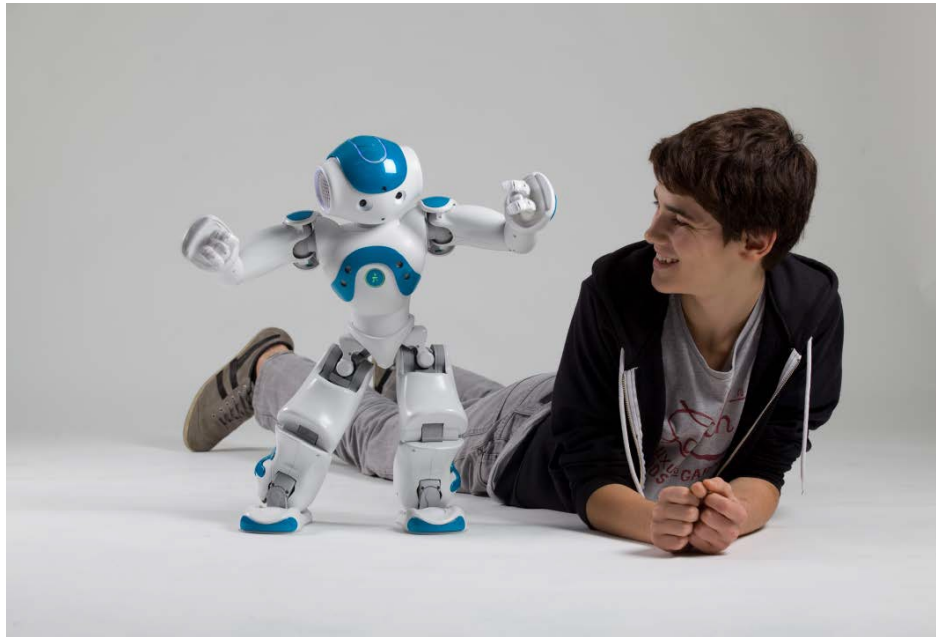


**2012**

Stokes Educational Services

Dana Cochran  
Robert Stokes



# TEACHING WITH ROBOTICS

©2012, Stokes Educational Services, LLC. All rights reserved.

Stokes Educational Services  
112 Cedar Lane  
Carl Junction, MO 64834 [www.stokeseducation.com](http://www.stokeseducation.com)



## Table of Contents

Unit 1 Learning with Music .....	4
Lesson 1.1: Singing Silly Songs Lesson Plan. ....	4
Lesson 1.2: Singing Silly Songs, Part 2 Lesson Plan.....	7
Lesson 1.3: Using Songs to Learn Lesson Plan .....	10
Lesson 1.4: Using NAO to Create Transition Cues Lesson Plan .....	14
Lesson 1.5: Music Games in Middle and High School Lesson Plan .....	17
Lesson 1.6: Music Appreciation at the High School Level Lesson Plan .....	20
Unit 2 Science .....	23
Lesson 2.1: Teaching Colors in Early Childhood Lesson Plan.....	23
Lesson 2.2: Teaching Colors in Early Childhood, Part 2 Lesson Plan .....	27
Lesson 2.3: Water Cycle for Elementary Lesson Plan.....	30
Lesson 2.4: Designing an Experiment in Middle School Lesson Plan.....	33
Lesson 2.5: Designing an Experiment in High School Lesson Plan .....	36
Unit 3 Math .....	40
Lesson 3.1: Teaching Numbers in Early Childhood Lesson Plan .....	40
Lesson 3.2: Teaching Basic Math Facts in Elementary Lesson Plan .....	43
Lesson 3.3: Adding and Subtracting Integers in Middle School Lesson Plan.....	48
Lesson 3.4: Using Algebra and Trigonometry Lesson Plan .....	51
Unit 4 Social Studies .....	56
Lesson 4.1: My Community for Early Childhood Lesson Plan .....	56
Lesson 4.2: The Capitals in Elementary Lesson Plan .....	60
Lesson 4.3: World Geography in Middle School Lesson Plan .....	65
Lesson 4.4: Using NAO to Teach History in High School Lesson Plan .....	69
Unit 5 Language Arts .....	73
Lesson 5.1: Story Time for Early Childhood Lesson Plan .....	73
Lesson 5.2: Vocabulary Builders for Elementary Lesson Plan .....	76
Lesson 5.3: Using NAO as a Presentation Partner in Middle School Lesson Plan .....	79
Lesson 5.4: Multimedia Presentations in High School Lesson Plan .....	82



## Unit 1 Learning with Music

### Lesson 1.1: Singing Silly Songs Lesson Plan

Overview: Students create different voices and use voice settings to program NAO to sing silly songs used to teach children at the early childhood level.

Objectives:

- Students will review steps to power up NAO and connect NAO to Choregraphe
- Students will use Choregraphe to program NAO to speak
- Students will change NAO's speaking voice
- Students will alter NAO's voice settings in order to create different voice inflections
- Students will program NAO to sing two different children's songs.

Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*



**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 1 Learning with Music Pre-test
- Lesson 1.1 Singing Silly Songs Activity Sheet (Teacher Version)
- Lesson 1.1 Singing Silly Songs Activity Sheet (Student Version)
- Reviewing Speech and Operations Information Sheet
- Voice Acting Information Sheet
- Singing Silly Songs Brainstorming Worksheet
- Singing Silly Songs PowerPoint
- Silly Songbook

Lesson Outline:

- Distribute Learning with Music Unit Pre-test.
- Allow students to complete pre-test.
- Collect and score pre-tests.
- Distribute or launch Reviewing Speech and Operations Information Sheet.
- Instruct students to review the specific skills on the information sheet. Make sure students are proficient with all skills listed.
- Distribute the Voice Acting Information Sheet.
- Stress to students the importance of creating a character and meaning through voice changes.
- Instruct students to read and reference pages 15 and 136 of *An Introduction to Robotics with NAO*.
- Distribute the Singing Silly Songs Brainstorming Worksheet.
- Lecture using the Singing Silly Songs PowerPoint.
- Instruct students to use NAO and Choregraphe to experiment with voices and options as they brainstorm ways to program NAO to sing.
- Instruct students to complete the Singing Silly Songs Brainstorming Worksheet to record solutions.
- Distribute the Silly Songbook.
- Instruct students to select two songs and create a program in which NAO sings.
- Have a recital for your class choir of robots.



Enrichment Activity:

Program several NAO robots to sing the same 3-4 songs in unison. Present a choir-style performance for a group of preschool or pre-kindergarten students.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children’s Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

## BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6-Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



## Lesson 1.2: Singing Silly Songs, Part 2 Lesson Plan

Overview: Students create movements for Silly Songs from Lesson 1.1.

Objectives:

- Students will create movements for the two songs used in Lesson 1.1.
- Students will use movement to create meaning for the songs used in Lesson 1.1.

Common Core Standards:

- **11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- **11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- **11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- **11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- **9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- **9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- **9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- **W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- **W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*
- **W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- **W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- “Introduction to Movement with Purpose”
- Lesson 1.2 Singing Silly Songs Part 2 Activity Sheet (Teacher Version)
- Lesson 1.2 Singing Silly Songs Part 2 Activity Sheet (Student Version)
- Movements Information Sheet
- Singing Silly Songs Part 2 PowerPoint

Lesson Outline:

- Discuss the importance of movement to memory.
- Read and discuss the article, “Introduction to Movement with Purpose.” Focus on pages 4 – 11.
- Have students work in small groups to review each of the six purposes of movement in the classroom. Each group can share what they have learned with the class.
- Distribute the “Six Purposes for Movement” worksheet.
- Instruct students to complete the worksheet as part of the discussion of the article.
- Distribute the Movements Information Sheet.
- Review the broad steps of programming movements with students using the Movements PowerPoint. Refer to the Movements Information Sheet to review the specific steps of creating movements in different ways.
- Demonstrate how to use Choregraphe as needed based on the skill set of your students. More seasoned programmers can take the Movements Information Sheet and move forward. Less experienced developers may need to review the different ways to create custom movements and/or the box library movements.
- Allow students some time to explore the keyframe motion and other areas
- Instruct students to program NAO to move – with purpose - in connection to the silly songs from Lesson 1.1.
- Encourage students to program movements with purpose.
- Have students demonstrate the silly songs.
- Discuss how movements were used effectively and with purpose in each song.
- \*\*Remember, a brain break is an acceptable use of movement. Some songs may lend themselves more toward this purpose for movement.\*\*Discuss how students think movement does or doesn’t impact learning, specifically in early childhood.
- Collect, review, and score students’ completed Choregraphe program files.

