



Name: _____ Date: _____

Solar Dynamics Observatory

Pre & Post Assessment

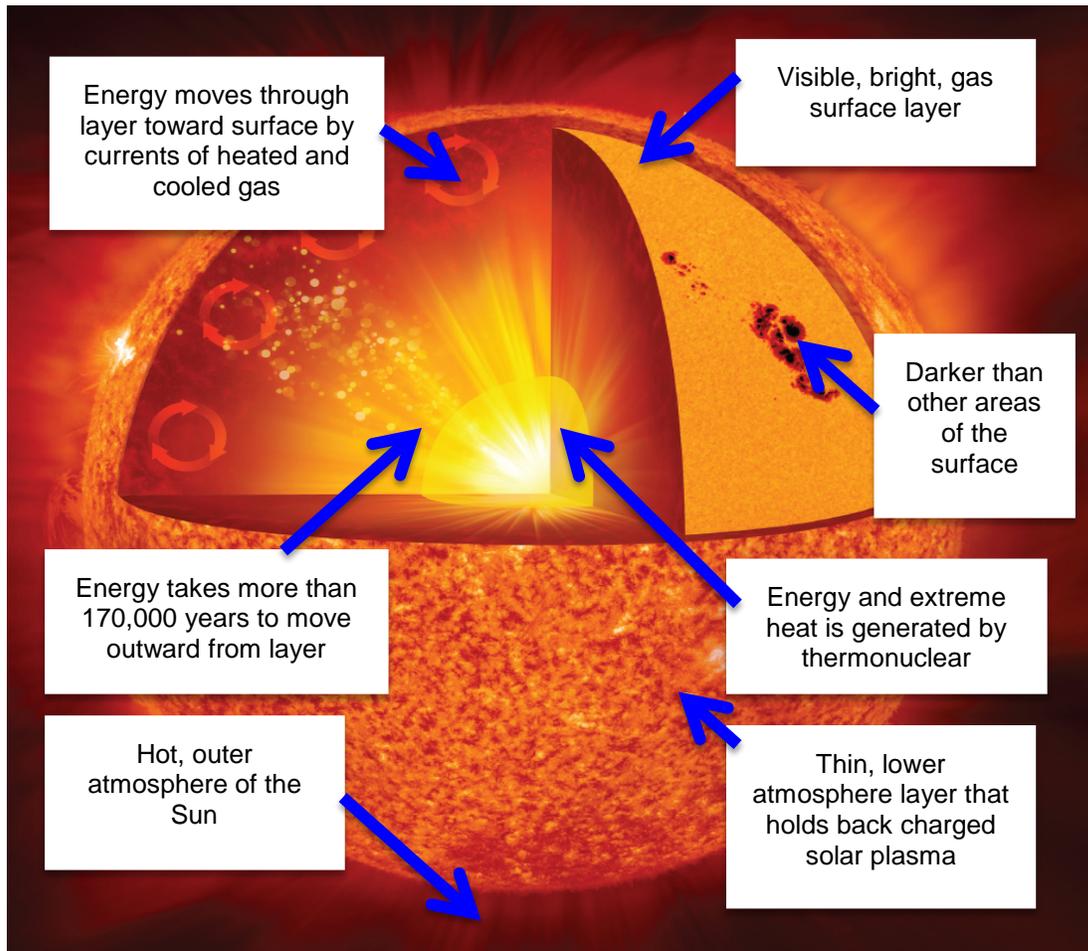
Pre Assessment or Post Assessment (check one)

Instructions: Read each question and select the correct response(s).



1. _____ is the primary source of energy that sustains life on Earth.

- The Earth's core
- Fossil fuel
- The Water Cycle
- The Sun



2. Correctly match each part of the Sun (letter) with its description:

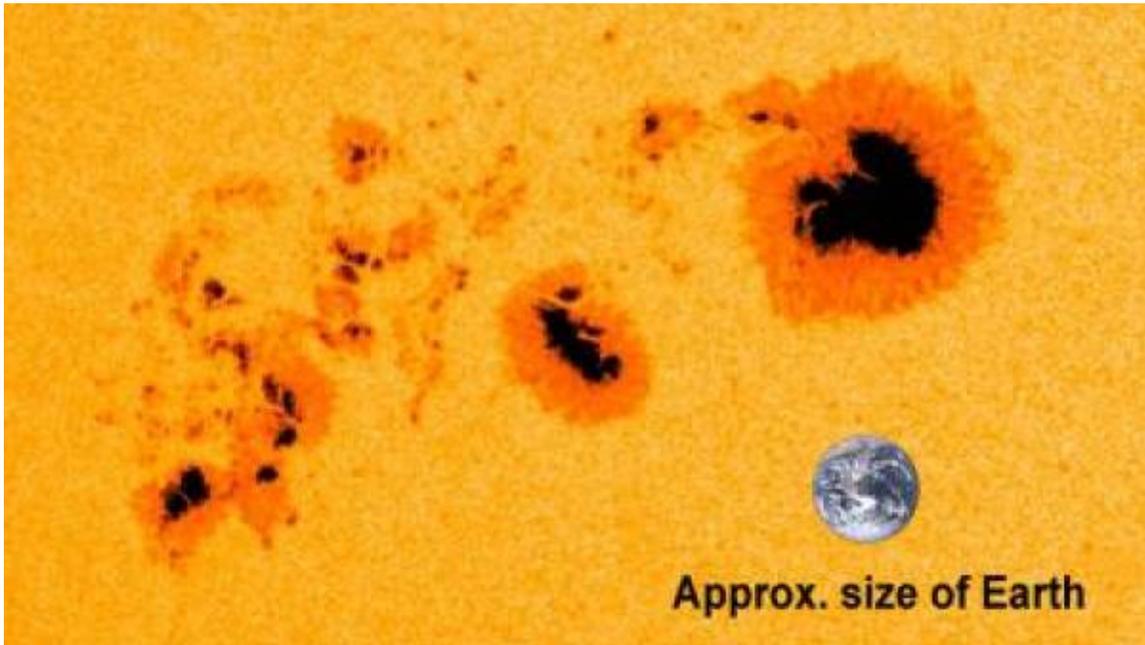
- | | |
|--------------------|-------------------|
| A. Convective Zone | E. Photosphere |
| B. Chromosphere | F. Radiative Zone |
| C. Corona | G. Sunspots |
| D. Inner Core | |

| Letter | Part of Sun Description |
|--------|--|
| | Energy takes more than 170,000 years to move outward from layer |
| | Darker than other areas of the Sun's surface |
| | Visible, bright, gas surface layer |
| | Hot atmosphere of the Sun |
| | Thin, lower atmosphere layer that holds back charged solar plasma |
| | Energy moves through layer toward surface by currents of heated and cooled gas |
| | Energy and extreme heat is generated by thermonuclear reactions |



