

Game Onboarding:

When players begin their journey into the game, they'll be prompted to input their name right on the homepage. On the next screen, there will be 4 options:

- **Resume Game** : Pick up where they left off.
- **New Game** : Start a fresh adventure.
- **High Scores** : Check out top scores.
- **About** : Learn more about the gameplay.
- **Credit** : View the game's creators.
- **Exit** : Leave the game.

On clicking the new game option, a map will unfold, revealing the levels available for exploration. Initially, only the first level will be accessible, with subsequent levels unlocking as players progress and accumulate points. Once unlocked, players have the freedom to choose which level they want to tackle next. On clicking the resume game option, previously unlocked levels will be also seen unlocked in the directed map.

Level Welcome:

Upon selecting a level, players will be greeted with a warm Martian-themed welcome screen. This screen sets the stage for the adventure ahead and features a 'Start' button to initiate the level. The game comprises five distinct levels. Each level transports players to a different region of the Martian landscape. On the starting of each level, the screen will show the level's region name followed by the amount of time they must complete the exploration within.

Real-time Martian Weather:

Throughout gameplay, players will receive real-time updates on Martian weather conditions directly on their screen. This includes essential information such as maximum and minimum temperatures, UV index, and atmospheric pressure. For example, if a player engages with the game on May 1st, 2024, they'll see the actual weather data from Mars on that specific date, adding an extra layer of realism and immersion to the experience.

Game Play and Puzzles:

- Puzzles within each level are crafted to reflect the unique geological features and landmarks of the region.

- Upon discovering objects within a level, players utilize shovels to collect samples of the objects and extract valuable information. On hitting the object with shovel, a pop up will show -

Name of the object

Sample Collected!

Analyze Button

- On clicking the analyze button, respective analyzing text will show up for each object.
- Extracted information serves as critical clues to aid players in deciphering puzzles.
- Each object from different levels has a different extraction time.
- The more upgraded shovels the player uses, the less time will be needed to extract information. Shovels and different suits can be bought from the store in exchange for currency. Currency for this game is “Basalt” samples. Every level has a designated number of basalt rocks which players can collect and use as currency. Beside a currency icon, level-screen will show the number of basalts (currency) a player has.
- Player suits will have different activity features to aid the player in quest and reduce game play time.
- Accessible via puzzle icons on the gaming screen, players can view and attempt both unsolved puzzles at any time during gameplay. Number of puzzle icons depends on the number of puzzles required to solve at each level.
- Level screen will also have a store icon. Store icon will direct players to shovel and suit store. In the store, items will be listed as following :

Item icon
Item feature
Item price
Buy / Use Button

If an item is already bought, players can use it. If not bought yet, players have to buy it first.

- Level screen will also have an inventory icon. Upon clicking on this icon, players will be directed to an inventory where they can see their collected samples. Inventory will be updated as they progress to collect samples throughout the game. In the inventory, samples will be listed as following :

Sample icon

Sample Name

- Each level imposes a specific time limit for completion. If players can not finish on time, no points will be gained.
- Players can gain points by solving puzzles correctly. Points of a level = $1.5 \times$ seconds saved before the level's timespan ends.
- On clicking any option, system will check whether clicked option is collected in inventory or not, if not collected yet ,

POP UP - "You didn't collect this sample of this element yet ! "

If the sample is collected, for the right answer - "Correct!!" , for the wrong answer - "Try again ! "

On clicking the right answer of any puzzle, that puzzle icon will be disabled.

- Players can attempt puzzles multiple times until solved.
- Players will encounter dust storms and meteoroids falling, where they have to take shelter or face failure. If failed to escape, the player has to start the level from the initial point again.
- Each level will have a hideout where they start their journey from and come back in order to escape calamities.
- Players can level up only if the player has completed all the puzzles or challenges within the time limit.

