



# Cost and Design Comparison



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## Unit Overview

**Topic:** Engineering Design Process

### Standards:

- Asking questions (for science) and defining problems (for engineering)
- Constructing explanations (for science) and designing solutions (for engineering)
- Designing Technological/Engineering Solutions using science concepts

## Activity Structure

**Title:** Cost and Design Comparison

### Guiding Questions:

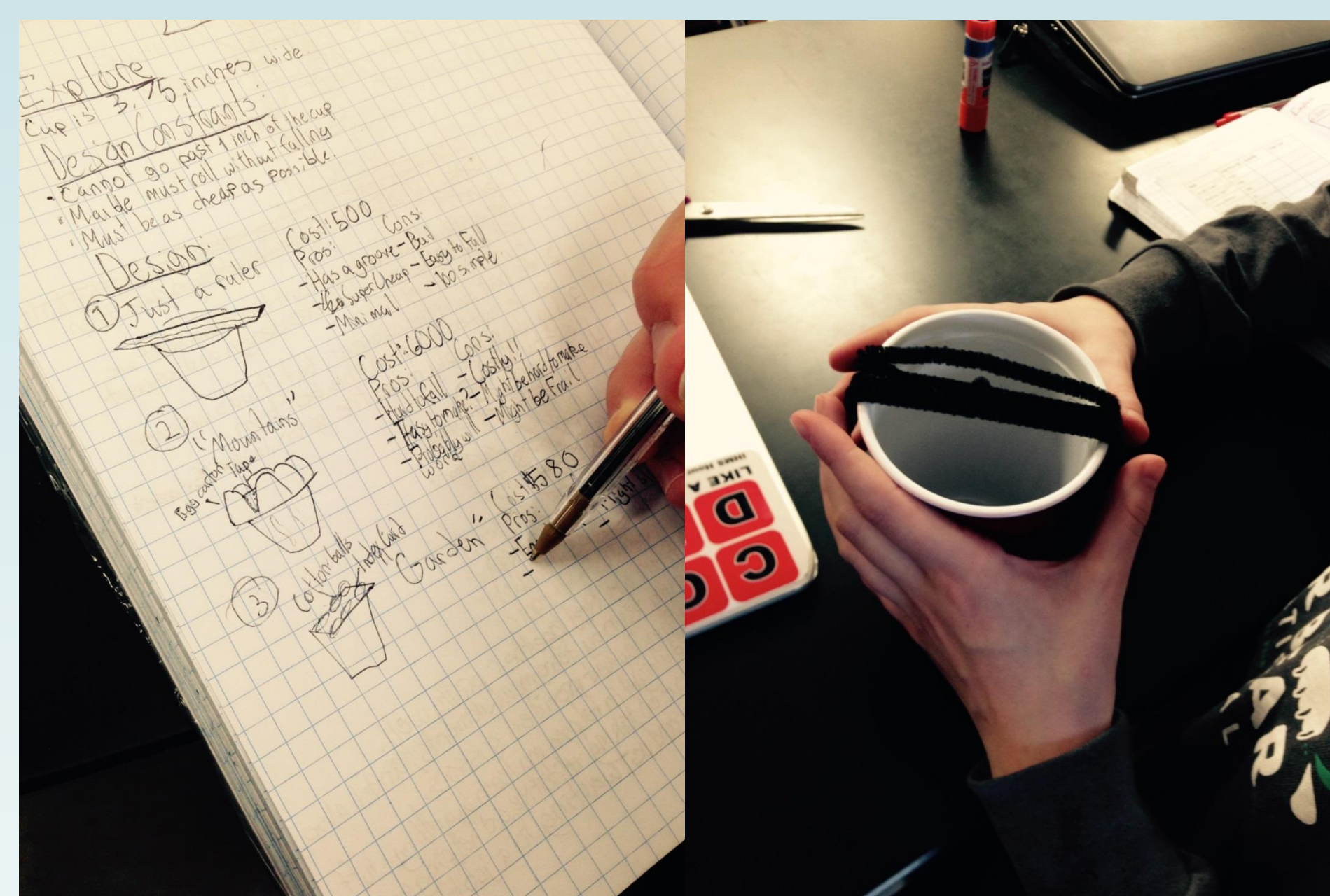
- What is the relation between cost and design?
- What is the relation between constraints and design?
- What is the engineering design process?

