

Inventions CTY Course Syllabus

Day	Time	What	How
Day 1 Monday	AM	<ol style="list-style-type: none"> 1. Get to know each other. 2. Complete CTY forms. 3. Differentiate between a discovery and invention. 	<ol style="list-style-type: none"> 1. Introduce classroom routines 2. Work together to solve a problem 3. Sign the CTY Honor Code and Lab Safety Contract 4. Fill out <i>Interest Inventory</i> 5. Play <i>Get to Know You Bingo</i> 6. Complete “Discovery” and “Inventions” chart 7. Complete <i>Can you name that ancient inventions?</i> worksheet
	PM	<ol style="list-style-type: none"> 1. Assess prior knowledge. 2. Critical thinking challenge. 	<ol style="list-style-type: none"> 1. Take a pre-assessment 2. Make desk covers or cover desks with paper or plastic 3. Build a car that rolls down a ramp using only two pieces of paper, tape and 5 large paper clips.
	<p>Homework</p> <ol style="list-style-type: none"> 1. Interview a parent, grandparent, or other adult about an invention that changed his or her life. For example, most adults over the age of 40 did not have a personal computer when they were children. The personal computer has had an impact on peoples’ lives because it has made communication easier through the use of email. It has made researching information easier because of the Internet and search engines such as Google. It has allowed people to complete tasks such as bookkeeping, letter writing, and keeping records in a quick and timely manner. These have both a negative and a positive impact on peoples’ lives. Ask the adult you interview to identify both positive and negative aspects of an invention that has changed his or her life. 2. Read pp. 12-20 in <u>Inventing Stuff</u>. <i>You Are an Inventor</i> Read about ways to become an inventor and learn four different ways to invent new products. 3. Add one entry into the IDEA diary. This entry will be an original idea. The student may be asked to solve a problem when developing his or her idea. Explain that inventors keep journals or logs that include ideas and drawings of new inventions. You may show the students the information (included in this curriculum guide or available on the Internet) about Charles Sumner Tainter, Howard Head, and Andrew Butler and Kevin Reeder to reinforce the importance of recording information. 		

Day	Time	What	How
Day 2 Tuesday	AM	<ol style="list-style-type: none"> 1. Discuss how inventions have changed lives. 2. Identify ways to invent. 3. Use creative thinking skills. 	<ol style="list-style-type: none"> 1. Share family interviews 2. Discuss SCAMPER 3. Introduce bridges. Focus on three types. 4. Build a bridge out of paper only.
	PM	<ol style="list-style-type: none"> 1. Identify inventor attributes. 2. Creative thinking challenge. 	<ol style="list-style-type: none"> 1. Take <i>Are You An Inventor?</i> quiz. Discuss results. 2. Movie on bridges (20 minutes) 3. Build a bridge using spaghetti and gum drops.
	Homework		
<ol style="list-style-type: none"> 1. Read pp. 22-32 in <u>Inventing Stuff</u>. <i>Your Idea Factory</i> This chapter is about how you can help your brain organizer your thinking. Techniques to develop ideas include asking questions, looking for patterns, brainstorming, using SCAMPER, listing attributes, drawing pictures, and keeping an idea file. 			
Day 3 Wednesday	All day	1. Field Trip	1. Field Trip to Baltimore Museum of Industry
Day 4 Thursday	AM	1. Review parts of a circuit.	<ol style="list-style-type: none"> 1. Build a Circuit using light bulb. 2. Expand your Circuit to include a buzzer, motor, and another light bulb.
	PM	1. Identify Parallel and Series Circuits.	<ol style="list-style-type: none"> 1. Complete elements of games graphic organizer. 2. Begin creating Electric game. Using an electric Circuit, create a board game.
Homework			
<ol style="list-style-type: none"> 1. Complete Invention Idea Surveys. Interview three or more people (any age) to identify problems for which you could find a logical or reasonable solution. 2. Read p 34-37 in <u>Inventing Stuff</u> <i>Inventing Backwards</i> This chapter is about taking things apart in order to learn how they work. This is called “reverse engineering” or “take apart.” 3. Find a broken electrical device (clock radio, telephone, computer, toaster, or other appliance). Bring it to class to take apart during the invention dissection session. 4. Have a parent sign the Invention Convention Checklist for Thursday in the First Week. 			

Day	Time	What	How
Friday Day 5	AM	<ol style="list-style-type: none"> 1. Monitor progress on games. 2. Identify strengths and weaknesses in games. 3. Revise games. 	<ol style="list-style-type: none"> 1. Continue creating board game objectives and rules. 2. Complete and play games.
	PM	<ol style="list-style-type: none"> 1. Review inventing skills. 2. Use critical thinking skills. 	<ol style="list-style-type: none"> 1. Guest Speaker from the US Patent Office 2. Introduction to Simple Machines.
	Homework		
<ol style="list-style-type: none"> 1. Add one idea to the IDEA Diary. 2. Read pg 38-48 in <u>Inventing Stuff</u> <i>Invent by Solving Problems</i> This chapter gives students six steps to success when inventing new products. 			
Day 6 Monday	AM	<ol style="list-style-type: none"> 1. Review Simple Machines 2. Use critical thinking skills. 	<ol style="list-style-type: none"> 1. Gear worksheet 2. Move a dice from one side of the room to another using a pulley.
	PM	<ol style="list-style-type: none"> 1. Identify 4 forces on an airplane. 2. Introduce Bernoulli. 	<ol style="list-style-type: none"> 1. Build and test types of paper airplanes
	Homework		
<ol style="list-style-type: none"> 1. Invention Diary #3 Create a toy using objects from around your house. 2. Work on your Invention Convention materials list and bring it in on Monday. Make sure to have a parent sign your <i>Invention Convention Checklist</i> for Monday, Second Week. 			
Day 7 Tuesday		<ol style="list-style-type: none"> 1. Field Trip 	<ol style="list-style-type: none"> 1. Field trip to Udvar Hazy