Deliverables:

- “Six Purposes for Movement” worksheet
- Completed Choregraphe program
- Demonstration of silly song with movement incorporated



Enrichment Activity:

Research the connection between movement and learning. Write a 3-5 page argumentative or analytical research paper using MLA format and citing at least 3 scholarly journals or articles.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children’s Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

Purdue OWL

<http://owl.english.purdue.edu/owl/resource/658/02/>

## BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6-Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



### Lesson 1.3: Using Songs to Learn Lesson Plan

Overview: Students program NAO to sing songs that teach concepts such as the names of the 50 States or other concepts.

Objectives:

Students will use Choregraphe or the programming language of their choice to program NAO to sing.

Students will alter NAO's voice settings in order to create different voice inflections.

Students will program NAO to sing two different songs, such as:

- Nifty 50 States
- Conjunction Junction
- I'm Just a Bill
- Multiplication Rock
- Star Spangled Banner
- This Land is Your Land
- Head, Shoulders, Knees, and Toes

Students will program NAO to play a song based on the selection of a learner by using a touch or voice interaction.

Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 1.3 Using Songs to Learn Activity Sheet (Teacher Version) x Lesson 1.3 Using Songs to Learn Activity Sheet (Student Version) x *Music and Learning* excerpt
- Reviewing Speech and Operations Checklist
- Voice Acting Information Sheet
- Movements Information Sheet
- Singing to Learn Interaction Information Sheet
- Singing to Learn PowerPoint

Lesson Outline:

- Distribute the excerpt from Music and Learning. A pdf is included in the lesson materials and the article is accessible online at <http://education.jhu.edu/PD/newhorizons/strategies/topics/Arts%20in%20Education/brewer.htm> The book *Music and Learning* by Chris Boyd Brewer could also be purchased for use with this lesson.
- Instruct students to read and summarize the article. You may wish to have students utilize a graphic organizer as a summary tool or have students provide a 1-2 page summary of key points in their own words.
- Discuss the article as a class with particular attention to the ways in which music can be used to learn information and create the right atmosphere for learning.
- Collect and score students’ summaries.
- Distribute the Singing to Learn Information Sheet.
- Lecture using the Singing to Learn PowerPoint.

- Review the steps for creating voice and movements as in Lessons 1 and 2 of this Unit.
- Review or demonstrate the steps for using robotic interactions such as voice and/or touch to enable students to select the song they would like to sing.
- Instruct students to save programs and demonstrate for the class.
- Instruct students to make improvements or modifications to their programs if needed based on the demonstration.
- Collect students' final programs. If possible, utilize the programs with younger students and evaluate the program's effectiveness.

Deliverables:

Summary of "Music and Learning" article  
Completed Choregraphe program

Enrichment Activity:

Program several robots to sing 3 to 4 songs in unison. Present a choir-style performance for a group of preschool or pre-kindergarten students.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children's Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6-Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

VIDEO

NAO Developer Program – subscription channel on YouTube  
<http://www.youtube.com/user/ObiJerome/videos?view=0>



NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



### **Lesson 1.4: Using NAO to Create Transition Cues Lesson Plan**

Overview: Students use NAO to create transition cues for a middle school classroom. Transitions should use music and be determined by a teacher's voice or touch commands to NAO.

#### Objectives:

- Students will understand the concept of transitions in terms of teaching and learning.
- Students will program NAO with at least three transition songs for use in making the following transitions:
  - Beginning of class period
  - End of class period
  - Cleaning up after and activity
  - Moving into Pairs
  - Moving into groups of 4
  - DEAR Time (Silent Reading Time)
  - Brain Break (Get up and move/stretch)
  - Others as designated by instructor
- Students will program NAO to interact with the teacher through touch or voice in order to use the transitions in a middle school classroom.

#### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 1.4 Using NAO to Create Transition Cues Activity Sheet (Teacher Version)
- Lesson 1.4 Using NAO to Create Transition Cues Activity Sheet (Student Version)
- Transitions Information Sheet
- Transitions PowerPoint

Lesson Outline:

- Lecture using the Transitions PowerPoint as students take notes and reference the Transitions Information Sheet.
- Make sure students understand the importance of transitions in education and how transitions are utilized specifically in middle school/junior high classrooms.
- Instruct students to work together in pairs or small groups to create at least three transitions which are initiated by either voice or touch commands from the teacher or students.
- Instruct students to utilize the Internet to locate music/sound clips of the appropriate length for use in transition.
- Instruct students to demonstrate their programs by cooperating with a middle school or junior high classroom to use the transitions in a real-world setting if possible. If working with a classroom isn't an option students can demonstrate their completed programs in their classroom.
- Collect and score completed Choregraphe programs.

Deliverables:

Completed Choregraphe program  
 Demonstration of completed program



Enrichment Activity:

Create a lesson plan for use in a middle school or junior high level science classroom. The lesson plan should make use of NAO and specifically, transitions using NAO's interactivity.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children's Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

## BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6-Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>





## Lesson 1.5: Music Games in Middle and High School Lesson Plan

Overview: Students program NAO to play and dance to various songs from different genres and interact with a person as he or she identifies the genre and/or performer.

### Objectives:

Students will program NAO to play different genres of music from different performers.

Students will include audio clips from at least 10 different genres of music:

- |             |                       |
|-------------|-----------------------|
| ○ Popular   | ○ Opera               |
| ○ Country   | ○ Native American     |
| ○ Jazz      | ○ Ballroom tango      |
| ○ Classical | ○ Ballroom paso doble |
| ○ Rock      | ○ Ballroom salsa      |
| ○ Hip-hop   | ○ Gospel              |
| ○ Blues     | ○ Military march      |
| ○ Bluegrass | ○ Big Band            |
| ○ Folk      | ○ Others              |

Students will program NAO to dance or move to the different clips.

Students will program NAO to play a game in which NAO asks the listener to identify either the artist or genre of music.

### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 1.5 Music Games in Middle and High School Activity Sheet (Teacher Version)
- Lesson 1.5 Music Games in Middle and High School Activity Sheet (Student Version)
- Music Games Information Sheet
- Music Games PowerPoint
- Logic Flow Worksheet

Lesson Outline:

- Distribute the Music Games Information Sheet and lecture using the Music Game PowerPoint.
- Instruct students to take note of any new programming questions.
- Distribute the Logic Flow worksheet. Review the process of creating a logical programming flow.
- Instruct students to work with a partner to create a logic flow for programming the game.
- Students need to consider how users will access the game and how NAO will ask questions and “play” the game.
- Review the Logic Flow worksheet and answer any questions before students begin programming.
- Instruct students to work in pairs to create a game program in which NAO plays a clip of music and then quizzes the listener on the genre or artist.
- Collect and score students’ completed programs.



Deliverables:

Completed Logic Flow

Completed Choregraphe program. Enrichment Activity:

Write a paper to explain the concept of using play, music, and motion to improve learning and knowledge retention. The paper should include a thesis statement and follow MLA formatting and be at least 4 pages in length with a Works Cited pages.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children’s Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

## BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6- Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.



## Lesson 1.6: Music Appreciation at the High School Level Lesson Plan

Overview: Students program NAO to play and move to various songs from different operas and interacts with a person as he or she identifies the opera, time period, and/or Composer of the piece.

### Objectives:

Students will program NAO to play different segments from famous operas.

Students will include audio clips from at least 10 different clips from at least 5 different operas:

- Fidelio
- Don Giovanni
- William Tell
- The Flying Dutchman
- The Damnation of Faust
- Macbeth
- The Merry Wives of Windsor
- Rigoletto
- Faust
- Carmen
- Madama Butterfly
- L'Orfeo
- Le Nozze di Figaro (The Marriage of Figaro)
- Il Barbiere di Siviglia (The Barber of Seville)
- La Traviotta ○ Don Carlos
- La Boheme
- Tristan and Isolde
- Porgy and Bess
- La Grande Macabre

Students will program NAO to move to the different clips.

Students will program NAO to play a game in which NAO asks the listener to identify either the Opera, time period, or Composer based on the audio clip.

### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 1.6 Music Appreciation at the High School Level Activity Sheet (Teacher Version)
- Lesson 1.6 Music Appreciation at the High School Level Activity Sheet (Student Version)
- Information Sheets from previous Unit 1 lessons, if needed
- PowerPoint presentations from previous Unit 1 lessons, if needed
- Unit 1 Post Test
- Unit 1 Post Test ANSWER KEY

Lesson Outline:

- Distribute Learning with Music Unit Posttest.
- Allow students to complete Posttest.
- Collect and score pre-tests.
- Review the programming objective with students. Students are to program NAO to play a similar game to that in Lesson 1.5. Answer student questions and highlight programming issues.
- Instruct students to program NAO to play a game in which students identify the Opera, time period or composer of an audio clip.
- Demonstrate the game with classmates or in other classrooms.
- Collect and score completed Choregraphe programs.

