

### Performance Task Creator

**NGSS: Standards and Performance Expectations (PEs):**

Assess the DoK required by the Performance Expectations (PEs), Disciplinary Core Ideas (DCIs), and Crosscutting Concepts (CCCs) of the NGSS:  
 [Clarification: You can list the key PEs, DCIs, and CCCs that students will come away with when completing this project/activity.]

**Standard: PE:**

● **DCIs:**  
**3-ESS3 Earth and Human Activity**

DCI: 3-ESS3-B - Natural Hazards: A variety of natural hazards result from natural processes. Humans cannot eliminate natural hazards but can take steps to reduce their impacts.

3-5-ETS1-1 Define a simple design problem reflecting a need or a want that includes specified criteria for success and constraints on materials, time or cost.

3-5 ETS1-2 Generate and compare multiple possible

**Real-World Problem/Challenge:**

(A problem that the community or world is currently facing that requires skills and content embedded in the benchmarks to solve.) [Clarification: This can be a real-world need that students can address. The challenge should be doable for the grade level to work on **and a real-world transfer.**]

When high winds occur, many buildings that are not structurally sound get destroyed.

**Real-World Product:**

(A product that is similar to what would be found in the real world, e.g. Environmental Impact Statement (EIS), essay, PSA, **model** for an idea/process of improvement, testable **prototype**.) [Clarification: What will students **create** (process, protocol, prototype, etc.) as a result of using the EDP? Describe briefly here, what the **end-product** will be that students can showcase at the end of the year.]

Students will design and build a house that is 9 inches or taller, with 4 walls and a roof, that can withstand the wolf (a hand fan) from blowing it down for a minimum of 10 seconds. The materials available are oaktag, index cards, straws, craft sticks, masking tape and scissors.

**Real-World Role:**

(Something that students might actually do and/or consider as a future in a STEM career. [Clarification: Use this activity/project to inform students of the possible **careers in engineering** and link this with giving them real-world roles such as “budding engineers,” “inventors,” “innovators”.]

Students will be design engineers, having to design and build a structure for the three little pigs. They will then test the strength of the house they created.

**Real-World Audience:**

(Ideally beyond the walls of the school, and an audience whom are authentically part of the challenge (clients/customers). [Clarification: This could be the school principal/admin, faculty, staff, students at the school; families, greater community, Island/State, country, world. Make it as realistic as possible, where the audience is the “client” or “customer” or “end user” of your real-world product.]

Audience will be other third graders (their peers), possibly older students in grades 4-6.

**What do students need to know or be able to do in order to accomplish this?**

[Clarifications: (a) Briefly outline the key activities by the EDP stages (i.e. “ASK: Students will interview other students from other classes to ask them about how they feel about what they are currently doing with recycling on campus.”); (b) Add time frames (i.e. three class periods at 45 minutes each time) for each stage of the EDP; (c) Note in the activities how students will develop deeper understandings of content, concepts, and skills/practices (science/engineering) with each EDP step; (d) List\* resources needed, including guest speakers, field trips, books, videos, etc.), and supplies/materials (tools, consumables, etc.)] **\*List of resources should be attached on a separate page.**

ASK: Students will listen to the story of The Three Little Pigs so they can design a house for the pigs to live in, making sure it is strong enough that the wolf is unable to blow it down.

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solutions to a problem based on how well each is likely to meet the criteria and constraints of the problem.

3-5 ETS1-3 Plan and carry out fair tests in which variables are controlled and failure points are considered to identify aspects of a model or prototype that can be improved.

● **CCCs:**

3-5 ETS1-2 Engineers improve existing technologies or develop new ones to increase their benefits, decrease known risks, and meet societal demands.

**Transfer Skills of Science Investigation & the EDP:**

(How might the science and engineering practices (EDP) be used in real life?)

[Clarification: Refer to the science and engineering practices (SEPs) of the NGSS for the selected standards you chose above. This is the blue section in the NGSS document.]

Students will critique their solution and their peers' solution (by designing and building a house that

**Real-World Process/the Engineering Design Process:**

(The process mirrors what would take place in the real world.) [Clarification: You can briefly discuss how this project/activity will address all five stages of the EDP.]

Students will have to design and build a house that is 9 inches or taller, with 4 walls and a roof, that can withstand the wolf (fan) blowing it down for at least 10 seconds, using craft sticks, straws, 5x7 inch pieces of oaktag, index cards and inches of masking tape. A ruler will be available so students can see whether their tower is 9 inches tall. They will test the strength of their house to see if it can withstand the wolf's blowing (a hand fan) for 10 seconds by observing if their house was upright (didn't fall) after the wolf was finished blowing.

Students will make adjustments if their house didn't meet the specifications (9 inches tall with 4 walls and a roof)), or if it didn't hold up for the 10 seconds. They will record in their engineering notebook whether it met the specifications and how long it held up for and do a student reflection. Students will then do 2 (or more) designs to improve their structure by

IMAGINE: Students compare buildings (durable and not durable) and sketch their own ideas.

September 17-18, 2019

PLAN: Students will use a Pugh chart to decide which design concept is best. They will draw a detailed sketch and label important elements. Materials will also be listed.

September 19-20, 2019

CREATE: Students will create and test their design, documenting and evaluating their house.

September 23-25, 2019

IMPROVE: Students will see what worked/didn't work, and how they can improve their house. They will test their improved house, again documenting and evaluating their improved house.

September 26-27, 2019

COMMUNICATE: Students to share their design with their peers, possibly students in grades 4-6 also.

Books and videos will be shown, so students understand the importance of a structurally sound house.

meets the specifications) by citing relevant evidence of how it meets the criteria and the constraints of the problem.

describing the design change and justification, and retest to see if their design improved. If it did, they need to evaluate why it worked better. If it didn't, they need to evaluate why not and figure out what they need to do to create a stronger house.

**Real-World Scenario/Problem Statement:** (Put it together and set up a scenario that is engaging for students that is relevant and will address NGSS grade level standards along with the EDP.) [Clarification: Create a scenario that puts them in the real-world role (i.e. engineering team, citizen scientists). **Use the template that the UH STEM Pre-Academy gave you at Session #3 to craft this problem statement** to engage students and make this assignment a project that will have real-world, relevant impacts.]

The three little pigs need a strong house to live in because if their house collapses, they won't have a place to live and they may get hurt or even eaten by the big bad wolf.