

EXERCISE: The Martian

Purpose Provide students with practice distinguishing between problems that require a Status Quo Cycle (Detect & Correct) response, and an Innovation Cycle (Explore and Discover) response. And, help students become proficient at recognizing these patterns.

Recommended for Trail 7 Choosing a Mindset

Time required 10-15 minutes

Key Points

Solving problems typically require applying either the Status Quo cycle or the Innovation cycle.

Some require a combination of both.

These are very different ways of approaching challenges and applying the wrong one is usually dysfunctional.

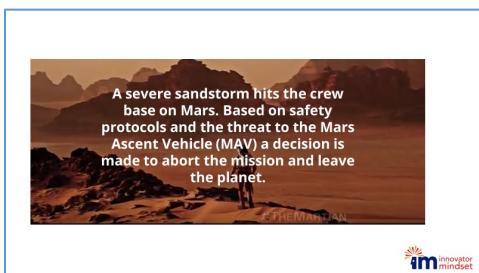


Instructions Play the trailer from The MARTIAN.

You may want to begin by asking how many students have seen the movie. Explain that the trailer will give them a quick sense of the story line.

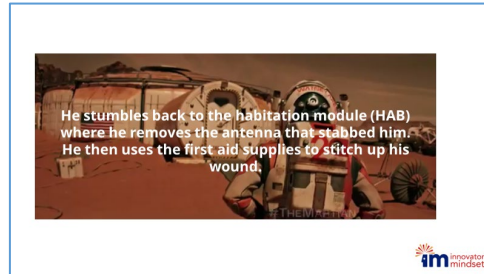
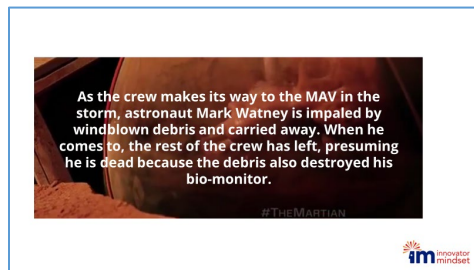
After students have viewed the trailer, explain that you are going to give them a series of challenges based on the movie, and you want them to tell you whether each is a Status Quo problem or an Innovation problem.

As you show each problem, have students respond and explain their reasoning. Encourage them to debate if there is disagreement. (Correct responses are indicated below.) Use each example to help students explore what distinguishes these patterns from each other and how each cycle is best suited to a specific type of problem.



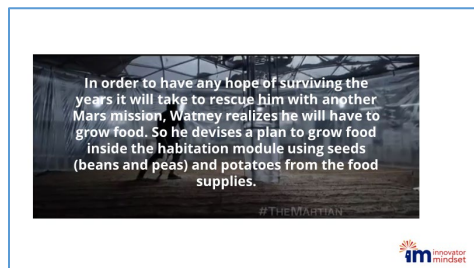
- 1) A severe sandstorm hits the crew base on Mars. Based on safety protocols and the threat to the Mars Ascent Vehicle (MAV) a decision is made to abort the mission and leave the planet.

(SQ) This is following predetermined procedures to address an anticipated potential problem.



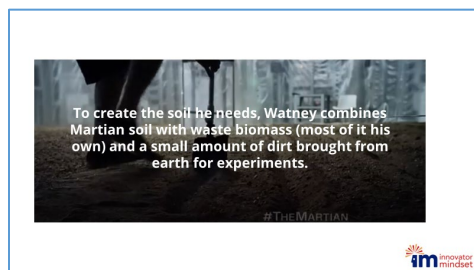
- 2) As the crew makes its way to the MAV in the storm, astronaut Mark Watney is impaled by windblown debris and carried away. When he comes to, the rest of the crew has left, presuming he is dead because the debris also destroyed his bio-monitor. He stumbles back to the habitation module (HAB) where he removes the antenna that stabbed him. He then uses the first aid supplies to stitch up his wound.

(SQ) Watney is doing "detect and correct" on himself, to restore the proper functioning of his own body.



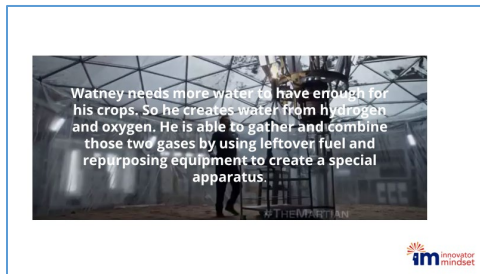
- 3) In order to have any hope of surviving the years it will take to rescue him with another Mars mission, Watney realizes he will have to grow food. So he devises a plan to grow food inside the habitation module using seeds (beans and peas) and potatoes from the food supplies.

(IC) This is improvising a solution to a problem that the mission did not prepare for.