Level scenario :

Level	Region	Discoveries	Analysis Text
1	Southern Highlands	- Basalt (Number of Basalt for this level is - 15)	<ul style="list-style-type: none">• Formed through volcanic activity• Primarily consists of Olivine, Feldspars, and Pyroxenes.
		- Basaltic Shergottites	Hurray! Found a Meteorite! <ul style="list-style-type: none">• Mineralogy comprises mostly pigeonite and augite.• Holds evidence of

			interaction with Martian water.
		- Lherzolithic Shergottites	It's a Meteorite <ul style="list-style-type: none"> • Ultramafic rocks of plutonic origin • Shares mineralogical and chemical features with basaltic shergottites • Silicon-poor
2	Syrtris Major	- Dacite	<ul style="list-style-type: none"> • Volcanic rock • High in silica • Low in alkali metal oxides • Composed predominantly of plagioclase feldspar and quartz • Has a fine-grained (aphanitic) to porphyritic texture.
		- Granitoids	<ul style="list-style-type: none"> • Coarse-grained igneous rocks • Predominantly consists of quartz, plagioclase, and alkali feldspar.
		- Basalt (Number of Basalt for this level is - 25)	<ul style="list-style-type: none"> • Already explored in Southern Highlands • Consists primarily of Olivine, Feldspars and Pyroxenes
		- Nili Fossae (different type of terrain texture)	<ul style="list-style-type: none"> • A group of large, concentric grabens on Mars. • Contains carbonate minerals • One of seven finalists for the MSL(Mars Science Laboratory) landing sites.

		- Carbonate Rocks (In Nili fossae terrain)	<ul style="list-style-type: none"> • Formed through hydrothermal precipitation. • Evidence of living organisms could have been preserved here.
3	Northern Lowlands	- Andesite	<ul style="list-style-type: none"> • More evolved forms of magma • Highly volatile • Constitutes the majority of the crust
		- Dacite	<ul style="list-style-type: none"> • Volcanic rock • High in silica • Low in alkali metal oxides • Composed predominantly of plagioclase feldspar and quartz
		- Basalt (Number of Basalt for this level is - 35)	It's your currency to use ! Basalt !
		- Granitoids	<p>Do you remember this high silica rock? You've already discovered it in Syrtis Major. This volcanic rock is composed predominantly of quartz, plagioclase, and alkali feldspar. Guess the name and win extra points!</p> <p> <input type="checkbox"/> Basalt <input type="checkbox"/> Dacite <input checked="" type="checkbox"/> Granitoids <input type="checkbox"/> Nili Fossae </p>
		- Sedimentary Rocks	<ul style="list-style-type: none"> • Makes up the majority of the Northern lowlands deposits • May have formed from sea/lake deposits • Holds chances of finding fossilized life

			<ul style="list-style-type: none"> Shows cross-bedding in their layers
		- Carbonate Rocks	<p>Carbonate Rocks. Do you remember where you've seen them? Guess the name and win extra points!</p> <p><input checked="" type="checkbox"/> Nili Fossae</p> <p><input type="checkbox"/> Southern Highlands</p> <p><input type="checkbox"/> Main region on Syrtis Major</p>
		- Nakhilite	<p>Meteorite Again!</p> <ul style="list-style-type: none"> Contains carbonate and sulfate salts Suggests residence in an environment rich with liquid seawater Crystallized 1.3 to 1.4 billion years ago
4	Meridiani Planum	- Basalt (Number of Basalt for this level is - 40)	<p>Can you guess the rock? You've already seen it in all the previous regions.</p> <p><input checked="" type="checkbox"/> Basalt</p> <p><input type="checkbox"/> Dacite</p>
		- Jarosite	<ul style="list-style-type: none"> Indicative of past aqueous activity Often found in association with hematite Formed in acidic, sulfate-rich environments
		- Hematite Outcrops	<ul style="list-style-type: none"> Iron oxide mineral Abundant on Mars Associated with past aqueous environments Regarded as martian blueberries but they are not blue

		- Sulfate Salt Deposits	<ul style="list-style-type: none"> • Indicative of past aqueous activity • an preserve evidence of ancient environments
		- Chlorine and Bromine Deposits	<ul style="list-style-type: none"> • Halogens associated with Martian soils and sediments • can provide insights into the chemical composition of the Martian surface
		- Bounce Rock	Meteorite!! <ul style="list-style-type: none"> • It's composition identical to that of Shergottites found on Earth • Believed to have been ejected by impact of large asteroids or comets • Composed mainly of the volcanic mineral, pyroxene • Unlike any rock or volcanic deposit on Mars."
5	Gusev Crater	- Humphrey	<ul style="list-style-type: none"> • A dark volcanic rock • About 60 centimeters (2 feet) tall • Shows bright material in interior crevices and cracks that looks like minerals crystallized out of water
		- Basalt	The more you collect me, the

