX CAS handhelds
- 60 standard-A to mini-B USB cables
- 30 stainless steel temperature sensors
- 30 Vernier EasyLink® USB sensor interfaces

Supplies List

- 10 measuring tapes and/or meter sticks

Software Requirements

- TI-Nspire™ CX or TI-Nspire™ CX CAS Navigator Teacher Software



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Instructor Notes

Student Login

PD Objectives

- Participants will log in to the TI-Nspire™ CX Navigator™ network as students in an existing class.

Materials Needed/Set Up Requirements

- Two TI-Nspire™ CX handhelds for each participant

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Distribute the loaner TI-Nspire™ CX handhelds to participants.
- Provide information to participants regarding his/her User Name.
- Have participants log in to the TI-Nspire™ CX Navigator™ class.
- If participants brought their own TI-Nspire™ handhelds, you will have opportunities later to help them update the operating system on each of their handhelds. It is suggested that you not spend time updating on the first morning of the workshop.
- Consider setting up a “parking lot” so that participants can list any questions or concerns.

Technology Tips

- Prior to the start of the workshop, create a TI-Nspire™ CX Navigator™ class using participants' names.
- If the names of the participants are not available prior to the workshop, use an existing class in your TI-Nspire™ CX Navigator™ Teacher Software or use the practice class provided with the workshop loan equipment. Or if time permits, set up a new class, and have each participant **Add a student to current class**, entering First Name, Last Name, and User Name.
- Inform participants that a network only needs to be selected once, not every time a handheld is logged in.

Instructor Notes

The TI-Nspire™ CX Navigator™ Experience

PD Objectives

- The focus of this demonstration activity is to model a constructivist science lesson that uses many features of the TI-Nspire™ CX Navigator™ System.

Materials Needed/Set Up Requirements

- *What_is_a_Chemical_Poll.tns*
- *Chemical_PreSurvey.tns*
- *Is_it_a_Chemical_1.tns*
- *Is_it_a_Chemical_2.tns*
- *The_Chemical_List.tns*
- *The_Real_Chemical_List.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- The most important part of this lesson is to ensure that participants take on the role of student in a science classroom. If they answer questions as teachers, remind them to think about how students would respond to this activity.

Technology Tips

- Participants may need assistance when first attempting to “grab and drag” as they move the words around. Log on yourself and be a Live Presenter to show them how to do this.

Summary Reflection Questions

- How was the instructor able to interact with the class using the TI-Nspire™ CX Navigator™ System?
- How did the instructor use these interactive features to guide the group through the activity?
- Pick one of the TI-Nspire™ CX Navigator™ features you saw demonstrated. What could be another use of this feature in the classroom?

Instructor Notes

TI-Nspire™ CX Scavenger Hunt – The Calculator Application

PD Objectives

- The primary goal of the activity is give participants practice using the Calculator application.

Materials Needed/Set Up Requirements

- If needed, explain the difference between the Calculator application and the Scratchpad.
- Do not introduce participants to the Scratchpad until later to avoid confusion.

Main Focus

- Participants will become familiar with the Calculator application.
- The instructor role for this activity is to walk around and observe.

Instructor Notes

Demonstration – Formative Assessment

PD Objectives

- The focus of this demonstration activity is the use of the TI-Nspire™ CX Navigator™ System for assessment.

Materials Needed/Set Up Requirements

- *Demo_FA_Math.tns*, or
- *Demo_FA_MG_Science.tns*, or
- *Demo_FA_HS_Science.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Participants will play the role of students who respond to questions in an assessment document sent to their handhelds by the TI-Nspire™ CX Navigator™ System.
- The instructor acts as the class teacher. The instructor again demonstrates how to send a document to a class.
- Use the Auto-Refresh feature of Class Capture to demonstrate the monitoring of student work during a class.
- Demonstrate how to collect a document, save it to Portfolio, and show the Class Results in the Review Workspace.
- Compare this assessment to the Quick Polls that were sent during other activities.
- The participant materials for this activity are designed to serve as a guide for the demonstration. Ask the participants to NOT follow along with the print materials while you are giving the demonstration, but assure them all the steps to perform the TI-Nspire™ CX Navigator™ tasks are in the materials. They will have many opportunities to discuss and practice various assessment options available with the TI-Nspire™ CX Navigator™ System.

Technology Tips

- Remind the participants that they do not submit their responses as they did for Quick Polls.

Summary Reflection Questions

- How does the ability to compare a previous assessment of the same concept in the Portfolio enable you to more easily gauge the growth of student?
- What benefits does the use of the Auto-Refresh feature of Class Capture provide when students are working on an assessment or any other assignments?

Instructor Notes

The River of Life

PD Objectives

- The intent of this activity is for participants to become more familiar with the Lists & Spreadsheets and Data & Statistics applications.

