



THE MARTIAN

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Novel Study



Why Novel Studies in the Science Classroom?

Here at Nitty Gritty Science we want to foster the love of reading and improve science literacy. We believe that using novel studies in the science classroom will not only give students exposure to different perspectives but will also help them develop an understanding of how science vocabulary applies to so many events in their lives.

Research also shares benefits of using novel studies in the science classroom such as:

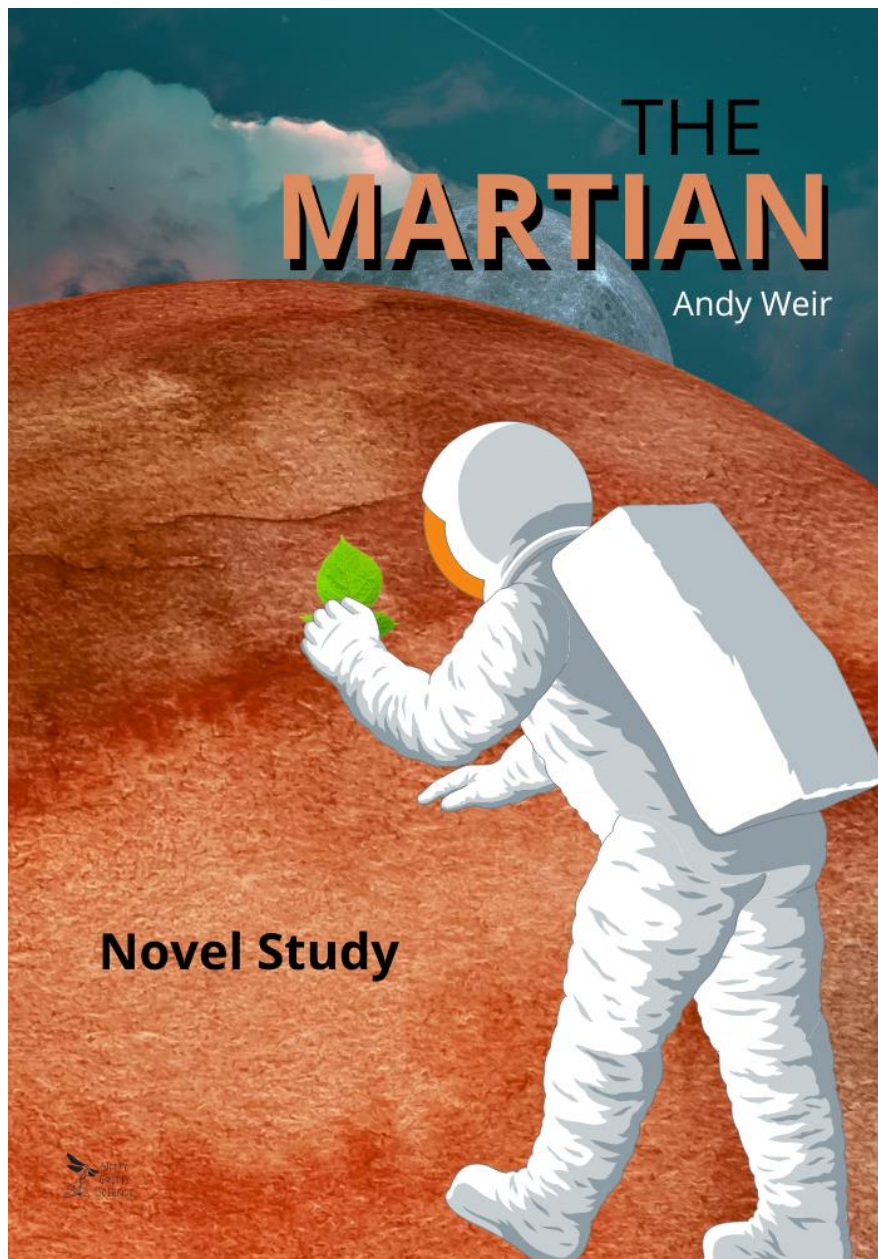
The literacy from reading can easily come from non-fiction and fiction novels that surround a science-related topic and are far more of a high-interest read for the majority of students than reading a textbook (Anderson & Hite, 2010; Batchelor, 2017; Coiro, 2012; Freudenrich, 2000).

Science fiction novels are an excellent way to engage students in science ideas while also helping students improve their literacy skills. (Creech and Hale, 2006)

Teachers can add in other readings from the internet and news articles which brings the reading level down to a more manageable level, however students are more willing to learn and spend the time to learn new vocabulary when highly engaged in what they are reading (Weinbugh et al., 2014).

There is very little research out there about the usefulness of using novels in classrooms other than ELA. Others have used novels and other types of formats to get students excited about science and science concepts (Batchelor, 2017; Coiro, 2012; Freudenrich, 2000; Ivey & Fisher, 2005; Jarman & McClune, 2001), but very few have used novels to teach science concepts and also try to increase literacy skills among students in the secondary classroom, so Nitty Gritty Science is here to help with that!

Happy reading,
Erica



Six days ago, astronaut Mark Watney became one of the first people to walk on Mars.

Now, he's sure he'll be the first person to die there.

After a dust storm nearly kills him and forces his crew to evacuate while thinking him dead, Mark finds himself stranded and completely alone with no way to even signal Earth that he's alive—and even if he could get word out, his supplies would be gone long before a rescue could arrive.