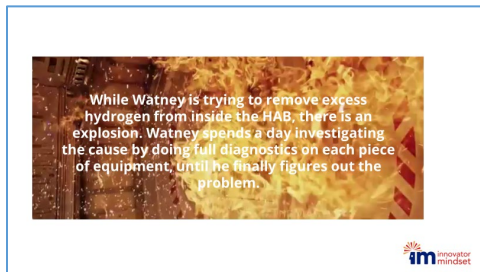
- 4) To create the soil he needs, Watney combines Martian soil with waste biomass (most of it his own) and a small amount of dirt brought from earth for experiments.

(IC) More improvising by repurposing available resources.



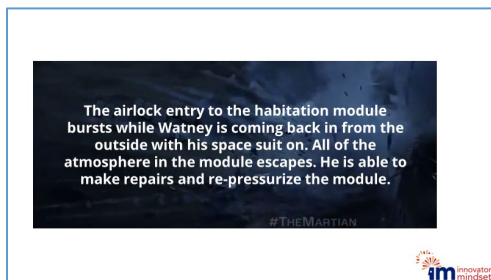
- 5) **Watney needs more water to have enough for his crops. So he creates water from hydrogen and oxygen. He is able to gather and combine those two gases by using leftover fuel and repurposing equipment to create a special apparatus.**

(IC) More improvising...



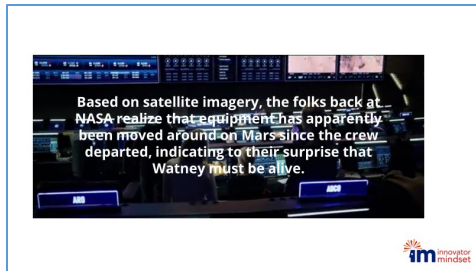
- 6) **While Watney is trying to remove excess hydrogen from inside the HAB, there is an explosion. Watney spends a day investigating the cause by doing full diagnostics on each piece of equipment, until he finally figures out the problem.**

(SQ) This is solving a problem by finding what went wrong and making sure that things are working properly. This is classic "Detect and correct."



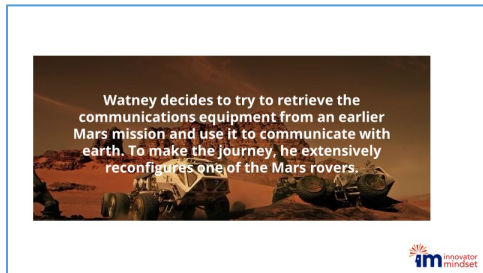
- 7) **The airlock entry to the habitation module bursts while Watney is coming back in from the outside with his space suit on. All of the atmosphere in the module escapes. He is able to make repairs and re-pressurize the module.**

(SQ) This is restoring the proper functioning of the habitation module (a potential problem that was anticipated and materials provided for such repairs.)



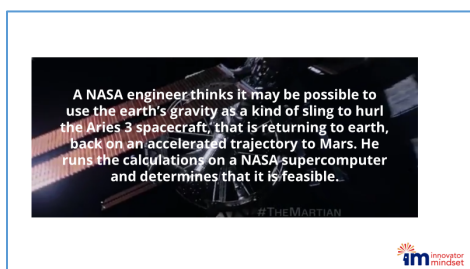
- 8) Based on satellite imagery, the folks back at NASA realize that equipment has apparently been moved around on Mars since the crew departed, indicating to their surprise that Watney must be alive.**

(IC) This is an unexpected discovery that was made by noticing surprising new information.



- 9) Watney decides to try to retrieve the communications equipment from an earlier Mars mission and use it to communicate with earth. To make the journey, he extensively reconfigures one of the Mars rovers.**

(IC) This is more improvising with available resources, in many different ways, in order to solve a problem (lack of communication with earth).



- 10) A NASA engineer thinks it may be possible to use the earth's gravity as a kind of sling to hurl the Aries 3 spacecraft that is returning to earth, back on an accelerated trajectory to Mars. He runs the calculations on a NASA supercomputer and determines that it is feasible.**

(IC) This is an imaginative and resourceful solution to the problem of how to rescue Watney, one that was never an intended scenario for the mission.

Keep in mind that reality is always doing, “Detect and correct,” with us. It is those consequences that enable us to learn what is and is not possible. Watney was constantly struggling to find a solution that would enable him to survive. So in a sense his goal was to maintain and restore the status quo—preserving his own life and getting home. To do that, he needed to be skilled at both kinds of problem solving. However, it was when he applied the Innovation Cycle that he was able to make critical breakthroughs. Just following the Status Quo Cycle would not have been enough.

Some problems require a combination of both patterns, or it may not be clear at first which is needed. At times, Watney and NASA considered a status quo response and then shifted to a more innovative approach when initial attempts at solution were inadequate. For example, NASA attempted an expedited resupply mission. When that failed, the approach shifted to sending the Aries spacecraft back to Mars.

If you place The Martian trailer video in a folder labeled *IM Videos* on your desktop, it should play through the PowerPoint slides. If this doesn't work, you will need to reload/reconnect the videos to play them within PowerPoint.

The Martin video clips and images included here as a convenience for instructors. They are not being sold by Innovator Mindset and anyone can obtain this video online, where it has been viewed by millions.