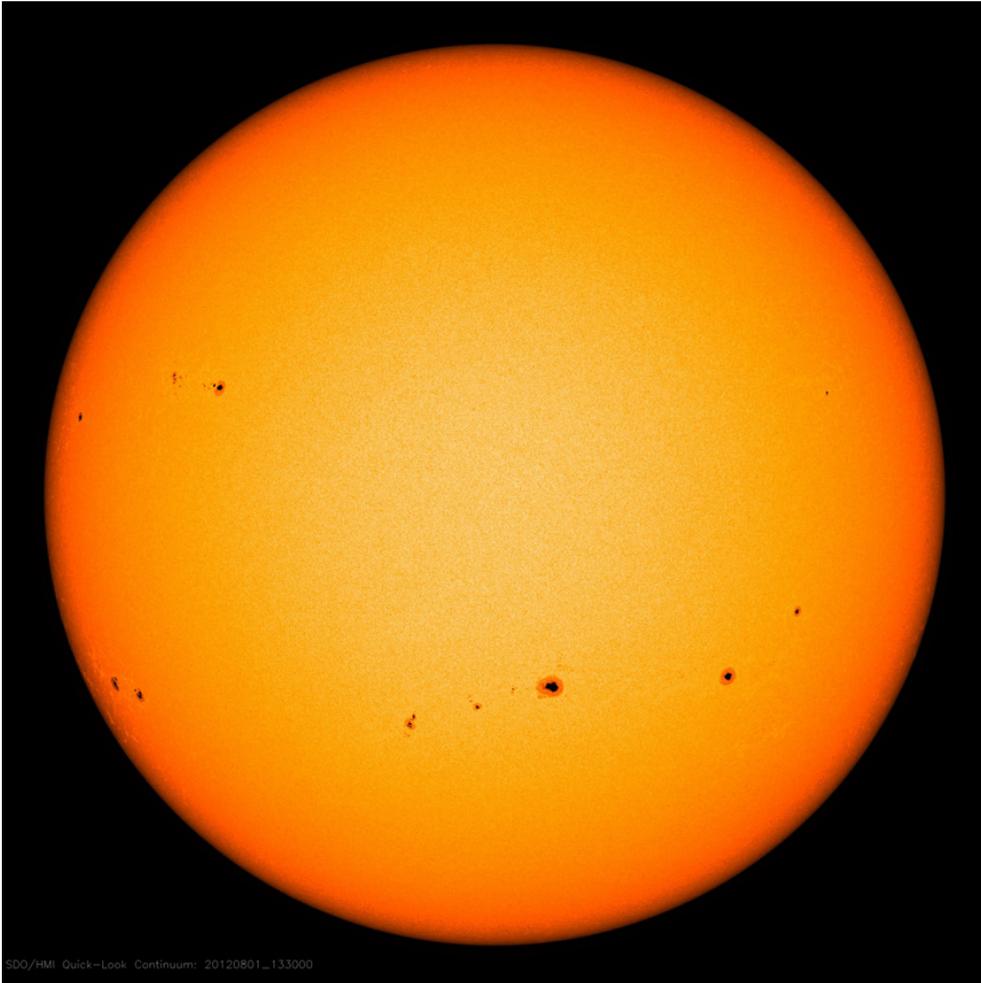
3. The Sun contains about 99% of all the mass in the Solar System; the planets and all other naturally occurring space objects consist of only 1% of its mass. Choose the statement that explains why planets, asteroids, and comets orbit the Sun:

- The greater the mass of an object, the greater its force of gravity on other objects.
- The smaller the mass of an object, the greater its force of gravity on other objects.
- The greater the mass of an object, the lower its force of gravity on other objects.
- The smaller the mass of an object, the lower its force of gravity on other objects.



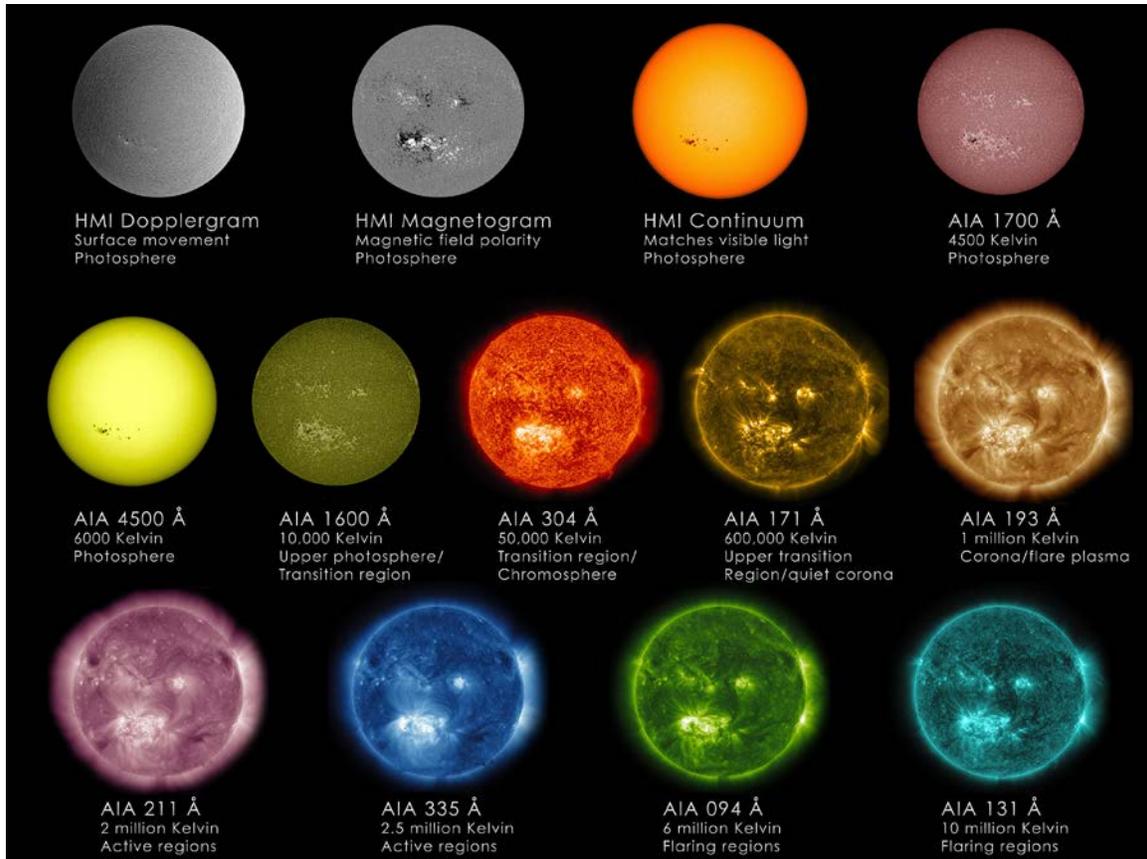
4. Sunspots appear dark because they are _____ than the surrounding surface area of the sun.

