

Introduction to the Next Generation Science Standards (NGSS) and the *Five Tools and Processes for Translating the NGSS*

Introduction

During this introduction session, participants' prior knowledge, beliefs and misconceptions about the NGSS are elicited. Facilitators can use this time as an opportunity to learn more about the participants in order to best support teacher teams in their small groups during the later Five Tools sessions.

- Goals:**
- Provide an introduction to the shifts and innovations of the NGSS
 - Deepen participants understanding of the research and rationale for the development of the *Five Tools and Processes for Translating the NGSS*

Prerequisite: NONE

Total Time = **Part 1 Introduction** (Slides 1-10) [30 minutes]

**120 minutes
(2 hours)**

Purpose: Set the stage for the focus of the session and begin to build community.

Summary: Participants have an opportunity to connect to one another and to the content of the day through the Magnetic Quotes activity. Professional Development (PD) Leaders review the goals and agenda. Initial group norms are agreed upon.

Part 2 Vision of the NGSS (Slides 11-12) [60 minutes]

Purpose: Provide participants with some of the underlying thinking behind the new standards.

Summary: Readings about the major NGSS shifts, the innovations of the NGSS and a summary of the research on How People Learn

Part 3 Overview of the Five Tools and Processes (Slides 13) [5 minutes]

Purpose: Introduction to the Five Tools and Processes

Summary: Participants watch the Five Tools and Processes introduction video and are presented with the Five Tools and Processes graphic.

Part 4 NGSS compared to old standards (Slides 14-15) [25 minutes]

Purpose: Introduction to an NGSS standards page

Summary: Through a comparison of a new standards page to an old one, participants are introduced to the NGSS architecture.

- Materials:**
- Charts
 - List of Science and Engineering Practices (use BLUE font)
 - List of Crosscutting Concepts (use GREEN font)

Handouts

HO 1 NGSS Shifts

HO 2	NGSS Innovations
HO 3	How People Learn
HO 4	Five Tools Graphic
HO 5	Sample page from the NGSS
HO 6	Sample page from previous standards

Resources (optional for this session)

R 1	<i>A Framework for K-12 Science Education: Practices, Crosscutting Concepts, and Core Ideas</i> (2012) by National Research Council
R 2	<i>Next Generation Science Standards For States, By States Volume 1: The Standards</i> (2013) by NGSS Lead States
R 3	<i>Next Generation Science Standards For States, By States Volume 2: The Appendices</i> (2013) by NGSS Lead States


Slides

Slide 1	Introduction to the Five Tools
Slide 2	My thoughts about the NGSS
Slide 3	Magnetic Quote 1
Slide 4	Magnetic Quote 2
Slide 5	Magnetic Quote 3
Slide 6	Magnetic Quote 4
Slide 7	Magnetic Quote 5
Slide 8	Magnetic Quote 6
Slide 9	Goals
Slide 10	Norms
Slide 11	The vision of the NGSS
Slide 12	Innovations of the NGSS
Slide 13	Five Tools video
Slide 14	NGSS vs. Old Standards
Slide 15	Reflection

- Advance Preparation:**
- Communicate with participants prior to the session. Decide if you want participants to sit in predetermined groups (based on grade level/topic).
 - Select sample page from NGSS and related page from previous state standards
 - Print all 3 Handouts (1/participant).
 - Prepare charts (list of SEPs and CCCs)
 - Optional: participants can read their assigned text in advance of session.

- Optional – A Five Tools cover page and a “Foreward” by Rodger Bybee are included in the handouts pdf. These can be provided to participants prior to or during the session.

Part 1 Introduction (30 minutes)



Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 10px; text-align: center;"> <p>Introduction to the Five Tools and Processes for Translating the NGSS into Instruction and Classroom Assessment</p> </div> <p>Slide 1 (1 minute)</p>	<p>1. Display Slide 1 (Introduction to the Five Tools). Welcome participants to the session.</p>
<div style="border: 1px solid black; padding: 10px;"> <p>My thoughts about the NGSS... </p> <p>Around the room are Magnetic Quotes about the NGSS.</p> <p>Choose a statement that “attracts” you and move to the appropriate chart.</p> <p>Share with those in your small group why you chose this statement. Be prepared to share a summary of your conversation</p> </div> <div style="border: 1px solid black; padding: 10px;"> <p>TEACHERS WANT TO ENGAGE STUDENTS, BUT FIND IT DIFFICULT TO FIND TIME TO INTEGRATE THE PRACTICES—IN PART DUE TO THE CURRENT FOCUS ON TESTING AND ASSESSMENT RESULTS. IF THE ASSESSMENTS REMAIN THE SAME, TEACHERS WON’T SEE A NEED TO CHANGE.</p> </div> <div style="border: 1px solid black; padding: 10px;"> <p>TEACHERS TEND TO BE CONTENT-FOCUSED AND DON’T HAVE MUCH EXPERIENCE OR INTEREST IN ENGINEERING. THE FOCUS ON ENGINEERING PUTS THEM OUTSIDE THEIR COMFORT ZONE. THIS WILL BE A CHALLENGE FOR US.</p> </div>	<p>2. Display Slide 2 (My thoughts about the NGSS). Explain to participants that the quotes around the room represent a number of reactions, thoughts and concerns about the NGSS. When standing near a quote, participants who do not yet know each other can introduce themselves.</p> <p>3. Display Slides 3-8 (Magnetic Quotes). Read aloud through all of the magnetic quote options. For larger groups, use all six of the quotes. For smaller groups, select 3-5 quotes that you anticipate will be most relevant. If printed largely enough, these slides can also be hidden.</p> <p>4. After participants have discussed their quote in small groups, lead the whole group in a brief sharing out. Themes across the groups can be charted. Use as an opportunity to gather participants’ prior ideas and beliefs about the NGSS. As questions arise, they can be charted as well, though they do not necessarily need to be answered at this time, nor do misconceptions need to be corrected.</p>

Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 5px;"> <p>TRADITIONAL APPROACHES TO SCIENCE TEACHING—TEACHER-CENTERED, LECTURE-BASED, TEACHER AS THE HOLDER OF ALL KNOWLEDGE—WILL NOT MOVE US TO THE VISION SET FORTH IN THE NGSS. WE NEED TO BE ABLE TO HELP STUDENTS MAKE MEANING THROUGH THE NGSS.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TEACHERS TEND TO PLAN DAY-TO-DAY, THINK LESSON-TO-LESSON, AND TEACH THE SCIENTIFIC METHOD DURING THE FIRST FEW WEEKS OF SCHOOL. THE NGSS CALL FOR A FOCUS ON A UNIT OF INSTRUCTION WITH RICH TASKS THAT BUNDLES PERFORMANCE EXPECTATIONS.</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>WE (ALL) NEED INSTRUCTIONAL MATERIALS THAT EMBODY THE NGSS. HOW WILL WE FIND TIME TO DEVELOP EFFECTIVE UNITS OF INSTRUCTION? HOW CAN WE FIND HIGH QUALITY MATERIALS?</p> </div> <div style="border: 1px solid black; padding: 5px;"> <p>TEACHERS OFTEN MISS OUT ON OPPORTUNITIES TO GO MORE IN DEPTH AND ENGAGE STUDENTS IN DOING SCIENCE AS SCIENTISTS BECAUSE THEY ARE CONCERNED ABOUT TEACHING CONTENT SO STUDENTS WILL DO WELL ON TESTS. AND THEY ONLY HAVE LIMITED TIME TO TEACH SCIENCE AT THE ELEMENTARY LEVEL.</p> </div> <p>Slides 2-8 (15 minutes)</p>	
<div style="border: 1px solid black; padding: 5px;"> <p style="text-align: center;">Goals</p> <ul style="list-style-type: none"> • To provide an introduction to the shifts and innovations of the NGSS • To deepen participants understanding of the research and rationale for the development of the <i>Five Tools and Processes for Translating the NGSS</i> </div> <p>Slide 9 (1 minute)</p>	<p>5. Display Slide 9 (Goals). Explain that the purpose of this session is to introduce participants to the NGSS and the Five Tools and Processes. The group will have an opportunity to get to know each other through discussions in order to set the stage for the remaining Five Tools PD sessions.</p>

Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> <p style="text-align: center;">Norms</p> <p>Given the articulated goals for our work together and needs of the group:</p> <ul style="list-style-type: none"> - What behaviors address those goals and needs? - What norms promote these behaviors? </div> <p>Slide 10 (13 minutes)</p>	<p>6. Display Slide 10 (Norms). Small groups may need to set their own norms, but this time can be used to establish whole group norms. If your group already has group norms, this slide can be edited, although those norms should be revisited in the context of this session.</p>

Part 2 Vision for the NGSS (60 minutes)

PD Leader Note: The slides below are timed for participants to read their assigned texts during the session. If participants received their assigned readings in advance, more time can be spent in discussion.

Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> <p style="text-align: center;">The vision of the NGSS: 3 Readings</p> <ul style="list-style-type: none"> • Part 1: In your reading group, summarize the key ideas of the passage • Part 2: In your jigsaw group, answer the following question on chart paper: How does this help you think about your teaching and learning? • Part 3: Gallery walk / share-out <div style="display: flex; justify-content: space-around; align-items: center; margin-top: 10px;">  <div style="text-align: center;"> <p>NGSS Innovations</p> <p><small>By Rodger W. Bybee</small></p> </div>  </div> </div> <p>Slide 11 (55 minutes)</p>	<p>7. Participants should be divided into three expert groups. Display Slide 11 (The vision of the NGSS). Participants should read their assigned text and discuss the key ideas. Distribute HO1, HO2 and HO3. Let participants know that they are receiving all handouts, even though they are only expected to focus on one reading at this time.</p> <p>8. Next, in groups made up of at least one person from each expert group, participants should chart the answer to the posted question. They can share about their reading but should spend more of their time looking for themes across the three readings, and how it can help them think about their own practice and classrooms.</p> <p>9. After a brief gallery walk, use remaining time to share common themes that have emerged.</p>
<div style="border: 1px solid black; padding: 10px; margin-bottom: 5px;"> <p style="text-align: center;">Innovations of NGSS</p> <p style="text-align: center;">https://www.youtube.com/watch?v=JZZFJS3yUwo</p> </div> <p>Slide 12 (5 minutes)</p>	<p>10. Display Slide 12 (Innovations) in order to access the video during which Rodger Bybee and Peter McClaren discuss the innovations of the new standards.</p>

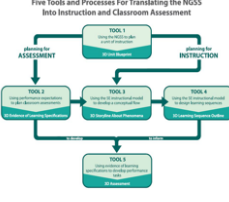
Part 3 Introduction to the Five Tools and Processes (5 minutes)

Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 10px;"> <p>How do we build the necessary teacher knowledge to translate the NGSS? https://www.youtube.com/watch?v=EU1RfziAG1o</p> </div> <p>Slide 13 (5 minutes)</p>	<p>11. Display Slide 13 (Five Tools video) in order to access the video that will introduce participants to the Five Tools. Distribute HO4 (Five Tools Graphic).</p>

Part 4 NGSS Compared to old standards (25 minutes)

PD Leader Note: Edit Slide 14 as needed. Select an appropriate page from the NGSS to compare to a similar grade level and content page from the previous state standards of the location where your PD is taking place. It is recommended that you give participants a page that is different from the one they will work from during their Tool 1 experience.

Slide and Time	Facilitation Notes
<div style="border: 1px solid black; padding: 10px;"> <p>NGSS vs. Our Old State Standards</p> <p>Compare a page from:</p> <ul style="list-style-type: none"> • the state standards • the NGSS <div style="border: 1px solid black; border-radius: 50%; width: 100px; height: 70px; display: flex; align-items: center; justify-content: center; margin-left: 20px;"> <p>What do you notice?</p> </div> </div> <p>Slide 14 (20 minutes)</p>	<p>12. Display Slide 14 (NGSS vs. Old Standards). Use this opportunity to allow participants to discover similarities and differences between previous standards and the new NGSS. Distribute HO5 and HO6. Allow participants time to talk in small groups.</p> <p>13. During the whole group share out, be sure to highlight the foundation boxes on the NGSS page, along with the Performance Expectations on the top of the page. Share the SEP (blue) and CCC (green) charts; tell participants these charts will remain hanging for the other Five Tool sessions.</p>

Slide and Time	Facilitation Notes
<p style="text-align: center;">Reflection</p> <div style="display: flex; align-items: center;">  <div style="margin-left: 20px;"> <p>What challenges do you anticipate in translating these new standards into instruction and classroom assessment?</p> </div> </div> <p>Slide 15 (5 minutes)</p>	<p>14. Display Slide 15 (Reflection). Gather final thoughts from participants. Collect remaining questions and concerns.</p>