ARTBOTICS:
PORTRAITURE AND LEGO ROBOTICS

PROGRAM DESCRIPTION

The program encourages the engineering design process, basic engineering principles, computer programming and elementary math concepts, as well as diverse drawing techniques. The program is built around a theme of self identity, encouraging students to consider who they are and who they want to become as adults.

Ultimately, each student will create his or her own animated self-portrait using LEGO Robotics. This art in motion program emphasizes integrated Science, Technology, Engineering, Art and Math (STEAM) concepts in a fun and engaging way.

This is a ten-week program to serve 12 students in 4th grade at each of three elementary schools and 12 students in 6th grade at Chattanooga Girls Leadership Academy. Each class will be staffed by one lead and one assistant teacher. The program is tentatively scheduled as follows for the weeks of **February 3 through April 10, 2014**.

3.15-4.30 Mondays - Clifton Hills
3.15-4.30 Thursdays - Orchard Knob
3.15-4.15 Mondays - East Lake
4.30-5.30 Mondays - Chattanooga Girls Leadership Academy

STAFF EXPECTATIONS

Saturday, January 25	2-hour training session	mandatory for all staff
February 3 - April 10, 2014	1-hour per week lesson planning	recommended for lead staff
February 3 - April 10, 2014	1-hour per week instruction	mandatory for all staff
February 3 - April 10, 2014	2-3 classroom observations (Carrie)	mandatory for all staff
Saturday, March 1	1-hour mid-program meeting	mandatory for lead staff
Saturday, April 19	1-hour final staff meeting	mandatory for lead staff
early or mid-May	Student art fair	mandatory for all staff

The key focus of the program is on the ten-week instructional period from the weeks of February 3 - April 10, 2014. Each staff member works one one-hour instructional period per week during the ten weeks, not including transportation, set-up and pack-up time. Lead instructors are required to develop lesson plans for each session based on the curriculum outline.

Celebration Events

All staff members, lead and assistant, are required to attend an early or mid-May art fair during which time the students will show their projects to their parents and peers. The fair will feature students and projects from both the Story Creators and Artbotics after school programs.

Substitute Procedures

A substitute list of all staff members, their telephone numbers, email address, and general availability will be distributed to all staff members. You must secure your own substitutes, notify the coordinator of the change (Carrie-Meadows@utc.edu and 423-618-6616), and make your own payment arrangements.

Payment Procedures

Employee stipends will be disbursed as a single lump sum at the end of the program in mid-May. You must complete a W-9 during training for your check to process.

STUDENT CHALLENGES

1. Build a robotic self-portrait (face only) with moveable parts. For example, you might have eyes that "bug out" or spin around. At the same time, your tongue could be wagging or your ears twitching. Choose one of three portrait styles (or a combination) based on our three art experiences: Chuck Close-style grid portrait, oil pastel portrait, or cartoon caricature.

2. Present your final animated self-portrait project during an Art Fair in May.

PROGRAM OVERVIEW

Sessions 1-4	**Introduction to Identity Theme, LEGO Robotics and Art Experiences** Follow teacher prompts to complete daily journal sketches and practice three portrait styles: Chuck Close-style grid portrait, oil pastel portrait, or cartoon caricature.	
Sessions 5-6	**LEGO Robot Experiences and Animation Plan** Learn three key lessons designed to help you move your LEGO robot. Use this knowledge to create an animation plan for your portrait.	Teacher sign-off by Session 6 (idea workable)
Sessions 7-8	**Prepare Your Portrait for Animation** Complete an earlier portrait in one of the three portrait styles: Chuck Close-style grid portrait, oil pastel portrait, or cartoon caricature. Mark holes, motors, and brain placement on foamboard. Check cord lengths and other details to make sure your plan is workable. Mount portrait to foamboard. Attach motors and microcontrollers with tape.	Teacher sign-off by Session 7 (cord lengths) Cut foamboard
Sessions 9-10	**Program Your Animation** Program your animations and complete the project.	

LESSON PLANS

Sessions 1-4: Introduction, Self-Identity and Art Experiences

Session 1

10 min: Welcome and fun introduction activity: show example teacher portrait in motion (stared in training and finished during lesson planning; needs at least two moving parts that move at the same time)

10 min: Snack

10 min: Introduction to LEGO Robotics

15 min: Discussion of portraits/personal identity/emotional identity/future identity

Presentation of journals

15 min: Take student pictures while students are sketching in their journals from a prompt

Suggested prompts:

What kind of animal would you like to be? What would you look like?

