

Inventions (INVT)  
CTY Course Syllabus

Day	Time	What	How
Day 1 Monday	AM	<ol style="list-style-type: none"> <li>1. Get to know each other.</li> <li>2. Complete CTY forms.</li> <li>3. Differentiate between a discovery and invention.</li> </ol>	<ol style="list-style-type: none"> <li>1. Introduce classroom routines</li> <li>2. Work together to solve a problem</li> <li>3. Sign the CTY Honor Code and Lab Safety Contract</li> <li>4. Fill out <i>Interest Inventory</i></li> <li>5. Play <i>Get to Know You Bingo</i></li> <li>6. Complete “Discovery” and “Inventions” chart</li> <li>7. Complete <i>Can you name that ancient inventions?</i> Worksheet</li> <li>8. Create/Bind an Idea Journal</li> </ol>
	PM	<ol style="list-style-type: none"> <li>1. Assess prior knowledge.</li> <li>2. Critical thinking challenge.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take a pre-assessment</li> <li>2. Make desk covers or cover desks with paper or plastic</li> <li>3. Complete Challenge: How can I build the tallest structure out of spaghetti and gum drops that will support a ping pong ball or other lightweight object?</li> </ol>

Day	Time	What	How
		<p>Homework</p> <ol style="list-style-type: none"> <li>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.</li> <li>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.</li> <li>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.</li> </ol>	
Day 2 Tuesday	AM	<ol style="list-style-type: none"> <li>1. Discuss how inventions have changed lives.</li> <li>2. Identify ways to invent.</li> <li>3. Use creative thinking skills.</li> <li>4. Introduce Invention Convention Proposal</li> </ol>	<ol style="list-style-type: none"> <li>1. Share family interviews</li> <li>2. Discuss SCAMPER</li> <li>3. Create a new kind of rake using items from a box of odds and ends. Name it, describe it, and display it.</li> <li>4. Create a new holiday in the month of August and a greeting card to go along with it. Pitch your idea to the CEO of a greeting card company.</li> </ol>

Day	Time	What	How
	PM	<ol style="list-style-type: none"> <li>1. Identify inventor attributes.</li> <li>2. Creative thinking challenge.</li> </ol>	<ol style="list-style-type: none"> <li>1. Take <i>Are You An Inventor?</i> quiz. Discuss results.</li> <li>2. Create an invention to retrieve an object off of a shelf without getting out of a chair.</li> </ol>
	<p>Homework</p> <ol style="list-style-type: none"> <li>1. Add one idea in IDEA diary. Think about this as you create your new invention: In 1990, <i>Crayola</i> added eight new colors to its crayon selection: wild strawberry, jungle green, dandelion, fuchsia, vivid tangerine, teal blue, royal purple, and cerulean. Create 2 or 3 wild new colors and great names to go with them. (from <i>Bright Ideas Calendar: 365 Trivia Activities</i> by Sue Boulais, McDonald Publishing Co.)</li> <li>2. Read pp. 22-32 in <i>Inventing Stuff. 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.</li> </ol>		
Day 3 Wednesday	AM	<ol style="list-style-type: none"> <li>1. Identify past inventors and inventions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Research inventors and their inventions.</li> <li>2. Make Inventor trading cards about 2 inventors and their inventions.</li> </ol>
Computer Lab	PM	<ol style="list-style-type: none"> <li>1. Identify elements of a board game.</li> <li>2. Use trading cards to learn inventors / inventions.</li> </ol>	<ol style="list-style-type: none"> <li>1. Complete elements of games graphic organizer.</li> <li>2. Begin creating Inventor/Invention game.</li> </ol>

Day	Time	What	How
	Homework	<ol style="list-style-type: none"> <li>1. Complete <i>Invention Idea Surveys</i>. Interview three or more people (any age) to identify problems for which you could find a logical or reasonable solution.</li> <li>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.”</li> <li>3. Find a picture of an object that is a simple machine or that incorporates a simple machine. Bring to class on Day 6 (the following Monday).</li> <li>4. If a student still needs to complete the trading cards, have him or her complete them for homework.</li> <li>5. 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.</li> <li>6. Have a parent sign the Invention Convention Checklist for Thursday in the First Week.</li> </ol>	
Day 4 Thursday	AM	<ol style="list-style-type: none"> <li>1. Monitor progress on games.</li> <li>2. Identify strengths and weaknesses in games.</li> <li>3. Revise games.</li> </ol>	<ol style="list-style-type: none"> <li>1. Continue creating board game objectives and rules.</li> <li>2. Begin designing and creating board for the game.</li> <li>3. Complete and play games.</li> </ol>
	PM	<ol style="list-style-type: none"> <li>1. Review inventing skills.</li> <li>2. Use critical thinking skills.</li> </ol>	<ol style="list-style-type: none"> <li>1. List inventing process on the board. Students identify the steps used to create a new board game.</li> <li>2. Create a device to propel a ball into the air for the longest period of time or distance.</li> </ol>