Day	Time	What	How
Day 8 Wednesday	AM	<ol style="list-style-type: none"> 1. Develop a patent or a trademark for a new invention. 2. Identify and develop new inventions using several different simple machines. 3. Define work and force. 	<ol style="list-style-type: none"> 1. Apply for a CTY patent. 2. Identify six simple machines.
	PM	<ol style="list-style-type: none"> 1. Create a new Rube Goldberg-like invention. 	<ol style="list-style-type: none"> 1. Build an egg drop.
	<p>Homework</p> <ol style="list-style-type: none"> 1. Add one idea to IDEA diary. This will be an original idea. 2. Write a paragraph describing how the Rube Goldberg device they built worked. Describe the steps that were completed to raise the flag. Explain which simple machines were used in the device. 3. Read pp. 50 - 71 in <i>Inventing Stuff Invent by Finding New Uses for Things</i> This chapter helps students understand that many objects have more than one use – they just need to find that use. Students are also given many ideas to tinker with in this section. 4. Find a broken electrical device (clock radio, telephone, computer, toaster, or other appliance). Bring it to class to take apart during the invention dissection session. 5. Give each student the <i>Final Patent Application</i> worksheet. Draw a detailed illustration of your invention for Invention Convention. Have a parent sign the Invention Convention Checklist for Tuesday, Second Week. 		
Day 9 Thursday	AM	<ol style="list-style-type: none"> 1. Identify electrical components. 	<ol style="list-style-type: none"> 1. Take apart a broken appliance and identify various electrical components.
	PM	<ol style="list-style-type: none"> 1. Continue take-apart activities. 2. Use creative thinking skills to build a new device. 	<ol style="list-style-type: none"> 1. Continue taking apart broken appliances. 2. Build a fantasy device out of broken appliance parts.

Day	Time	What	How
		<p>Homework</p> <ol style="list-style-type: none"> 1. Add one idea to IDEA diary. 2. Designers claim that some everyday items, such as safety pins, the needle, and the paper clip have successful designs that have never been made better. Paper clips are lightweight, cheap, strong and easy to use. List possible reasons why the designs of the other items are successful. 3. Begin writing the steps for creating your invention for the Invention Convention. 4. Start designing and building your invention for the Invention Convention. 5. Have a parent sign the Invention Convention Checklist for Wednesday, Second Week. 	
Day 10 Friday	AM	1. Learn about Energy Sources	<ol style="list-style-type: none"> 1. Build Solar cars. 2. Explain how the vehicle was able to use the energy of the sun to propel it forward
	PM	<ol style="list-style-type: none"> 1. Learn about Energy. 2. Understand ways to use solar energy. 	1. Make your own ice cream.
		<p>Homework</p> <ol style="list-style-type: none"> 1. Add one idea to your IDEA diary. Think about a way to incorporate Bernoulli's principle into a new kitchen gadget or appliance. 2. Test your model or prototype for the Invention Convention. Record your results in a data chart or a graph. Take pictures or draw illustrations of your new invention. Have a parent sign the Invention Convention Checklist for Thursday, Second Week. 	
Day 11 Monday	AM	1. Research a Scientist.	1. Pick an Inventor. Identify key facts.
	PM	1. Introduce Archimedes principle	<ol style="list-style-type: none"> 1. Build Mobile using key facts about your inventor. 2. Build a clay boat.

Day	Time	What	How
		<p>Homework</p> <ol style="list-style-type: none"> 1. Change your model based on test results and observations. Have a parent sign your Invention Convention Checklist. 2. Bring in your invention model or prototype to share with class. 3. Add one idea to IDEA diary. This idea should solve a problem such as how to feed a pet while on vacation or open a door while you are carrying bags in each hand. 4. The students will describe in writing how their vehicles were able to move using energy supplied by an object other than a motor. They will tell how potential energy was released and then how it became kinetic energy (energy of motion) as the vehicle was propelled forward. 	
Day 12 Tuesday	AM	1. Understand electrical circuits.	<ol style="list-style-type: none"> 1. Invention Convention Check in 2. Build electrical circuits.
	PM	1. Review Bernoulli's principle.	1. Guest Speaker Marine One helicopter pilot
		<p>Homework</p> <ol style="list-style-type: none"> 1. Older students should be working on their Display Boards for the Invention Convention. Problem, Solution, Procedure should be added to the board at this time 2. Continue working on Invention Convention inventions. 	
Day 13 Wednesday	AM	1. Use inventor skills to create a candy bar and sell it to the class.	<ol style="list-style-type: none"> 1. Create a candy bar and advertisement and sell it to the rest of the class. 2. Work on Advertisement for invention convention
	PM	1. Review Newton's 3 laws.	1. Build a track using newspaper only and can support a golf ball and several marbles, which demonstrates Newton's three laws.
		<p>Homework</p> <ol style="list-style-type: none"> 1. Finish Invention Convention invention; bring it to class on day 14 	

Day	Time	What	How
Day 14 Thursday	AM	1. Review Newton's three laws.	1. Post test 2. Evaluations 3. Complete the invention for the Invention Convention and set up your tri-fold display board.
	PM	1. Use inventor skills to create inventions that incorporate magnets.	1. Use the properties of magnets to create a new device for a handicapped person and a toy.
	Homework 1. Practice speech for Invention Convention. You only have five minutes to give your speech. Practice in front of a mirror.		
Day 15 Friday	AM	1. Share inventions with all CTY students.	1. Invite CTY classes to visit Invention Convention.
	PM	1. Share inventions with parents and friends.	