The purpose of the ENGAGE phase is to pique students' interest and get them personally involved in the lesson, while pre-assessing prior understanding.

The purpose of the EXPLORE phase is to provide students with the opportunity to construct their own understanding of a topic.

The purpose of the EXPLAIN phase is to provide students with the opportunity to explain and refine what they have learned so far and determine what it means.

The purpose of the ENRICH phase is to provide students with an opportunity to explore in more depth what they have learned and to transfer concepts to more complex problems.

The purpose of the eNGINEER phase is to provide students with an opportunity to develop greater depth of understanding about the problem topic by applying concepts, practices, and attitudes. They use concepts about the natural world and apply them to the man-made (designed) world.

The purpose of the EVALUATE phase is for both students and teachers to determine how much learning and understanding has taken place.

The Student
- Applies concepts, principles, and theories related to Design and how Resources guide decision making;
- Uses “Design,” “Modeling,” “Human Values,” “Resources,” and “Systems” to develop solutions to problems;
- Uses creativity to design and build solutions;
- Uses the Design Process to test and redesign solutions against criteria and constraints;
- Identifies problems and uses Modeling to predict redefined solutions;
- Applies “what if” concepts to different contexts;
- Identifies the quality of designed solutions;

The Teacher
- Introduces the concepts of Design and Resources, describing how they interact;
- Reiterates the Design Process;
- Facilitates student learning through the use of inquiry and design;
- Elaborates on design failures to deepen understanding;
- Provides students with resources for the application of engineering solutions;
- Guides students in the application of quality-control methods;
- Encourages Engineering Design Journal (EDJ) entries and student innovation.
The STEM Design Challenge

Criteria

✓ Work in groups of 3 or 4
✓ Build the tallest freestanding structure

Constraints

✓ Only use the materials provided
✓ You may not use any additional materials
✓ Marshmallow must remain intact
✓ Marshmallow must be at the top of the structure
✓ You may cut the tape and break the spaghetti
✓ You may poke the spaghetti into the marshmallow
✓ You may not hollow out or cut the marshmallow
✓ You have 13 minutes

Materials

✓ 20 sticks of spaghetti
✓ 24” of string
✓ 6” masking tape
✓ 1 Marshmallow

The Marshmallow Challenge

A hands-on design challenge that illustrates how we all make assumptions when approaching situations or problems and reinforces the importance of understanding the “problem.”

Adapted from marshmallowchallenge.com