- hotter
- cooler
- less active
- made of different material



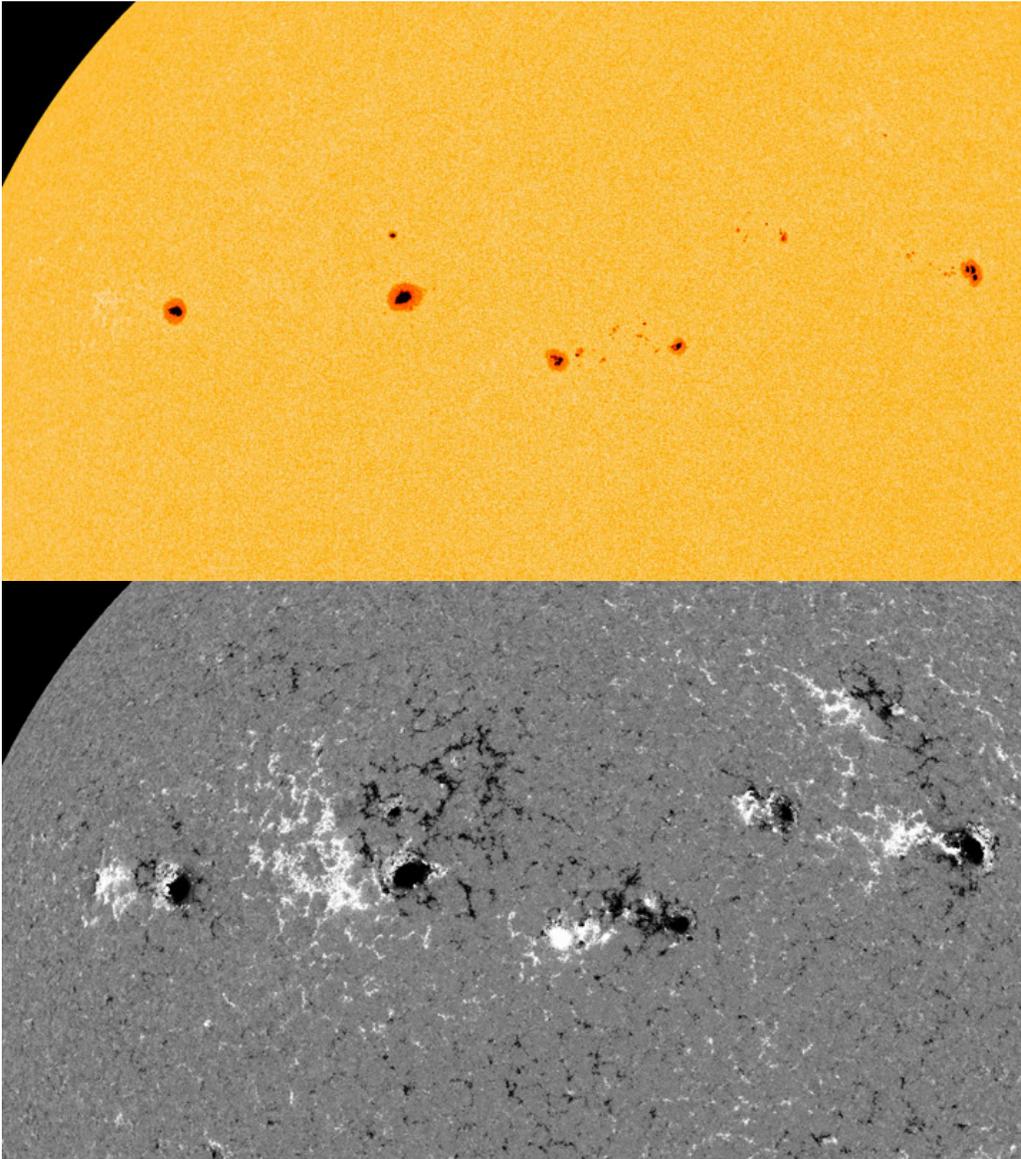
5. Sunspots

- float in the atmosphere just above the Sun's surface and indicate the direction of the solar winds.
- are located on the Sun's surface and have magnetic fields with opposite polarities (+ and -), similar to a magnet.
- are located just below the Sun's surface in the convection zone, which causes their movement.
- are imperfections on the Sun's surface and indicate stable regions inside the Sun.



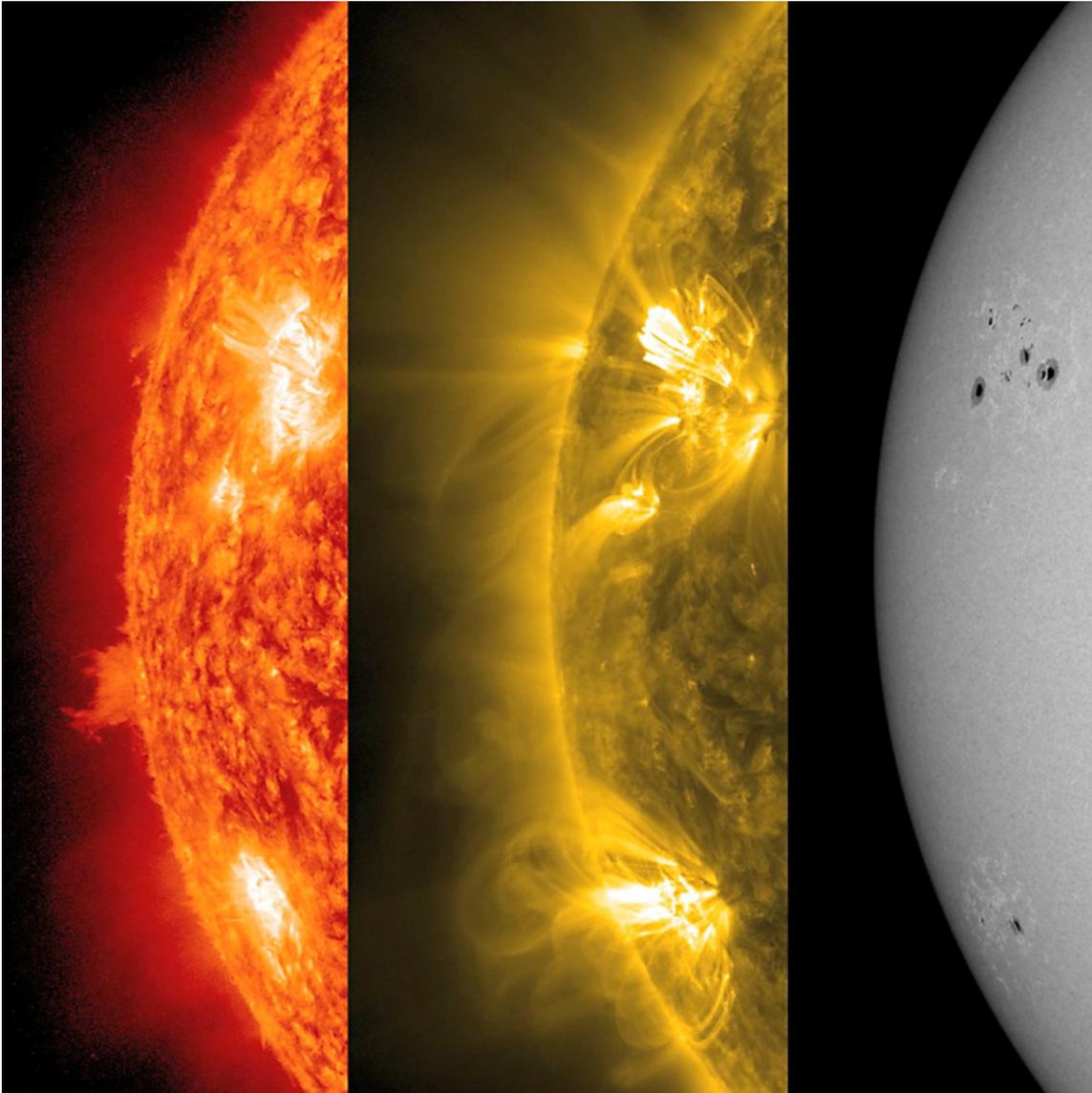
6. The Electromagnetic Spectrum represents different electromagnetic radiation wavelengths of _____.