Deliverables:

- Unit 1 Posttest
- Completed Choregraphe program

Enrichment Activity:

Program several NAO robots to sing the same 3-4 songs in unison. Present a choir-style performance for a group of preschool or pre-kindergarten students.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

KIDiddles: Children's Songs with Lyrics <http://www.kididdles.com/lyrics/s124.html>

Songs for Teaching <http://www.songsforteaching.com/preschoolkindergarten.htm>

## BOOKS

*The Complete Book and CD Set of Rhymes, Songs, Poems, Fingerplays, and Chants* (Complete Book Series) [Paperback] by Jackie Silberg and Pam Schiller

*Little Hands Fingerplays & Action Songs: Seasonal Rhymes & Creative Play for 2- To 6- Year-Olds* (Williamson Little Hands Book) [Paperback] by Emily Stetson and Vicky Congdon

## VIDEO

NAO Developer Program – subscription channel on YouTube  
<http://www.youtube.com/user/ObjJerome/videos?view=0>

NAO TV – subscription channel on YouTube  
<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>

## Unit 2 Science

### Lesson 2.1: Teaching Colors in Early Childhood Lesson Plan

Overview: Students create a program in which NAO uses object recognition to say the colors of cards as children display them.

Objectives:

Students will program NAO to say color words as cards with specific colors are displayed.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 2 Pre-test
- Unit 2 Pre-test ANSWER KEY
- Lesson 2.1 Teaching Colors in Early Childhood Activity Sheet (Teacher Version)
- Lesson 2.1 Teaching Colors in Early Childhood Activity Sheet (Student Version)
- Constructions Paper or Cardstock in different colors
- Teaching Colors through Object Recognition Information Sheet
- Teaching Colors through Object Recognition PowerPoint
- Design Critique and Suggestions Worksheet

Lesson Outline:

- Distribute the Unit 2 Pre-tests.
- Collect and score completed pre-tests.
- Lecture using the Teaching Colors through Object Recognition PowerPoint while students reference the Teaching Colors through Object Recognition Information Sheet.
- Refer students to pages 119-129 of *An Introduction to Robotics with NAO* digital textbook for more information on object recognition.
- Instruct students (working individually or in teams) to program NAO to recognize different colors using construction paper and/or cardstock in different colors. \*\*A variation would be to print the color word on the card or construction paper and incorporate that into the object recognition programming.
- Instruct students to utilize Vision Reco with a larger program with game-style interaction for children to learn colors and test color recognition. The program should include interaction in which NAO asks children to play, provides instructions, and gives feedback on each answer. (For example, NAO could ask the child to help him learn his colors by showing him a card and making sure he gets it right. To end the interaction the programming could include a For box to keep track of the count of cards and after a set number NAO could ask children how he’s doing and whether or not he needs more practice. Based on students’ answers he could continue “playing” or could thank children for helping him learn his colors and say good-bye.)
- Set up a sharing session for students to share their programs with other students or teams.
- Instruct students to critique programs and provide constructive feedback using the Design Critique and Suggestions worksheet.



- Collect and score students' Design Critique and Suggestions worksheets.
- Score students completed Choregraphe programs.
- If possible, set up a session with a pre-school class in your district or another location in the community with 3-5 year olds to allow students to use their programs in the field.

#### Deliverables:

- Unit 2 Pre-test
- Completed Choregraphe program
- Demonstration of completed program

#### Enrichment Activity:

Write a children's book for NAO to "read" to young children. The book should incorporate NAO's object recognition capabilities to interact with children specifically by asking them to help him recognize a color or color word. For example, NAO could "read" a story and at certain point ask children to provide the correct color before continuing to the next page. This will require not only a written book but also programming to accompany the book.

#### Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

NAO Recognizes Colors [http://www.youtube.com/watch?v=P-TYhFVq3\\_s](http://www.youtube.com/watch?v=P-TYhFVq3_s)

Robot App Store <http://www.robotappstore.com/Pages/Robot.aspx?Robot=NAO>

#### BOOKS

*Rise and Shine: A Practical Guide for the Beginning Science Teacher* By Linda Froschauer, Mary L. Bigelow

*Rubrics for Assessing Student Achievement in Science Grades K-12* By Hays B. Lantz, Jr.

*50 Terrific Science Experiments* By Elaine Wood, Pam Walker, Pamela J. Walker

*Students and research: Practical strategies for science classrooms and competitions.* By Cothron, J. H., Giese, R. N., & Rezba, R. J.



## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



## Lesson 2.2: Teaching Colors in Early Childhood, Part 2 Lesson Plan

**Overview:** Students create a program in which NAO displays a color with his LEDs and uses voice recognition to tell students whether or not they have named the correct color.

### Objectives:

Students will program NAO to display colors using LEDs and then recognize whether or not a student has named the correct color.

### Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*



### \*Enrichment Activity

#### Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 2.2 Teaching Colors in Early Childhood, Part 2 Activity Sheet (Teacher Version)
- Lesson 2.2 Teaching Colors in Early Childhood, Part 2 Activity Sheet ( (Student Version)
- Teaching Colors Using LEDs and Voice Interaction Information Sheet
- Teaching Colors Using LEDs and Voice Interaction PowerPoint

#### Lesson Outline:

- Lecture using the Teaching Colors Using LEDs and Voice Interaction PowerPoint as students refer to the Teaching Colors Using LEDs and Voice Interaction Information Sheet.
- Review the process of using voice interaction as well as LEDs on the ears and eyes.
- Instruct students to create a game-style interaction to use with children to quiz on color recognition.
- Arrange time for students to utilize the program with students in a real classroom, if possible. If this isn't possible, have students review each other's programs and offer suggestions for improvement.
- Utilize the process of creating the color recognition program as an opportunity to review the design process by allowing students to re-design their programs based on feedback from users.
- Collect and score students' completed Choregraphe programs.

#### Deliverables:

- Completed Choregraphe program
- Demonstration of completed program

#### Enrichment Activity:

Create a children's story that makes use of NAO's LEDs and this color recognition program to continue the story with young children. For instance, NAO can flash his LEDs and wait for the correct response from the group before continuing. This activity would require a book as well as a completed Choregraphe program.

#### Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>



Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

NAO Recognizes Colors [http://www.youtube.com/watch?v=P-TYhFVq3\\_s](http://www.youtube.com/watch?v=P-TYhFVq3_s)

Robot App Store <http://www.robotappstore.com/Pages/Robot.aspx?Robot=NAO>

## BOOKS

*Rise and Shine: A Practical Guide for the Beginning Science Teacher* By Linda Froschauer, Mary L. Bigelow

*Rubrics for Assessing Student Achievement in Science Grades K-12* By Hays B. Lantz, Jr.

*50 Terrific Science Experiments* By Elaine Wood, Pam Walker, Pamela J. Walker

*Students and research: Practical strategies for science classrooms and competitions.* By Cothron, J. H., Giese, R. N., & Rezba, R. J.

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



### Lesson 2.3: Water Cycle for Elementary Lesson Plan

Overview: Students program NAO to say the water cycle with motions to help students remember each stage.

Objectives:

- Students learn the stages of the water cycle.
- Students program NAO to say the water cycle with motions.
- Students program NAO to teach the water cycle to middle school students using the spoken water cycle and motions.

Common Core Standards:

**11-12.RST.3**: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4**: Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9**: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10**: By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3**: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4**: Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10**: By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4**: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6**: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4**: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 2.3 Water Cycle for Elementary Activity Sheet (Teacher Version)
- Lesson 2.3 Water Cycle for Elementary Activity Sheet (Student Version)
- Water Cycle Information Sheet
- Water Cycle PowerPoint

Lesson Outline:

- Lecture using the Water Cycle PowerPoint as students refer to the Water Cycle Information Sheet.
- Instruct students to program NAO to do the movements and sing the Water Cycle song.
- Demonstrate the completed song program.
- Instruct students to program NAO to breakdown the motions and Water Cycle song to teach it to students with the help of a classroom teacher. Programming should include audio, movements, and interactions. For example, NAO should say or sing the water cycle, perform the motions, and interact with the classroom teacher to teach each part of the water cycle. Consider creating script for the teacher and NAO to help keep programming in line.
- Have students demonstrate completed programs by playing the role of the teacher.
- Collect and score student’s completed Choregraphe programs.

Deliverables:

- Completed Choregraphe program
- Demonstration of completed program

Enrichment Activity:

Create an elementary level lesson plan and supplemental materials for use in teaching the water cycle. Supplemental materials include worksheets, information sheets, graphics, and other materials as needed.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.



<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

NAO Recognizes Colors [http://www.youtube.com/watch?v=P-TYhFVq3\\_s](http://www.youtube.com/watch?v=P-TYhFVq3_s)

Robot App Store <http://www.robotappstore.com/Pages/Robot.aspx?Robot=NAO>

## BOOKS

*Rise and Shine: A Practical Guide for the Beginning Science Teacher* By Linda Froschauer, Mary L. Bigelow

*Rubrics for Assessing Student Achievement in Science Grades K-12* By Hays B. Lantz, Jr.

