



CREATION AND THE BEGINNING OF HUMAN HISTORY

#11 - The Design of the Solar System

Psalm 19:1-11

PICTURES NEEDED

- 11-1 Sun and planets
- 11-2 Sun and planets size comparison

REVIEW (Before Teaching Lesson)

- **Journal Review:** Ask students to share an important truth that they learned from their journal readings at home that week. Share some of your own insights.
- **Previous Lesson Review:** (Use the visual from the last lesson to aid in review) For what purposes did God make the lights in the sky? What makes a day? Why is 24 hours a good length of time for a day? What makes a year? Why is a year a good length of time? How many stars are there? What does God know about each star?
- **The Big Question Review:** What do the stars tell us about God? Let the students give their answers to the question.
- **Bible Verse Review:** Isaiah 40:26
There is nothing God doesn't know or can't do.

(Lift your eyes and look to the heavens: Who created all these? He who brings out the starry host one by one, and calls them each by name.) Because of his great power and mighty strength, not one of them is missing.

LESSON CONTENT

Note: The Bible verses included in the lesson are from the NIV 1984 edition. The wording of the questions is derived from that version. If another version of the Bible is used, questions may need to be adapted.

Romans 1: 20, says that men are without excuse when they deny God. *For since the creation of the world God's invisible qualities--his eternal power and divine nature--have been clearly seen, being understood from what has been made, so that men are without excuse.*

Why are people without excuse when they deny God? The power and majesty of who God is can be seen through what he has made.

Psalms 19:1-6 has this to say about the heavens:

¹The heavens declare the glory of God; the skies proclaim the work of his hands.²Day after day they pour forth speech; night after night they display knowledge. ³There is no speech or language where their voice is not heard. ⁴Their voice goes out into all the earth, their words to the ends of the world. In the heavens he has pitched a tent for the sun, ⁵which is like a bridegroom coming forth from his pavilion, like a champion rejoicing to run his course. ⁶It rises at one end of the heavens and makes its circuit to the other; nothing is hidden from its heat.

What does the passage say about the heavens and skies? The heaven and skies declare the glory of God and the work of his hands to everyone on earth. If that is true, then we need to examine what the sun and the stars have to say to us.

What is the sun? The sun is a medium sized star that is yellow in color and produces a lot of energy mostly through the burning of gases. The sun is the center of our solar system. It is the source of light and heat for the earth.

How hot is the sun? The surface temperature of the sun is about 6,000 degrees Celsius. Water boils at 100 degrees C so you know that 6,000 degrees is very hot. Inside the sun it is even hotter, around 15 million degrees Celsius. If a pin were that hot the heat from it would kill someone who was standing ninety miles away.

What else is there in our solar system besides the sun? Besides the sun, the solar system is made up of eight planets, some with moons orbiting them. **(picture 11-1)** Just to state the facts isn't enough; we need to think about the sun and planets more deeply and reflect on how their existence speaks of God's eternal power and divine nature.

How big is the sun? **(picture 11-2)** The sun is huge. Over one million earths could fit into the space it takes up. (Explain the diagram.) All things are made up of matter and have mass. Ninety-nine percent of the mass (amount of matter) in the solar system is in the sun. Anything that has mass is subject to the law of gravity. The sun and all the planets are subject to gravity.

What is gravity? Gravity is the force of attraction that exists between all objects as a result of their mass. We stay put on the earth and don't float around in space because of the

earth's gravitational pull.

What is the effect of the pull of the sun's gravity on the earth and planets? The massive size of the sun causes it to exert a strong gravitational pull on the earth and the other planets. It is that gravitational pull that keeps them orbiting around the sun. Without the creation of the sun, there would be no solar system and earth would have been just a huge, frozen meteor spinning through space, unable to support life.

What is a solar system? A solar system is made up of a star or stars and the planets and objects orbiting them. Our solar system is unique in that it only has one star, the sun. Most solar systems have two or more stars.