- light energy
- mechanical energy
- sound energy
- chemical energy



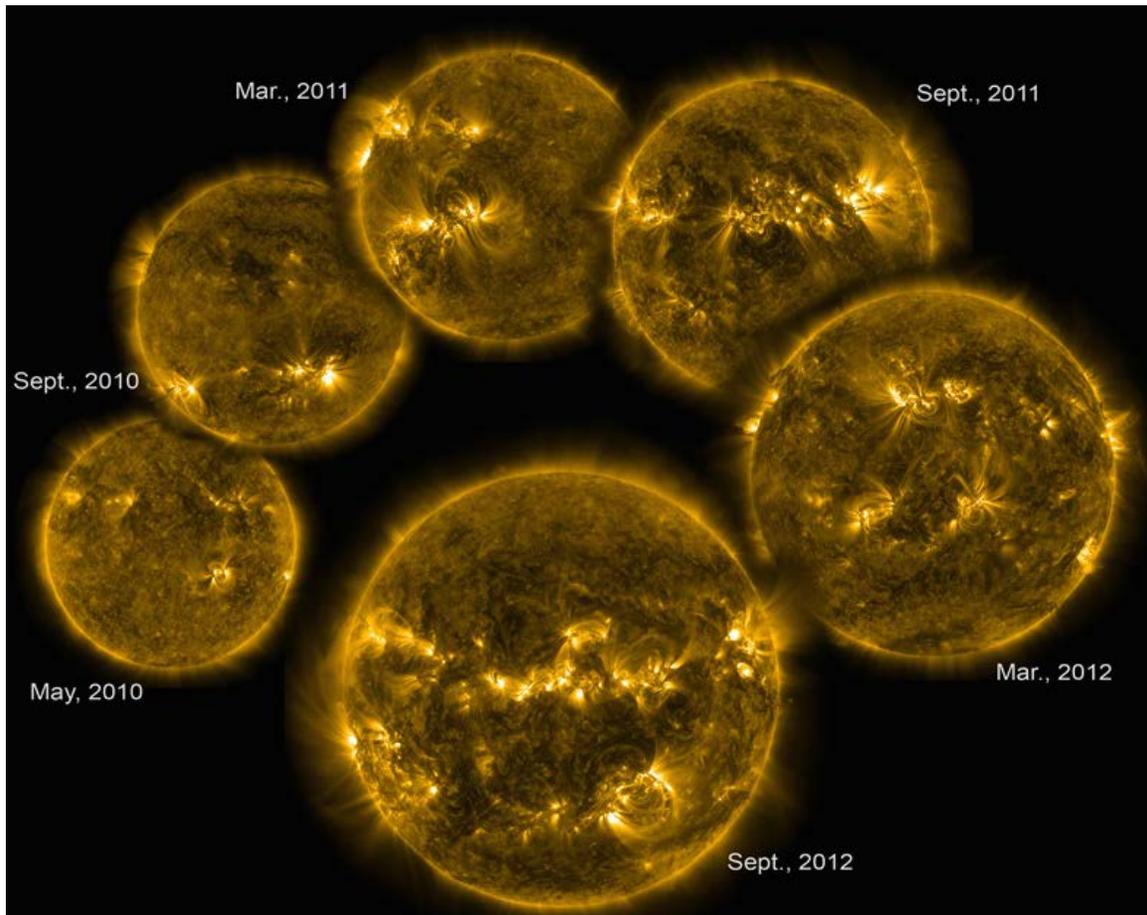
7. The size and amount of sunspots on the Sun are directly related to its level of solar activity.

- True
- False
- Do Not Know



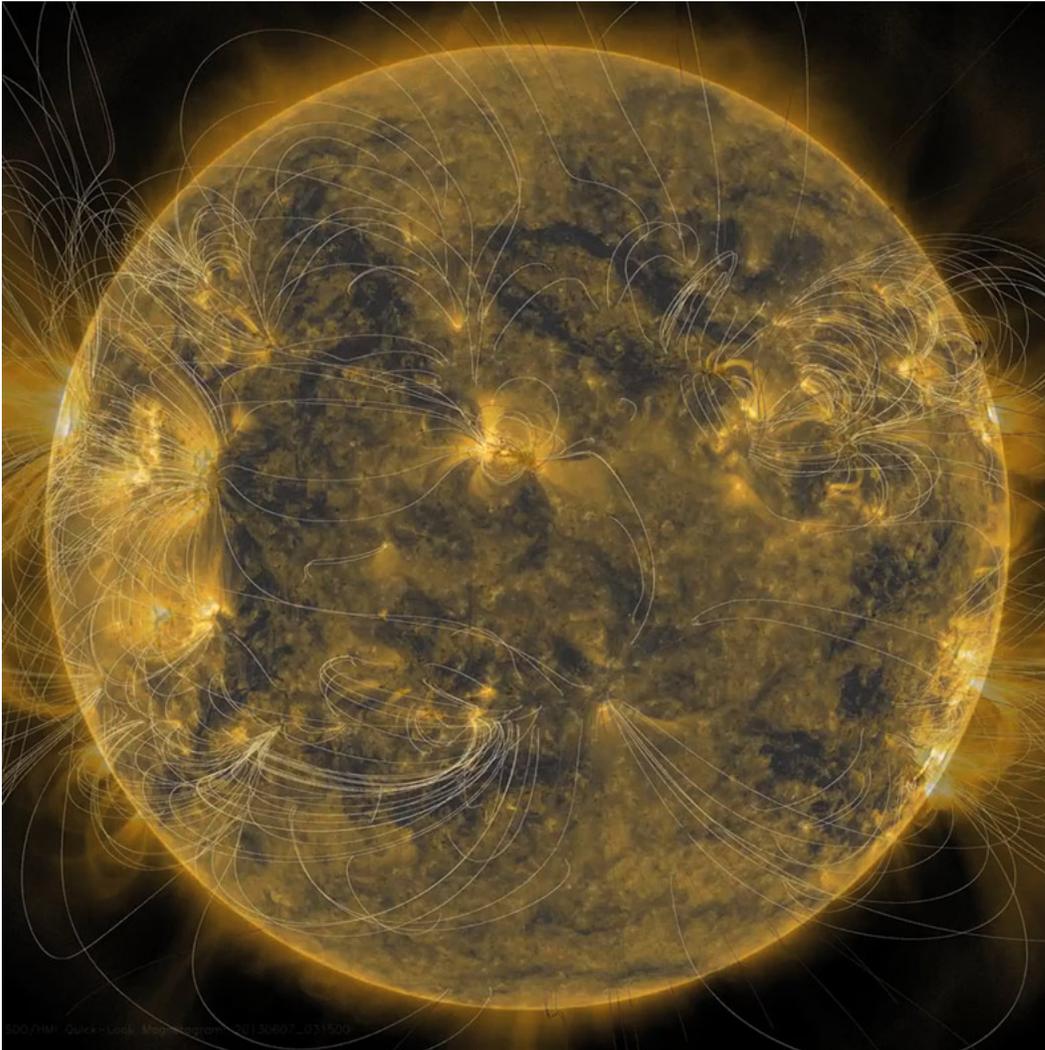
8. The Solar Cycle occurs about every 22 years and consists of an 11-year solar maximum and an 11-year solar minimum.

- Strongly Disagree
- Somewhat Disagree
- Do Not Know
- Somewhat Agree
- Strongly Agree