Materials Needed/Set Up Requirements

- *The_River_of_Life_HS.tns* (for HS Science)
- *The_River_of_Life_MG.tns* (for MG Science)
- Send the documents to participants using the TI-Nspire™ CX Navigator™ System.

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- This will most likely be the first time that participants encounter these two powerful applications for science classrooms – Lists & Spreadsheets and Data & Statistics. Be patient while they learn how to use these apps.
- Get the participants to talk about the pros and cons of each of the three different methods used in this activity to determine blood volume and weight (estimating from the graph, using graph trace, and using the formula relating weight and volume).

Technology Tips

- You might want to log in yourself and use Live Presenter to show participants how to select the variables in each axis on the Data & Statistics page.
- You might also want to show them how to grab the linear equation generated and move it to different positions on the screen.

Summary Reflection Questions

- Why are the skills explored in this activity important?
- How might you use this activity with your students?
- How does the manner in which a question is asked relate to a student's understanding of the relationship between blood volume and body weight?
- What steps would you take for students to be successful at answering the more challenging level of questions at the end of the activity?

Instructor Notes

The TI-Nspire™ CX Navigator™ Classroom

PD Objectives

- Participants will role-play and perform various TI-Nspire™ CX Navigator™ skills.

Materials Needed/Set Up Requirements

- Each pair of participants will need at least two TI-Nspire™ documents for this activity. You can send the documents to them through TI-Nspire™ CX Navigator™ and have them transfer from their handhelds to the computers they are using; you can provide the documents on a jump drive for each participant to load onto the computers during a break; or you can have them download the TI-Nspire™ documents from the Math Nspired or Science Nspired websites.

MG Math	HS Math	MG & HS Science
<i>Multiple_Representations.tns</i>	<i>Domain_and_Range.tns</i>	<i>Density_of_Metals.tns</i>
<i>Solving_Percent_Problems.tns</i>	<i>Arc_Length_and_Sectors.tns</i>	
<i>Variables_and_Expressions.tns</i>	<i>Families_of_Functions.tns</i>	

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- The participants will work in pairs during this activity. One participant will play the role of the “teacher” and operate the computer. One participant will play the role of “students” and operate the TI-Nspire™ CX handhelds. After they complete the activity, they should change roles and repeat the activity using different files.
- Give the participants a brief overview of the various workspaces in the software. The overview of the workspaces should be just detailed enough so that they understand directions such as “Go to the Documents Workspace”. A more detailed overview will be given in another activity.
- Monitor groups to be certain they are stopping to discuss the various “Reflection” components.

Technology Tips

- The class is created manually. If a teacher is interested in knowing how to upload a CSV file to create classes, they should be directed to the tip sheet.
- When logging in to the system, inform participants that handheld screens slightly differ depending on whether USB connection cables or wireless modules are used. The screens in the activity result when connected via the USB connection cable, so screens may be slightly different when using wireless modules in the classroom.

Summary Reflection Questions

- How can the TI-Nspire™ CX Navigator™ skills explored in this activity be used to facilitate the teaching and learning of mathematical concepts?
- How can the TI-Nspire Navigator skills explored in this activity be used to engage your students?

Instructor Notes

Practice Using Assessment Documents

PD Objectives

- To become more familiar with the available types of assessment questions
- To practice sending and collecting TI-Nspire™ documents
- To practice reviewing the class results

Materials Needed/Set Up Requirements

- *Density_Questions.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Help participants think about how the TI-Nspire™ CX Navigator™ Teacher Software is set up to assist teachers in the collection and analysis of student data. For example, how do the various pictures/icons for sending, collecting and deleting student documents relate to the task at hand?
- This activity is designed for participants to work together in pairs with each person taking on the role of the student and the teacher. At some point midway through the lesson, you may wish to have a group discussion about how the activity is progressing.

Technology Tips

- Participants might need to be reminded that a correct answer is marked in the Documents Toolbox section of the software and not directly on the question page of the TI-Nspire™ document.

Summary Reflection Questions

- There are several reflection questions built into the document. You might want to have participants focus on these questions during and after the activity.

Instructor Notes

Reflection**PD Objectives**

- This time is provided for the participants to reflect on the day's activities.

Materials Needed/Set Up Requirements

- TI-Nspire™ CX Navigator™ Skills Rating Checklist – Appendix
- Ticket Outta Here – Appendix

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Participants will reflect on the day's activities.
- To help monitor the progress of each participant on the various TI-Nspire™ CX Navigator™ skills, you will find a "Skills Rating Checklist" at the end of the participant binder materials. Use this checklist at the end of each day so that participants can think through what they have learned and what they still need to know and/or practice.
- Ask participants to complete the "Ticket Outta Here."

