Answering the Why's for the Three-Act Video Tasks	
Why #1	• **Play the video … Our goal here is to keep the task concrete and intuitive.** o For some students, the context of the problem is the intriguing part. Introducing the mathematics and subsequent vocabulary too early makes the tasks take on a more formal (and for many students, less interesting) perspective. Let the context draw students into the problem.
Why #2	• **Ask students to write down guesses.** o Guessing helps to create a level playing field for all students. Too often, we ask questions that quick thinking students are able to answer limiting the opportunity for all students to participate. Guessing is a "safe" way to welcome input from everyone.
Why #3	• **Also ask students to write down a number they know is too high and a number they know is too low or ask students to estimate.** o This quick and high leverage teacher move requires students to estimate an answer. Estimation is a powerful skill that is emphasized in grade school though, questionably, less so in high school. At the same time, students can safely take a risk in which they have a high probability of success. Most students can take the context of the problem and reason about a range of possible values. Asking students to put bounds on their answer also works to calibrate their guess and to check their final answer against.
Why #4	• **Ask students to pair and share.** o Giving students the space to share their thinking and responses with other students play many critical roles in learning. 1) Students are often much more comfortable sharing with one student or a small group of students than with the entire class. It is less intimidating! 2) When students are talking, the teacher is able to listen and gather evidence as to student thinking. Using this information, the teacher can make informed and productive choices as to which student responses to attend to in whole class discussion. 3) Listening to other students and their strategies is a learned skill that students need to be given the chance to practice. Making sense of other's thinking can increase one's own understanding. 4) Students develop facility and understanding around mathematical vocabulary.
Why #5	• **Take a class-wide poll of guesses.** o A poll of guesses gives you immediate formative assessment data about student thinking. As the teacher you can determine where to focus your facilitation of ideas and student conversation. Keep in mind that "wrong" guesses are great learning opportunities for students. Use the breadth of guesses to reveal the varied student thinking inherent in student solution strategies. If the class does not have a wide variety of guesses, consider suggesting something like "another class said …" to increase the diversity and encourage students to take a stand based on logic.
Why #6	• **The class is divided.** o Controversy intrigues students and creates buy in. Students want to "prove" they are right. As mentioned in "Why #5," controversy supports and encourages varied student thinking. If the class does not have a wide variety of guesses (or there appears to be consensus quickly), consider suggesting something like "another class said …" to increase the diversity and encourage students to take a stand based on logic.

Why #7	• **Ask students what information is important or students realize they do not have enough information.** o In a "math" class, students will go immediately for the numbers in a problem and ignore information that is critical or not relevant. Facilitating a discussion with students about information that is helpful and vital to solving the problem (as well as recognizing extraneous information) will help students to develop a more critical eye when approaching mathematical tasks. In "real life," we have to sift through and uncover the information needed to answer the question we are asking. o Don't be too quick to point students to the relevant information. Let students begin to "mess" with the problem and any given information. Provide students with the information as they request it. This will help students to develop in both perseverance and in their ability to problem solve. Again, in "real life," information is not always readily apparent.
Why #8	• **The goal of this slide is to verify that math is a functional model for describing the world.** o Often "school" mathematics students are taught and exposed to is devoid of any context and, therefore, any real life connection to students. It is important for students to see that mathematics is relevant in every day occurrences in interesting ways.
Why #9	• **Title the lesson.** o Asking students to come up with the title of the lesson is a quick, inconspicuous strategy to have students reflect on the mathematics content using appropriate vocabulary.
Why #10	• **Make a list of information requested. … The goal here isn't to pass judgment on good and bad suggestions.** o Collect student ideas so that students receive acknowledgement for their contributions to the class's collective thinking. Hearing and seeing student ideas can engage students and spark further ideas and dialogue. You don't want to shut down student thinking by judging and steering students toward "the correct answer" but rather accept all ideas as equal. Due to time constraints and the likelihood of repeated ideas, not all ideas need to be captured.
Why #11	• **Give students some time to struggle.** o A trait we value in students is the ability to persevere through problem solving. Yet, we want to "help" students so we jump in with ideas or leading questions. "Grit" in solving mathematics is developed by giving students the time to wrestle with tasks and their respective mathematical concepts. Learning is messy and in the process of struggling, students are developing "grit" as they connect emerging and old ideas in the creation of new learning.
Why #12	• **Ask students to estimate again.** o The initial guessing is to create a safe environment that acknowledges every student's contribution. When more information is shared, this changes our perspective and causes us to rethink. It is important that students realize that the absence or addition of information should cause us to relook at a problem with a critical eye. Asking students to "estimate again" communicates that the answer doesn't need to be exact, but our estimate will take into account the new information. As a result of the new information, new strategies may emerge.
Why #13	• **Ask students "What assumptions about Starbursts are built into your answer?"** o Probability can often be counterintuitive. Students tend to rely on personal experience and what they "believe" should happen when reasoning about the likelihood of events and outcomes. In addition, students either ignore assumptions that are inherent in a task or make assumptions that have an impact on the answer. It is important that students recognize two things: 1) assumptions play a crucial role in probability (and, in fact, most mathematics tasks); and 2) in mathematical problem solving, there may be a theoretical answer and an experimental one.