*50 Terrific Science Experiments* By Elaine Wood, Pam Walker, Pamela J. Walker

*Students and research: Practical strategies for science classrooms and competitions.* By Cothron, J. H., Giese, R. N., & Rezba, R. J.

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>





## Lesson 2.4: Designing an Experiment in Middle School Lesson Plan

Overview: Students design an experiment to test the sensitivity of NAO's voice recognition.

Objectives:

Students design an experiment to test the sensitivity of NAO's voice recognition sensors. Students write up their experimental design including the process of testing and how data will be collected and analyzed.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choreographe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 2.4 Designing an Experiment Middle School Activity Sheet (Teacher Version)
- Lesson 2.4 Designing an Experiment Middle School Activity Sheet (Student Version)
- Designing an Experiment PDF
- Designing an Experiment PowerPoint

Lesson Outline:

- Lecture using the Designing an Experiment Information Sheet as students refer to the Designing an Experiment PowerPoint.
- Discuss the experimental design process with the class and answer any questions students might have.
- Instruct students to design an experiment to test the sensitivity and/or accuracy of NAO's voice recognition.
- Instruct students to write up their experimental design.
- Review the experiments as a class.
- Instruct students to revise their designs based on the discuss.
- Instruct students to conduct their experiments and collect data.
- Instruct students to write up their final experimental reports and submit for scoring.
- Discuss how this type of lesson could be used in a middle school classroom to teach the basics of experimental design.
- Instruct students to create a worksheet (and corresponding answer key) for use by a teacher in a middle school classroom. The worksheet should provide a guide to designing an experiment for users.
- Collect and score the worksheets and answer keys.

Deliverables:

- Final experimental reports
- Worksheets for use by middle school teachers

Enrichment Activity:

Create a flyer or brochure explaining the sensitivity and accuracy of NAO's voice recognition sensors. Incorporate data into the flyer to explain how well the sensors work.



### Additional Resources:

#### INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

NAO Recognizes Colors [http://www.youtube.com/watch?v=P-TYhFVq3\\_s](http://www.youtube.com/watch?v=P-TYhFVq3_s)

Robot App Store <http://www.robotappstore.com/Pages/Robot.aspx?Robot=NAO>

#### BOOKS

*Rise and Shine: A Practical Guide for the Beginning Science Teacher* By Linda Froschauer, Mary L. Bigelow

*Rubrics for Assessing Student Achievement in Science Grades K-12* By Hays B. Lantz, Jr.

*50 Terrific Science Experiments* By Elaine Wood, Pam Walker, Pamela J. Walker

*Students and research: Practical strategies for science classrooms and competitions.* By Cothron, J. H., Giese, R. N., & Rezba, R. J.

#### VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



## Lesson 2.5: Designing an Experiment in High School Lesson Plan

Overview: Students design and conduct an experiment to test the accuracy of NAO's object recognition sensors and software.

Objectives:

Students design an experiment to test the sensitivity of NAO's object recognition sensors. Students write up their experimental design including the process of testing and how data was collected and analyzed.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 2 Post Test
- Unit 2 Post Test ANSWER KEY
- Lesson 2.5 Designing an Experiment in High School Activity Sheet (Teacher Version)
- Lesson 2.5 Designing an Experiment in High School Activity Sheet (Student Version)

Lesson Outline:

- Distribute the Unit 2 Posttests.
- Collect and score the completed Posttests.
- Discuss the experimental design process with the class and answer any questions students might have. The process is the same whether implemental at the middle school or high school level. Discuss how students might expect experiments to be different at the high school level. For example, the data analysis might utilize more advanced math skills or the experimental process might be more detailed or experiments might have more than one dependent variable.
- Instruct students to design an experiment to test the sensitivity and/or accuracy of NAO's object recognition. Students could test several different aspects of object recognition – NAO marks, 2D objects, 3D objects, or faces.
- Instruct students to write up their experimental design.
- Review the experiments as a class.
- Instruct students to revise their designs based on the discussion.
- Instruct students to conduct their experiments and collect data.
- Instruct students to write up their final experimental reports and submit for scoring.
- Discuss how this type of lesson could be used in a high school classroom to extend understanding of experimental design.
- Discuss how experimental design and engineering design are connected.
- Instruct students to create a worksheet (and corresponding answer key) for use by a teacher in a high school classroom. The worksheet should compare and contrast experimental design and the engineering design process.
- Collect and score the worksheets and answer keys.



Deliverables:

- Unit 2 Post Test
- Final write up Experimental Design
- High school worksheet and answer key

Enrichment Activity:

Design an activity using NAO to teach engineering design. The activity materials should include worksheets, lesson plans, information sheets, and resources for both teachers and students.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

NAO Recognizes Colors [http://www.youtube.com/watch?v=P-TYhFVq3\\_s](http://www.youtube.com/watch?v=P-TYhFVq3_s)

Robot App Store <http://www.robotappstore.com/Pages/Robot.aspx?Robot=NAO>

## BOOKS

*Rise and Shine: A Practical Guide for the Beginning Science Teacher* By Linda Froschauer, Mary L. Bigelow

*Rubrics for Assessing Student Achievement in Science Grades K-12* By Hays B. Lantz, Jr.

*50 Terrific Science Experiments* By Elaine Wood, Pam Walker, Pamela J. Walker

*Students and research: Practical strategies for science classrooms and competitions.* By Cothron, J. H., Giese, R. N., & Rezba, R. J.

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>



Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SgIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plep>

## Unit 3 Math

### Lesson 3.1: Teaching Numbers in Early Childhood Lesson Plan

Overview: Students create a program in which NAO says the number when a card is displayed. Learners say the same number word and NAO reacts accordingly with either a “high five” or a “shaking head.”

Objectives:

Students will program NAO to identify numbers using object recognition for number cards. Students will program NAO to react to students’ voices and provide a specific response based on whether or not the number is correct.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*





**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 3 Pre-test
- Unit 3 Pre-test ANSWER KEY
- Lesson 3.1 Teaching Numbers in Early Childhood Activity Sheet (Teacher Version)
- Lesson 3.1 Teaching Numbers in Early Childhood Activity Sheet (Student Version)
- Using Object and Voice Recognition to Teach Numbers Information Sheet
- Using Object and Voice Recognition to Teach Numbers PowerPoint
- Number cards

Lesson Outline:

- Distribute the Unit 3 Pretest.
- Collect and score the completed pretests.
- Lecture using the Teaching Numbers in Early Childhood Power Point while students refer to the Teaching Numbers in Early Childhood Information Sheet. Review the specific steps needed to program NAO to interact with a high five or by shaking its head and answer any programming questions.
- Instruct students to create a program in which NAO says the number when a card is displayed. Learners say the same number word and NAO reacts accordingly with either a “high five” or a “shaking head.”
- Provide time for students to demonstrate their completed programs.
- Collect and score completed Choregraphe programs.

Deliverables:

Completed Choregraphe program  
 Demonstration of completed program

Enrichment Activity:

Create a lesson plan for use in a middle school or junior high level science classroom. The lesson plan should make use of NAO and specifically, transitions using NAO's interactivity.



Additional Resources:

## INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library for Mathematics

[http://www.awesomelibrary.org/Classroom/Mathematics/Elementary\\_School\\_Math/Elementary\\_School\\_Math.html](http://www.awesomelibrary.org/Classroom/Mathematics/Elementary_School_Math/Elementary_School_Math.html)

## BOOKS

*Math Games: 180 Reproducible Activities to Motivate, Excite, and Challenge* By Judith A. Muschla, Gary Robert Muschla

*Math Wise! Over 100 Hands-On Activities that Promote Real Math Understanding* By James L. Overholt, Laurie Kincheloe

*Hands-On Math Projects With Real-Life Applications: Grades 6-12* By Judith A. Muschla, Gary Robert Muschla

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



### Lesson 3.2: Teaching Basic Math Facts in Elementary Lesson Plan

Overview: Students program NAO to quiz elementary students on basic math facts in addition, subtraction, multiplication, and division.

Objectives:

- Students will program NAO to quiz elementary students on addition facts.
- Students will program NAO to quiz elementary students on subtraction facts.
- Students will program NAO to quiz elementary students on multiplication facts.
- Students will program NAO to quiz elementary students on division facts.
- Students will program NAO to select the appropriate quiz based on a student's feedback through voice or touch.

Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*



**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choreographe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 3.2 Teaching Basic Math Facts in Elementary Activity Sheet (Teacher Version)
- Lesson 3.2 Teaching Basic Math Facts in Elementary Cues Activity Sheet (Student Version)
- Math Box Functions Information Sheet
- Math Box Functions PowerPoint
- Brainstorming Worksheet (optional)
- Design Critique and Suggestions Worksheet

Lesson Outline:

- Lecture using the Math Box Functions PowerPoint and Information Sheet.
- Instruct students to explore the math box functions for multiply and divide and create a couple of simple program flows using these functions.
- Group students in teams of 2-4 students.
- Instruct students to brainstorm ways to program NAO to help elementary students learn math facts for addition, subtraction, multiplication, and division. Students should record their ideas and discuss the basic logic flow of at least one of the ideas.
- Discuss the ideas of each group as a class. Work through the logic of a couple of ideas to continue to solidify the process for students.
- Instruct students to work together to create a program for NAO to help students learn math facts. Students can tackle this as four separate programs or as one large program with all four options. Students could use voice interaction or object interaction with flash cards or some combination of the two. For example, students could use flash cards for the addition and subtraction facts by having the learner show NAO a flash card and programming NAO through object recognition to answer the problem. For multiplication and division students could use voice recognition combined with the multiply or divide boxes to answer problems.
- Review students' logic flows or programming plans along the way. While you may not want to formally require a logic flow be submitted for scoring you will want to have intermediate check points with students to review their plans and help identify challenges.



- Provide ample time for students to work through this challenge.
- Provide time for students to share and critique programs and to provide suggestions for improvement. Students may use the Design Critique and Suggestions Worksheet.
- Evaluate programs by meeting with each team concurrently to the teams evaluating each other's programs. Provide your own suggestions for improvement.
- Provide time for resign.
- Provide time for students to demonstrate the completed programs with the class.
- Collect and score completed Choregraphe programs.

#### Deliverables:

- Design Critique and Suggestions Worksheet (optional) Completed Choregraphe program
- Demonstration of completed program

#### Enrichment Activity:

Create a design notebook documenting the process of designing this interaction. Include brainstorming ideas, logic flows, first programming attempt, design suggestions, subsequent designs, and the final program. Throughout the notebook provide explanations of challenges and solutions. Include pictures and programming code examples as appropriate.

#### Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library for Mathematics

[http://www.awesomelibrary.org/Classroom/Mathematics/Elementary\\_School\\_Math/Elementary\\_School\\_Math.html](http://www.awesomelibrary.org/Classroom/Mathematics/Elementary_School_Math/Elementary_School_Math.html)

#### BOOKS

*Math Games: 180 Reproducible Activities to Motivate, Excite, and Challenge* By Judith A. Muschla, Gary Robert Muschla

*Math Wise! Over 100 Hands-On Activities that Promote Real Math Understanding* By James L. Overholt, Laurie Kincheloe

*Hands-On Math Projects With Real-Life Applications: Grades 6-12* By Judith A. Muschla, Gary Robert Muschla



## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



10. *Evaluate programs by meeting with each team concurrently to the teams evaluating each other's programs. Provide your own suggestions for improvement.*
11. *Provide time for redesign.*
12. Demonstrate the completed programs to the class.
13. Submit your completed Choregraphe program(s) for scoring.

**Deliverables**

- Design Critique and Suggestions Worksheet (optional) Completed Choregraphe program
- Demonstration of completed program



### Lesson 3.3: Adding and Subtracting Integers in Middle School Lesson Plan

Overview: Students program NAO to demonstrate the addition and subtraction of integers using a “walk-on” number line.

Objectives:

Students will program NAO to add integers using a walk-on number line.

Students will program NAO to subtract integers using a walk-on number line. Common

Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*





**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 3.3 Adding and Subtracting Integers Activity Sheet (Teacher Version) x  
Lesson 3.3 Adding and Subtracting Integers Activity Sheet (Student Version) x  
Integers Information Sheet
- Integers PowerPoint
- Walk-on Number Line Worksheet

Lesson Outline:

- Lecture using the Integers PowerPoint as students refer to the Integers Information Sheet.
- Instruct students to complete the Walk-on Number Line Worksheet working with at least one other person.
- Discuss the activity as a class. Brainstorm ways the activity could be completed using NAO. For example, NAO could be programmed to interact based on voice commands to complete integer addition and subtraction or NAO could perform each part of an integer addition or subtraction problem and ask learners to provide answers along the way.
- Instruct students to program NAO to perform an interactive version of the Walk-on Number Line Activity with middle school learners. The program should be performed in a game-based style with interaction and feedback throughout. Students have used the programming skills needed for this activity in other activities to this point. Movement, object recognition, voice recognition, and conditionals. You may want to review the use of NAOMarks and touch sensor interactions as these could be used in meeting this challenge.
- Instruct students to share programs with other teams. Students should critique the design and provided feedback for improvement.
- Instruct students to re-design/revise programming based on feedback.
- Provide time for students to demonstrate completed programs.
- Collect and score completed Choregraphe programs.

Deliverables:

- Completed Choregraphe program
- Demonstration of completed program

Enrichment Activity:

Create a program for another math game/skill to use with middle school students. Create a Teacher's Guide to accompany the program. The guide should include a narrative description of the program, graphics/drawings if needed, instructions/rules of play suitable for distributing to students, and a worksheet or other assessment tool.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library for Mathematics

[http://www.awesomelibrary.org/Classroom/Mathematics/Elementary\\_School\\_Math/Elementary\\_School\\_Math.html](http://www.awesomelibrary.org/Classroom/Mathematics/Elementary_School_Math/Elementary_School_Math.html)

BOOKS

*Math Games: 180 Reproducible Activities to Motivate, Excite, and Challenge* By Judith A. Muschla, Gary Robert Muschla

*Math Wise! Over 100 Hands-On Activities that Promote Real Math Understanding* By James L. Overholt, Laurie Kincheloe

*Hands-On Math Projects With Real-Life Applications: Grades 6-12* By Judith A. Muschla, Gary Robert Muschla

VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



### Lesson 3.4: Using Algebra and Trigonometry Lesson Plan

Overview: Students review algebra and trigonometry concepts. Students identify an activity in which students learn algebra and trigonometry while working with NAO. Students create a set of materials including lesson plans, worksheets, and so forth.

Objectives:

Students will utilize algebra and trigonometry skills to program NAO's movements.  
Students will create a quick reference card to help students learn how to calculate x-parameters and Theta values.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 3 Posttest
- Unit 3 Posttest ANSWER KEY
- Lesson 3.4 Using Algebra and Trigonometry Activity Sheet (Teacher Version)
- Lesson 3.4 Using Algebra and Trigonometry Activity Sheet (Student Version)
- Turning Trigonometry Information Sheet (from Basic Programming)
- Turning Trigonometry PowerPoint (from Basic Programming)
- Turning Trigonometry Worksheet (from Basic Programming)
- Turning Trigonometry Worksheet ANSWER KEY (from Basic Programming)

Lesson Outline:

- Distribute the Unit 3 Post Test.
- Collect and score the completed post tests.
- Lecture using the Turning Trigonometry PowerPoint as students refer to the Turning Trigonometry Information Sheet. These are both from the Basic Programming course. So, if students have completed that course previously this will be a review, however, the trigonometry and algebra skills are one which most students need reinforced.
- Instruct students to complete the Turning Trigonometry Worksheet. Again, if students completed the Basic Programming course this will be a review of skills.
- Collect and score worksheet.
- Discuss the math skills you have reviewed at this point with the class. Make sure students have an understanding of the algebra and trig needed.
- Brainstorm activities which could be created to teach these skills to high school students using NAO. For example, a scavenger hunt activity could be used to teach students to calculate the x-parameter and Theta values to make NAO move to a specific place. Another example might be an obstacle course or a bomb removal scenario. Discuss all these options with the class and others students come up with while brainstorming.
- Instruct students to select one of the activities you came up with as a class and create an activity for high school students to utilize the algebra and trigonometry skills you reviewed. Students should create a lesson plan and any other materials (worksheets, PowerPoints, any programming needed, etc.) needed for completing the activity.



- Instruct students to exchange lesson materials with another team and complete the team's activity. Students should provide suggestions for improvement of the activity and/or materials as well as correction of grammar, spelling, and/or formatting.
- Answer any questions students may have.
- Instruct students to make any changes before submitting the project for scoring.
- Collect and score activity materials.

#### Deliverables:

Turning Trigonometry worksheet  
Algebra and Trigonometry Lesson Materials

#### Enrichment Activity

Create a brochure marketing NAO as a math tutor for all ages. Highlight NAO's ability to teach students basic concepts, quiz math facts, teach Integers, and work with higher-level math skills.

#### Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library for Mathematics

[http://www.awesomelibrary.org/Classroom/Mathematics/Elementary\\_School\\_Math/Elementary\\_School\\_Math.html](http://www.awesomelibrary.org/Classroom/Mathematics/Elementary_School_Math/Elementary_School_Math.html)

#### BOOKS

*Math Games: 180 Reproducible Activities to Motivate, Excite, and Challenge* By Judith A. Muschla, Gary Robert Muschla

*Math Wise! Over 100 Hands-On Activities that Promote Real Math Understanding* By James L. Overholt, Laurie Kincheloe

*Hands-On Math Projects with Real-Life Applications: Grades 6-12* By Judith A. Muschla, Gary Robert Muschla

#### VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube



<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



8. Exchange lesson materials with another team and complete the team's activity. Provide suggestions for improvement of the activity and/or materials as well as correction of grammar, spelling, and/or formatting.
9. *Answer any questions students may have.*
10. Make any changes before submitting the project for scoring.
11. Submit activity materials for scoring.

