

TE 804 Names: Emily Davidson
INQUIRY TEACHING INVESTIGATION PLAN

Objective

Students will understand the scientific idea of the nebular hypothesis theory, and how it describes the formation of the solar system.

Content

The solar system started as a nebular disc of dust and gases which began to rotate which caused 99% of the mass to enter the center of the spinning nebula and then created a large amount of heat. The remaining dust and gas particles began to condense together to form planets while the mass in the center formed the sun.

Teaching Plan

	<i>Major Activity(s)</i>	<i>Anticipated and/or Researched Problems</i>	<i>Scaffolding</i>	<i>Embedded Assessment (including specific Qs)</i>
<i>Establish a problem /Engage</i>	<i>- Then given data on the distance and diameter of the planets the students will recreate the solar system in the classroom. They will make use of a table of information given to them and they will have to complete calculations in order to find the distances and diameters each planet should be around the classroom. For each of the planets there will be a fact sheet which will describe the density and the composition. This will transition into talking about</i>	<i>- Students with math disabilities will run into issues with the calculations - Those students who have anger management issues while working in groups will have problems. - If I don't keep all the students active in this process it will lead to the classroom getting off task. -Students who don't know anything about planets may be lost, and those students that know everything about the planets will be bored. Hopefully transforming the classroom into the solar system will make it a more inviting place to be.</i>	<i>- I am going to start off by having the students tell me everything they can in regards to the solar system. - then as a class I am going to explain that by the end of the week they are going to be explaining how the solar system came to be. - By starting out building the solar system as a visual and then moving on to talking about the differences between the planets it will help students to be able to differentiate out what planet they are looking at later. If I have the planets already created then this process will only take a day to get through building the solar system and doing the math portion as well. In the future if there is more time I will have the kids take</i>	<i>My embedded assessment will be the introduction to astronomy asking what students know about the solar system. This will introduce me to what their misconceptions are and will also give me a starting point on the task at hand. My next set of embedded assignments are going to be seeing how their math skills are by having them convert the distances from miles to centimeters. Then they will have to measure out the room to the correct places In order to get it correct. Then they will have to put up the planets, and after that will come the information time. They will have to sort through the data in order to place the planets in order of their density, distance, and composition. They will then have to answer questions on the relationships between the different planets. They will need to see the relationship between the densities the farther they get from the sun and the</i>

	<p><i>finding data on the planets and finding relationships on their placement within the solar system.</i></p> <p><i>- Given data on planets it is their job to put the planets in order based on their characteristics. They will be completing page 4 and 5 of the worksheet (Formation and structure of the solar system)</i></p>		<p><i>the day to recreate the planets.</i></p>	<p><i>composition as well. This will lead into talking about the separation of materials as the solar system formed.</i></p>
<p><i>Questions</i></p>	<p><i>1. What is the order of the planets?</i></p> <p><i>2. What is the pattern you see in the differences of the planets the farther they get from the sun?</i></p> <p><i>3. Is there any natural separations</i></p>	<p><i>Students with no background in astronomy will feel like they don't know but they will have all of the data in front of them to answer these questions after they have filled in the table. This requires students to see beyond the numbers to use their experiences with the data to find patterns. My hope is that by seeing the representations of the</i></p>	<p><i>Starting out simple with the order of the planets and moving onto patterns of the placements of the planets allows for a better base of knowledge for them before they have to figure out how the solar system formed.</i></p>	<p><i>See on the left.</i></p>