		(Number of Basalt for this level is - 50)	more you earn !
		- Carbonate rocks	<p>It is formed through hydrothermal precipitation. Guess it and win extra points !</p> <p> <input checked="" type="checkbox"/> Carbonates <input type="checkbox"/> Hematite <input type="checkbox"/> Basalts </p>
		- Sulfate Salt Deposits	<ul style="list-style-type: none"> • More sulfate salts than found anywhere else so far on Mars • Indicative of past aqueous activity • Can preserve evidence of ancient environments on Mars.
		- Goethite	<p>Remember the jarosite from Meridiani Planum ?</p> <ul style="list-style-type: none"> • Over time, the water turns jarosite into another mineral called goethite. • In dry conditions, such as on Mars, goethite dehydrates into yet another iron-rich mineral called hematite, which is what gives Mars its rust-red color. • Goethite forms only in the presence of water, so its

			discovery is the first direct evidence of past water in the Columbia Hills's rocks.
		- Hematite (Iron-rich mineral that gives Mars its rust-red color)	<p>This is what makes Mars rusty-red . Do you know its name ? Guess and Gain extra points!"</p> <p><input type="checkbox"/> Basalt</p> <p><input checked="" type="checkbox"/> Hematite</p> <p><input type="checkbox"/> Jarosite</p>

Level Puzzles :

Level	Puzzles	Challenges
1. Southern Highlands	<p>1. I am born from the depths of Lava reservoirs.Yet, I am the silent singer of silicon-poor compositions</p> <p><input type="checkbox"/> Basalt</p> <p><input type="checkbox"/> Basaltic Shergottites</p> <p><input checked="" type="checkbox"/> Lherzolitic Shergottites</p>	<ul style="list-style-type: none"> • Must solve two of the puzzles. • Dust storm for 10 seconds. • Dust storm appears right after 2 minute game play. • Must finish the Level in 4 minutes.
	<p>2.In the cosmic dance of time, I emerge from ancient flames. For eons, I've journeyed through the void, bearing tales untold, Each crystal a witness to the touch of Liquid Crystals, bold</p> <p><input type="checkbox"/> Basalt</p> <p><input checked="" type="checkbox"/> Basaltic Shergottites</p> <p><input type="checkbox"/> Lherzolitc Shergottites</p>	
2. Syrtis Major	<p>1.Born from lava's swift freeze, with quartz and feldspar it gleams; scarce alkali, well-grained sheen, in Martian landscapes, it's a dream</p>	<ul style="list-style-type: none"> • Must solve three of the puzzles. • Meteoroids falling for

	<input type="checkbox"/> Basalt <input checked="" type="checkbox"/> Dacite <input type="checkbox"/> Granitoids <input type="checkbox"/> Nili Fossae	15 seconds. <ul style="list-style-type: none"> • Meteoroids fall right after 3 minute game play. • Must finish the Level in 6 minutes.
	2.Through hydrothermal embrace, life's essence may gleam, within these silent depths, a preserved story, unseen <input type="checkbox"/> Basalt <input type="checkbox"/> Dacite <input type="checkbox"/> Granitoids <input checked="" type="checkbox"/> Carbonated Rocks	
	3.A treasure trove they found, with carbonate minerals, their mysteries unwound <input type="checkbox"/> Basalt <input type="checkbox"/> Dacite <input type="checkbox"/> Granitoids <input checked="" type="checkbox"/> Nili Fossae	
3. Northern Lowlands	1.In realms where waters once whispered tales, Beneath the ancient gaze of Martian skies, I lie, a testament to time's gentle hand, Where secrets of life may yet arise. <input type="checkbox"/> Andesite <input type="checkbox"/> Sedimentary Rocks <input checked="" type="checkbox"/> Carbonate Rocks <input type="checkbox"/> Nakhlite	<ul style="list-style-type: none"> • Must solve two of the puzzles. • Dust storm for 20 seconds. • Dust storm comes right after 3 minute game play. • Must finish the Level in 8 minutes.
	2.I form the bedrock, in layers, stories unfold. From ancient waters or windswept sands, they say, Within my embrace, life's whispers may sway. <input type="checkbox"/> Dacite <input checked="" type="checkbox"/> Sedimentary Rocks <input type="checkbox"/> Carbonate Rocks <input type="checkbox"/> Nakhlite	
4.Meridiani Planum	1.Aqueous whispers in silent stone, where Martian skies once did roam. Minerals aligned in secret tales, within this ancient Martian veil. <input checked="" type="checkbox"/> Jarosite <input type="checkbox"/> Sulfates <input type="checkbox"/> Carbonates	<ul style="list-style-type: none"> • Must solve three of the puzzles. • Dust storm for 20 seconds. • Dust storm comes right after 3 minute game