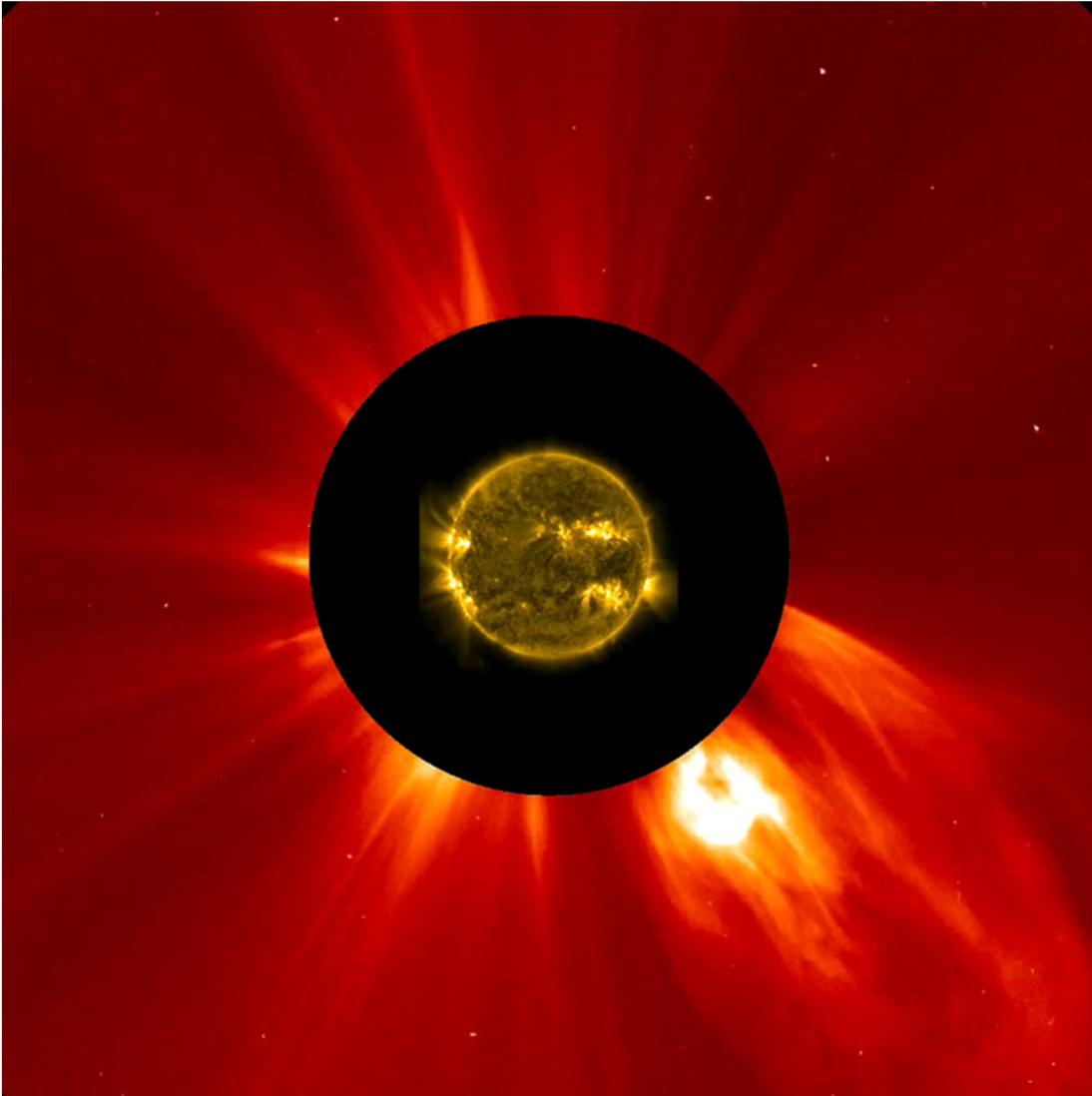
9. Which of the following situations occur on the Sun during its solar maximum?

- Lowest amount of sunspots and solar activity, magnetic poles are stable
- Lowest amount of sunspots and solar activity, magnetic poles exchange places
- Greatest amount of sunspots and solar activity, magnetic poles exchange places
- Greatest amount of sunspots and solar activity, magnetic poles are stable



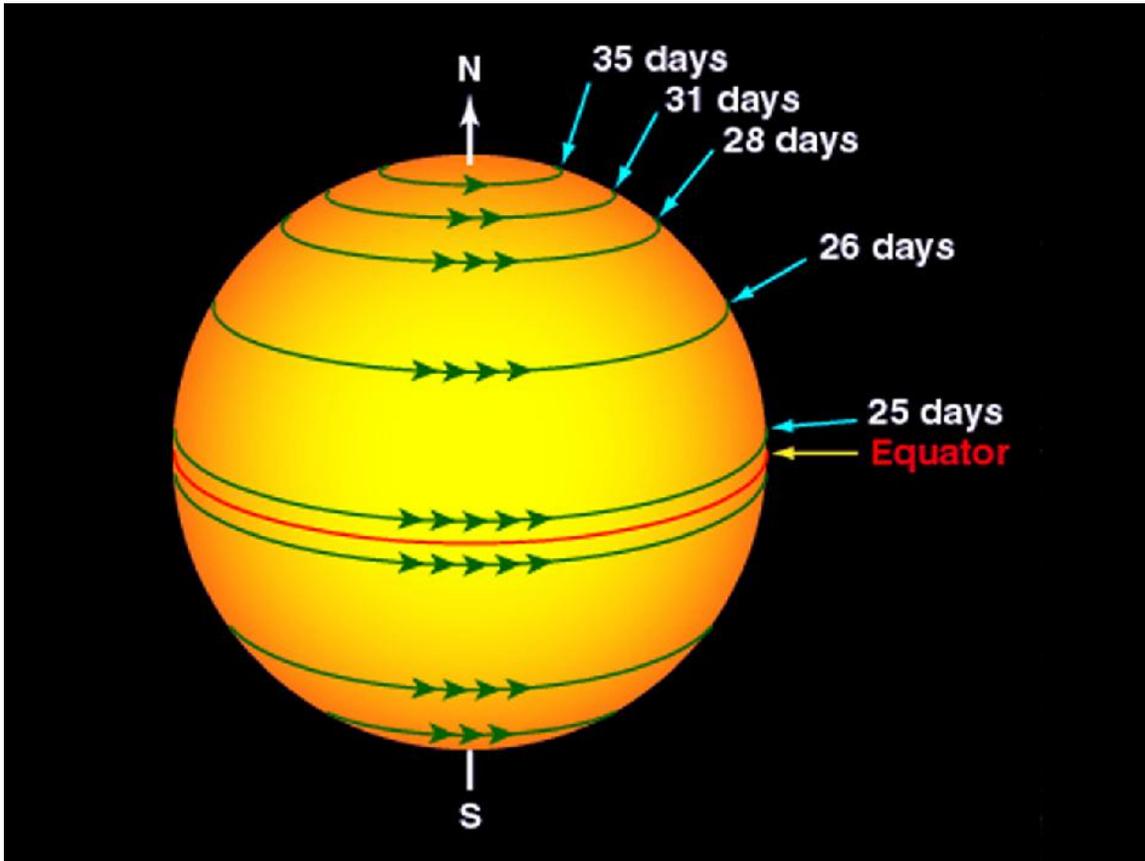
10. Solar activity (including sunspots) is caused by _____ .

- electrical currents flowing inside the Sun
- heat from the Sun's core being released at the surface of the Sun
- the change in density between the Sun's core and its surface
- changes in the magnetic field of the Sun



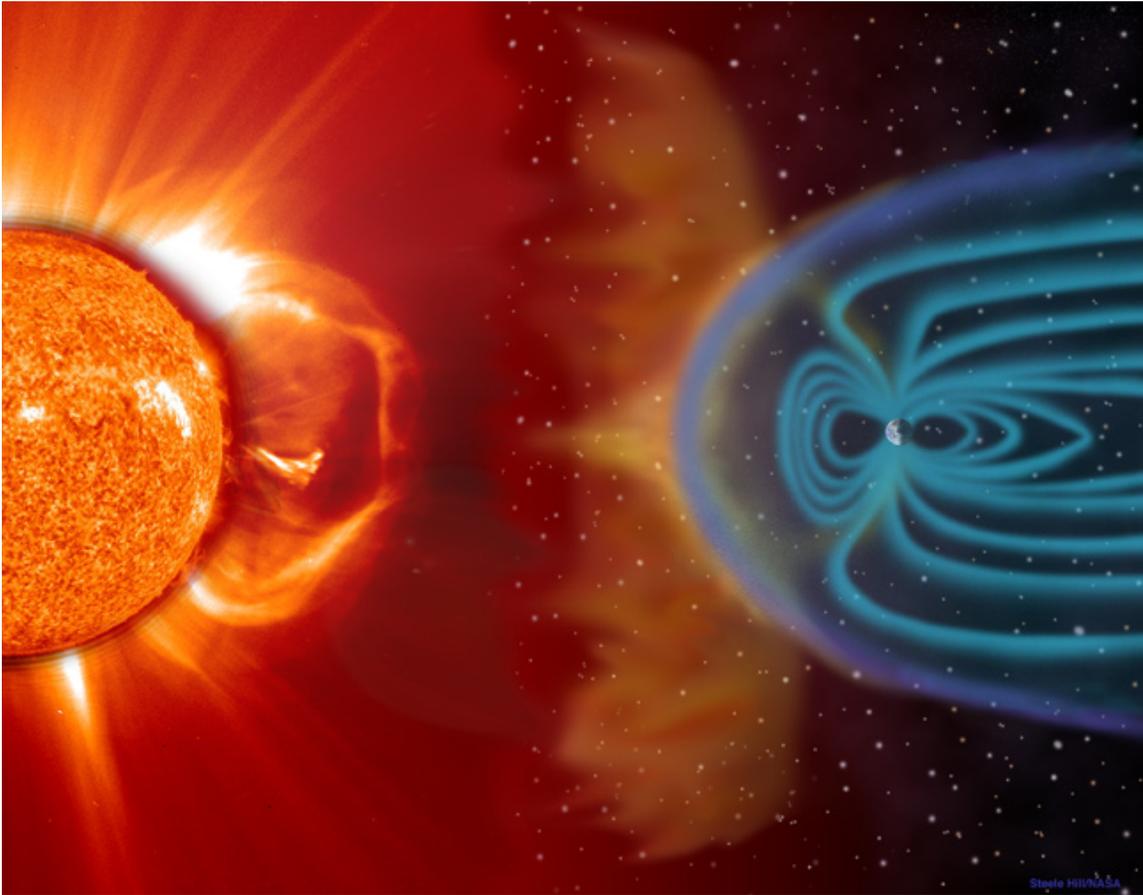
11. The two sources of solar activity that are the main cause of solar storms and Space Weather are (select two answers):

