

Asteroid Ascend!

Sample Curriculum for Grades 6-12



Middle School Space Science Essential Goals

While completing the Asteroid Ascend Curriculum, participating students will:

- ❖ Create plans for investigations which include: asking questions, forming hypotheses, and collecting accurate data.
- ❖ Research **NASA**, the work that they conduct, their contributions to space science, and current/future projects such as *Asteroid Redirect Mission (ARM)*.
- ❖ Analyze and review data and findings from **NASA** and their affiliates.
- ❖ Communicate scientific investigations (written, oral, digital and pictorial).
- ❖ Utilize technology (i.e. Google Virtual Reality Glasses, programming languages Python and Ruby, and Unity) to develop games and other applications that will serve as a learning tool for their peers and the greater community.
- ❖ Program an operational Virtual Reality game that will be presented to their peers, mentors, school staff, and community.
- ❖ Recognize that people from different cultures and in different times in history have made advancements in space science and technology.
- ❖ Engage with students in grades 9 through 12 in a mentee capacity.
- ❖ Interact with stakeholders in the fields of technology and space science through town hall meetings, Skype chats, and after-school/weekend sessions.

High School Space Science Essential Goals

While completing the Asteroid Ascend Curriculum, participating students will:

- ❖ Create plans for investigations which include: asking questions, forming hypotheses, and collecting accurate data.
- ❖ Research **NASA**, the work that they conduct, their contributions to space science, and current/future projects such as *Asteroid Redirect Mission (ARM)*.
- ❖ Analyze and review data and findings from **NASA** and their affiliates.
- ❖ Communicate scientific investigations (written, oral, digital and pictorial).
- ❖ Complete a *Capstone Project* in their senior year.
- ❖ Utilize technology (i.e. Google Virtual Reality Glasses, programming languages Python and Ruby, and Unity) to develop games and other applications that will serve as a learning tool for their peers and the greater community.
- ❖ Program an operational Virtual Reality game that will be presented to their peers, mentors, school staff, and community.
- ❖ Recognize that people from different cultures and in different times in history have made advancements in space science and technology.
- ❖ Engage with students in grades 6 through 8 in a mentor capacity.
- ❖ Interact with stakeholders in the fields of technology and space science through town hall meetings, Skype chats, and after-school/weekend sessions.

PROGRAM FORMS

To Educators:

Please use the forms in this section to gauge the effectiveness of Asteroid Ascend's lessons. It is recommended to make three to five assessments over the course of the program and you can complete these documents at any point during the program.*
However, it is suggested that you complete an assessment right after the end of your session or after an interaction with a student.

ASTEROID ASCEND!

PRE-REPORT

Date: _____

For Session(s)#: _____

Pre-Report Completed By: _____

DESIRED RESULTS	
Student Essential Learnings	
Student Understandings	Student Essential Questions
Students Will Know.....	Students Will Be Able To.....

NOTES:

ASTEROID ASCEND!

FINAL REPORT

Date: _____

For Session(s)#: _____

Report Completed By: _____

RESULTS	
Student Takeaways	
Student Understandings	Student Essential Questions
Students Know.....	Students Are Able To.....

NOTES:

ASTEROID ASCEND!

Innovative Learning Plan

Date: _____

For Session#: _____

Report Completed By: _____

Innovative Learning Plan	
Activities	
Materials	Accommodations
Technology and Science Integration	Short Term Goals

NOTES:

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CURRICULUM CALENDAR

MONTH

Essential Learning					
Knowledge					
Assessment					
Skills					
Learning					
Student Support					
Materials					

Notes:

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SESSION 1 AGENDA OUTLINE

Staff Roles

Session Facilitators:

Educator(s) & Teaching Fellow(s)/Teaching Assistant(s)

Session Run Time:

90 Minutes

Session Objectives:

After completing Session 1 of ASTEROID ASCEND! students will:

- 1) Welcome!/Overview of Program**
- 2) Learn essential facts and characteristics of asteroids (10 Minutes)**
 - ❖ Composition
 - ❖ Elements
 - ❖ Where asteroids are found
 - ❖ Why asteroids are important
 - ❖ History of space and asteroids
- 3) Introduction to National Aeronautics and Space Administration (NASA) (10 Minutes)**
 - ❖ NASA's History
 - ❖ What does NASA do?
 - ❖ Why is NASA important?
 - ❖ NASA's research and projects
- 4) Introduction to NASA's Asteroid Redirect Mission (ARM) (10 Minutes)**
 - ❖ Purpose
 - ❖ Key Points
 - ❖ Plan of Action
 - ❖ Why ARM is important

5) Virtual Reality(VR) Demonstration (40 Minutes)

- ❖ What is VR?
- ❖ How can VR help NASA astronauts, scientists, and everyday people learn more about asteroids and space?
- ❖ Explore Space with VR
 - Students will break into groups (with an educator or teaching fellow) and examine the Google VR Glasses.
 - Educators and teaching fellows are urged to listen to student responses as they examine the product at first. If students react with amazement and/or curiosity, educators are encouraged to lead a discussion based on student responses.
- ❖ Use Virtual Reality!

Educators and students will test the Google VR Glasses

6) Journal Writing/Voice Recording and Conclusion (20 Minutes)

Students will be encouraged to write in their journal about experiences, feelings, questions, etc for the day. Students have the option of recording their journal entry if writing is not their preferred medium.

ASTEROID ASCEND!

SESSION 2 AGENDA OUTLINE

Staff Roles

Session Facilitators:

Educator(s) & Teaching Fellow(s)/Teaching Assistant(s)

Session Run Time:

110 Minutes

Session Objectives:

After completing Session 2 of ASTEROID ASCEND! students will:

1) Welcome/Review of Lesson 1-Interview(20 Minutes)

- ❖ Students will get into pairs and interview each other on what they learned during lesson one. Students will share their finding with the group.

**Educators and teaching fellows: it is suggested that you walk around the room as interviews are taking place. This is a great way for you to get a better feel for how the lesson was received by your students.*

2) Virtual Reality Part 2(30 Minutes)

- ❖ Students will assemble and decorate a pair of Google VR Glasses
- ❖ After assembly, students and mentors will take turns trying out the Google VR Glasses again with a game, this time really focusing on their experience.

3) Gaming and Virtual Reality Part 3 (40 Minutes)

On a projector screen, students and educators/teaching fellows will examine the code that was used to write the game they just tested. Educators will explain briefly what code is, how it is used for gaming, and why it's important for students to learn code.

As one student wears the Google VR Glasses and plays the game, another student will join the educator at the lectern/front of the class to show the class how manipulating code can yield various results.

4) Journal Writing/Voice Recording and Conclusion (20 Minutes)

Students will be encouraged to write in their journal about experiences, feelings, questions, etc for the day. Students have the option of recording their journal entry if writing is not their preferred medium.

SAMPLE