Appendix III: Handouts for Students and Parents

Figure 1. Section I Parent Letter

Section I Parent Letter

Dear Parent(s):
Re: Young Inventor Training Program Date:_____

We have starting a young inventors training program that will take place on _____.

We are excited about your son/daughter participation. We are in Section _____ of the training and need your help in gathering the attached supplies to make this program a success. Old and used items are the best for our young inventors program. We also need volunteers to help with the young inventor lessons on the day(s) noted below. If you are able to volunteer in the classroom on any of the day(s) and hour(s) listed, please let me know.

We would like to receive all donated supplies by _____.

Volunteers are needed on: _____.

Thank you. We hope you will enjoy watching the young inventors program unfold.

_____ _____ _____
Teacher name Email Teacher signature

SUPPLIES

- Popsicles
- One multi-pocket folder ***(Must have for your daughter/son)***
- Old wind up clocks that the students will take apart ***(We really need these!)***
- Glue gun, glue sticks, and/or tape
- Stapler and scissors
- Cardboard box cutter or heavy duty X-acto knife
- Screwdrivers and small screws, flathead and Phillips head
- Needle nose pliers and/or old tweezers
- Paper (white and scratch) and pencils (one for each student)
- Old flimsy forks and spoons made of soft metal
- Old combs
- Old socks
- Old spectacles and eyeglasses, even old sunglasses
- Old flimsy child scissors
- Paper bags (large and small)
- Old newspaper
- Post It notes
- Tinker Toys (old style with wheels and connecting sticks)
- Cardboard and paper boxes (small)
- Waxed paper milk and juice cartons (clean)
- String, cord, and rubber bands
- Molding clay (in colors)
- Cellophane (in colors) and/or saran wrap
- Plastic wheels (Small to be made into steering wheels)
- Paint brushes and washable paint
- Pipe cleaners, straws, and popsicle sticks

Figure 2. Inventions I Used Today *Name:*_____

Inventions I Used Today

Something you used today:	If it had not been invented, what would you use?	In what way would it bother you?

Figure 3. My Invention Research *Name:*_____

My Invention Research

Item that I will research:	When was it Invented?	Who is the inventor?	How old was he/she?	What is interesting about the invention story?

Figure 4. Further Invention Research *Name:*_____

Further Invention Research

Item	Who invented it and when?	What else did you find out?	Sources (List book or URL)
Fork			
Scissors			
Eyeglasses			
Paper			

Figure 5. Very Important Mistakes

*Name:*_____

Very Important Mistakes

Inventions that were based on mistakes	Who made the mistake?	What Happened?	Where did you find the answer? (List book or URL)
Slinky			
Post It notes			
Frisbee			
Gravity			
Yo-yo			
Pacemaker			

Figure 6. Section II Parent Letter

Section II Parent Letter

Dear Parent(s):

Re: Young Inventor Training Date: _____

Our young inventor training program is underway and takes place _____.

We are excited about your son/daughter participation. We are in Section _____ of the training and need your help in gathering the attached supplies to make this program a success. Old and used items are the best for our young inventors program. We also need volunteers to help with the young inventor lessons on the day(s) noted below. If you are able to volunteer in the classroom on any of the day(s) and hour(s) listed, please let me know.

We would like to receive all donated supplies by _____.

Volunteers needed on: _____.Thank you.