- Solar Flares
- Coronal Loops
- Solar Wind
- Coronal Streamers
- Coronal Mass Ejections (CMEs)



12. The Sun rotates faster at its equator than at its poles, which causes the Sun's magnetic field lines to become twisted and stressed beyond their limits. The magnetic field lines then release huge amounts of energy through solar activity, which can cause solar storms that affect Earth.

- True
- False
- Do Not Know



13. The magnetosphere _____ .

- is the protective layer of the Earth's atmosphere that can absorb harmful electromagnetic radiation from X-rays, and Gamma rays
- is the magnetic force located inside of Earth that drives plate tectonics
- is the magnetic field that surrounds Earth and protects it from charged particle radiation released from solar storms that are carried by the solar wind
- is the magnetic field that extends from the surface of the Earth to the surface of the Moon



14. It is important to improve our understanding of Space Weather because Space Weather that reaches Earth can (select all that apply):

- Cause surges in power grids that can result in power outages and blackouts in our electricity supply
- Disrupt our navigation and communication systems (e.g., aircraft, GPS, cell phones, ATMs)
- Cause colorful auroras often seen in the polar latitudes (Aurora Borealis in the Northern Hemisphere and Aurora Australis in the Southern Hemisphere)
- Harm astronauts in space (high-energy radiation exposure to x-rays and gamma rays)
- Damage sensitive electronics on orbiting spacecraft (e.g., satellites, space telescopes)
- None of the above



15. The _____ is the cause of seasons on Earth.

- change in the distance between the Earth and the Sun
- tilt of Earth's axis
- change in the amount of released energy from the Sun
- change in the amount of clouds

End of Assessment



Names: _____ Date: _____

SDO Solar Module Activity Rubric

Teacher & Student Co-Assessment

Solar Module Activity (circle one):

| | | |
|-----------|-----------|-----------|
| 1A | 1B | 1C |
| 2A | 2B | 2C |
| 3A | 3B | 3C |

| | |
|--|--|
| <p>4 Advanced</p> | <p>1. Completes all the items of the activity. 2. Demonstrates in-depth knowledge of activity content. 3. All evidence of learning (questions, artifacts, and/or graphs, etc.) completed accurately. 4. Uses complete sentences. No mistakes in spelling, punctuation, or capitalization. 5. Very neatly written or typed.</p> |
| <p>3 Proficient</p> | <p>1. Completes most of the items of the activity. 2. Demonstrates proficient knowledge of activity content. 3. All evidence of learning (questions, artifacts, and/or graphs, etc.) completed proficiently. 4. Uses complete sentences most of the time. Few mistakes in spelling, punctuation or capitalization. 5. Writes neatly.</p> |
| <p>2 Partially Proficient</p> | <p>1. Completes some of the items of the activity. 2. Demonstrates partially proficient knowledge of activity content. 3. All evidence of learning (questions, artifacts, and/or graphs, etc.) partially completed. 4. Uses complete sentences some of the time. Several mistakes in spelling, punctuation or capitalization. 5. Writes fairly neatly.</p> |
| <p>1 Unsatisfactory</p> | <p>1. Completes few or none of the items of the activity. 2. Demonstrates below proficient knowledge of activity content. 3. All evidence of learning (questions, artifacts, graphs, etc.) incomplete. 4. Uses many incomplete sentences. Mistakes in spelling, punctuation, and capitalization interfere with meaning. 5. Illegible writing.</p> |

NOTES:

Names: _____ Date: _____

Module 4: SDO Exploration Museum
 Teacher Assessment: Content & Exhibit Rubric

| Expectation | 4 Advanced | 3 Proficient | 2 Partially Proficient | 1 Unsatisfactory |
|--|---|--|--|--|
| Topic & Content Accuracy 40% _____ points | Exhibit demonstrates advanced understanding of content. Topic and content are thoroughly explained with more than 4 details in one complete paragraph per exhibit section. All facts are accurate. 4 or more sources and/or links cited per section. | Exhibit demonstrates proficient understanding of content. Topic and content are explained with 3-4 details in one complete paragraph per exhibit section. May have 1-2 inaccurate facts. 3 sources and/or links cited per section. | Exhibit demonstrates basic understanding of content. Topic and content are adequately explained with 1-2 details in a short paragraph per exhibit section. May have 3-4 inaccurate facts. 2 sources and/or links cited per section. | Exhibit demonstrates limited understanding of content. Topic and content are minimally explained without details in an incomplete paragraph per exhibit section. More than 4 inaccurate facts. 0-1 sources and/or links cited per section. |
| Exhibit Elements & Design 25% _____ points | Exceptional formatting and organization of information, enables self-directed visitors. 3 graphics/images with descriptions per section. 3 total complete and functional artifacts or demonstrations with descriptions. Exhibit checklist is complete and accurate. | Proficient formatting and well-organized information, curators easily guide visitors through exhibit. 2-3 graphics/images with descriptions per section. 3 total artifacts or demonstrations. Exhibit checklist has 1-2 errors. | Adequate formatting and organization of information, curators guide visitors with difficulty through exhibit. 1-2 graphics/images without descriptions per section. 1-2 total artifacts or demonstrations. Exhibit checklist has 3-4 errors. | No formatting and organization of information, curators are confused and unable to guide visitors through exhibit. No graphics/images per section. 0-1 total incomplete artifacts or demonstrations. Exhibit checklist has more than 4 errors. |
| Exhibit Creativity & Innovation 20% _____ points | Exhibit information is presented through highly engaging, multi-sensory methods. Interactive media and hands-on resources are used to effectively communicate exhibit content. | Exhibit information is presented using original and unique methods. Utilizes a variety of resources to accurately communicate exhibit content. | Exhibit information is presented primarily through a "cut and paste" method. Limited evidence of originality to communicate exhibit content. | Exhibit is plagiarized or incomplete. |
| Writing Mechanics 15% _____ points | All capitalization, mechanics, punctuation, and spelling are correct after self-check and peer edits. | Total of 1-3 capitalization, mechanics, punctuation, and/or spelling errors after self-check and peer edits. | Total of 4-6 capitalization, mechanics, punctuation, and/or spelling errors after self-check and peer edits. | More than 6 capitalization, mechanics, punctuation, and/or spelling errors after self-check and peer edits. |