What makes you laugh?

What do you like best about yourself--creativity, personality, appearance--why?

Pretend that you see yourself walking into a room. What's your first impression of yourself? What stands out about you?

What thing in nature best describes you? Are you a rock? A tree? Why?

I wish I could be like.... This person is special because.…

I wish to be a _____ when I grow up. Then I will.…

What three words describe you right now? Draw them!

Session 2

5 min: Sketching/Writing from prompt

Suggested prompts:

When you are angry, how do you look?

When you are happy, what thing in nature are you most like? The sun? The sky?

What makes you laugh?

What color makes you think of happiness?

10 min: Snack

15 min: Book of the Day: ***Looking Like Me*** (*Basquiat* for CGLA)

1) share with class

3) discuss identity and technique: Emotional Identity Portrait/Silhouette

30 min: Pastel self-portraits

Session 3

5 min: Sketching/Writing from prompt

Suggested Prompts:

What sets you apart from other people?

What is something you dislike about yourself?

What would you change about yourself if you found a magic wand?

10 min: Snack

15 min: Book of the Day: ***I Like Myself*** (*Smile* for CGLA)

1) share with class

3) discuss identity and technique: Loving all parts of yourself, especially what makes you different. Emphasis on particular parts of your portrait in cartoon style.

30 min: Cartoon self-portraits

Session 4

5 min: Sketching/Writing from prompt

Suggested Prompts:

What is something that really bugs you?

What are two lies and two truths about yourself? (share with the class to guess!)

Draw a picture of yourself, and hide two secrets in your drawing.

If you had to give up one feature of your face like your nose or mouth, what would it be?

Draw yourself happy. Draw yourself sad on top of your happy drawing--what's the same?

10 min: snack

15 min: Book of the Day: ***Chuck Close Face Book***

1) share with class

3) discuss identity and technique: What's on the inside, what about you is hidden in the details? What's hidden in the grids that make up Close's portraits?

30 min: Grid portraits

Sessions 5-6: LEGO Robotics Programming

Session 5

10 min: snack

15 min: LEGO Lesson: movement in rotation or degrees

Instructor demos the One-handed Clock Program

25 min: LEGO Challenge: One-Handed Clock

Instructor prepares four clock faces and hands for this exercise

Students individually write a program to..

a) move from 12.00 to 5.00 clockwise

b) move from 5.00 to 10.00 counterclockwise

c) go clockwise again from 10.00 to 9.00

Students bring their bricks to one of the clock faces and run the program

10 min: Students use engineering design process (Ask - Imagine - Plan - Create - Improve) to begin animation plan (goal: two motors/moving parts)
*sketch in journal

Session 6

*sign off on animation plan: Student Worksheet #1

10 min: snack

15 min: LEGO Lesson: Review movement in rotation or degrees/ Demo One-handed Clock Program again OR…

LEGO Lesson #2: Moving two motors at once

25 min: LEGO Challenge: Continue One-handed Clock challenge OR...

LEGO Challenge #2: Program the Teacher's Portrait

Instructor brings self-portrait (started at training) and asks students to program two motors to move at once, such as an eyebrow raising while the nose twitches.

*If possible, both teachers could bring a self-portrait to program in the same way.

Students individually write a program to accomplish instructor goals.

Students bring their bricks to the portrait(s) and run their programs

10 min: Students use engineering design process (Ask - Imagine - Plan - Create - Improve) to begin animation plan (goal: two motors/moving parts)
*sketch in journal/teacher approves by end of session

Sessions 7-8: Preparing the Portraits for Animation

Session 7

*sign off on cord lengths and cut foamboard by Session 7: Student Worksheet #2

If possible, begin class with a writing/drawing prompt focused on identity.

Students complete their portraits using at least one drawing technique and prepare their portraits for animation.

NOTE: If students have mastered programming, you may add a second day to finish portraits and leave only one day (Session 10) for programming.

Session 8

*mount the LEGO parts by Session 8: Student Worksheet #3

If possible, begin class with a writing/drawing prompt focused on identity.

Students attach robotics components on one side and art on the other.