### Objectives:

- Compare the costs of alternate designs
- Compare medical device design to the engineering design process
- Compare the different effects of constraints on alternate designs
- Apply the engineering design process to solve a design challenge
- Build, test, and redesign a prototype that mimics the function of a laparoscopic closure device

## Activity Implementation

- Students were taught about medical device design
- Students worked in teams to brainstorm ideas considering constraints to mimic a laparoscopic closure device, particularly cost
- Teams built multiple prototypes and then improved on them to make them more competitive



## Engineering Design Process

### Applications:

- Medical device design

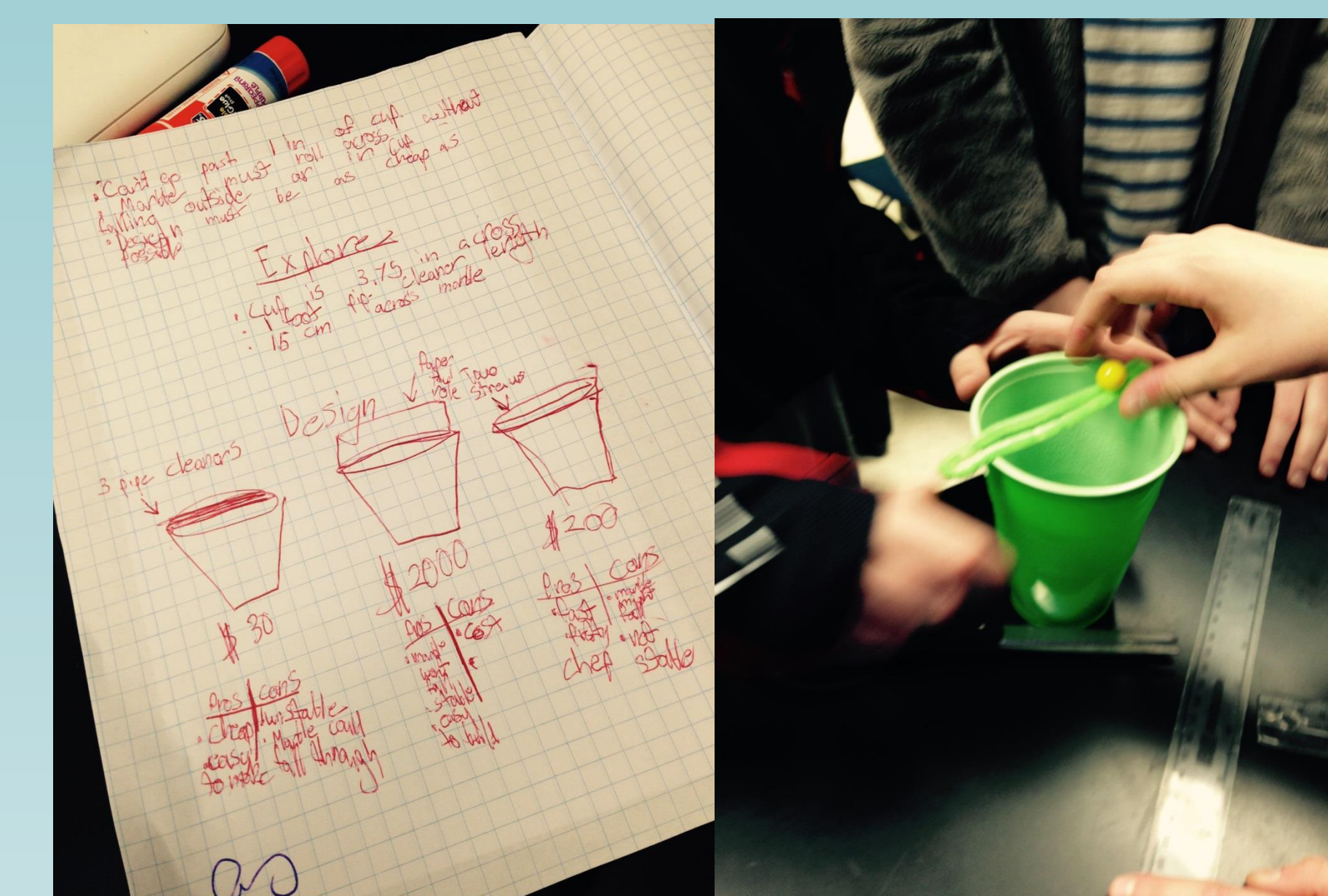
### Careers:

- Biomedical engineers
- Mechanical engineers
- Cost analysts
- Regulatory analysts