	<p><i>between the planets based on their composition?</i></p> <p><i>4. How did this pattern come to be in the formation of the solar system?</i></p>	<p><i>solar system up on the wall it will help them to see the differences in their size and distance and that will be another pattern they can recognize.</i></p>		
<p><i>Evidence: Data and patterns</i></p>	<p><i>1. On a platform have drops of water and allow it to spin and have the students document what happens to the drops over time as it spins.</i></p> <p><i>2. Students will be doing ballet spins and they will try spinning first with their arms spread out and then with their arms tight to their sides. They will document under which conditions they began to spin faster.</i></p>	<p><i>1. Each group will need to have this or else this will be a bad demo. Also there needs to be some definite concepts thrown in like how the drops represent dust and gas over time.</i></p> <p><i>2. Instead of paying attention to making the connections between what is happening between the concepts and the activity, I have a fear that students will possibly end up screwing around instead of seeing the educational side to it.</i></p> <p><i>~ With all of these there are issues that if I don't explain exactly what I want the students to get out of it then I am unsure if students will be able to make the connections</i></p>	<p><i>- As a class we will talk about making conclusions on data even when it sometimes seems disconnected between the subject at hand and what they are doing in the lab. After we talking about the process of making conclusions then we will go through the lab and the students will come up with the patterns that they see. Today will be a very active day because there will be a multitude of sensory elements occurring. This will help the students to listen better and will help transition from planets information to looking at the big picture of the solar system. Once they see the patterns in the solar</i></p>	<p><i>I will ask them these questions:</i></p> <p><i>1. What is a nebula made up of? What does the spinning plate represent? What force is causing the spinning nebula to rotate? What is happening to the drops as the nebula begins to spin? Draw a diagram showing the transition between when the nebula begins to spin and when the demo ends.</i></p> <p><i>2. Where did most of the drops travel to in the nebula? If this were a real life nebula create a story behind the formation of the planets using theses words (and more): planets, protoplanets (pre-planets), sun, gravity, heat, revolution, rotation...</i></p> <p><i>3. During the second portion of the activity when the students have to represent the portion where they see the increase in speed when they tuck their arms</i></p>

			<p><i>system then we can break down the formation through experiences in labs. I want them to see in the droplet lab that as spinning of the nebula (plate) occurs that gas and dust will begin to combine to form larger bodies. Those bodies will eventually form the planets. Also I want them to see through the “ballet” lab that when most of the matter is close to the center the system will begin to spin faster and heat will begin to increase.</i></p>	<p><i>in when they are spinning will piggyback on the idea of the water droplets when all the mass begins to move toward the center over time. after this is over then the students will be able to put all of their experiences from the properties of the planets to the 2 labs to try to come up with a way the solar system formed.</i></p>
<p><i>Students’ Explanations</i></p>	<p><i>Student will be creating diagrams off of their experiences with the planets properties and the two labs.</i></p>	<p><i>I foresee that if students didn’t grasp anything from the two labs that they will have a hard time with this portion. As a class we will discuss their diagrams and they will have to compare with a group and then come up with a group diagram. This way then even those students that didn’t grasp part of it can be helped by another student.</i></p>	<p><i>I will model a diagram of another event so that students understand what I mean when I ask them to diagram their findings. I think that it is important for them to do it individually as a scientist would when he found his data then as a group as scientists would do to find out what other scientists think. As a group then</i></p>	<p><i>As stated before the question in this will be for the students to come up with their diagram of how the solar system formed from a basic nebula. They will make use of their prior experiences with planet characteristics and the two labs in order to come up with a diagram.</i></p>

			<p><i>they will help each other dig through the data they found to come up with a diagram. They can then use this as their explanation and as a class we will combine the groups diagrams in order to come up with a scientific explanation.</i></p>	
<p><i>Scientific theories or models</i></p>	<p><i>The scientific theory or model will be to find the Nebular Hypothesis theory. The students will be coming up with a model and then will be in the end comparing theirs to the images of the Nebular hypothesis theory.</i></p>	<p><i>Students that have been missing at all will find themselves a little bit lost throughout this whole time.</i></p>	<p><i>Starting out with planets, then moving onto lab experiences, then moving onto creating diagrams of their hypothesis. Then in the end the students will compare theirs to the scientific diagram.</i></p>	<p><i>In this section of the lesson the embedded assessment will be having the students actively compare their different ideas to the one we will discuss in the classroom.</i></p>
<p><i>Communication</i></p>	<p><i>Comparing their diagrams to the diagram of what is in their books they will be able to see how close or far off they are.</i></p>	<p><i>Students who don't actively examine the differences in their diagrams and the answer will not get it right.</i></p>	<p><i>This is the summing up of the inquiry assignment by assessing how well the students did in finding the possible method of formation of the solar system.</i></p>	<p><i>The embedded assessment will once again be in their comparison of their diagrams to the one in their book.</i></p>