Blendies

A rebuildable spinning top that mixes colors before your eyes.

PRE-K THROUGH GRADE 8 | AGES 4 TO 14 | ABOUT 45 MIN

These are the standards listed in the Blendies educator guide. Under each one is where you will see it in the activity.

Next Generation Science Standards (NGSS)

CODE	WHAT IT COVERS
K-PS2-1	Motion and Stability: Forces and Interactions
WHERE YOU'LL SEE IT (GRADES K-2): Learners **compare how a symmetrical Blendie spins versus an asymmetrical one**, feeling how a gentle flick or two-hand push produces a smooth spin on a balanced build and a wobbling, quickly-stopping spin on an unbalanced build - observing firsthand that the same push can change an object's motion in different ways depending on its shape.	
K-2-ETS1-2	Engineering Design: Develop a simple sketch, drawing, or physical model
WHERE YOU'LL SEE IT (GRADES K-2): Learners **plan and test a symmetrical Blendie before building an asymmetrical one**, using the imagined center line as a simple mental model of symmetry and iterating their piece arrangement until the shape is the same on both sides - then predicting how the spin will change when the symmetry is broken.	
3-PS2-1	Forces and Interactions: Balanced and Unbalanced Forces
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **plan and conduct an investigation on how balance affects a spinning Blendie**, comparing symmetrical and asymmetrical builds and providing evidence that balanced mass allows smooth rotation while an off-center weight creates an unbalanced force that causes wobble and an early stop.	
4-PS3-1	Energy: Speed and Kinetic Energy
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **use the two spinning techniques to vary how much energy they put into the Blendie**, observing that a harder, faster flick produces a faster spin with more kinetic energy - and that the spin gradually slows and stops as friction between the dowel and spinning surface removes energy from the system.	
MS-PS2-2	Motion and Stability: Effect of Forces on Motion
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **design an investigation comparing the angular motion of balanced and unbalanced Blendies**, planning a fair test that changes only the symmetry of the build while holding the initial push the same - collecting evidence that net unbalanced forces on an off-center mass change the Blendie's rotational motion and spin duration.	
MS-LS1-8	Gather and synthesize information that sensory receptors send messages to the brain
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **explain optical color mixing as the eye and brain doing the mixing, not the paint**: when a Blendie spins fast enough, light reflected from the red and yellow pieces reaches the retina's receptors faster than the brain can resolve separate images, so the brain synthesizes the incoming signals into one perceived color (orange). The colors on the cardboard never touch - the blend happens between receptor and brain.	

Common Core State Standards (Math and ELA)

CODE	WHAT IT COVERS
RI.K-2.7	Use illustrations and words in a text to describe key ideas
WHERE YOU'LL SEE IT (GRADES K-2): Learners **follow the instructional playing cards and slide deck illustrations step-by-step** to identify the peanut, wing, stopper, and dowel by name, matching picture diagrams to the physical pieces in their kit before assembling them into a working Blendie.	
SL.K-2.1	Participate in collaborative conversations
WHERE YOU'LL SEE IT (GRADES K-2): Learners **take turns describing what happens when they spin their symmetrical and asymmetrical Blendies**, using shared vocabulary like "symmetrical," "wobble," and "spin" to compare observations with a partner and predict which color combination will blend into orange, green, or purple.	
RI.3-5.3	Explain relationships between ideas in a text
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **explain the cause-and-effect relationship between symmetry and spin quality** by tracing how a balanced build on the dowel leads to smooth rotation while an off-center wing creates wobble - connecting the written build instructions and slide diagrams to the physical result they observe on the spinning surface.	
SL.3-5.4	Report on a topic with descriptive details
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **present their symmetry experiment results to a partner or small group**, describing how the symmetrical Blendie spun, how the asymmetrical one wobbled, and which two primary colors they chose to blend - using descriptive language to explain exactly what their eyes saw at slow versus fast spin speeds.	

CODE	WHAT IT COVERS
RST.6-8.3	Follow a multistep procedure when carrying out experiments
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **follow the nine-step Blendies build sequence precisely**, understanding that the order matters - the first stopper has to be halfway down the dowel before the peanuts are added, and the top stopper must be pressed firmly at the end - because skipping or reversing steps produces a loose build that falls apart mid-spin.	
SL.6-8.1	Engage in collaborative discussions to analyze ideas
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **debate why the Blendie produces a different secondary color at different spin speeds**, bringing their own observations to a group discussion of how human vision processes motion - building scientific argumentation skills by connecting what they see to the concept of optical blending.	
K.G.B.4	Analyze and compare two- and three-dimensional shapes
WHERE YOU'LL SEE IT (GRADES K-2): Learners **identify and compare the peanut (two-lobe) and wing (three-lobe) shapes** in their kit, describing their similarities and differences and using positional language to arrange them symmetrically on the dowel - placing pieces "across from" and "on top of" each other to make the same shape on both sides of an imagined center line.	
1.G.A.3	Partition shapes into equal shares
WHERE YOU'LL SEE IT (GRADES K-2): Learners **imagine a line straight down the middle of their Blendie to check for symmetry**, partitioning the whole shape into two halves and checking whether the left half matches the right half - reinforcing the concept of equal shares and the everyday vocabulary of "half" and "same on both sides."	
4.G.A.3	Recognize a line of symmetry for a two-dimensional figure
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **identify lines of symmetry on their Blendie builds**, testing whether a given arrangement of peanuts and wings can be folded along a line so that matching parts align - then comparing builds with one line of symmetry to a shape like a star that has multiple lines (radial symmetry), directly observing how the type of symmetry affects how the Blendie spins.	
3.MD.B.3	Draw a scaled bar graph to represent a data set and solve problems using it
WHERE YOU'LL SEE IT (GRADES 3-5): Learners **time how long their symmetrical and asymmetrical Blendies spin** across several trials, then draw a scaled bar graph with one bar per build type and use it to answer "how many seconds longer did the balanced one spin?" - turning their own spin data into a graph they can reason from.	
8.G.A.1	Verify experimentally the properties of rotations, reflections, and translations
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **use their own Blendie as a physical model to verify rotational symmetry**, marking the top of a symmetrical build and confirming it lands back in the same spot after a half-turn on the dowel, then repeating the test on an asymmetrical build and confirming it does not - verifying the property experimentally with the spinning top itself instead of a coordinate grid.	
6.SP.B.5	Summarize numerical data sets in relation to their context
WHERE YOU'LL SEE IT (GRADES 6-8): Learners **collect spin-duration data across multiple symmetrical and asymmetrical Blendie trials**, calculate the mean spin time for each build type, describe the variability between trials, and draw a data-backed conclusion about how symmetry affects rotational motion - practicing statistical summary in the context of their own physical experiment.	

LEARNERS EXPLORE

symmetry; line of symmetry; balance and rotational stability; optical color mixing; primary and secondary colors; balanced and unbalanced forces