	<div data-bbox="456 205 620 241"><input type="checkbox"/> Hematite</div> <div data-bbox="406 279 956 344">2. In rusted hues, I stand with my friends, a testament to time's unending drone.</div> <div data-bbox="456 380 745 499"> <input type="checkbox"/> Jarosite <input type="checkbox"/> Sulfates <input checked="" type="checkbox"/> Hematite Outcrops </div> <div data-bbox="406 569 1003 667">3. A wanderer from Earth's twilight. Ejected by force, from impact's might, A tale of cosmic collision, in the starry night.</div> <div data-bbox="456 674 729 835"> <input checked="" type="checkbox"/> Bounce Rock <input type="checkbox"/> Shergottite <input type="checkbox"/> Martian Meteorite <input type="checkbox"/> Pyroxene </div>	<div data-bbox="1190 205 1252 241">play.</div> <ul style="list-style-type: none"> • Meteoroids falling for 15 seconds. • Meteoroids fall right after 6 minute game play. • Must finish the Level in 10 minutes.
5. Gusev Crater	No Puzzle	<ul style="list-style-type: none"> • Must solve three of the puzzles. • Dust storm for 10 seconds. • Dust storm comes right after 3 and 10 minute game play. • Meteoroids falling for 15 seconds. • Meteoroids fall right after 7 minute game play. • Must finish the Level in 12 minutes. • On clicking the puzzle/challenge icon - "No puzzles anymore ! Collect every element and get back to me !" • After the player collects every other element on

		<p>this level(After or within 12 minutes), on clicking the puzzle/challenge icon, they will be directed to inventory and asked to put every element on its respective region. If the player puts everything correctly ,They win !.</p>
--	--	--

Object Extraction time (without any shovel used):

Objects	
Name	Extraction Time
Basalt	8s
Basaltic Shergottites*	10s
Lherzolithic Shergottites*	10s
Dacite*	15s
Granitoids	12s
Nili Fossae*	15s
Carbonate Rocks*	15s
Andesite	14s
Sedimentary Rocks*	20s
Nakhlites	14s
Jarosite Deposits*	22s
Hematite Outcrops*	22s
Sulfate Salt Deposits	16s
Chlorine and Bromine Deposits	16s
Bounce Rock*	22s
Humphrey	20s
Sulfate Salt Deposits	20s

Goethite	20s
----------	-----

*denotes that this object is answer of any puzzle

Mining tools (Shovel) details : (Can be collected from store)

Shovels			
No.	Color	Speed	Price
Shovel-1	Wood	2X	5
Shovel-2	Bronze	4X	10
Shovel-3	Silver	6X	20
Shovel-4	Golden	7X	25
Shovel-5	Sky Blue	8X	30

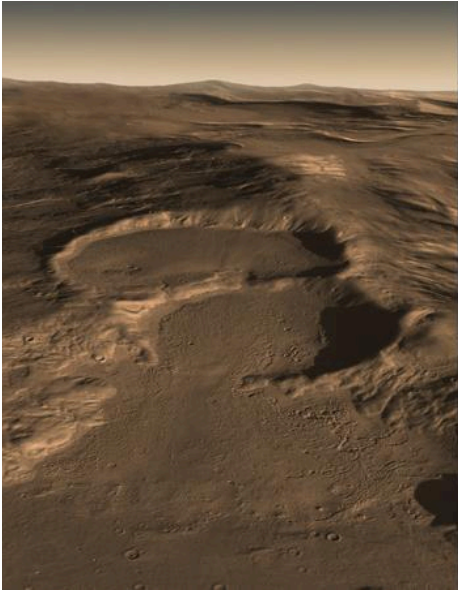
Suits Details :

