

Caught on Video! Using Handheld Digital Video Cameras to Support Evidence-based Reasoning

The EiE curriculum provides a rubric to evaluate how well each wall performed during the wrecking ball test. We (authors) are not at liberty to share this copyrighted work. Teachers may assign each team points that correspond to the highest level (level 1, the lightest force, to level 4, the largest force from the wrecking ball) at which the wall experienced little (e.g., cracking) or no damage. However, assigning points based solely on wall testing results may miss the point that designs should be well reasoned. The first two sample rubrics assess the way in which students use evidence-based reasoning, with support from video cameras, for their first (Table 1) and subsequent (Table 2) designs. The third sample rubric (Table 3) is a means to evaluate the way in which students operate cameras in the evidence-collection process.

Table 1: Sample Rubric for Video-Supported Evidence-Based Reasoning of First Design

Design Aspect	✓+	✓	✓-
Wall Stacking	<ul style="list-style-type: none"> • Uses relevant evidence, including video segments of real walls, from wall walk to inform stacking design. • References specific observations from wall walk or from analysis of video segments (e.g., that specific walls observed had a staggered brick/stone orientation) when articulating reasoning for their wall stacking design on video. 	<ul style="list-style-type: none"> • Uses relevant evidence from wall walk to inform stacking design. • References <i>general</i> observations (e.g., “that’s how walls are built”) when articulating reasoning for their wall stacking design. 	<ul style="list-style-type: none"> • Decides upon wall stacking arrangement without considering/ articulating evidence from wall walk.
Mortar Design	<ul style="list-style-type: none"> • Uses relevant evidence from sandwich tests, including from video segments of sandwich testing**, to inform mortar design. • References observations from sandwich tests or from analysis of video segments of sandwich tests (e.g., clay alone cracks, yet clay with sand performed better on sticking test) when articulating reasoning for their mortar design on video. 	<ul style="list-style-type: none"> • May use relevant evidence from sandwich tests to inform mortar design. • References <i>general</i> observations (e.g., “that mortar was stronger”) when articulating reasoning for their mortar design. 	<ul style="list-style-type: none"> • Decides upon mortar design without considering/ articulating evidence from sandwich tests.

* The use of the word “relevant” means that the evidence used is pertinent to the design aspect.

** Although video segments were not used in the vignette shared in the “Caught on Video!” article for this purpose, video recording the sandwich testing process would be a highly appropriate use of video cameras to capture evidence.

Table 2: Sample Rubric for Video-Supported Evidence-Based Reasoning of Second (or subsequent) Designs

Design Aspect	✓+	✓	✓-
Wall Stacking	<ul style="list-style-type: none"> • Uses relevant evidence from wall walk or wrecking ball tests (if evident during testing process***), including video segments from the wall walk and wrecking ball tests, to inform stacking design. • References specific observations made during wall walk and wrecking ball tests or from analysis of video segments of the wall walk and wrecking ball tests (e.g., that designs that were not staggered tended to break along vertical mortar lines) when articulating reasoning for their wall stacking design on video. 	<ul style="list-style-type: none"> • May use relevant evidence from wall walk or wrecking ball tests (if evident during testing process***) to inform stacking design. • References general observations and/or wrecking ball test results (e.g., that staggered rocks made for stronger walls) when articulating reasoning for their wall stacking design. 	<ul style="list-style-type: none"> • Decides upon wall stacking arrangement without considering/articulating evidence from wall walk and/or wrecking ball test results.
Mortar Design	<ul style="list-style-type: none"> • Uses relevant evidence from sandwich tests and wrecking ball tests, including from video segments of sandwich tests and wrecking ball tests**, to inform mortar design. • References specific observations from sandwich tests and wrecking ball tests or from analysis of video segments of those tests (e.g., all of the soil-sand mortars did not perform as well as the clay-sand or clay-soil mortars) when articulating reasoning for their mortar design on video. 	<ul style="list-style-type: none"> • May use relevant evidence from sandwich tests or wrecking ball tests to inform mortar design. • References general observations or wrecking ball test results (e.g., “that mortar was stronger”) when articulating reasoning for their mortar design. 	<ul style="list-style-type: none"> • Decides upon mortar design without considering/articulating evidence from sandwich or wrecking ball test results.

*** This may be used in cases where wrecking ball testing results – observed and played again as video segments – demonstrated that non-staggered stacking resulted in failure at low levels of force from the wrecking ball.

Table 3: Sample Rubric to Evaluate how Students Record Evidence using Video Cameras

	✓+	✓	✓-
During Wall Walk	<ul style="list-style-type: none"> • Uses video camera to capture one or more walls on the wall walk. • Mortar joints and wall stacking arrangements are evident on video segments. 	<ul style="list-style-type: none"> • Uses video camera to capture one or more walls on the wall walk. • Video is not taken closely or clearly enough to be able to examine mortar joints or wall stacking. 	<ul style="list-style-type: none"> • Does not record a wall on the wall walk. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Does not use the camera appropriately (i.e., to record walls) during the wall walk.
During Sandwich Testing	<ul style="list-style-type: none"> • Uses video camera to capture all sandwich testing results (i.e., for single-material mortars and dual-material mortars) and speaks into the video camera to identify the kind of mortar for each sandwich result (e.g., “this is the result for clay only”). • Results are clearly captured on video (e.g., sand in a pile, cracks in clay-alone are clearly depicted). 	<ul style="list-style-type: none"> • Uses video camera to capture most, but not all, sandwich testing results. <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Students do not speak into the camera to identify the kind of mortar for each sandwich result. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Results may or may not be clearly captured. 	<ul style="list-style-type: none"> • Too few testing sandwich results are captured. <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Those that are captured may or may not be clearly captured. • Students may or may not speak into the camera to identify the kind of mortar for each sandwich result.
During Wrecking Ball Testing	<ul style="list-style-type: none"> • Uses video camera to capture wrecking ball testing results at a safe distance and speaks into the video camera to identify the kind of mortar used for the wall design (e.g., “this is a clay-clay-sand mortar”) and the test angle (1, 2, 3, or 4). • Wrecking ball test results are clearly captured on video. 	<ul style="list-style-type: none"> • Uses video camera to capture most, but not all, test angles for the wrecking ball test results (e.g., only 3 of 4 angles tested). <p style="text-align: center;">OR</p> <ul style="list-style-type: none"> • Students do not speak into the camera to identify the kind of mortar used for the wall 	<ul style="list-style-type: none"> • Too few test angles results are captured (e.g., only one or two of four angles tested). <p style="text-align: center;">AND</p> <ul style="list-style-type: none"> • Those that are captured may or may not be clearly captured. • Students may or may not speak into the camera to

		design. AND • Results may or may not be clearly captured.	identify mortar used in the wall design.
--	--	---	--