Day	Time	What	How
	<p>Homework</p> <ol style="list-style-type: none"> <li>1. Add one idea to the IDEA Diary. This idea should address the question: Riding a bike at night can be dangerous. What are some ways to modify a bike so that it will be safer to ride?</li> <li>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.</li> <li>3. Complete Invention Convention proposal. Due on Friday (Day 5).</li> <li>4. Bring in a gadget to sketch on Monday (Day 6). Make sure it has moving parts.</li> <li>5. Have a parent sign the Invention Convention Checklist for Friday in the First Week.</li> </ol>		
Day 5 Friday	AM	<ol style="list-style-type: none"> <li>1. Describe ways to name inventions.</li> <li>2. Use critical thinking skills.</li> </ol>	<ol style="list-style-type: none"> <li>1. Invention naming activity</li> <li>2. Protect a fragile item, a potato chip, when it is mailed.</li> </ol>
	PM	<ol style="list-style-type: none"> <li>1. Identify characteristics of bridges.</li> <li>2. Explain why triangles are stronger than rectangles.</li> <li>3. Develop a new food item using the invention process.</li> </ol>	<ol style="list-style-type: none"> <li>1. Build and test a straw bridge for strength.</li> <li>2. Create a new candy or snack bar.</li> <li>3. Watch the Patent Video</li> </ol>
	<p>Homework</p> <ol style="list-style-type: none"> <li>1. Optional – make your candy bar or snack bar that you designed in class. Bring in enough to share with the class on the next class day.</li> <li>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.</li> </ol>		
Day 6 Monday	AM	<ol style="list-style-type: none"> <li>1. Develop a patent or a trademark for a new invention.</li> <li>2. Identify and develop new inventions using several different simple machines.</li> <li>3. Define work and force.</li> </ol>	<ol style="list-style-type: none"> <li>1. Determine the difference between a patent and a trademark.</li> <li>2. Apply for a CTY patent.</li> <li>3. Identify six simple machines.</li> <li>4. Draw a gadget.</li> </ol>

Day	Time	What	How
	PM	1. Create a new Rube Goldberg-like invention.	1. Learn about Rube Goldberg. 2. Invent a new Rube Goldberg-like invention to raise and lower a flag.
	Homework		
	<ol style="list-style-type: none"> <li>1. Add one idea to IDEA diary. This will be an original idea.</li> <li>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.</li> <li>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.</li> <li>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.</li> <li>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.</li> </ol>		
Day 7 Tuesday	AM	<ol style="list-style-type: none"> <li>1. Identify simple machines.</li> <li>2. Identify electrical components.</li> </ol>	<ol style="list-style-type: none"> <li>1. Watch <i>Junkyard Wars</i> and list the simple machines in the video.</li> <li>2. Take apart a broken appliance and identify various electrical components.</li> </ol>
	PM	<ol style="list-style-type: none"> <li>1. Continue take-apart activities.</li> <li>2. Use creative thinking skills to build a new device.</li> </ol>	<ol style="list-style-type: none"> <li>1. Continue taking apart broken appliances.</li> <li>2. Build a fantasy device out of broken appliance parts.</li> </ol>

Day	Time	What	How
		<p>Homework</p> <ol style="list-style-type: none"> <li>1. Add one idea to IDEA diary.</li> <li>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.</li> <li>3. Begin writing the steps for creating your invention for the Invention Convention.</li> <li>4. Start designing and building your invention for the Invention Convention.</li> <li>5. Have a parent sign the Invention Convention Checklist for Wednesday, Second Week.</li> <li>6. Gather 1-4 secret ingredients to add to invented ice cream flavor</li> </ol>	
Day 8 Wednesday  Half-day	AM	<ol style="list-style-type: none"> <li>1. Learn about Bernoulli's Principle.</li> <li>2. Apply the concepts of Bernoulli's Principle to a new invention.</li> <li>3. Open Inventions</li> </ol>	<ol style="list-style-type: none"> <li>1. Invent a new toy using Bernoulli's Principle.</li> <li>2. Design a paper airplane that flies.</li> <li>3. Describe how Bernoulli's Principle applies to airplanes.</li> <li>4. Soda Fizz/Ice cream in a bag.</li> </ol>
		<p>Homework</p> <ol style="list-style-type: none"> <li>1. Add one idea to your IDEA diary. Think about a way to incorporate Bernoulli's principle into a new kitchen gadget or appliance.</li> <li>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.</li> </ol>	
Day 9 Thursday	AM	<ol style="list-style-type: none"> <li>1. Use critical thinking skills to make a vehicle move.</li> </ol>	<ol style="list-style-type: none"> <li>1. Build cars using different energy sources.</li> </ol>
	PM	<ol style="list-style-type: none"> <li>1. Understand ways to use solar energy.</li> </ol>	<ol style="list-style-type: none"> <li>1. Build a solar car.</li> <li>2. Explain how the vehicle was able to use the energy of the sun to propel it forward.</li> </ol>