The store will have different astronaut suits as well. Different suits have different abilities like running faster, jumping higher. These suits will help the player to explore and to hide faster

Suits				
No.	Color	Speed	Jump force	Price (Basalts)
Suit-1	White	5X	0	10
Suit-2	Blue	10X	3	15
Suit-3	Dark-Yellow	15X	6	20
Suit-4	Dark-Green	20X	9	30

Visualization Reference :

Southern Highlands :



Source :
<https://www.universetoday.com/tag/mars-southern-highlands/>

Basalt :



Source : <https://en.wikipedia.org/wiki/Basalt>

Basaltic Shergottites:



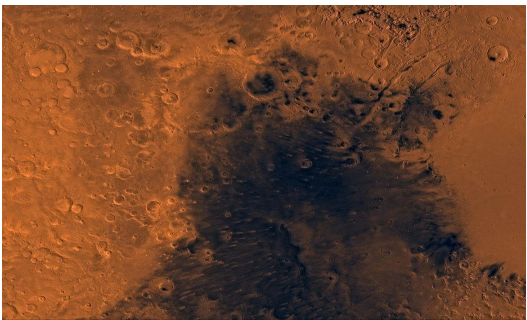
Source :
<http://www.meteorites.tv/284-nwa-2975-martian-meteorite.html>

Lherzoltic Shergotittes :



Source :
www.arizonaskiesmeteorites.com/AZ_Skies_Links/Martian/NWA_1950/

Syrtis Major :



Source : https://en.wikipedia.org/wiki/Syrtis_Major_Planum

Dacites :



Source: <https://en.wikipedia.org/wiki/Dacite>

Granitoid :



Source : <https://en.wikipedia.org/wiki/Granitoid>

Nili Fossae :



Source : https://en.wikipedia.org/wiki/Nili_Fossae

Carbonate Rocks :



Source :
<https://news.cornell.edu/stories/2017/02/scientists-are-puzzled-over-lack-carbonate-mars>



Source :
<https://geology.com/stories/13/rocks-on-mars/mudstones.jpg>

Nakhlites :

Northern Lowlands :



Source :
<https://reasons.org/explore/publications/articles/martian-lowlands-are-old>



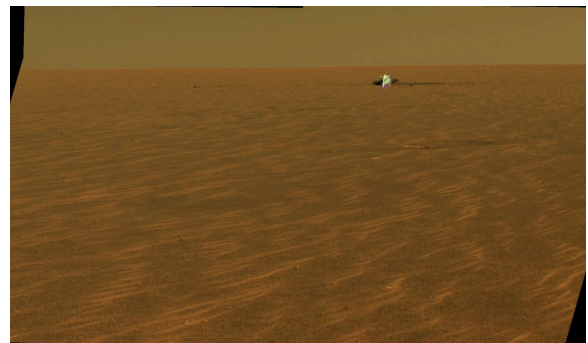
Source: https://upload.wikimedia.org/wikipedia/commons/thumb/f/fe/NWA_998_meteorite%2C_nakhlite.jpg/1024px-NWA_998_meteorite%2C_nakhlite.jpg

Andesite :



Source :
<https://rocksminerals.flexiblelearning.auckland.ac.nz/rocks/images/andesite.jpg>

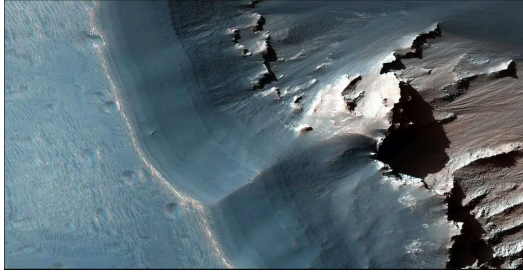
Meridiani Planum :



