Designing Dolls

The Movie:

Next year's Barbie dolls are the result of a great deal of planning and creative work by this year's designers. Featured: Jennifer Williams, Assistant Product Manager, Mattel; Cassidy Park, Designer, Mattel. *(Movie length: 3:20)*

Background:

Dolls, whether they are made of wood, paper mache, porcelain, cloth, or plastic, have apparently been part of human culture as far back as we have records.

The craft of doll-making has many facets, and a doll designer must have both a sense of proportion and a sense of style. For dolls to be commercially successful, the designer must also have a good sense of what people like and want. Given those things, making dolls becomes a matter of quality materials, skillful techniques, and inspired artistry.

Curriculum Connections:

Measurement (distance) | 1

One of the professionals in the movie states that "if you lined up all of the Barbies in the world head to toe, they would circle the world 8 times." If a Barbie doll is 10" high, and the Earth has a circumference of around 25,000 miles, how many dolls would that be?

Percents | 2

The table below presents information regarding the cost of making four different types of skirts for a doll. The differences in the skirts are the relative amounts of cotton and rayon used. Complete the table, based on these assumptions:

- It takes 15 grams of material to make the skirt.
- Cotton costs 1.5 cents per gram.
- Rayon costs 0.8 cents per gram.

	Skirt A	Skirt B	Skirt C	Skirt D
Percent of cotton in skirt	50%	60%	70%	80%
Percent of rayon in skirt	50%	40%	30%	20%
Amount of cotton used (in g)	??	??	??	??
Amount of rayon used (in g)	??	??	??	??
Cost of cotton per skirt	??	??	??	??
Cost of rayon per skirt	??	??	??	?
Total cost	?	??	??	??

Percents

In order to determine how much of each type of doll should be manufactured, it helps to know how popular each type will be. Suppose that this chart represents the results of surveying doll buyers nationwide:

Age range	Percent of total buyers in this age range	Number surveyed	Prefer "glamour doll"	Prefer "lawyer doll"	Prefer "mom doll"
5 – 8	45%	124	34	20	80
9 – 10	35%	144	42	68	34
11 – 12	20%	96	10	72	14

a) Compute the percentages of each group which prefer each type of doll. What is the highest percentage?

b) If you have 10,000 buyers total, find out how many would buy each type of doll. (You will first need to determine how many buyers there are in each age range.)

Algebra (coordinates)

Below is a pattern for a high-necked jacket, placed on a 1/4" grid. Find the coordinates of each corner of the pattern. Multiply each coordinate value by 1.5 to get the coordinates of a pattern for a jacket that is 150% as large. Plot those points and draw that pattern.
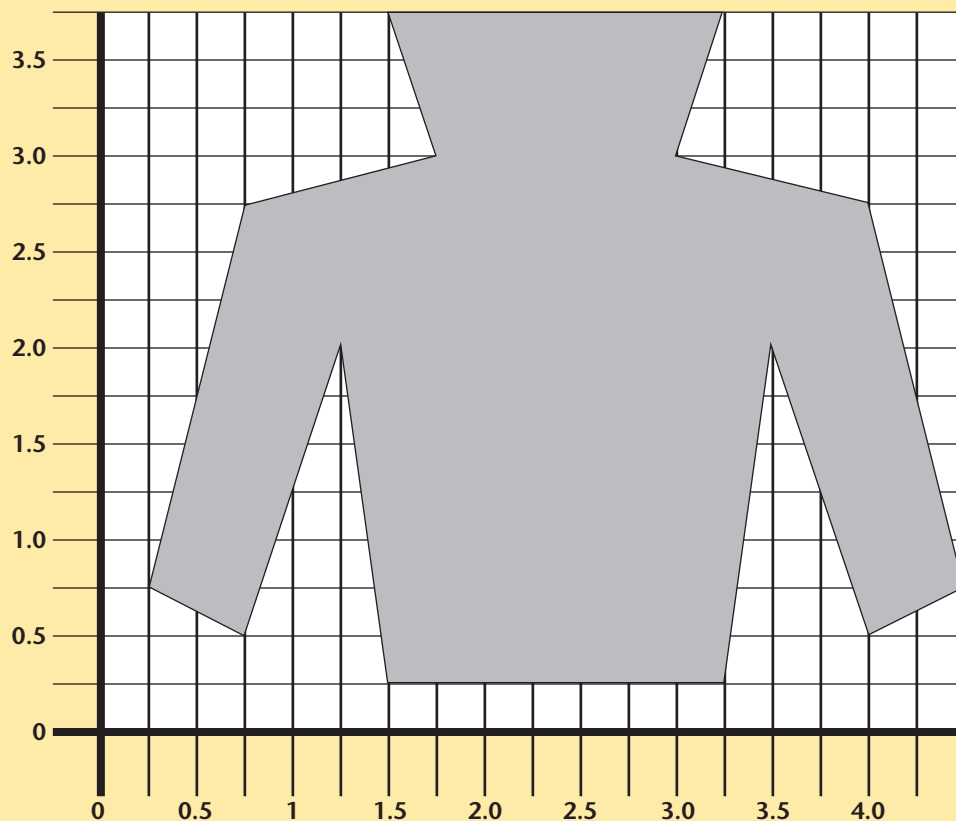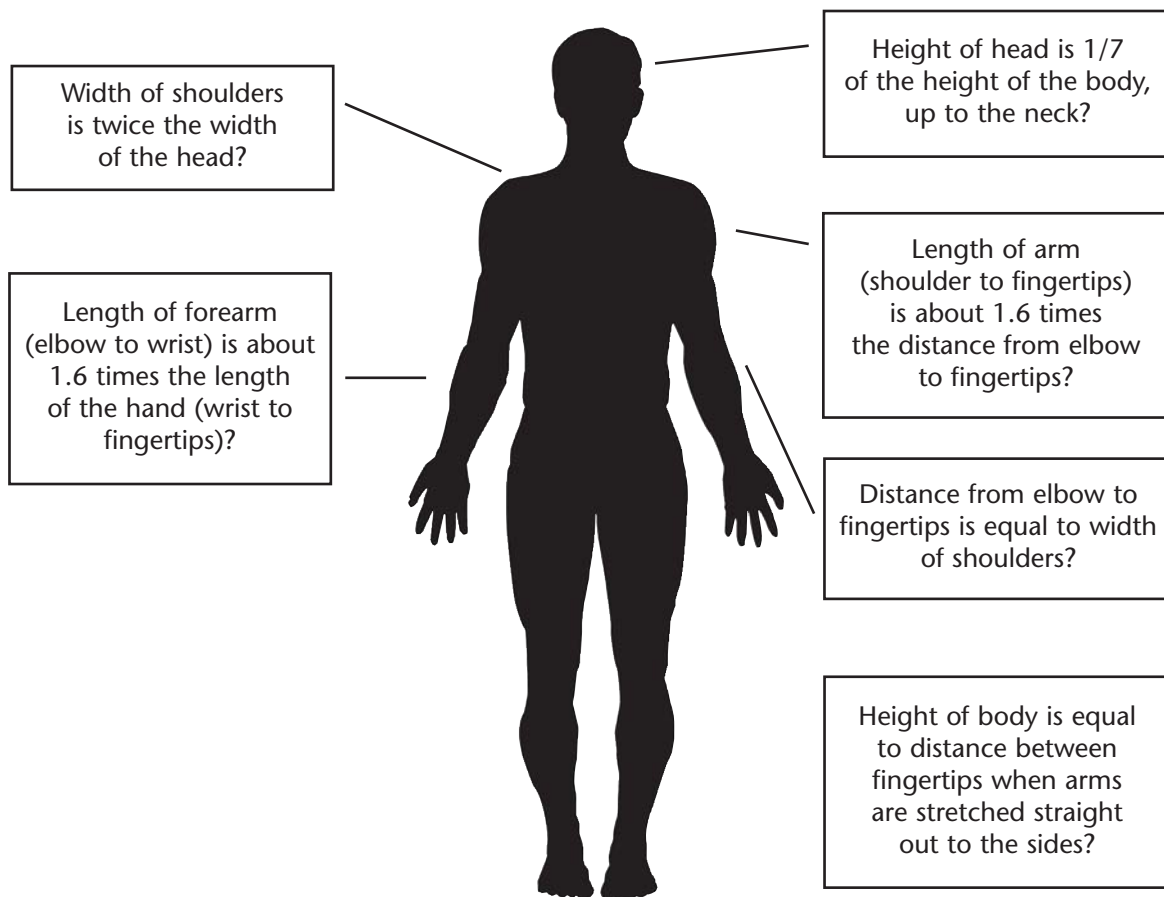
Always a Doll Moment, Inc.