**Deliverables**

Turning Trigonometry worksheet  
Algebra and Trigonometry Lesson Materials



## Unit 4 Social Studies

### Lesson 4.1: My Community for Early Childhood Lesson Plan

Overview: Students program NAO to recognize specific people within the community, to tell children about the jobs those people do, and to ask children to identify community members who perform a specific job.

Objectives:

- Students program NAO to recognize community members based on pictures.
- Students program NAO to tell young children about the community member.
- Students program NAO to ask students to identify the community member who does a certain job by holding up the picture of that person.

Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 4 Pre-test
- Unit 4 Pre-test ANSWER KEY
- Lesson 4.1 My Community in Early Childhood Activity Sheet (Teacher Version)
- Lesson 4.1 My Community in Early Childhood Activity Sheet (Student Version)
- Picture Cards of Community Members
- My Community Information Sheet
- My Community PowerPoint

Lesson Outline:

- Distribute the Unit 4 Pretest.
- Collect and score the completed pretests.
- Lecture using the My Community PowerPoint as students refer to the My Community Information Sheet.
- Discuss the importance of children in early childhood learning about community members and their specific jobs.
- Instruct students to program NAO to recognize community members based on pictures.
- Instruct students to program NAO to tell young children about different community members.
- Instruct students to program NAO to ask children to identify a community member who does a certain job by holding up the picture of that person.
- Collect and score the three completed programs.

Deliverables:

- Unit 4 Pre-test
- Completed Choregraphe program – Community Member recognition
- Completed Choregraphe program – Tell me More about Community Members

- Completed Choregrpahe program – Identify Who Does a Specific Job
- Demonstration of completed programs

#### Enrichment Activity:

Create a picture book of community members performing their respective jobs within the community. Program NAO to “read” the book to students either alone or working with a teacher, adult, or older student. Video NAO reading to students in an early childhood classroom, if possible.

#### Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library – Social Studies

[http://www.awesomelibrary.org/Library/Materials\\_Search/Lesson\\_Plans/Social\\_Studies.html](http://www.awesomelibrary.org/Library/Materials_Search/Lesson_Plans/Social_Studies.html)

Best of History <http://www.besthistorysites.net/>

Thinkfinity <http://www.thinkfinity.org/welcome>

#### BOOKS

*Differentiation Strategies for Social Studies, Grades K-12: Social Studies* By Wendy Conklin

*Social Studies Worksheets Don't Grow Dendrites: 20 Instructional Strategies* By Marcia L. Tate

*America's History Through Young Voices: Using Primary Sources In The K-12 Social Studies Classroom* by Richard Wyman

#### VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>



Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



## Lesson 4.2: The Capitals in Elementary Lesson Plan

Overview: Students program NAO to quiz students on the capitals of the United States using the state name. Create a second program to ask students to name the capitals based on information other than the state name.

### Objectives:

Students program NAO to play a game with elementary students to quiz them on the capitals of the United States.

Students program NAO to ask students to name state capitals based on information other than the state name.

### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choreographe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 4.2 The Capitals in Elementary Activity Sheet (Teacher Version)
- Lesson 4.2 The Capitals in Elementary Activity Sheet (Student Version)
- The Capitals Information Sheet
- Capitals PowerPoint

Lesson Outline:

- Lecture using the Capitals PowerPoint as students refer to The Capitals Information Sheet.
- Discuss with students at what age they learned the state capitals and what they did to accomplish that goal. Most students probably used flash cards or maps or some other standard memorization technique. Some students may have used a song or mnemonic. Discuss ways NAO could help students learn capitals.
- Instruct students to program NAO to quiz students using state names. Students should name the capital when NAO asks about a state. NAO should provide corrective feedback in order to help students learn the correct capitals. Depending upon the size of your class and your time constraints you might choose to have students work in groups and program specific regions. For example, one group could take the New England states, a second group could take the mid-Atlantic region, another the Southeast, and so forth. You could be creative and break the groups/states by NCAA conferences or decade of statehood or states with similar state birds or other method.
- Review programs as groups work.
- Provide time for groups to share programs.
- Collect and score programs.
- Instruct students to create a program in which NAO quizzes learners on state capitals based on information other than the state's name such as state nickname, date of statehood, mascot of an NCAA team within the state, famous native of the state and or other piece of information.
- Review programs as students work.
- Provide time for groups to share programs.
- Collect and score completed programs.

Deliverables:

- Completed Choregraphe program – State Name quiz
- Completed Choregraphe program – Other State Information quiz
- Demonstration of completed programs

Enrichment Activity:

Prepare NAO to function as a tour guide for the city. NAO should discuss the city's history, nickname, fun things to do, and other information which might make someone want to visit the city. NAO should use movements and sound effects to make the information interesting and entertaining. Program NAO to respond to frequently asked questions about the city which might arise after the "tour." Prepare NAO to give general responses when a question is asked for which the robot does not have a pre-programmed answer.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library – Social Studies

[http://www.awesomelibrary.org/Library/Materials\\_Search/Lesson\\_Plans/Social\\_Studies.html](http://www.awesomelibrary.org/Library/Materials_Search/Lesson_Plans/Social_Studies.html)

Best of History <http://www.besthistorysites.net/>

Thinkfinity <http://www.thinkfinity.org/welcome>

## BOOKS

*Differentiation Strategies for Social Studies, Grades K-12: Social Studies* By Wendy Conklin

*Social Studies Worksheets Don't Grow Dendrites: 20 Instructional Strategies* By Marcia L. Tate

*America's History Through Young Voices: Using Primary Sources In The K-12 Social Studies Classroom* by Richard Wyman



## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



**Deliverables**

- Completed Choregraphe program – State Name quiz
- Completed Choregraphe program – Other State Information quiz
- Demonstration of completed programs





### Lesson 4.3: World Geography in Middle School Lesson Plan

Overview: Students program NAO to quiz students on world capitals, countries, and continents.

Objectives:

- Students program NAO to interact with students to learn more about world capitals by asking students to select a capital to learn more.
- Students program NAO to quiz students on the continents.
- Students program NAO to quiz students on the world capitals of high-profile countries on each continent.
- Students create a guide for middle school students to use in programming NAO to help them deliver a presentation on a selected world capital.

Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*



**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 4.3 World Geography in Middle School Activity Sheet (Teacher Version)
- Lesson 4.3 World Geography in Middle School Activity Sheet (Student Version)
- World Geography Information Sheet
- World Geography PowerPoint

Lesson Outline:

- Lecture using the World Geography PowerPoint as students refer to the World Geography Information Sheet.
- Instruct students to create three programs for NAO to help middle school students strengthen their world geography skills:
- Program 1: Select four world capitals and create a program in which NAO interacts with learners to teach them about one or more capitals.
- Program 2: Create a program in which NAO teaches students about the seven continents and then quizzes students over the information.
- Program 3: Select at least 10 countries and create a program in which NAO teaches learners about each of the country's capital city and then quizzes learners to assess their understanding.
- Provide time for students to share and critique programs and provide suggestions for improvements to classmates.
- Collect and score all three programs.
- Discuss how a middle school student could create his or her own presentation on a world capital and use NAO as a presentation partner. Ask students to consider what types of support materials students might need in order to be successful.
- Instruct students to create a guide for middle school students to use in creating a presentation on a world capital and in using NAO as a presentation partner. Students could create an example program with pre-set interaction points and then provide step-by-step instruction on how to enter speech scripts for NAO and wait times for the programming. Alternately, students might want to create a programming guide with pictures and instructions to guide middle school students through the process of programming NAO.



- Review students' projects throughout the process.
- Provide time for students to evaluate and critique each other's work.
- Instruct students to present their solution for the challenge of guiding middle school students through using NAO as a presentation partner.
- Collect and score completed guides.

Deliverables:

- Completed Choregraphe Program 1
- Completed Choregraphe Program 2
- Completed Choregraphe Program 3
- Demonstration of completed programs Presentation/Discussion of Guide Solution
- Completed Guide for Middle School students

Enrichment Activity:

Write a book about NAO travelling the world and create an program for NAO to interact with specific points as the book is read aloud. For example, when reading about a time NAO was riding the subway, NAO can provide a sound effect or music clip and then “jump in” to tell a story. The idea would be to create the feeling that NAO is actively listening to the book and providing commentary.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library – Social Studies

[http://www.awesomelibrary.org/Library/Materials\\_Search/Lesson\\_Plans/Social\\_Studies.html](http://www.awesomelibrary.org/Library/Materials_Search/Lesson_Plans/Social_Studies.html)

Best of History <http://www.besthistorysites.net/>

Thinkfinity <http://www.thinkfinity.org/welcome>

**BOOKS**

*Differentiation Strategies for Social Studies, Grades K-12: Social Studies* By Wendy Conklin



*Social Studies Worksheets Don't Grow Dendrites: 20 Instructional Strategies* By Marcia L. Tate

*America's History Through Young Voices: Using Primary Sources In The K-12 Social Studies Classroom* by Richard Wyman

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



## Lesson 4.4: Using NAO to Teach History in High School Lesson Plan

Overview: Students select a famous historical speech and use NAO to recreate the speech with NAO's speech functionality or by playing an audio recording of the actual speech. NAO should also incorporate movement to complement the speech. Students also include an introduction to the speech and a question and answer wrap-up conducted by NAO with listeners after the speech.