Source :
<https://upload.wikimedia.org/wikipedia/commons/6/6b/Sol322B.SmoothSheet.bedforms.close.to.heat.shield.crp.jpg>

Sedimentary Rocks :

Jarosite Deposits :



Source :
<https://www.nasa.gov/wp-content/uploads/2023/03/pia20371.jpg>

Hematite Outcrops:



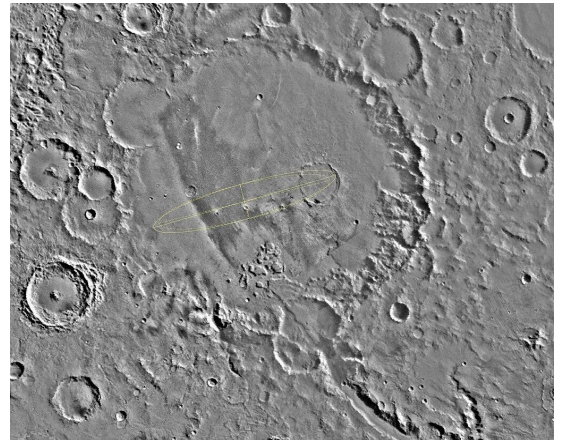
Source :
https://www.chinadaily.com.cn/english/doc/2004-03/20/xinsrc_060ba2574b7b42c4acb15e60b01145b1_blueberry.jpg (They are not blue, the picture shows false-color composite image)

Bounce Rock :



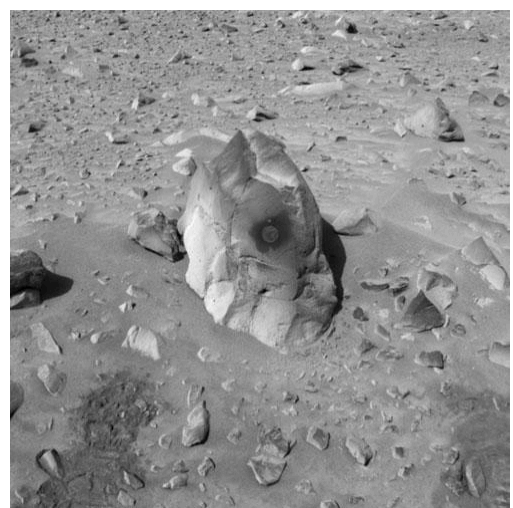
Source :
https://upload.wikimedia.org/wikipedia/commons/thumb/8/88/58606main_image_feature_167_iwfull.jpg/800px-58606main_image_feature_167_iwfull.jpg

Gusev Crater :



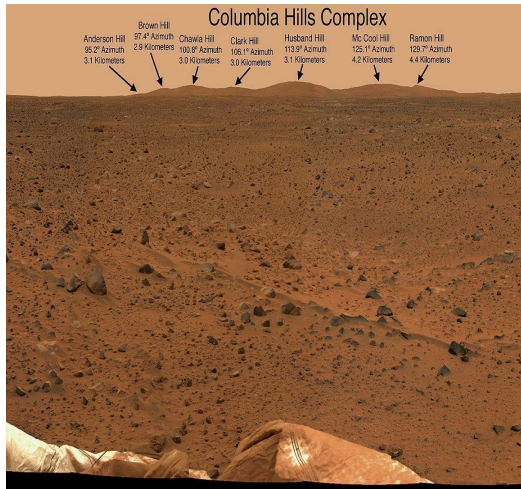
Source :
https://upload.wikimedia.org/wikipedia/commons/thumb/6/62/Gusev_crater_Spirit_landing_ellipse.jpg/1024px-Gusev_crater_Spirit_landing_ellipse.jpg

Humphrey :



Source :
https://mars.nasa.gov/mer/gallery/press/spirit/20040305a/05-ra-03-humphrey-A061R1_br.jpg

Columbia Hills :



Source :

https://upload.wikimedia.org/wikipedia/commons/thumb/a/ae/Columbia_Hills_from_MER-A_landing_site_PIA05200_br2.jpg/1280px-Columbia_Hills_from_MER-A_landing_site_PIA05200_br2.jpg