To: Designer
From: VP New Projects
Re: Next year's line

For next year, we are planning a new line of dolls which are quite accurate in their representation of the shape of the body.

Over the years we have heard many "rules of thumb" about ratios in the human body. I would like you to make some measurements on people you know and verify whether or not these are true. Then, based on what you learn, make a silhouette figure 10" high, facing front as the figure below, in which the ratios of the parts of the body are as accurate as possible.

Width of shoulders is twice the width of the head?

Height of head is 1/7 of the height of the body, up to the neck?

Length of arm (shoulder to fingertips) is about 1.6 times the distance from elbow to fingertips?

Length of forearm (elbow to wrist) is about 1.6 times the length of the hand (wrist to fingertips)?

Distance from elbow to fingertips is equal to width of shoulders?

Height of body is equal to distance between fingertips when arms are stretched straight out to the sides?

Questions:

What is the relationship, if any, between lengths of arms and lengths of legs?

What is the relationship, if any, between length of legs and total body height?

Teaching Guidelines: Always a Doll Moment
Math Topics: Measurement (distance), Ratios

Materials: Measuring tape

Students should work in groups of 4 to 5 members for this activity.

Distribute the handout and read it with the students. Ensure that they understand the task.

Students should plan what data they are going to gather, and how they are going to organize and record their data.

Each group should collect appropriate measurements on all of its members, and decide which of the rules of thumb are true. They should also answer the two questions regarding lengths of legs.

Students should work individually to make their silhouette figures.

You may wish to ask students to submit, along with their silhouettes, their measurements and calculations that show how the figures illustrate the rules.
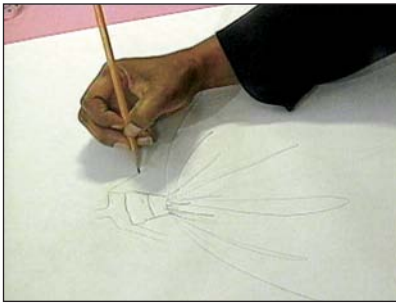
If you enjoyed this Futures Channel Movie, you will probably also like these:

The Tools of Graphic Design, #4015	Graphic artists lay out images and type with tools like rulers, triangles, compasses and computers, so the printer can perfectly recreate the designer's work.
Designing Toy Cars, #4013	These toy cars are near-exact replicas, and that requires an understanding of the concept of "scale".
Designing Sunglasses, #4012	Watch as a new model of sunglasses goes from design sketch to finished product.