### Objectives:

- Students will select and research a famous historical speech:
  - The Gettysburg Address
  - The I Have a Dream Speech
  - Christmas Eve Broadcast to Earth
  - FDR Asks Congress to Declare War On Japan
  - We Shall Fight on the Beaches
  - Ain't I a Woman
  - Others...
- Students will program NAO to provide historical context and an introduction to a famous speech.
- Students will program NAO to recreate the speech with movements and if possible actual audio clips of the speech.
- Students will program NAO to complete a question and answer session with listeners after the speech is completed.

### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.



**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choreographe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 4 Posttest
- Unit 4 Posttest ANSWER KEY
- Lesson 4.4 Using NAO to Teach History Activity Sheet (Teacher Version) x Lesson  
4.4 Using NAO to Teach History Activity Sheet (Student Version) x History  
Information Sheet
- History PowerPoint

Lesson Outline:

- Distribute the Unit 4 Posttest.
- Collect and score the Unit 4 Posttest.
- Lecture using the History PowerPoint as students refer to the History Information Sheet. Discuss the impact of speeches – both great and not so great – on history with the class. Ask students to consider speeches such as Martin Luther King’s, “I Have a Dream” speech and the lasting effect of the speech today. Ask students to provide other examples of great speeches as well as examples of times when speeches had a negative effect. An example might be speeches in which the speaker made a mistake or speeches in which the content presented was not received favorably.



- Discuss why students think some speeches are more memorable than others. Discuss whether or not “great” speeches were recognized as such in the moment or if history identifies them as great after the passage of time. There are no “correct” answers for these discussions, they merely serve to get students thinking about the topic and also provide a way to introduce them to speeches with which they may not be as familiar.
- Instruct students to select a famous historical speech. Students can select from the options below or choose another speech:
  - The Gettysburg Address
  - The I Have a Dream Speech
  - Christmas Eve Broadcast to Earth
  - FDR Asks Congress to Declare War On Japan
  - We Shall Fight on the Beaches
  - Ain’t I a Woman
  - Others...
- Instruct students to research the selected speech. You may want to review students’ selections before giving the go-ahead for research.
- Instruct students to program NAO to provide historical context and an introduction for the selected speech.
- Instruct students to program NAO to recreate the speech with movements and if possible actual audio clips of the speech. Many speeches, such as “I Have a Dream,” are available online. Using the actual audio clip can be very powerful. Students should utilize NAO’s capacity for playing audio clips to their advantage.
- Instruct students to program NAO to complete a question and answer session with listeners after the speech is completed. Students should have NAO provide a wrap-up for the speech – i.e. what happened next, what impact did the speech have in the moment, what happened to the speaker, and so forth. NAO should also be prepared to answer FAQs and to provide an appropriate response to any questions for which a response hasn’t been programmed.
- Evaluate students’ programs throughout the development process. Answer questions and provide suggestions for improvement as needed.
- Provide time for each student and/or group to present their program to the class.
- Collect and score completed programs.

Deliverables:

- Completed Choregraphe program
- Demonstration of completed program

Enrichment Activity:

Write a paper in MLA format supporting why the chosen speech is either an example of a “great” speech or a “not so great” speech. The paper should be at least 5 pages in length with a minimum of 7 sources and include a Works Cited page. The paper should include quotes from the speech, but should not include the entire text of the speech. The paper should also include a personal example explaining why the speech is important/meaningful/memorable.



### Additional Resources:

#### INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Awesome Library – Social Studies

[http://www.awesomelibrary.org/Library/Materials\\_Search/Lesson\\_Plans/Social\\_Studies.html](http://www.awesomelibrary.org/Library/Materials_Search/Lesson_Plans/Social_Studies.html)

Best of History <http://www.besthistorysites.net/>

Thinkfinity <http://www.thinkfinity.org/welcome>

#### BOOKS

*Differentiation Strategies for Social Studies, Grades K-12: Social Studies* By Wendy Conklin

*Social Studies Worksheets Don't Grow Dendrites: 20 Instructional Strategies* By Marcia L. Tate

*America's History Through Young Voices: Using Primary Sources In The K-12 Social Studies Classroom* by Richard Wyman

#### VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>





## Unit 5 Language Arts

### Lesson 5.1: Story Time for Early Childhood Lesson Plan

Overview: Students select a children’s story. Students program NAO to tell the story then ask students questions about the story. Based on the student’s answer NAO can respond by acting out parts of the story again to correct or reinforce the answer

Objectives:

- Students program NAO to tell a children’s story.
- Students program NAO to ask questions about the story and respond based on a student’s response.

Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.
- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*



**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 5 Pre-test
- Unit 5 Pre-test ANSWER KEY
- Lesson 5.1 Story Time for Early Childhood Activity Sheet (Teacher Version) x Lesson 5.1 Story Time for Early Childhood Activity Sheet (Student Version) x Story Time Information Sheet
- Story Time PowerPoint

Lesson Outline:

- Distribute the Unit 5 Pre-tests.
- Collect and score completed pretests.
- Lecture using the Story Time PowerPoint as students refer to the Story Time Information Sheet.
- Provide students access to various children's books appropriate for early childhood students. Picture books, alphabet books, and story books are all appropriate.
- Instruct students to create a program using Choregraphe in which NAO reads the book to children or NAO to tell the story as the teacher holds the books up for students to see. NAO should then ask children questions about the story and based on children's answers NAO should respond by acting out parts of the story again to correct or reinforce the answer.
- Provide time for students to demonstrate the completed program for the class.
- Collect and score the completed programs.

Deliverables:

Completed Choregraphe program  
 Demonstration of completed program

Enrichment Activity:

Create an alphabet book for NAO to read and act out for learners. Program NAO to recognize specific objects corresponding to letters (selected letters or all letters) and create an interaction in



which NAO calls out a letter and responds appropriately when children produce the correct object. For example, teach NAO to recognize an apple, associate it with the letter “A” and respond positively when learners identify the object as something that starts with A.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Read, Write, Think <http://www.readwritethink.org/>

K-12 Language Arts Sites <http://ginaotto.com/languagearts.html>

Scholastic <http://www.scholastic.com/browse/article.jsp?id=3749814>

Goodreads <http://www.goodreads.com/genres/picture-books>

**BOOKS**

*Differentiation Strategies for Language Arts: Language Arts* By Wendy Conklin

*The Writing Teacher's Activity-a-Day: 180 Reproducible Prompts* By Mary Ellen Ledbetter

**VIDEO**

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



## Lesson 5.2: Vocabulary Builders for Elementary Lesson Plan

Overview: Students program NAO to quiz elementary students on vocabulary specific to a subject area or use a list of “must know” grade-level specific vocabulary words.

### Objectives:

Students select a vocabulary list based on a specific subject or from a list of must-know grade-level specific vocabulary words.

Students define the selected words.

Students program NAO to play a game with elementary students in which NAO quizzes students on the vocabulary.

### Common Core Standards:

**11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 5.2 Vocabulary Builders for Elementary Activity Sheet (Teacher Version)
- Lesson 5.2 Vocabulary Builders for Elementary Activity Sheet (Student Version)
- Vocabulary Builders Information Sheet
- Vocabulary Builders PowerPoint

Lesson Outline:

- Lecture using the Vocabulary Builders PowerPoint as students refer to the Vocabulary Builders Information Sheet.
- Instruct students to select a vocabulary list based on a specific elementary-level subject or from a list of must-know grade-level specific vocabulary words. For example, an Internet search or visit with a middle school teacher could provide a list of content specific vocabulary words or a list of grade-level must know vocabulary.
- Instruct students to define the selected words and use definitions in programming NAO for interaction with elementary students.
- Instruct students to program NAO to play a game with elementary students in which NAO quizzes students on the vocabulary.
- Provide time to demonstrate the programs.
- Collect and score completed programs.
- Instruct students to research ways to teach vocabulary. The article on the site - <http://www.edutopia.org/blog/vocabulary-instruction-teaching-tips-rebecca-alber> - is a great jumping off point for discussing ways to improve vocabulary instruction. Students should select another way to teach the same set of vocabulary words using NAO.
- Instruct students to program NAO again using the same words list and employing a different technique.
- Provide time to demonstrate the revised programs.
- Discuss the programs and compare changes.
- Collect and score completed programs.