What would happen to our solar system if there were another star? If there were another star besides the sun in our solar system, it would also exert gravitational pull on the planets that would throw off their orbits around the sun. For the earth that would mean that its orbit, instead of being circular would be irregular; at times it would be closer to the sun and at other times farther away from it.

What would happen to the earth if its orbit were irregular? Everything on the earth would burn up if earth got any closer to the sun and everything would freeze if it were farther away. We know that God designed the earth as a place for people to live and it is a perfect distance from the sun to support life. If earth's distance from the sun varied even a little, the environment would change and life on earth would cease to exist.

What is different about our sun from other stars? Remember the sun is actually a star made up of burning gas. Most stars are considered unstable because their energy output varies. Sometimes they produce more energy and are hotter and other times they produce less energy and are cooler. Our sun is unique in that it is a very stable star with a constant energy output, which only varies less than a few tenths of one percent. Considering the immense size of the sun, that is a very small fraction.

What would happen if the energy output of the sun varied? If the energy output of the sun were unstable that would mean that sometimes it would be too hot on earth and at other times it would be too cold. God uniquely designed the sun to be a stable source of energy for the earth. The sun provides the right amount of heat the earth needs to support life. The existence of other planets in the solar system also speaks of the glory of God. The planets in the solar system help to stabilize the distance of the earth from the sun. Our solar system is made up of four inner and four outer planets.

What are the four inner planets? The four inner planets are Mercury, Venus, Earth, and Mars. They are called terrestrial planets. Terrestrial comes from the Latin word "terra" which means earth. The terrestrial planets are small and earth-like with rocky surfaces.

What are the outer planets? The four outer planets are Jupiter, Saturn, Uranus, and Neptune. (Pluto is no longer considered a planet.) They are called Jovian planets, as they are Jupiter-like. Jovian is another name for the god Jupiter, after which the planet was named. These planets have atmospheres thousands of miles thick, made up of poisonous gases. Because we can't see through the gases there is no way to know what the cores of these planets are like.

Jupiter is huge and has over three hundred times as much mass as the earth. What does that mean in terms of its gravitational pull? Its gravitational pull would be huge because of its size. Because of its gravitational pull, it has been described as a cosmic vacuum cleaner, sucking in meteoroids that might otherwise enter the area of the inner planets and possibly crash onto the earth. God designed the solar system so earth would have a stable and secure place within it.

Besides saying that the heavens declare the glory of God, Psalm 19 also speaks of God's word:

⁷The law of the LORD is perfect, reviving the soul. The statutes of the LORD are trust worthy, making wise the simple. ⁸The precepts of the LORD are right, giving joy to the heart. The commands of the LORD are radiant, giving light to the eyes. ⁹The fear of the LORD is pure, enduring forever. The ordinances of the LORD are sure and altogether righteous. ¹⁰They are more precious than gold, than much pure gold; they are sweeter than honey, than honey from the comb. ¹¹By them is your servant warned; in keeping them there is great reward.

What do these verses say the word of God does for us? God's word brings new life to the soul. It also makes a person wise, fills him with joy, leads him down a right path, and protects him from danger.

If God's word does these things for us, what would be the smart thing for us to do? Since God's word is the source of what is right and true and provides blessing, protection and guidance, we will do well if we study it and make it part of us.

How do we make God's word part of us? When we take in God's word through studying the Bible on a daily basis and thinking about it throughout the day, it becomes part of us. God's Spirit makes it real to our lives and we experience its benefit. We need to seek to know God through both the study of his creation and his word.

Jesus said that the heavens and earth will pass away but God's word will last forever. God's wisdom existed before creation and it will continue to exist even when everything else disappears. Why is that? God is eternal and so his word is eternal. He will always exist and his word therefore will always exist too.