Sessions 9-10: Programming the Animations

*Student Worksheet #4

*Student Worksheet #5 for advanced students only

May - Art Fair

STUDENT WORKSHEET #1: Develop an Animation Plan
**complete and get your teacher's approval by the end of Session 6*

Choose an earlier portrait in one of the three portrait styles: Chuck Close-style grid portrait, oil pastel portrait, or cartoon caricature.

Sketch your animation plan in your journal and label the parts that move. Put an X on the places you will need to cut holes.

Moving Part #1 _____

Moving Part #2 _____

Moving Part #3 _____

Student Checklist	Teacher Checklist
____ Choose a portrait style	____ Is the project workable in time allowed?
____ Plan for 2-3 moving parts	____ Will motors be attached near the center of each moving part?
____ Share your idea with a classmate	____ Are 2-3 motors used?

STUDENT WORKSHEET #2: Complete Your Portrait
**complete and get your teacher's approval and complete by the end of Session 7*

Complete an earlier portrait based on your animation plan in one of the three portrait styles: Chuck Close-style grid portrait, oil pastel portrait, or cartoon caricature.

Create moving parts in the same medium you created your portrait.

Be sure your cords will reach (plug motor cords into the ABC plugs on the robot, and arrange the motors and brain on the board).

Label where all the motors and the NXT brain will be placed by tracing them onto the back side of your foam board and marking where holes need to be cut.

Student Checklist	Teacher Checklist
____ Finish drawing your portrait	____ Check cord lengths
____ Draw and color the moving parts	____ Be sure the motors will be attached near the center of each moving part
____ Check cord length	____ Troubleshoot and adjust animation plans
____ Mark foamboard for robot parts	____ Confirm that cutting holes are clearly marked
	____ Cut holes in foamboard

STUDENT WORKSHEET #3: Mount the Robotic Parts
**complete by the end of Session 8*

Glue your portrait to the foamboard.

Attach the motors and brain to the foamboard with LEGO pieces and tape.

Attach the moving parts to the motors. This will take some creativity!

Once you have motors and the brain attached to the foam board and the design assembled, you will start the last step: programming your animatronic with the group!

Student Checklist	Teacher Checklist
____ Glue the portrait to foamboard	____ Portrait ready for programming
____ Tape the motors and brain	
____ Attach the moving parts to motors	

STUDENT WORKSHEET #4: Program Your Animations

Before you begin the programming exercises, write down which motor plug (A, B or C) each moving part is plugged into.

Part of the portrait	**Port (circle one)**	**Movement (choose one)**	**Draw a circle showing how far the part will turn/move**	**Unit (choose one)**
_____	A B C	____ Spin in circles ____ Spin half way around ____ Wiggle a little ____ Other (describe below)		____ Rotations ____ Degrees ____ Seconds
_____	A B C	____ Spin in circles ____ Spin half way around ____ Wiggle a little ____ Other (describe below)		____ Rotations ____ Degrees ____ Seconds
_____	A B C	____ Spin in circles ____ Spin half way around ____ Wiggle a little ____ Other (describe below)		____ Rotations ____ Degrees ____ Seconds

STUDENT WORKSHEET #5: Add Sensors

**for advanced students only*

If you're ready for an additional challenge, add sensors to your project. For example, when the button is pushed, the eyes could move. Below draw a line from the motors to the sensors you'd like to add.

Motor A controls _____ and will be controlled by the _____ sensor.

Portrait Part (eye, nose, etc) *Choose one: light, touch (button), sound or ultrasonic*

Motor B controls _____ and will be controlled by the _____ sensor.

Portrait Part (eye, nose, etc) *Choose one: light, touch (button), sound or ultrasonic*

Motor C controls _____ and will be controlled by the _____ sensor.

Portrait Part (eye, nose, etc) *Choose one: light, touch (button), sound or ultrasonic*

*** You may only use each sensor type once.**

STUDENT WORKSHEET #6: Preparing the Artist Statement

Look back in your journal and reflect on your intentions for your self portrait and the reasons behind your animation decisions. Be sure your write about how the portrait and animations work together to reveal something important about your personal identity.

Sample Artist Statement

> Personal identity is not just about the self, it *is* the self. When I really think honestly about myself, I consider who I am and who I want to be.
>
> I am an artist. I am also a wife, daughter, and friend.
>
> I want to be a bright smile in my loved ones' day, and I like to express myself through my words. So, my mouth is a powerful part of who I am and who I want to be. I want to offer the world smiles, love, and a little comedy.
>
> But I am much more complex than what you see. My eyebrows point to the mysterious me, the parts nobody else knows, and I'll keep them to myself!