_____ _____ _____

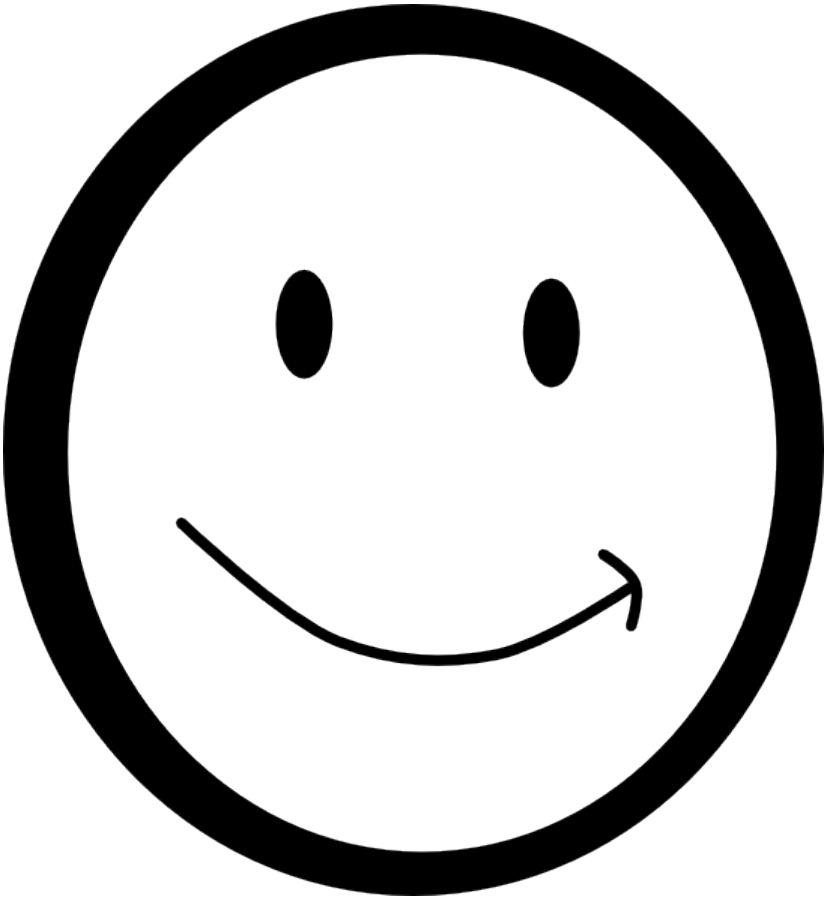
Teacher name Email Teacher signature

SUPPLIES

- Pencils, paper (scratch and white), construction paper/cardboard/old file folders
- Two or more glue guns (one for each work station), glitter glue, and glue sticks
- Masking tape, packaging tape, and scotch tape
- Two or more sets of pliers and a number of screwdrivers, flathead and Phillips head
- Stapler, and scissors, and box cutter for cutting cardboard (optional; careful tearing also works)
- Molding clay and erasable/washable crayons, markers
- Old cardboard (the sides of old boxes are ideal) for every 4 students
- Small balls or wheels of any kind up ¼ - 2 inches in size.
- Old hardware accessories:
  - Nuts (large & small, square & round), bolts, and washers (metal, large & small)
  - Large wood screws (2-4 inches), metal or plastic coil springs and S-hooks of all sizes
  - Screw hooks, S-hooks (metal, large & small), and screw anchors (plastic, large & small)
  - Chain links (metal & tiny—no larger than ¼ inch), thin copper or stainless steel wire
- Old bottle tops and squeeze tube caps (clean, any size)
- Plastic and waxed paper milk, juice cartoons (small, clean), and egg cartons (clean and dry)
- Cotton balls, ear swabs, and pipe cleaners
- Popsicle sticks, old paper towel rolls, and long packing tubes
- Cord, string, ribbon, rubber bands of all sizes and colors
- Saran wrap, waxed paper, and aluminum foil
- Balloons of different shapes and sizes, tissue paper and starch for paper mâché
- Rubber or plastic balls of all sizes
- Old spoons, forks, and knives, bowls and plates
- Fabric remnants and interesting ribbon scraps and tassels
- Old newspapers (to create work areas for the children) and paper bags for storage and clean up

