Alignment of *Alien Rescue* with Next Generation Science Standards

Alien Rescue was designed to meet the learning goals set out in the Next Generation Science Standards. The following is a sample chart that identifies the features of Alien Rescue that address these standards.

MS= Middle School (Grades 6-8)

Reference: http://www.nextgenscience.org/searchd standards

Physical Sciences	
Forces and Interactions	**Alien Rescue**
MS-PS2-3. Ask questions about data to determine the factors that affect the strength of electric and magnetic forces.	Students learn that Earth has a liquid metallic core. They recognize that some worlds do not, and they discuss the effect of this feature on a world in terms of seismic activity, cratering, and magnetic fields.
MS-PS2-4. Construct and present arguments using evidence to support the claim that gravitational interactions are attractive and depend on the masses of interacting objects.	Students compare the gravity of the alien worlds with that of the Earth, and learn of the effect of gravity on weight and livability.
Waves and Electromagnetic Radiation	**Alien Rescue**
MS-PS4-2. Develop and use a model to describe that waves are reflected, absorbed, or transmitted through various materials.	Students use spectra to identify elements; they recognize that every element has a spectral signature.
Life Sciences	
Growth, Development, and Reproduction of Organisms	**Alien Rescue**
MS-LS1-5. Construct a scientific explanation based on evidence for how environmental and genetic factors influence the growth of organisms.	Students can discuss how an alien's body evolved through adaptation to the environment of its homeworld.
Matter and Energy in Organisms and Ecosystems	**Alien Rescue**
MS-LS2-4. Construct an argument supported by empirical evidence that changes to physical or biological components of an ecosystem affect populations.	The aliens bring with them the seeds of their ecosystem, which they can use to make a world habitable, if the physical factors of that world are suitable.
Earth and Space Sciences	
Space Systems	**Alien Rescue**
MS-ESS1-2. Develop and use a model to describe the role of gravity in the motions within galaxies and the solar system.	Students compare the lengths of the planets' years and explain how the distance of a planet's orbit from the sun affects this length.

History of Earth		**Alien Rescue**
MS-ESS2-3.	Analyze and interpret data on the distribution of fossils and rocks, continental shapes, and seafloor structures to provide evidence of the past plate motions.	Students compare geological events on Earth with those on Io, a volatile world.
Weather and Climate		**Alien Rescue**
MS-ESS2-5.	Collect data to provide evidence for how the motions and complex interactions of air masses results in changes in weather conditions.	Students examine the atmospheric composition of other worlds.
Human Impacts		**Alien Rescue**
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects. [		The alien solar system was destroyed by a catastrophic event - a nearby star went supernova, emitting radiation that would eventually make their worlds uninhabitable.
Engineering, Technology, and Applications of Science		
Engineering Design		**Alien Rescue**
MS-ETS1-1.	Define the criteria and constraints of a design problem with sufficient precision to ensure a successful solution, taking into account relevant scientific principles and potential impacts on people and the natural environment that may limit possible solutions.	Some of the questions students identify cannot be answered through the use of existing knowledge bases. They identify which questions can be answered by sending probes to other worlds, then design these probes to gather the information they need. Students learn about the characteristics of each planet in the solar system and investigate the potential and the requirements to support life.
MS-ETS1-2.	Evaluate competing design solutions using a systematic process to determine how well they meet the criteria and constraints of the problem.	Students design probes that they can they send to other worlds to collect information. They design a solution plan and implement it. Students discuss their designs for probes with classmates. They explain the reasons for malfunctions and review their designs based on their success or failure to achieve desired ends. They review and evaluate the designs of others. Students deal with the constraints of money and space in building probes. As students discuss their hypotheses, investigation plans, and findings with their classmates, they engage in critique of both their own and others' ideas. They support their opinions with scientific evidence gained

		through their investigations.
MS-ETS1-3.	Analyze data from tests to determine similarities and differences among several design solutions to identify the best characteristics of each that can be combined into a new solution to better meet the criteria for success.	Students use a wide range of scientific instruments, and recognize that some data would not be available without those instruments. For example, without the probes, students would be unable to gather accurate information on some worlds because of distance. Students plan and implement investigations throughout their work in Alien Rescue. They ask questions about the worlds in our solar system based on what the different species need, gather information from existing databases to develop hypotheses about the suitability of a world for a particular species, and select the scientific instruments necessary to gather the information they need to test their hypotheses.
MS-ETS1-4.	Develop a model to generate data for iterative testing and modification of a proposed object, tool, or process such that an optimal design can be achieved.	Students have limited funds for probe building, and must make trade-offs to maximize their resources. Students learn that previous probe missions experienced a variety of failures, and that backup systems may improve the likelihood of obtaining needed information. Students collect information about the solar system using virtual tools, including a thermometer, barometer, magnetometer, mass spectrometer, spectrograph, seismograph, RADAR, and infrared, narrow angle, and wide angle cameras. Students record information in an online notebook.