Session 14

Prototype Practicalities

Prototyping

In This Session:

A) Prototype Planning (30 minutes)
- Student Handout
- Student Reading

B) Prototype Materials (60 Minutes)
- Student Handout

C) Budget (60 Minutes)
- Student Handout

Home Improvement
- Student Handout

In *Prototype Practicalities* you will begin planning for construction of your prototype. In *14A: Prototype Planning*, prototypes are reintroduced as you strategize plans and create your specifications for developing a prototype. In *14B: Prototype Materials*, consider what materials you will use to develop your prototype. Finally, in *14C: Budget*, use a spreadsheet program to develop a budget for your project. The Home Improvement activity, *Your Work Schedule*, helps you structure your time for working on your prototype.

Prototype Planning

Handout: Session 14, Activity A

Now that you have a model made, it's time to move on to the next step: building a prototype. Remember the differences between a prototype and a model. Plan your prototype in your design notebook.

> **Model:** A visual representation of a total design (or some aspect of the design) that is nonfunctional.
> **Prototype:** A working model used to demonstrate and test some aspect of the design or the design as a whole. A prototype is produced before the final version.

1. What ideas do you have for developing your prototype?

2. What suggestions do your peers have for you?

3. In *11B Handout: The Perfect Fit: Meeting Needs Through Design*, you should have come up with your design requirements. You are going to use those to develop design specifications. Requirements are general ways that the designer-engineer will meet the needs of the users. Specifications are more specific and identify measurable needs for the product design—they serve as guidelines for designing and engineering the product. Using the chart from *11B Handout* add specifications to the chart.

Name of Product: _____ Brief Description: _____

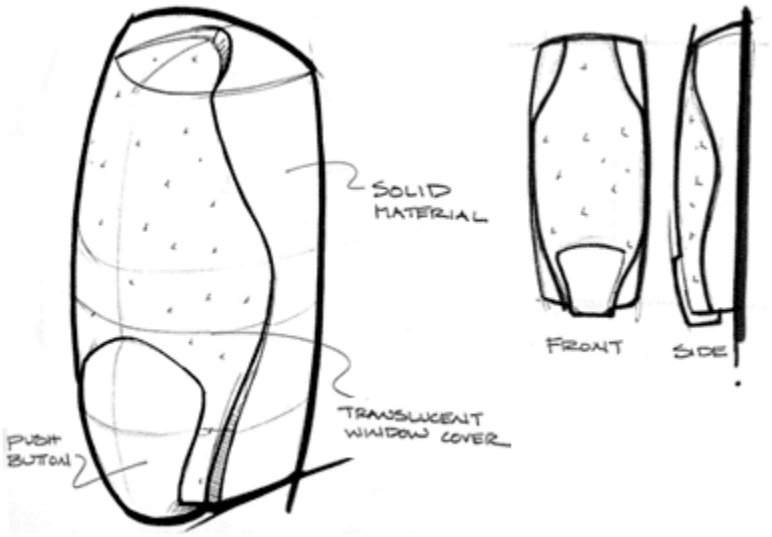
User Needs	Design Requirements	Design Specifications

ZIBA Designs a Soap Dispenser

Reading: Session 14, Activity A

ZIBA Design designed a new Dial* soap dispenser for commercial use in restrooms. Follow the process that ZIBA engineers and product designers used to develop this product.

Sketch of Dial Soap Dispenser



A new Dial soap dispenser needed to meet the following requirements:

- Dispenser has a semi-translucent cover for viewing soap levels.
- Dispenser uses a rounded push button for easy interaction.
- Spout needs to indicate where soap comes out.
- Space should be available on the inside of the cover for distributor label.
- The Dial brand should be recognizable.

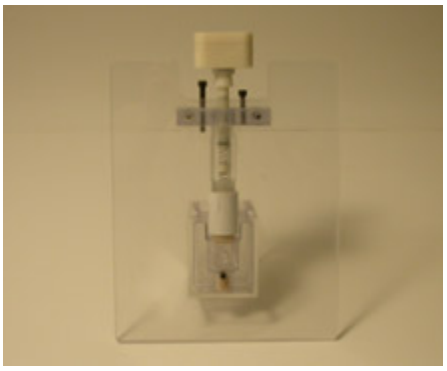
14A Reading: ZIBA Designs a Soap Dispenser (continued)

This first sketch shows the initial concept from a front, and side view.

Computer Model

This shows a computer model of the soap dispenser. A computer model is used to help product designers plan the design and dimensions more accurately than a hand-drawn sketch. This computer rendering is used to guide the development of the soap dispenser model.

