**Findley Oaks Elementary**

**STEM Design Brief**

**Name: If I had a pet Spider I’d build him a Geodesic Dome for a Home**

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| **Subject:**Fall STEM Activity | **Grade Level:****5** | **Suggested Timeframe:**45 minutes |

**Standard:**

**S2CS3:** Students will identify and investigate problems scientifically.

**S2CS4:** Students will use the ideas of system, model, change, and scale in exploring scientific and technological matters.

B**ackground/Design Challenge:**

Have you ever seen a geodesic dome? A famous geodesic dome is spaceship Earth at EPCOT in Walt Disney World, Florida.

G**eodesic domes** are structures that look like half spheres made up of many triangle supports. They're futuristic looking and eye-catching. Maybe because these shapes are so rare in architecture, it's hard not to let your eyes be drawn to these domes.

Facts:

* Geodesic domes come from geodesic designs based on a polyhedron. A polyhedron is a three-dimensional solid that’s made up of many flat faces. (Other examples are pyramids and prisms).
* The most common polyhedron used to make geodesic dome designs is called an icosahedron. This is a solid shape composed of 20 flat faces. Each face is an identical equilateral (all the sides are equal).

**Information about spiders and their habitats Did you know?**

When you think about where Spiders live, the better question to ask would be where don’t they live? Spiders are able to live just about anywhere and that is why there is such diversification out there. They are ranked at #7 when it comes to the most diversified living creatures in the world. That gives you a good idea of the spectrum of how they have branched out. The only place in the world where you won’t find spiders is in Antarctica. You will be able to find Spiders living in very dry climates. Some of them have evolved to the point where they don’t need to be around any water at all. They can survive in some of the harshest conditions you could imagine. They get the water they need from their food sources.

The tropic regions are also home to many species of Spiders. Not only are they able to thrive in the climate, they are also able to find plenty of food resources for them to enjoy. These living creatures are known as terrestrial as they almost always live on land. They may be found in trees, on plants, and even living in the blades of grass in your yard.

Spiders are quite versatile and they do well in all types of habitat. They do have to find shelter though when the cooler temperatures settle in. Otherwise their body temperature can change too much and they will die. This is why there are times of the year when you may see them plenty and others that you don’t see them around at all.

It can be tough to fully identify any Spider habitat if you aren’t really looking for them. They blend in very well to their natural surroundings. They are able to chance colors too if they need to in order to blend in with what is all around them. Not everyone believes that the Spider can live in the wetlands but they do.

Some live along the edges of lakes and ponds too. They don’t need the water or the moisture there. Instead, this location offers them a prime area to be able to find lots of food and shelter. It is a winning location for them that helps them to be able to thrive.

Spiders are even making their home in your home! It doesn’t matter how clean you are or how much you look for them. They may be in areas such as crawl spaces, the back of a closet, and even outside in a pile of bricks. If you have lots of clutter in your home you are offering even more spaces that make an ideal Spider habitat.

Many Spiders live a much longer life in captivity than they do in the wild. However, it depends on how they are cared for. Some of the larger spiders don’t do well being trapped in a small area. They also become very aggressive if they are touched often due to their heightened senses.

Food supply has a great deal of influence in the Spider habitat. This is why you will see some of them in certain areas and not others. They need to be able to build their webs and have enough prey coming along for them to survive. Otherwise they have to look for a new location where those needs can be met.

As humans continue to disrupt the natural habitat of the Spider, they are also branching out in new locations. This is why even dangerous spiders are sometimes seen in places that they never were before. They can even get into food shipments. Wouldn’t you like one for a pet?

The students at Findley Oaks Elementary love spiders and need your help designing a geodesic dome for them to play with/on. Our possibly, you can enclose it to make it their home. Are you up for the challenge?

**Criteria:**

The dome must:

* be free standing
* made out of triangles
* make a spider happy

**Constraints:**

* You will be working in a team of \_\_\_\_\_ members.
* You are limited to using only the materials listed/provided.
* Your team has \_\_\_\_\_\_\_amount of time to complete the challenge.

**Materials:**

* Gumdrops (11)
* Toothpicks (25)
* If creating a habitat-(leftover clear plastic laminate)
* tape

**Tools:** (You may use these tools, but they may not become part of your product.)

* student research
* rulers
* Scissors

Engineering Scoop

Engineers often use triangles when they design buildings. Triangles are stable shapes. That means that they don’t bend, twist, or collapse easily when you push on then.
a square is not as stable. Test it. Make a square and a triangle out of toothpicks and gumdrops. Press down on one corner of each shape. How do the two shapes compare? Does one bend, twist, or collapse more easily that the other?

**IF I HAD A PET SPIDER** 3rd Grade fall STEM Day Activity

Team Members

1. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Engineering Scoop

Before you build:

Engineers often use triangles when they design buildings. Triangles are stable shapes. That means that they don’t bend, twist, or collapse easily when you push on then.
A square is not as stable. Test it. Make a square and a triangle out of toothpicks and gumdrops. Press down on one corner of each shape.

1. How do the two shapes compare?
2. Does one bend, twist, or collapse more easily that the other?

 After your Geodesic Dome is complete, answer the following questions.

1. How many side did you create the base of your dome out of and why?
2. What design challenges did you have? What modifications did you make?