Names: _____ Date: _____

Module 4: SDO Exploration Museum
 Student Assessment: Group Self-Evaluation Rubric

| Expectation | 4 Advanced | 3 Proficient | 2 Partially Proficient | 1 Unsatisfactory |
|--|--|---|---|--|
| <p>Quality of Learning & Project Work 25%</p> <p>_____ points</p> | <p>Quality and depth of activity and exhibit work is in-depth, accurate, and exceeds expectations. All work thoroughly completed neatly and legibly with attention to detail. Meets the “Advanced” criteria of the Content & Exhibit Rubric.</p> | <p>Quality of activity and exhibit work is accurate and achieves expectations. All work completed neatly and legibly. Meets the “Proficient” criteria of the Content & Exhibit Rubric.</p> | <p>Quality of activity and exhibit work is mainly accurate and partially meets expectations. Most work completed neatly and legibly. Meets the “Partially Proficient” criteria of the Content & Exhibit Rubric.</p> | <p>Quality of activity and exhibit work is mainly inaccurate and does not meet expectations. Most work not completed neatly or legibly. Meets the “Unsatisfactory” criteria of the Content & Exhibit Rubric.</p> |
| <p>Project & Time Management 25%</p> <p>_____ points</p> | <p>Team is consistently prepared, focused, on time and on task with completing activity and exhibit work. Project materials are carefully maintained and always accessible by all team members.</p> | <p>Team is frequently prepared, focused, on time and on task with completing activity and exhibit work. Project materials are responsibly maintained and are regularly accessible by all team members.</p> | <p>Team is occasionally prepared, focused, on time and on task with completing activity and exhibit project work. Project materials are somewhat maintained and are usually accessible by all team members.</p> | <p>Team is not prepared or focused, wastes time and off task with completing activity and exhibit work. Project materials are not maintained or accessible by all team members.</p> |
| <p>Team Effort 25%</p> <p>_____ points</p> | <p>Consistently contribute best effort towards achieving group goals. Always willing to accept and complete assigned project tasks. Group completes fair share of work and supports each other in completing work.</p> | <p>Frequently contribute full effort towards achieving group goals. Regularly willing to accept and complete assigned project tasks. Group completes fair share of work.</p> | <p>Occasionally contribute full effort towards achieving group goals. Sometimes willing to accept and complete assigned project tasks. Group usually completes fair share of work.</p> | <p>Does not contribute full effort towards achieving group goals. Never willing to accept and complete assigned project tasks. Group does not share workload.</p> |
| <p>Team Cooperation & Respect 25%</p> <p>_____ points</p> | <p>Group consistently works as a team in a positive manner. Team always respects the opinions of others, solves problems constructively, and fully supports group decisions. Never distracts other teams.</p> | <p>Group frequently worked as a team in a positive manner. Team generally respects the opinions of others, solves problems politely, and frequently supports group decisions. Rarely distracts other teams.</p> | <p>Group occasionally works as a team in a positive manner. Team sometimes respects the opinions of others, solves problems with some arguing, and usually supports group decisions. Sometimes distracts other teams.</p> | <p>Group does not work together as a team in a positive manner. Team does not respect opinions of others, solves problems with constant arguing, and does not support group decisions. Always distracts other teams.</p> |

Names: _____ Date: _____

Module 4: SDO Exploration Museum

Teacher Assessment: SDO Exploration Museum: 3-D Solar Exhibit Presentation Rubric

Exhibit Presentation Checklist:

1. ___ Prepare exhibit display, artifacts and demonstrations as a team.
2. ___ Practice individual exhibit display descriptions (curator parts) and demonstrations.
3. ___ Practice curator parts and demonstrations together as a team.
4. ___ Practice speaking clearly, appropriate body language and eye contact as curators.
5. ___ Set-up team exhibit for museum event.
6. ___ Remain in curator mode for museum visitors during event.
7. ___ Clean-up team exhibit after museum event.

Total points earned (cumulative value of above points): _____ /28 points

| | |
|----------------------------------|--|
| 4 Advanced | <ol style="list-style-type: none"> 1. Has exhibit display descriptions memorized. 2. Stays in curator mode. 3. Uses 3 or more artifacts or demonstrations. 4. Speaks clearly and distinctly. 5. Uses appropriate body posture and eye contact. |
| 3 Proficient | <ol style="list-style-type: none"> 1. Has most of display descriptions memorized. 2. Stays in curator mode for most of museum visit. 3. Uses at least two artifacts or demonstrations. 4. Usually speaks clearly and distinctly. 5. Uses appropriate body posture and eye contact most of the time. |
| 2 Partially Proficient | <ol style="list-style-type: none"> 1. Has limited amount of exhibit display descriptions memorized. 2. Often out of curator mode. 3. Uses one artifact or demonstration. 4. Speaks clearly and distinctly some of the time. 5. Uses appropriate body posture and eye contact some of the time. |
| 1 Unsatisfactory | <ol style="list-style-type: none"> 1. Does not have exhibit display descriptions memorized. 2. Not in or out of curator mode for most of museum visit. 3. No artifacts or demonstrations. 4. Speaks too softly or not distinctly. 5. Uses inappropriate body posture or no eye contact. |

NOTES:



| SDO Solar Modules NGSS Physical Sciences | | NGSS Middle School (6-8) Standards | | |
|--|--|--|--|----------------------------------|
| | | MS-PS2 Motion and Stability: Forces and Interactions | MS-PS4 Waves and their Applications in Technologies for Information Transfer | |
| SDO Solar Module Topics | Solar Module Activity Objectives | Disciplinary Core Ideas | | |
| | | PS2.B: Types of Interactions | PS4.A: Wave Properties | PS4.B: Electromagnetic Radiation |
| Module 1 What are the features of the Sun? | A. Structure of the Sun B. Observing the Sun C. Light Energy | | | 1C (MS-PS4-2) |
| Module 2 How and why do we study the Sun? | A. Electromagnetic Spectrum B. Magnetism C. Spectroscopy | 2A (MS-PS2-3) 2B (MS-PS2-3) 2B (MS-PS2-5) | 2A (MS-PS4-1) 2C (MS-PS4-1) | 2A (MS-PS4-2) 2C (MS-PS4-2) |
| Module 3 How does the Sun affect the Earth? | A. Cause of Seasons B. Space Weather C. Magnetosphere | 3A (MS-PS2-4) 3B (MS-PS2-5) 3C (MS-PS2-5) | | |



| SDO Solar Modules NGSS Earth and Space Sciences | | NGSS Middle School (6-8) Standards | | |
|--|--|---------------------------------------|------------------------------------|----------------------------------|
| | | MS-ESS1 Earth's Place in the Universe | | MS-ESS3 Earth and Human Activity |
| SDO Solar Module Topics | Solar Module Activity Objectives | Disciplinary Core Ideas | | |
| | | ESS1.A: The Universe and Its Stars | ESS1.B: Earth and the Solar System | ESS3.B: Natural Hazards |
| Module 1 What are the features of the Sun? | A. Structure of the Sun B. Observing the Sun C. Light Energy | 1B (MS-ESS1-1) | 1A (MS-ESS1-3) 1C (MS-ESS1-3) | |
| Module 2 How and why do we study the Sun? | A. Electromagnetic Spectrum B. Magnetism C. Spectroscopy | | | |
| Module 3 How does the Sun affect the Earth? | A. Cause of Seasons B. Space Weather C. Magnetosphere | 3A (MS-ESS1-1) | 3A (MS-ESS1-1) | 3B (MS-ESS3-2) 3C (MS-ESS3-2) |