Day	Time	What	How
		<p>Homework</p> <ol style="list-style-type: none"> <li>1. Change your model based on test results and observations. Have a parent sign your Invention Convention Checklist.</li> <li>2. Bring in your invention model or prototype to share with class.</li> <li>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.</li> <li>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.</li> </ol>	
Day 10 Friday	AM	1. Understand electrical circuits.	1. Build electrical circuits.
	PM	<ol style="list-style-type: none"> <li>2. Work with a small group to solve a problem.</li> <li>3. Complete the hovercraft activity.</li> <li>4. Use skills to re-create a light bulb.</li> </ol>	<ol style="list-style-type: none"> <li>1. Use electrical components to build a hovercraft.</li> <li>2. Work in a small group to build and design a hovercraft.</li> <li>3. Test and revise a working model.</li> <li>4. Build a working light bulb.</li> </ol>
		<p>Homework</p> <ol style="list-style-type: none"> <li>1. Display Boards for the Invention Convention. Problem, Solution, Procedure should be added to the board at this time.</li> <li>2. Finish Invention Convention invention; bring invention and display board to class on day 11. (Some class time will be given to finish boards and invention)</li> <li>3. Bring a shoebox or other small box to class on Day 11.</li> </ol>	

<b>Day</b>	<b>Time</b>	<b>What</b>	<b>How</b>
Day 11 Monday	AM	1. Use inventor skills to create electrical devices.	1. Create a mechanical and an electrical fan.
	PM	1. Use inventor skills to create electrical devices.	1. Create a burglar alarm. 2. Create an electrical game (Steady Hand). 3. Complete the invention for the Invention Convention and set up your tri-fold display board.
Homework			
<ol style="list-style-type: none"> <li>1. Add one idea to IDEA diary. They will invent a device that incorporates a mini-light bulb into a device already in use. The students may answer this question when completing this assignment: How can I see to eat my dinner if the power is out?</li> <li>2. According to city records in Cleveland, Ohio, the first electric traffic lights were installed in the U.S. on August 15, 1914. How long have traffic lights been in use in the U.S.? How were vehicles and pedestrians directed before traffic lights? Write a news article for a local paper telling everyone about this wonderful new invention.</li> <li>3. Prepare Invention Convention Speech. Include problem, solution, how your invention works, name of invention, selling price, and advertisement. Be sure to practice in front of a mirror and a family member.</li> </ol>			
Day 12 Tuesday	AM	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.
	PM	1. Use inventor skills to create inventions that incorporate magnets. 2. Prepare for Invention Convention	1. Create a magnetic toy. 2. Visit other invention classes and hear their presentations.
Homework			
<ol style="list-style-type: none"> <li>1. Add one idea to IDEA diary.</li> <li>2. There are several unusually shaped houses around the United States. For example, there is a house shaped like a shoe in Pennsylvania, like a teapot in Washington, and like a duck in Kentucky. Create a house with an unusual shape. Pictures of these houses are available on the Internet if you would like to see what they look like. Sketch both the outside and a cutaway of the inside. Name your house.</li> </ol>			

<b>Day</b>	<b>Time</b>	<b>What</b>	<b>How</b>
Day 13 Wednesday	AM/PM	1. Museum of Industry Trip	1. 10:30 Design It Workshop: Wiring a House 2. 12:30 Design It Workshop: Balls and Tracks
	Homework 1. Add one idea to IDEA diary. 2. Practice speech for Invention Convention. You only have five minutes to give your speech. Practice in front of a mirror 3. Choose one experience from the Museum of Industry fieldtrip and reflect on it. How did this experience enrich and enhance my summer?		
Day 14 Thursday	AM/PM	US Patent Field Trip	
	Homework 1. Add one idea to IDEA diary 2. Practice speech for Invention Convention. You only have five minutes to give your speech. Practice in front of a mirror. 3. Choose one experience from the US Patent Office and reflect on it. How did this experience enrich and enhance my summer?		
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.	