Begin your own artist statement by answering the following questions in your journal.

1. What do you like most about your final portrait?

2. Why did you use this portrait for your project instead of the others you made?

3. What does the portrait tell other people about who you are or who you want to become?

4. Create an "I am" list like the one in the sample artist statement above. What aspects of "you" does your portrait show?

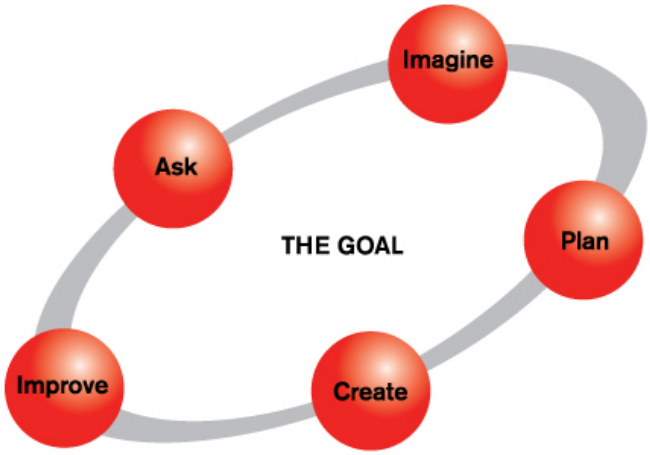
5. Do you think your portrait and its animations are funny, serious, or something else?

6. What do the animations say about your personality or the way you look?

7. Do you think your final animated portrait show people how you really look, how you want to look, or how other people see you? Explain why.

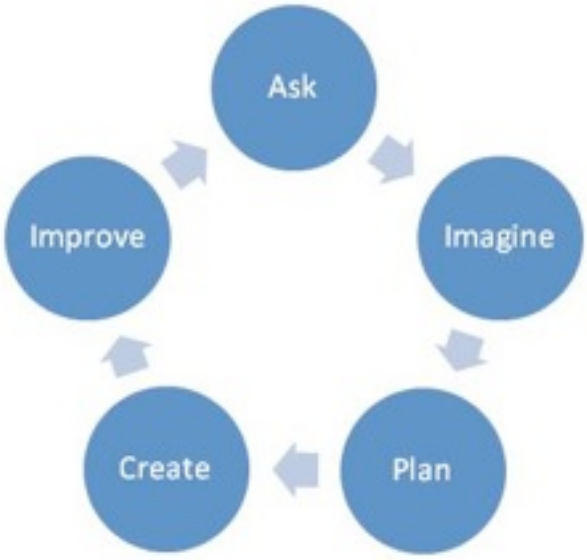
Engineering is Elementary.org

http://www.eie.org/content/engineering-design-process



Teach Engineering.org

http://www.teachengineering.org/engrdesignprocess.php



JOURNAL PROMPTS

Use and adapt these prompts as you please to get students writing and drawing in their journals.

- What do you like most about yourself?
- What is something you dislike about yourself?
- What is something you are optimistic about?
- What is something that really bugs you?
- What would happen if you could fly? What would you do first?
- What would happen if you could become invisible whenever you wanted to? What would you do?
- What would you change about yourself if you found a magic wand?
- What kind of animal would you like to be? What would you look like? What would you do?
- What makes you laugh?
- What talents do you have?
- What three words would describe you right now?
- What color makes you think of happiness?
- What quality do you like best about yourself--creativity, personality, appearance--why?
- I wish I could be like.... This person is special because.…
- I wish to be a _____ when I grow up. Then I will.…
- When you are angry, how do you look?
- When you are happy, what thing in nature are you most like? The sun? Grass? The sky?
- Would you like to be famous? Why or why not? What would you like to be famous for?
- What sets you apart from other people?
- Pretend that you see yourself walking into a room. What's your first impression of yourself? What stands out about you?
- What thing in nature best describes you? Are you a rock? A tree? A squirrel? Why?
- What are two lies and two truths about yourself? (share with the class to guess!)
- Draw a picture of yourself, and hide two secrets in your drawing.
- If you had to give up one feature of your face like your nose or mouth, what would it be?
- Draw yourself happy. Draw yourself sad on top of your happy drawing--what's the same?

**We'll try to add to this list based on the program books during training.*