Deliverables:

- Completed Choregraphe programs
- Demonstration of completed programs



Enrichment Activity:

Create a lesson plan for use in a middle school or junior high level science classroom. The lesson plan should make use of NAO and specifically, transitions using NAO's interactivity.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Read, Write, Think <http://www.readwritethink.org/>

K-12 Language Arts Sites <http://ginaotto.com/languagearts.html>

Scholastic <http://www.scholastic.com/browse/article.jsp?id=3749814>

Goodreads <http://www.goodreads.com/genres/picture-books>

## BOOKS

*Differentiation Strategies for Language Arts: Language Arts* By Wendy Conklin

*The Writing Teacher's Activity-a-Day: 180 Reproducible Prompts* By Mary Ellen Ledbetter

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>



### Lesson 5.3: Using NAO as a Presentation Partner in Middle School Lesson Plan

Overview: Students research a topic and write a 5-paragraph essay. Students program NAO to interact with them as they present their essay to the class or group of parents.

Objectives:

Students will research a topic.

Students will write a 5-paragraph essay supporting the thesis statement on the topic.

Students program NAO to interact with them as they present their essay to the class or group of parents.

Common Core Standards:

**11-12.RST.3**: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.

**11-12.RST.4**: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.

**11-12.RST.9**: Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.

**11-12.RST.10**: By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.

**9-10.RST.3**: Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.

**9-10.RST.4**: Determine the meaning of symbols, key terms, and other domain-specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.

**9-10.RST.10**: By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.

**W.9-10.4**: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*

**W.9-10.6**: Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

**W.11-12.4**: Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*



**W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology's capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choregraphe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Lesson 5.3 Using NAO as a Presentation Partner in Middle School Activity Sheet (Teacher Version)
- Lesson 5.3 Using NAO as a Presentation Partner in Middle School Activity Sheet (Student Version)
- Presentation Partners Information Sheet
- Presentation Partners PowerPoint

Lesson Outline:

- Lecture using the Presentation Partners PowerPoint as students refer to the Presentation Partners Information Sheet.
  - Partners Information Sheet.
- Instruct students to research a topic and write a 5-paragraph essay supporting a thesis statement on the topic. Students will use the essay as a tool for teaching middle school students to program NAO as a presentation partner using NAO's interaction capabilities.
- Instruct students to program NAO to interact with them as they present their essay to the class.
- Instruct students to review their programs with other students or groups.
- Instruct students to use their essays and programs to create a set of materials to instruct middle school students on how to create their own essay and program NAO to be their presentation partner. Materials should include at least the following:
  - Sample essay
  - Sample Choregraphe program
  - Programming Instructions with screenshots of software steps
  - Troubleshooting Tips
- Submit completed materials for scoring.

Deliverables:

Materials set for use with middle school students

Enrichment Activity:

Create a video of NAO acting as a presentation partner and share online or with other classes. The video could be incorporated into the teaching materials packet.





### Additional Resources:

#### INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Read, Write, Think <http://www.readwritethink.org/>

K-12 Language Arts Sites <http://ginaotto.com/languagearts.html>

Scholastic <http://www.scholastic.com/browse/article.jsp?id=3749814>

Goodreads <http://www.goodreads.com/genres/picture-books>

#### BOOKS

*Differentiation Strategies for Language Arts: Language Arts* By Wendy Conklin

*The Writing Teacher's Activity-a-Day: 180 Reproducible Prompts* By Mary Ellen Ledbetter

#### VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6PK&feature=plcp>



## Lesson 5.4: Multimedia Presentations in High School Lesson Plan

Overview: Students research a topic and write a research paper based on the standards established by the high school English department. Students program NAO to present the research paper with motions, sound effects, and audio clips. Students will also program NAO to respond to specific questions provided by the teacher.

### Objectives:

- Students will research a topic question provided by the instructor.
- Students will develop a thesis statement in response to the question and write a research paper in support of the thesis.
- Students will write a research papers based on the standards of the school's English department. Alternately, students can use the following standards:
  - MLA format
  - 2 pages of content supporting the thesis statement
  - Works Cited page
  - 12-pt Times New Roman Font
  - Grammatically correct
  - Spelling, mechanics, and usage is correct
  - Paper is clearly and concisely written
  - Ideas are factually correct and logical
  - No Plagiarism
- Students will use research paper to create a multimedia presentation which includes NAO as a co-presenter.
- Students will use questions provided by the instructor to program NAO with responses which answer the questions.

### Common Core Standards:

- 11-12.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks; analyze the specific results based on explanations in the text.
- 11-12.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 11–12 texts and topics*.
- 11-12.RST.9:** Synthesize information from a range of sources (e.g., texts, experiments, simulations) into a coherent understanding of a process, phenomenon, or concept, resolving conflicting information when possible.
- 11-12.RST.10:** By the end of grade 12, read and comprehend science/technical texts in the grades 11-CCR text complexity band independently and proficiently.



- 9-10.RST.3:** Follow precisely a complex multistep procedure when carrying out experiments, taking measurements, or performing technical tasks, attending to special cases or exceptions defined in the text.
- 9-10.RST.4:** Determine the meaning of symbols, key terms, and other domain- specific words and phrases as they are used in a specific scientific or technical context relevant to *grades 9–10 texts and topics*.
- 9-10.RST.10:** By the end of grade 10, read and comprehend science/technical texts in the grades 9–10 text complexity band independently and proficiently.
- W.9-10.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.9-10.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*
- W.11-12.4:** Produce clear and coherent writing in which the development, organization, and style are appropriate to task, purpose, and audience.\*
- W.11-12.6:** Use technology, including the Internet, to produce, publish, and update individual or shared writing products, taking advantage of technology’s capacity to link to other information and to display information flexibly and dynamically.\*

\*Enrichment Activity

Materials:

- Computer with Choreographe and NAOqi software installed
- NAO Robot
- *An Introduction to Robotics with NAO* digital textbook
- Unit 5 Posttest
- Unit 5 Posttest ANSWER KEY
- Lesson 5.4 Multimedia Presentations in High School Activity Sheet (Teacher Version)
- Lesson 5.4 Multimedia Presentations in High School Activity Sheet (Student Version)

Lesson Outline:

- Distribute the Unit 5 Post Test.
- Collect and score the completed Unit 5 Post Test.
- Instruct students to research a topic question which you provide. Select timely topics.
- Instruct students to develop a thesis statement in response to the question and write a research paper in support of the thesis.
- Instruct students to write a research papers based on the standards of the school’s English department. Alternately, students can use the following standards:
  - MLA format
  - 2 pages of content supporting the thesis statement
  - Works Cited page



- 12-pt Times New Roman Font
  - Grammatically correct
  - Spelling, mechanics, and usage is correct
  - Paper is clearly and concisely written
  - Ideas are factually correct and logical
  - No Plagiarism
- Instruct students to use the research paper to create a multimedia presentation which includes NAO as a co-presenter. Presentations should incorporate a video, audio, PowerPoint, and/or other media components to add to the presentation of the research topic. Be creative in utilizing NAO's talents – play music, play audio clips, use movement, etc.
  - Instruct students to write questions related to the topic and program NAO with responses which answer the questions.
  - Provide time to complete the presentations with question and answer sessions.
  - Collect and score completed programs.

Deliverables:

Presentation of research paper with media  
Completed Choregraphe program

Enrichment Activity:

Locate and summarize a scholarly article on the effects of multimedia presentations on learning. Cite the source of the article. Relate the article to the activity.

Additional Resources: INTERNET

Fan page for Aldebaran Robotics Americas.

<https://www.facebook.com/AldebaranRoboticsAmericas>

Overview – NAO Software Documentation <http://www.aldebaran-robotics.com/documentation/index.html>

Read, Write, Think <http://www.readwritethink.org/>

K-12 Language Arts Sites <http://ginaotto.com/languagearts.html>

Scholastic <http://www.scholastic.com/browse/article.jsp?id=3749814>



Goodreads <http://www.goodreads.com/genres/picture-books>

## BOOKS

*Differentiation Strategies for Language Arts: Language Arts* By Wendy Conklin

*The Writing Teacher's Activity-a-Day: 180 Reproducible Prompts* By Mary Ellen Ledbetter

## VIDEO

NAO Developer Program – subscription channel on YouTube

<http://www.youtube.com/user/ObiJerome/videos?view=0>

NAO TV – subscription channel on YouTube

<http://www.youtube.com/user/AldebaranRobotics/videos?view=0>

Teach me, NAO! – YouTube Playlist set up by Dana Cochran with videos from developers around the world.

<http://www.youtube.com/playlist?list=PL6SqIAskpCjwPJ9ETQ8C9T2aagcOZ6P-K&feature=plcp>