Summary Reflection Questions

- Was today's pace all right?
- Is there any activity that you would like to review briefly tomorrow?
- What was your favorite activity today?

Instructor Notes

Class Capture Features for Science

PD Objectives

- The focus of this demonstration activity is to showcase many of the features of the Class Capture tool of the TI-Nspire™ CX Navigator™ System by teaching a lesson on temperature and phase changes.

Materials Needed/Set Up Requirements

- Class_Capture_Features_Science_QP.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- During the activity, the instructor provides various prompts and uses Class Capture to lead a discussion of how the temperature of water changes during the conversion of ice to steam.
- Use Live Presenter so that a participant can demonstrate how to name a list, enter data, and grab & drag data points on a Data & Statistics page. If something interesting occurs when using Class Capture, let that participant be the Live Presenter to showcase his or her graph or list.
- The participant materials for this activity are to serve as a guide for the demonstration for you and later for the participants in their own classrooms. Ask the participants to NOT follow the materials while you are giving the demonstration, but assure them all the steps to perform the TI-Nspire™ CX Navigator™ tasks are in the materials
- Be sure to Click Add to Stack whenever an interesting set of captures are displayed and as they make changes to their data and graphs.
- There are many opportunities to stop and discuss various situations and display interesting patterns.

Technology Tips

- Participants might need assistance when first attempting to “grab and drag” as they move the data points on their Data & Statistics page to modify their graph.
- In the Class workspace, go to **File > Settings > Teacher Preferences** to select or deselect **Randomize order in Screen Capture**.

Summary Reflection Questions

- How can Class Capture and Live Presenter be used to engage students in a lesson?
- How can Class Capture, Screen Stacks, and Live Presenter be used to assist students who might be unsure about how to interact with a TI-Nspire™ document?
- How can Class Capture and Live Presenter be used to encourage students to “talk about” the science in a lesson?
- How can you use Screen Stacks during and after a lesson?

Instructor Notes

Practice Creating an Assessment Document

PD Objectives

- Practice creating Custom Choice, Chemistry, and Open Response questions with TI-Nspire™ CX Navigator™ Teacher Software.
- Practice saving TI-Nspire™ documents.
- Practice sending, collecting, and saving files to the Student Portfolio.
- Practice opening and reviewing results in the Review Workspace.

Materials Needed/Set Up Requirements

- *Solubility.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- The purpose of this activity is to give participants the opportunity to create five questions (of various types) based on a diagram given at the start of a pre-made TI-Nspire™ document. They are asked to type in two of the five questions “as is” and then to create three more questions on their own.
- This activity is designed for participants to work together in pairs with each person taking on the role of the student and the teacher. At some point midway through the lesson, you might want to have a group discussion about how the activity is progressing.
- If time allows, consider asking participants to log back in and (using Live Presenter) have a few of them share their questions with the group.

Technology Tips

Summary Reflection Questions

- What are the characteristics of an effective question used for formative assessment?
- Are all question types equally effective in determining student knowledge of a concept?
- Classify all five questions that you wrote using Bloom’s Taxonomy (or a similar tool).

Instructor Notes

Introduction to the Vernier® DataQuest™ Application
PD Objectives <ul style="list-style-type: none"> • The purpose of this activity is for participants to experience the “plug-and-play” feature of the Vernier DataQuest™ app and how Class Capture can be used to enhance class discussions. • There are 3 parts to this activity. Parts 1 & 2 are done in succession. Part 3 is completed later and has its own Instructor Notes page.
Materials Needed/Set Up Requirements <ul style="list-style-type: none"> • Stainless Steel Temperature Sensors • Vernier EasyLink™ USB interfaces
Main Focus – Suggested Questions/Strategies for Accomplishing Objectives <p>Part 1: Exploring DataQuest</p> <ul style="list-style-type: none"> • The participants will take the role of students. They will experience the plug-and-play feature of the DataQuest app on the handheld by collecting surface temperature data on various body parts. Focus on being able to use the probes with no button pushing on the handheld. <p>Part 2: Using the Temperature Sensor</p> <ul style="list-style-type: none"> • The participants will take the role of students as they learn to set up a temperature sensor experiment and warm the sensor with their fingers to see how data is collected. They will use the data to figure out how the sensor works. • Divide the group in two, <u>remind them not to touch the metal part of the sensor</u>, and ensure that they make predictions. Run this like a classroom—and talk about it at the end. • Show Screen Captures of representative and exemplary data displays to facilitate discussion. Run this like a classroom—and talk about it at the end. • Have some fun. Use this as a chance for everyone to get to know each other a little better. If time permits, run the maximum temperature assessment challenge
Technology Tips <ul style="list-style-type: none"> • Don't pass out the temperature sensors until you are ready to use them. Caution participants from “playing” with the sensors. They can do this in Part 2 of the activity!
Summary Reflection Questions <ul style="list-style-type: none"> • What is the pedagogical importance of making your predictions and writing them down? • With the TI-Nspire™ CX Navigator™ System, when should student work be displayed with a name, and when should it be displayed anonymously? • How did Class Capture enhance this activity?

