

Designs of Nature

Designs are everywhere in nature, from the spiraling arrangement of scales on a cone to the lacy symmetry of a spider's web to the pattern of cells in a honeycomb. Nature's designs are beautiful to behold, and many of them also have a specific purpose. The closer we look, the more we learn to appreciate the relationship between form and function.

While viewing some of the intricate designs found in nature, children will discover how these forms contribute to an organism's chances of survival. The overlapping scales on a pine cone, like the shingles on a roof, help to shed water and protect the developing embryos inside. The beautiful web of an orb weaver is also a deadly trap created by the spider to ensnare unwary insects. The cells in a honeycomb, hexagon-shaped so they share walls and fit together tightly, make efficient use of the space in a hive.

The activities in this theme invite children to look for designs in nature, both to enjoy their beauty and to marvel at their functional efficiency. Children will discover how nature's creations effectively address the many challenges of survival in the natural world.

Among others, this theme helps students toward achievement of the following VT standards:

7.13 Students understand the characteristics of organisms, see patterns of similarity and differences among living organisms, understand the role of evolution, and recognize the interdependence of all systems that support life. This is evident when students: a) identify characteristics of organisms; b) categorize living organisms; c) describe and show examples of the interdependence of all systems that support life (family, community, food chain, populations, etc.); d) provide examples of change over time.

7.7 Students use geometric and measurement concepts. This is evident when students: a) solve problems by showing relationships between figures; c) identify, classify, and name geometric figures by specific attributes and properties; f) measure as exactly as possible or round off, as appropriate, and justify the choice.

1.13 Students listen actively and respond to communications. This is evident when students: a) ask clarifying questions; b) restate; c) respond through discussion, writing, and using art forms.

2.1 Students ask a variety of questions. This is evident when students: a) ask questions about how things get done and how they work; b) ask questions to determine why events occur; c) ask questions that compare and contrast, to determine similarities and differences; d) ask questions that help make connections.

2.1 Students use art forms to communicate, showing the ability to define and solve artistic problems with insight, reason, and technical proficiency.

SPIDERS & WEBS: Spider webs are beautifully designed to carry out their food-trapping functions, and so are the spiders that make them. Take an up-close look at a variety of spiders, examine spider anatomy, try to find dinner using only your sense of touch, and scout outdoors for webs of all types.

Materials to plan for: live spiders in glass jars, felt board and cutouts, bicycle wheel, blocks of wood, pictures of webs and spiders.

VARIATIONS ON A LEAF: Leaves may vary in appearance and texture, but they are all designed to function as food produces for their plants. Examine the structure of leaves looking for similarities and differences, share detailed observations, and appreciate our dependence on leaves as food factories.

Materials to plan for: leaves.

CONES: Cones are beautifully designed with series of overlapping scales to hold and protect their seeds. Discover the repeating patterns of spirals cradling the seeds, examine differences among various species of cones and conifers, and discover an abundance of cone-bearing plants in your own backyard.

Materials to plan for: a collection of various kinds of cones, small paintbrushes, craft paint.

SNOW & MORE: In freezing temperatures, water may take many forms, each with its own design and special beauty. Explore the ingredients of frozen precipitation, try to classify flakes according to their form, create a snowstorm of six-sided flakes, and perhaps catch some flakes as they fall from the sky.

Materials provided by VINS: slide show.

Materials to plan for: snow, thin white paper squares, pictures of snow and snowflakes.

TRACKS & TRACES: Tracks can provide a glimpse into the lives of animals whose actions are otherwise hidden from us. Observe the patterns animals create with their movements, examine the shapes and sizes of different tracks, and interpret the stories told by both tracks and traces.

Materials provided by VINS: slide show, track stamp construction kit.

Materials to plan for: small blocks of wood, inkpads, discarded window shade, shelf paper.

WINTER WEEDS: Winter weeds beautify the landscape with their variety of colors, shapes, and structures.

Examine the different structures of various winter weeds, notice the abundance of weeds growing nearby, describe a weed in a group poem, and create a winter weed bouquet.

Materials provided by VINS: slide show.

Materials to plan for: weeds, clay, craft dough, (optional) color photos of common winter weeds in summer flower.

BIRD NESTS: Created in a variety of designs and located in nearly every habitat, bird nests are wonderful examples of how form and function intersect in the natural world. Take apart a nest to examine the materials used in its construction, identify a nest builder by closely examining nest design, and try to build your own nest to hold and shelter eggs.

Materials provided by VINS: slide show, bird nests set. Note: It is illegal to collect nests without a permit!

Materials to plan for: yarn, pipe cleaners, forked twigs.

CAMOUFLAGE: Many creatures are shaped or colored to blend into their surroundings, and these different designs of camouflage are critical to the survival of those animals. Play with hiding shapes and colors in various backgrounds, and create your own camouflaged critter to fool your friends.

Materials provided by VINS: slide show.

Materials to plan for: wallpaper samples, (optional) pictures of different types of camouflage.

HONEYBEES: Honeybees are fascinating insects whose uniquely designed physical and social structures contribute to their survival. Investigate the anatomy of bees, comparing differences in the shapes of various kinds of bees. Examine the architecture of beehive cells to appreciate the strength of the design and the efficient use of space. Learn to communicate like a bee to find food.

Materials provided by VINS: honeybee video.

Materials to plan for: vcr and tv, dead bees, honeycomb cells or beehive frame.