Figure 7. Smiley Face

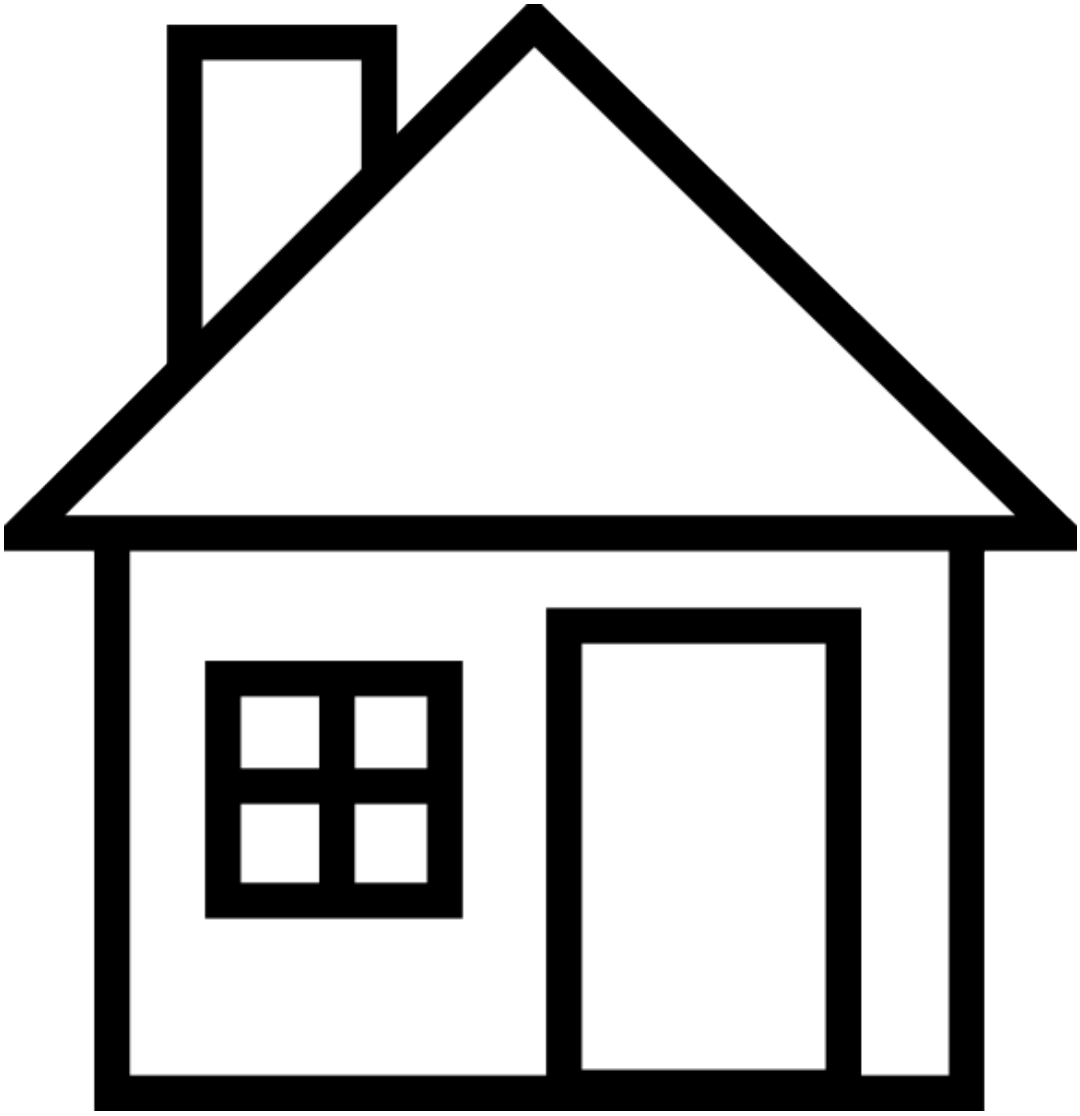
Smiley Face



Source (free printing): *http://www.clker.com/clipart-smiley-face-3.html*

Figure 8. House

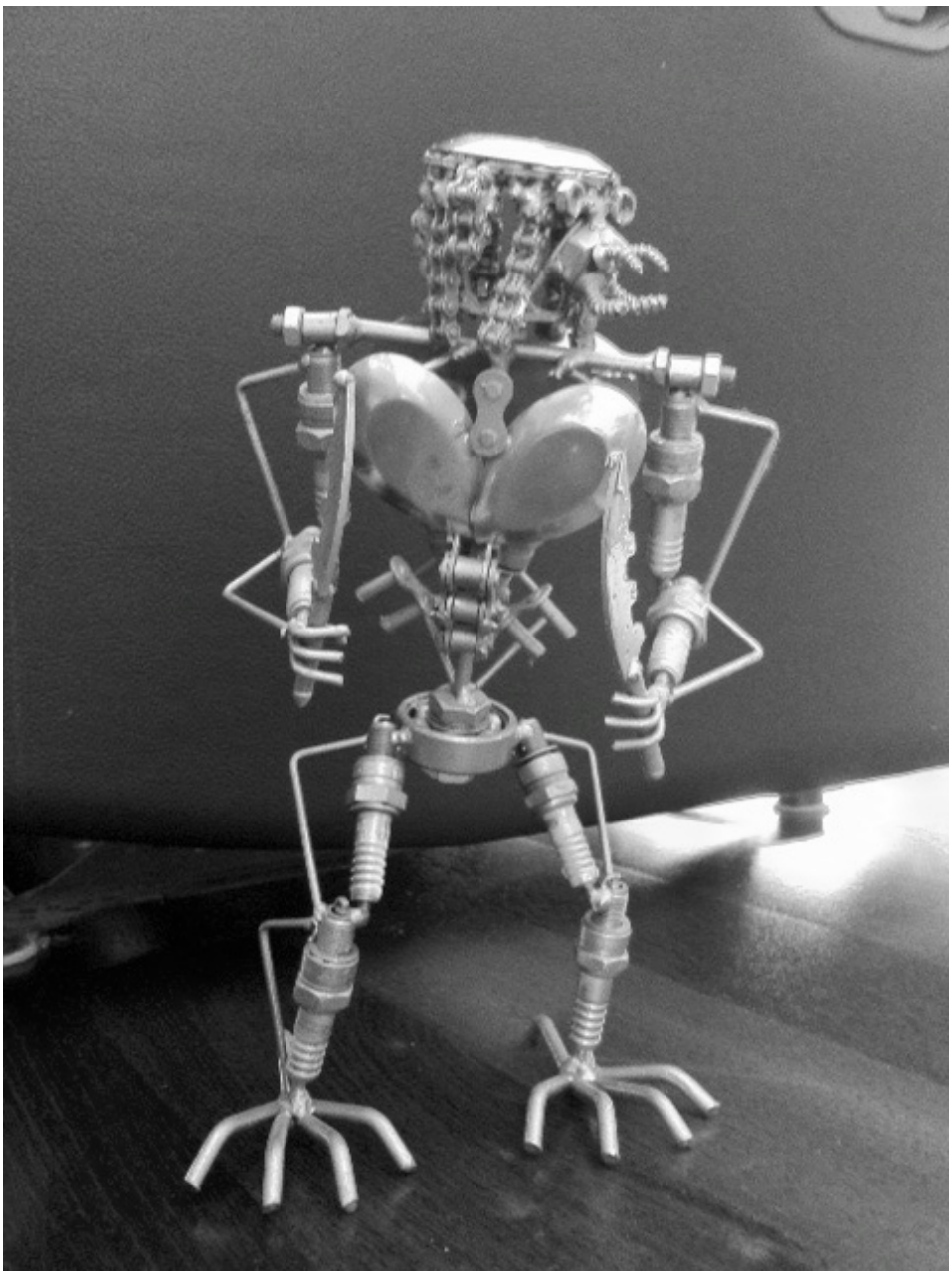
House



Source (free printing): http://www.clker.com/clipart-house-39.html

Figure 9. Hardware Dragon

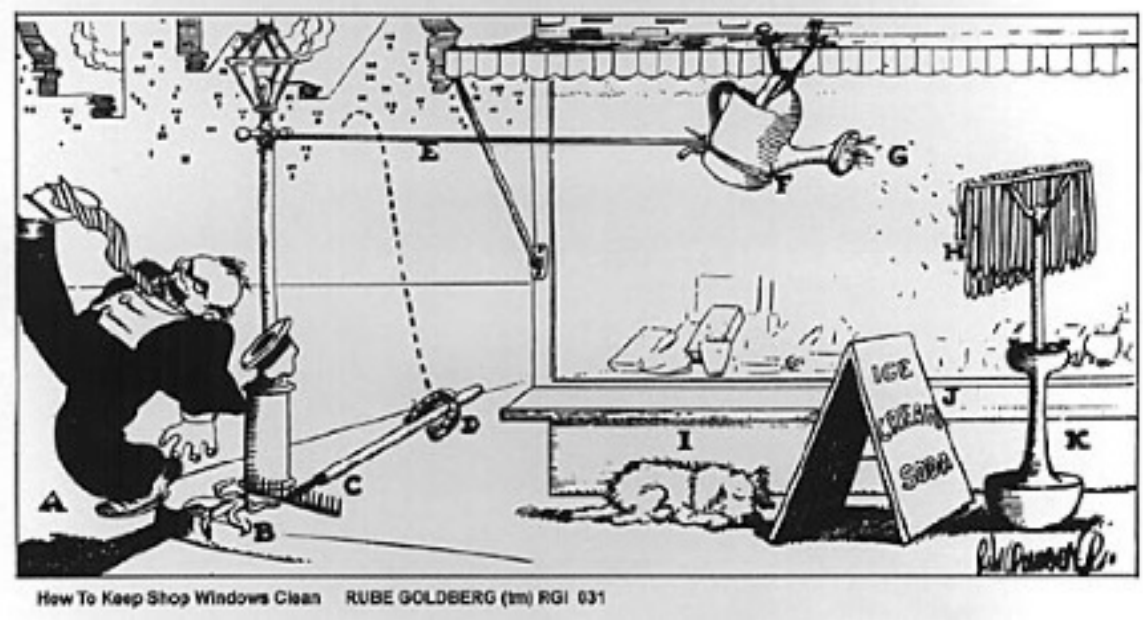
Hardware Dragon



(Source: This art piece was produced and sold commercially in Indonesia. Artist unknown)

Figure 10. Rube Goldberg's Window Washing Invention

Rube Goldberg's Window Washing Invention



*"Rube Goldberg stands in front of an x-ray and sees an idea inside his head showing how to keep shop windows clean. Passing man **(A)** slips on banana peel **(B)** causing him to fall on rake **(C)**. As handle of rake rises it throws horseshoe **(D)** onto rope **(E)** which sags, thereby tilting sprinkling can **(F)**. Water **(G)** saturates mop **(H)**. Pickle terrier **(I)** thinks it is raining, gets up