Instructor Notes

Linking Data from the Vernier® DataQuest™ Application

PD Objectives

- The purpose of this activity is for participants to practice using the built-in Vernier DataQuest™ app, and then link their data to other TI-Nspire™ apps (Lists & Spreadsheet and Data & Statistics).
- Live Presenter and Class Capture will be featured as ways to facilitate classroom laboratory activities.
- This is a continuation (Part 3) of the Introduction to DataQuest app.

Materials Needed/Set Up Requirements

- Stainless Steel Temperature sensors
- Vernier® EasyLink™ USB interfaces

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- The participants will take the role of students. They will determine the time graph settings for their data collection and what temperature data they would like to collect. Encourage them to use a 2-minute limit for their experiment. Use the Class Capture to monitor for issues.
- After data collection, use Live Presenter to share the data. Have the participants tell the story of their data collection, or have the audience try to figure out how the data was collected.
- Demonstrate how the TI-Nspire™ CX Navigator™ System can be used to monitor student progress during the linking of variables in the Lists & Spreadsheet and Data & Statistics portion of the activity. Try using Live Presenter with an experienced participant.

Summary Reflection Questions

- With the TI-Nspire Navigator System, when should student work be displayed with a name, and when should it be displayed anonymously?
- Which students would you make Live Presenters? Why?
- How did Class Capture enhance this activity?

Instructor Notes

The Portfolio Workspace

PD Objectives

- The intent of this activity is for participants to become more familiar with the Portfolio Workspace and its various grade-related features such as changing the answer key, grading student work from the Portfolio Workspace, and exporting assignment data.

Materials Needed/Set Up Requirements

- *Lab_Safety_Quiz.tns*
- *Element_Quiz_1.tns*
- *Element_Quiz_2.tns*
- *Density_of_Water.tns*

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Send the documents to the participants through TI-Nspire™ CX Navigator™ and have them transfer from their handhelds to the computers. Alternatively, provide the files on a jump drive for each participant to load onto the computers during a break.
- Be sure to discuss the importance of the Portfolio Workspace for teachers in their classroom. The Portfolio allows the teacher to easily manage assignments for absent students and gives the teacher a “picture over time” of student understanding if used regularly to assess student knowledge.

Summary Reflection Questions

- Why are the skills explored in this activity important?
- How do the Portfolio and Class Record options make it easy to include all students' work in the analysis of class data?

Instructor Notes

Data Aggregation in the Science Classroom

PD Objectives

- The intent of this activity is for participants to become familiar with the Data Aggregation with Lists technique using the TI-Nspire™ CX Navigator™ System.

Materials Needed/Set Up Requirements

- *Data_Aggregation.tns*
- Be sure to have measuring tape and/or meter sticks for participants to measure their “wingspan.” It is preferred that there is a measurement tool for every 2 to 4 participants. (Note: The activity asks participants to measure their armspan length or “wingspan” in inches and not centimeters. The rationale for this is that the other variable (height) is usually known in inches and not centimeters. Since most measurements in science are done in metric units, this is an obvious exception. Be prepared to offer this rationale or feel free to change the units for both variables to metric units.)

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- This technique is a powerful method of quickly and efficiently aggregating data in the classroom. Be sure to sell this approach compared to the “old days of having students write their data on the chalkboard and everyone copying the information.”
- It is important that participants practice this technique as it involves a few specific steps. Be ready to help them through any trouble spots when they practice this technique themselves in Part 2 of the activity.

Technology Tips

- If the data is “messy” (i.e. there are gaps in some of the data or there are obvious mistakes that need to be cleaned up), show participants how rows of data can be deleted within the Lists & Spreadsheets application (highlight the row and then right-click to delete the row).
- Be sure to show the other options available when right-clicking on the data (Send Table to New Document for example). It’s now even easier to send the data to students than it was before.

Summary Reflection Questions

- How might you use this specific technique with your students in your subject area?

Instructor Notes

Reflection**PD Objectives**

- This time is provided for the participants to reflect on the day's activities.

Main Focus – Suggested Questions/Strategies for Accomplishing Objectives

- Participants will reflect on the day's activities.
- To help monitor the progress of each participant on the various TI-Nspire™ CX Navigator™ skills, you will find a "Skills Rating Checklist" at the end of the participant binder materials. Use this check list at the end of each day so that participants can think through what they have learned and what they still need to know and/or practice.
- Ask participants to complete the "Ticket Outta Here."