LESSON WRAP-UP

- **Overview Questions:** What is unique about the sun compared to other stars? What does that mean for the earth? What do the other planets do for the earth? How do the heavens declare the glory of God? How does what they have to say extend to the ends of the earth? What does God's word do for us?
- **Thought Questions:** When God established the earth what were the plans he had for it? What is the role of the sun in fulfilling those plans?
- **Prayer:** Thank God for creating a place for people to dwell. Thank him that you have been granted life and an opportunity to know him. Pray that you would learn to praise and honor God as he deserves and receive from his word the joy, insight and protection God wants to give you.

- **The Big Question:** Why can all people know God through his creation?
Let the students give their answers to the question. Share the memory verse. Ask how it answers the question.
- **Memory Verse:** Psalm 19:1-3 The heavens declare the glory of God to everyone on earth.

¹The heavens declare the glory of God; the skies proclaim the work of his hands.)

²Day after day they pour forth speech; night after night they display knowledge.

³There is no speech or language where their voice is not heard.

ACTIVITIES (Completed after the lesson)

Any age appropriate activity can be included which fits into the class time. The activities with a star are included on the class notes.

- ★ **Lesson Notes:** Have the children answer the two questions individually or as a group.
What did you learn from this lesson? How can you put into practice what you learned?
- ★ **Memory Verse:** Read the memory verse on the cover of the class notes and then have the students fill in the blanks in the verse.
- ★ **Activity Page:** Word Search
Instructions: Find the names of the eight planets in the word search puzzle:
(Mercury, Venus, Earth, Mars, Jupiter, Saturn, Uranus, Neptune)

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(Over,Down,Direction)
EARTH(10,10,SE)
JUPITER(14,5,W)
MARS(1,7,S)
MERCURY(7,5,SW)
NEPTUNE(7,7,NW)
SATURN(8,11,N)
URANUS(10,13,NE)
VENUS(3,12,E)

- ★ **This Week's Big Question:** Have the students fill in the blanks for the way the memory verse answers the big question.
The heavens declare the glory of God to everyone on earth.
- ★ **Coloring Page:** Color the lesson picture.

- **Craft:** Tissue Paper Sun

As a reminder that the sun is the center of our solar system and is designed to support life on earth, make a tissue paper sun.

Materials: yellow card stock paper, yellow tissue paper, pencils, glue, string, hole punch, scissors.

Preparation: Run off craft 11 on card stock paper and cut the suns apart. Cut lots of 1" squares of yellow tissue paper.

Instructions: Cut out the sun, punch out a hole and tie a piece of string through it. Take a piece of tissue paper wrap it around the eraser end of a pencil. Dip the end with the tissue in glue and place the tissue on the side of the sun without the verse. Cover the whole surface of the sun this way. Another option is to roll the tissue squares into little balls and glue them to the sun.

- **Investigation Activity - Why do planets orbit the sun?**

1. Tie a washer to the end of a piece of string 3 feet long.
2. Hold the string about midpoint and twirl it in a circle. Discuss how the movement is similar to the movement of the earth around the sun and how it is different. (The string keeps the washer moving in an orbit. Gravitational force, in a similar sense, ties the earth to the sun and keeps it in orbit.)
3. Count the number of seconds it takes for the washer to make a complete orbit. Make the string shorter and count. Make the string longer and count. Discuss how this would relate to the speed of a planet's orbit and the length of time it would take for a planet to orbit the sun.

- **Game:** Spin Out

As a reminder that the gravitational pull of the sun keeps the planets in orbit and keeps them from spinning out into space, play "Spin Out".

Instructions: This should be played on a grassy or sandy area or a soft carpet. One child is the sun. He grabs hold of the hand of another child and spins that child around. At some point, he lets go of the child's hand and the child falls away. The child must stay in the position that he fell into. After every child has been spun out have the sun choose which one landed in the most interesting position.

JOURNAL

The journal is passed out at the end of class for the students to complete at home. It has six poetic readings and related Bible verses. It would be beneficial for the teacher to read through and be familiar with its content.