| <p style="text-align: center;">SDO Solar Modules NGSS Science and Engineering Practices</p> | | | | | | | | | |
|---|---|--|-----------------------------|--|---------------------------------|--|---|------------------------------------|--|
| SDO Solar Module Topics | Solar Module Activity Objectives | Asking Questions and Defining Problems | Developing and Using Models | Planning and Carrying Out Investigations | Analyzing and Interpreting Data | Using Mathematics and Computational Skills | Constructing Explanations and Designing Solutions | Engaging in Argument from Evidence | Obtaining, Evaluating, and Communicating Information |
| Module 1 What are the features of the Sun? | A. Structure of the Sun | X | X | | X | X | | | X |
| | B. Observing the Sun | X | | X | X | X | X | X | X |
| | C. Light Energy | X | X | X | | X | | | X |
| Module 2 How and why do we study the Sun? | A. Electromagnetic Spectrum | X | X | X | X | X | | | X |
| | B. Magnetism | X | X | X | X | X | | | X |
| | C. Spectroscopy | X | | X | X | X | | | X |
| Module 3 How does the Sun affect the Earth? | A. Causes of Seasons | X | X | | | | X | X | X |
| | B. Space Weather | X | | X | X | | X | X | X |
| | C. Magnetosphere | X | | X | X | X | X | X | X |



| <p style="text-align: center;">SDO Solar Modules NGSS Crosscutting Concepts</p> | | | | | | | | |
|---|----------------------------------|----------|--|---------------------------------|---------------------------|---|------------------------|----------------------|
| SDO Solar Module Topics | Solar Module Activity Objectives | Patterns | Cause and Effect: Mechanism and Prediction | Scale, Proportion, and Quantity | Systems and System Models | Energy and Matter: Flows, Cycles and Conservation | Structure and Function | Stability and Change |
| Module 1 What are the features of the Sun? | A. Structure of the Sun | | | X | X | | X | |
| | B. Observing the Sun | X | X | X | | | | X |
| | C. Light Energy | | | X | X | X | | |
| Module 2 How and why do we study the Sun? | A. Electromagnetic Spectrum | X | X | | X | X | | X |
| | B. Magnetism | X | X | | X | | | X |
| | C. Spectroscopy | X | | X | | X | | |
| Module 3 How does the Sun affect the Earth? | A. Causes of Seasons | | X | | X | | X | X |
| | B. Space Weather | X | X | | | X | | X |
| | C. Magnetosphere | X | X | X | | | | X |



Module 1:

| | |
|----------------------------------|---|
| Intro to SDO Video | http://sdo.gsfc.nasa.gov/gallery/animations/item/249 |
| SDO Science Overview Video | http://sdo.gsfc.nasa.gov/gallery/animations/item/255 |
| The Sun's Energy Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/1/2/ |
| Colors of the Sun Video | http://solar-center.stanford.edu/colors/ |
| Sun Comparison Activities | http://solar-center.stanford.edu/compare/ |
| Sun Trek Fact-ary | http://www.suntrek.org/factory/factory.shtml |
| Sun Origami Model | http://www.swpc.noaa.gov/content/education-and-outreach |
| Solar Space Telescopes Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/3/2/ |
| Sunspot Quiz | http://solar-center.stanford.edu/quizzes/sunspot_quiz_flash.html |
| How to Safely View the Sun Video | http://multiverse.ssl.berkeley.edu/Learning-Resources/Multiverse-in-the-Movies |

Module 2:

| | |
|-------------------------------|---|
| SDO AIA Video | http://sdo.gsfc.nasa.gov/gallery/animations/item/254 |
| SDO EVE Video | http://sdo.gsfc.nasa.gov/gallery/animations/item/253 |
| EM Spectrum Tour | http://missionscience.nasa.gov/ems/01_intro.html |
| The Sun & EM Spectrum Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/3/1/ |
| How to Use Helioviewer Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/3/3/ |
| User Guide for Helioviewer | http://wiki.helioviewer.org/wiki/Helioviewer.org_User_Guide_2.4.0 |
| Helioviewer Activity | http://helioviewer.org/ |
| The Dynamic Sun Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/1/3/ |
| SDO HMI Video | http://sdo.gsfc.nasa.gov/gallery/animations/item/252 |
| Solar System Magnetism | http://nasawavelength.org/resource/nw-000-000-003-158/ |
| Spectroscopy in Action Video | http://www.nasa.gov/audience/foreducators/topnav/schedule/programdescriptions/Eclips_Neon_Lights_9-12.html |
| Spectroscopy Explained | http://solarsystem.nasa.gov/deepimpact/science/spectroscopy.cfm |
| Graphing the Rainbow Activity | http://lasp.colorado.edu/home/education/K-12/project-spectra/ |

Module 3:

| | |
|--|---|
| Our World: Sunsets and Atmosphere | http://www.nasa.gov/audience/foreducators/nasaclips/search.html?terms=sunsets and atmosphere |
| Launchpad: Aurora Lights | http://www.nasa.gov/audience/foreducators/nasaclips/search.html?terms=Aurora Lights |
| Real World: Monitoring Earth's Energy Budget | http://www.nasa.gov/audience/foreducators/nasaclips/search.html?terms=earth%27s energy budget |
| What is the tilt of Earth's Axis? | http://www.suntrek.org/earth-beyond/spinning-orbiting-earth/what-causes-seasons/watch-tilt.shtml |
| Why are days longer in the summer? | http://www.suntrek.org/earth-beyond/spinning-orbiting-earth/what-causes-seasons/long-summer-days.shtml |
| Why are days hotter in the summer? | http://www.suntrek.org/earth-beyond/spinning-orbiting-earth/what-causes-seasons/hotter-sun-summer.shtml |
| Why are there four seasons on Earth? | http://www.suntrek.org/earth-beyond/spinning-orbiting-earth/what-causes-seasons/why-four-seasons.shtml |
| What causes the seasons? | http://spaceplace.nasa.gov/seasons/en/ |
| Solar Wind and Storms Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/2/1/ |
| The Threat to Earth Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/2/3/ |
| NOAA Space Weather Videos, Poster & Booklet | http://origin-www.swpc.noaa.gov/content/education-and-outreach |
| Camilla Space Weather Forecast | http://sdo.gsfc.nasa.gov/swx/forecast.php |
| Earth's Magnetic Shield Video | http://www.pbs.org/wgbh/nova/labs/lab/sun/2/2/ |
| NASA Space Weather Media Viewer | http://sunearthday.nasa.gov/spaceweather/ |

Module 4:

| | |
|---------------------------------------|---|
| Mysteries of the Sun Booklet & Videos | http://missionscience.nasa.gov/sun/ |
|---------------------------------------|---|





SDO Module Answer Key References:

Some SDO Module activities are static and have answer keys provided in the curriculum downloads or via the adapted resource links, which are listed in the relevant SDO activities. Some SDO Module activities use real-time or near real-time data and therefore do not have keys since the results are data dependent.

SDO Modules:

1A (online solar investigation WS): key provided in download

1B (sunspot tracking): data dependent

1C (pinhole camera research activity) key available via adapted resource link
NASA SDO Science of the Sun Secondary Science Learning Unit (pp. 21-26):
<http://sdo.gsfc.nasa.gov/assets/docs/UnitPlanSecondary.pdf>

2A (EM spectrum WS): key provided in download and (Helioviewer activity): data dependent

2B (solar magnetism) keys available via adapted resource links:
http://sunearthday.nasa.gov/2007/materials/magnetic_field_lines.pdf
http://cse.ssl.berkeley.edu/SegwayEd/lessons/exploring_magnetism/exploring_magnetism/index.html

2C (spectroscope research activity) key available via adapted resource link
NASA SDO Science of the Sun Secondary Science Learning Unit (pp. 93-100):
<http://sdo.gsfc.nasa.gov/assets/docs/UnitPlanSecondary.pdf>

3A (seasons demonstration): key provided in download

3B (Camilla space weather website): data dependent

3C (magnetometer research activity) data dependent, adapted resource link:
http://education.nationalgeographic.com/education/activity/build-a-magnetometer/?ar_a=4

4 (student-led summative assessment module): results are data dependent upon student project contents