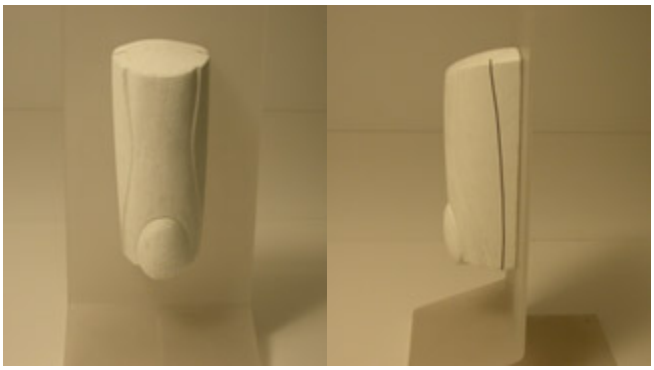
Mechanical Model



The next step is figuring out how the parts of the dispenser will work. In this case, a model was made of the mechanical component, the soap-dispensing mechanism. With this model, engineers can trial and test how the mechanism will work.

14A Reading: ZIBA Designs a Soap Dispenser (continued)

White Foam Visual Model

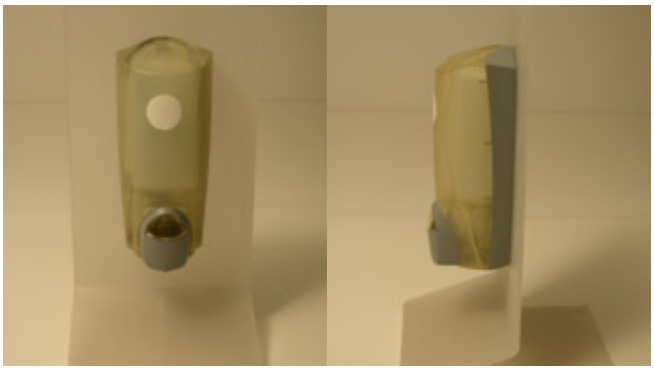


A white foam visual model is a quickly built model to evaluate early visual concepts and different product configurations. A white foam model is used for non-detailed, configuration explanation in the early phase of a design project. A front and side view are shown here.

Urethane Functional Model

A urethane foam model is a more detailed model used to evaluate a refined visual design. Details such as parting lines for manufacturing, and button details can be shown.

Mechanical Functional Prototype



14A Reading: ZIBA Designs a Soap Dispenser (continued)

A mechanical functional prototype is a complete mechanical and visual model used to evaluate all aspects of a product before proceeding to the manufacturing stage.

Production Product

The production product is the final design that rolls off the manufacturing line and is sold to customers.

Prototype Materials

Handout: Session 14, Activity B

Building a prototype can be fun and challenging. Here are a few tips to keep in mind:

1. Make it large enough. Remember that others will want to see the detail, and you will want to make sure all the parts work.
2. Pay attention to detail. Be sure that you show all the parts and components.
3. Make it strong. Use durable materials.
4. Make it "green." Use recyclable materials when possible.
5. Make it realistic. The prototype should be as close to the real product as possible.

Answer the following question to plan your prototype:

1. What materials are you considering using for your prototype?

2. Now, in your design notebook, draw a sketch of your prototype and label the materials.

Budget

Handout: Session 14, Activity C

Using a spreadsheet program, prepare a budget for your project. Include the materials, how much you will need of each material, the cost for each material, and the total cost.

Materials	Quantity	Cost
		Total Cost =

Your Work Schedule

Handout: Session 14, Home Improvement

By now, you will have set goals for yourself such as participating in a science fair. Because you will probably be doing much of the work for the remainder of the project at home, it is important to pace yourself and budget your time wisely. Creating a work calendar can help with this. Here are some suggestions for your calendar.

- Get a Yahoo personal account and use the Yahoo Calendar. http://calendar.yahoo.com/*
- If you use Microsoft Outlook* for email, you can use the calendar there.
- Make your own calendar.
- Use a store-bought calendar to plan your work schedule.

Things to include in your calendar:

- Work time and specific deadlines
- Personal dates such as vacations, family trips, and school events
- Class meetings
- Mentor meetings
- Partner check-ins
- Leader check-ins
- Science and engineering fair deadlines

Review your calendar and ask yourself:

- Do you have all fixed deadlines on the calendar?
- Do you have projected completion dates for goals and subgoals?
- Did you include research and information gathering time?
- Did you allot realistic time blocks to allow for setbacks?