to run into house and upsets sign **(J)** throwing it against non-tipping cigar ash receiver **(K)** which causes it to swing back and forth and swish the mop against window pane, wiping it clean." Permission to use: Rube Goldberg is the (R) and (c) of Rube Goldberg Inc.*

Figure 11. Studying Rube Goldberg Cartoons

*Name:*_____

Studying Rube Goldberg Cartoons

What Rube Goldberg invention did you choose?	What is basic goal of Rube Goldberg's invention?	What slapstick humor does Rube Goldberg use?	How does Rube Goldberg complicate the tasks involved?	Was the goal of the invention accomplished?	If not, what could you add to meet the goal?

Figure 12. Planning Your Own Rube Goldberg Invention

*Name:*_____

Planning Your Own Rube Goldberg Invention

5 Simple tasks	Goal of tasks	Add slapstick humor	How did you complicate the task?

Figure 13. Parent Letter: Asking for an Inventor Log

Parent Letter: Asking for an Inventor Log

Dear Parent(s):

We are proud of the progress that your son/daughter have made in our young inventors training program. Up until now, your son/daughter has been maintaining an inventor portfolio. Now he/she will advance to maintaining an inventor log. For this, your daughter/son will need:

_____

We will be collecting this over the next two weeks. Thank you for your assistance with our young inventor project.

_____	_____	_____
Teacher name	Email	Teacher signature

Figure 14. Best Practices in Maintaining an Inventor Log

Best Practices in Maintaining an Inventor Log

1. Number the log pages consecutively, *front and back*
2. Use pen rather than pencil
3. Line out mistakes
4. Write on every line—make an 'X' through blank lines and areas.
5. Sign and date every log entry.
6. Ask an *adult* to witness log entries regularly with their signature and date.

Figure 15. Bug List for Cooking Videos

*Name:*_____

Bug List for Cooking Videos

What really *bugged* the cooks?	In what way did it *bug* the cooks?