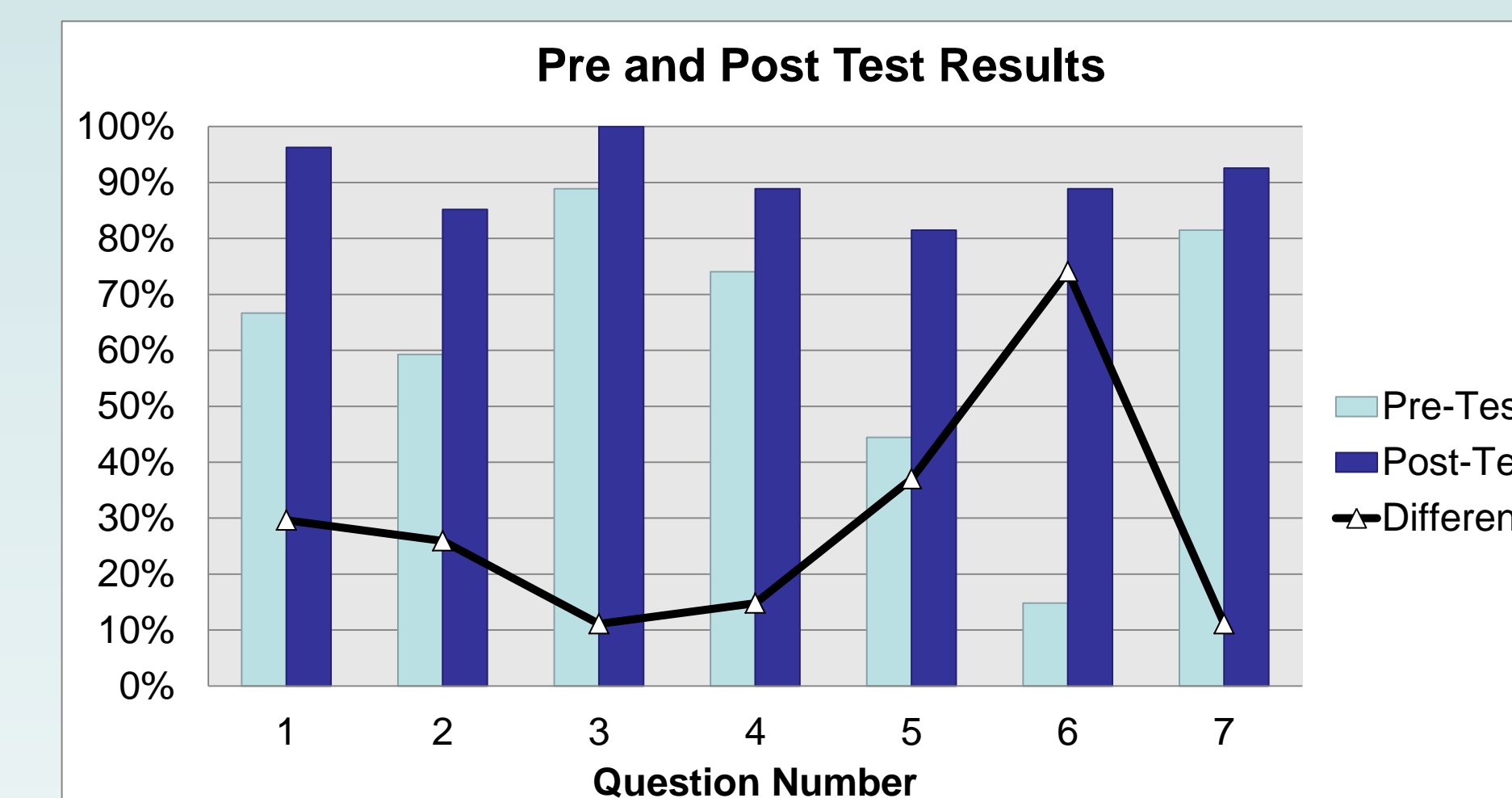
### Society:

- Gold standard medical devices
- Relation between cost and function

## Student Work



## Assessment Results: Impact on Student Learning



### Results::

- Averaged 30% improvement
- Lowest improvement 11%

## Reflection and Conclusion

### Successes:

- Every student involved
- Had the opportunity to solve a “real world” problem
- Creative solutions
- Emphasis on “make it better”
- Interesting discussion

### Improvements::

- Pre and Post test could have been more challenging
- Could have been more constraints