Chances are, though, he won't have time to starve to death. The damaged machinery, unforgiving environment, or plain-old "human error" are much more likely to kill him first.

But Mark isn't ready to give up yet. Drawing on his ingenuity, his engineering skills—and a relentless, dogged refusal to quit—he steadfastly confronts one seemingly insurmountable obstacle after the next. Will his resourcefulness be enough to overcome the impossible odds against him?

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Check out the following sample pages focusing on science vocabulary, reading comprehension, and literacy-based projects!

Teacher Guide included!

Find out what students already know.

THE MARTIAN Initials: _____

Before You Read

Directions: Imagine you were given the opportunity to go to Mars. What are the pros and cons? List three pros and cons for each and then explain why you would or would not like to travel there.

PROS

- 1.
- 2.
- 3.

CONS

THE MARTIAN Initials: _____

WORD STUDY: Chapters 1-3

1. Sol
What does the term sol mean?

2. Orbit
Earth orbits, or follows a path, around the sun, making one _____

THE MARTIAN Initials: _____

WORD STUDY: Chapters 1-3

6. MDV
Draw a picture of the Mars Descent Vehicle as you imagine it.

7. Atmosphere
List the five layers that make up Earth's atmosphere.

- 1.
- 2.
- 3.
- 4.
- 5.

9. Torrent
Identify two synonyms for the word *torrent*.


THE MARTIAN Initials: _____

WORD STUDY: Chapters 1-3

36. Parasite
Definition:

37. Equalizes
Use the word *equalize* in your own sentence.

38. Poles
Label the location of both North and South Poles on planet Earth.




40. Hydrazine
Hydrazine is an extremely combustible inorganic compound.

THE MARTIAN Initials: _____

WORD STUDY: Chapters 4-6

1. Scientific Method
List the steps of the Scientific Method below.

- 1.
- 2.
- 3.
- 4.
- 5.
- 6.
- 7.
- 8.



4. Abundance
Use the word *abundance* in your own sentence.

THE MARTIAN Initials: _____

WORD STUDY: Chapters 4-6

6. Aperture
Definition:

7. Synthetic
Identify two synonyms for the word *synthetic*.

8. Friction
Draw a picture that shows an example of friction.

9. Exothermic
Compare exothermic reaction to endothermic reaction.

10. Thermocouple
A thermocouple is a sensor that measures temperature.

11. Archeologist
List three examples of tools an archeologist might use.

- 1.
- 2.
- 3.

Vocabulary




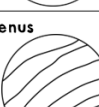
Novel Project option

THE MARTIAN Initials: _____

Chapter 8

Directions: Color each of the planets and then describe its size, atmosphere, and memorable characteristic.

The Inner Planets

Planet	Size	Atmosphere
Mars 		
Earth 		
Mercury 		
Venus 		

THE MARTIAN Initials: _____

WORD STUDY: Chapters 9-11

7. Valley
Draw a picture of a valley below.

8. Plains
Describe characteristics of plains.

9. Tetrahedron
How many faces, vertices, and edges does a tetrahedron have?

_____ Faces
_____ Vertices
_____ Edges

11. Weather

THE MARTIAN Initials: _____

WORD STUDY: Chapters 9-11

1. Maps
What's the difference between a map and a globe?

2. Navigation
Most people use GPS to navigate themselves around the world. What does GPS stand for?

3. Fossils
List three types of fossils.

4. Geological
The prefix *geo* means _____.
List two other words that begin with the prefix *geo*.

6. Magnetic field
Draw the magnetic field around the magnet below.

THE MARTIAN Initials: _____

Final Project

Teacher Guide:

In 1994, NASA announced the Mars Exploration Program (MEP), initially called Mars Global Surveyor. MEP was assigned the lead role for Mars Exploration Program Laboratory (JPL). MEP explores Mars on behalf of the Mars Mission Directorate (SMD). Mars Global Surveyor orbiters on and around Mars, Mars Global Surveyor conducted by national and international agencies and developing future rover and lander missions.

You and your students can learn more about the MEP Program by clicking [here](#).

NASA, the Jet Propulsion Laboratory, and the Mars Exploration Program has shared several **standard-aligned** activities that you can use to understand and learn more about Mars. Use the following link to download one or more for your students ([content/uploads/MSIP-MarsActivities.pdf](#) found on pdf page 36).

Happy Exploring!

Movie Guide: The Martian

Directions: Choose the answer that best completes each statement.

- The movie begins with the astronauts collecting _____.
a. plants
b. rock samples
c. dirt
d. both b and c
- The Ares III records the dust storm at how many Newtons?
a. 1,250N
b. 8600N
c. 300N
d. 2550N
- Why did the astronauts leave Mark behind?
a. They thought he was dead.
b. They couldn't get to him in time.
c. They thought he was already on the *Hermes*.
d. None of the above.
- What does the alarm in Mark's helmet indicate?
a. That there is a high level of carbon dioxide.
b. That there is a high level of oxygen.
c. That there is a low level of oxygen.
d. That there is a low level of helium.
- What does Mark use to close his wound?
a. scalpel
b. stapler
c. hot glue
d. duct tape
- How does Mark suggest he could die?
a. Not enough oxygen
b. Not enough water
c. Not enough food
d. All of the above

Movie Guide Included with Multiple Choice Questions that follow along with the movie



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