



## Intentional Planning Sheet – Wrecking Ball

This is a sample of the RISE Intentional Planning sheet that was co-constructed by RISE teachers with the goal of challenging children to design a wall that can withstand the force of a wrecking ball. The Intentional Planning sheet provides guidance in planning an experience and considers key details to assure the experience is rich in STE and HSC.

What is the problem/challenge? What is the learning goal?

*Can you build a wall that is strong enough / stable enough to withstand the wrecking ball?*

*Children will learn about stability through engaging with force of the wrecking ball and various types of materials*

HSC Information - What do the children know or what relevant experiences have they had? What links can we make from this information to the challenge activity?

*We obtained information about the homes children live in through an HSC Activity Sheet. From here we were able to engage children in talking about the various types of materials their homes were built out of and offer the opportunity for them to share other observations and experiences of their own. (e.g. Wood house is green because it was painted, you use a hammer and nails to build with wood, you need cement to build with bricks)*

What prior knowledge or skills are needed?

*Children need some awareness of materials and their strength in building. We decided that reading the story The Three Little Pigs would be an important activity to implement before this challenge. This would lay a foundation around this idea and link to cause and effect.*

*Do children know what a wrecking ball is?*

Variables:

*Weight of ball, size of ball, length of string, type of material, how materials are constructed with*

Materials: (e.g. visuals, charts, book, song, manipulatives)

*PVC piping to create frame of wrecking ball. Various size and weighted balls, string, tape, various building materials (wooden blocks, foam blocks, ramps, magna-tiles, bricks)*

How would you introduce the lesson (whole group)? Be sure not to give away the answer!

open ended  guided  structured

- 1. We share the activity sheets and invite them to talk about their homes, materials from which they are made, levels in their homes, other experience and knowledge.*
- 2. Share real pictures of buildings made of the materials noted on the activity sheet (glass, wood, brick, and cement). Ask children what they notice about them. How are they the same; how are they different?*
- 3. Pass around samples of the actual building materials (wood, cement, and brick).*
- 4. We would revisit The Three Little Pigs story asking children what they remember about the story including the materials homes were built from, which withstood the wolf, what cause and effect connections were made.*

What type of investigation would you set up in a learning center after the introduction (small group)?

open ended  guided  structured

*The first day, we would offer children the wrecking ball and 2 different materials to build with (wooden blocks and foam blocks). Children will build walls however they want and test it to see if it can withstand the wrecking ball.*

What questions would you pose to the children? Attention-focusing, Action, Problem-posing, Comparison, Math:

- Does the height of the structure affect the stability?*
- How many layers of blocks did you use?*
- What do you notice about the way your wall is designed compared to this wall?*
- Notice the way the bricks are laid in this picture. Do you think that affects the wall's stability? Let's explore!*
- I noticed you let go of the ball up here and before you let go of the ball down here. Does it matter at which point you release the ball?*

How would you assess understanding?

- We would listen to the children's responses to our questions. Are they able to articulate accurate connections? Are they designing responses to our questions that are successful?*

Potential extensions? (**connect – deepen – extend**)

- *The second day, we would offer the same experience as above but change the materials that children could build a wall with magna-tiles and legos.*
- *The third day, we would offer 2 different balls hung from the wrecking ball. The string length would be the same, the size of the ball would be the same, but the weight would be different. Children would only be provided wooden blocks to build a wall with. Why does one wrecking ball work while the other does not?*
- *The fourth day, children would be encouraged to build their home, using their HSC activity sheet as guidance. Could they build it to withstand the wrecking ball? What materials do you need? Do you notice any patterns? Are there parts of the wall that are stronger or weaker?*
- *What can be used to stabilize materials? Playdough, shaving cream, toothpaste*

Circle the frameworks that will be addressed:

## Scientific & Engineering Practices

1. Asking questions (science) defining problems (engineering)
2. Developing and using models
3. Planning and carrying out investigations
4. Analyzing & interpreting data
5. Using mathematics and computational thinking
6. Constructing explanations and designing solutions
7. Engaging in argument from evidence
8. Obtaining, evaluating and communicating information

## Crosscutting Concepts

1. Patterns
2. Cause and effect: Mechanism and explanation
3. Scale, proportion, and quantity
4. Systems and system models
5. Energy and matter
6. Structure and function
7. Stability and change

## Disciplinary Core Ideas

1. Physical sciences:
2. Life sciences:
3. Earth and space sciences
4. Engineering, Technology and the Applications of Science