Figure 16. Things That Really Bug Me

*Name:*_____

Things That Really *Bug* Me

What really *bugs* me?	In what way does it *bug* me?

Figure 17. Things That Really Bug My Classmates

*Name:*_____

Things That Really *Bug* My Classmates

Sample interview questions: a. Please think for a moment and choose something that you often do. b. Would you please describe this task from beginning to end? c. Would you please describe the task again but in more detail? d. Are there any things that are difficult or inconvenient about the task? e. What things slow you down when doing this task? f. Does anything annoy you about this task? g. Does anything ever get in your way?	
What really *bugs* my classmates?	In what way, does it *bug* my classmates?

Figure 18. Things That Really Bug Adults I Know

*Name:*_____

Things That Really *Bug* Adults I Know

What really *bugs* adults I know?	What is the core problem?

Figure 19. Parent Letter: Creating Young Inventor Bug Lists

Parent Letter: Creating Young Inventor *Bug* Lists through Interviewing Adults

Dear Parent(s):

Re: Creating young inventor *bug* lists through interviewing adults

As part of our young inventor training, your son or daughter has been practicing interviewing skills as part of their training in problem-finding, which is a crucial inventor skill. Our current young inventor lessons involve creating *bug* lists. We are asking the young inventors to fill out the attached worksheet, *Things that Really Bug Adults*. In order to complete the interviewing training, son or daughter will need to interview an adult they know well. This adult might be you, a family member, or a close friend of the family. If this adult is someone you do not know well, we recommend strongly that you or a designated adult accompany your son/daughter.

Thank you. We hope you will enjoy watching the exercise unfold.

Teacher name	Email	Teacher signature

Figure 20. Probortunities Worksheet

*Name:*_____

Probortunities Worksheet

What is the *big bug* item?			
What is the core problem?			
What are current solutions?			
Describe the solution:			
How does solution solve core problem?			
Who use the current solution?			
When, where, and how is it used?		.	
How and why does it work?			
Is this the best solution? If not, explain why not? (If so, go on to next *big bug*)			
If no, then what is the *probortunity*?			

FIGURE 21. S-C-A-M-P-E-R POSTER

S-C-A-M-P-E-R Poster

What is it the *big bug*?
What is the core problem?
What are the "probortunities" in existing solutions?
S-C-A-M-P-E-R
Substitute: What part of the product could I change? In exchange for what?
Combine: What materials, features, processes, people, products or components can I combine?
Adapt: How can you adapt the product or parts of the product for some other use?
Modify: What if I change the product or part of the product in some way?
Put to other purposes: What else can you use the product for?
Eliminate: What could you take away?
Rearrange/ Reverse: Can you mix up the parts into something new?

Figure 22. S-C-A-M-P-E-R Worksheet

*Name:*_____

S-C-A-M-P-E-R Worksheet

What is it the *big bug*?
What is the core problem?
What are the "probortunities" in existing solutions?
S-C-A-M-P-E-R
Substitute: What part of the product could I change? In exchange for what?
Combine: What materials, features, processes, people, products or components can I combine?
Adapt: How can you adapt the product or parts of the product for some other use?
Modify: What if I change the product or part of the product in some way?
Put to other purposes: What else can you use the product for?
Eliminate: What could you take away?
Rearrange/ Reverse: Can you mix up the parts into something new?

No worksheets for Figures 23 & 24

Figure 25. Parent Letter: Need Volunteers and Supplies

Parent Letter: Need Volunteers and Supplies

Dear Parent(s):

We are proud of the progress that your daughter/son have made in our young inventors training program. She/he has now succeeded in moving from studying about inventors to becoming young inventors themselves. The young inventors have progressed to the point of designing prototypes of their possible inventions. With this letter, I would like to ask for the help of parent volunteers that would enjoy working with the young inventors on our young inventor building day scheduled for:

_____

If you are able to volunteer on that day, please let me know. We also need you help in assisting your daughter/son gathering the supplies they need to build their invention designs. Below your daughter/son has written a list of materials needed. *We will be collecting the materials over the next two weeks.*

Thank you for your assistance with our young inventor project.

_____ _____ _____

Teacher name Email Teacher signature

Materials List: