

TRAINING ACTIVITIES FOR VISUAL-PERCEPTUAL SKILLS

ACTIVIDADES DE ENTRENAMIENTO DE HABILIDADES VISO-PERCEPTIVAS

Visual-Spatial Relationships (Basic Level)

Relaciones Viso-espaciales (Nivel Básico)



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TRAINING ACTIVITIES FOR VISUAL SPACIAL RELATIONSHIPS

The term visual perception makes reference to the capacity that brain has to understand and to interpret that eyes see (Gardner, 1986; Scheiman, 1997). Along with the basic visual functions and motor skills, visual perceptual skills allow us to carry out many activities of daily life (Chaikin and Downing-Baum, 1997; Erhardt and Duckman, 2005; Van Waelvelde, De Weerd, De Cock and Smits-Engelsman, 2004), and guide our actions (Goodale and Milner, 2009; Jeannerod, 2006).

Visual perception is inherently spatial (Sergent, 1991). Much of the information we process about the visual environment around us comes from stimuli that are subject to visual spatial relationships (up, down, over, under, front, etc.).

Visual spatial relationships are a visual perceptual ability that enables us to detect, differentiate and select certain visual stimuli among others and understand the location of these stimuli with respect to ourselves (Árnadóttir, 1999, Bryan, 2004, Manning, 2003; Petit, Orssaud, Tzourio, Mazoyer and Berthoz, 1997; Ullman, 1995). These visual stimuli can be faces, figures, objects, landscapes, letters, numbers, etc.

The visual, auditory and proprioceptive information is encoded from a body schema that is stored in the memory system. In this way we can perceive the location and spatial relationship between objects or between specific visual spatial contexts (Aguirre, Zarahn and D'Esposito, 1998; Petit et al., 1997). The spatial relationships require mechanisms for spatial attention (Logan, 1994), memory and motor output for the manipulation of objects (Arnadóttir, 1999).

An interesting study carried out recently (Andersen, Tiippana, Laarni, Kojo and Sams, 2009) revealed that the visual spatial attention acts as an operator for the perception of speech, so that helps audiovisual integration and directly influences auditory perception.

It has also been suggested (Jolicoeur, Ullman and Mackay, 1986) that the visual spatial relationships are realized through two types of representations of space, a perceptual representation, related to the selection of the object observed, and a conceptual representation, which needs to understand the location of the object with respect to a spatial reference, for example, the concepts such as "above", "below", etc.

As the number of objects that can be "used" for spatial relationships of a reference object is infinitely wide, relevant objects from the spatial attention are selected (Logan, 1994).

Other authors (Hoyer and Rybash, 1992; Kosslyn et al. 1989; Sergent, 1991) have reported that the acquisition of spatial relationships are conducted through two types of strategies: categories, which involve the understanding of concepts such as above-below, right-left and inside-outside, and coordinates, which specify the locations of objects, so they can be used to guide precise movements. Both hemispheres can compute both types of strategies, but in a different way (Kosslyn et al. 1989; Sergent, 1991).

Visual spatial knowledge that a person has about the world around him, allows establish the development of some internal mental maps of space. That is, before to know how and where one object is in one space previously, we must recognize us in this space, for example, how and where we are located in the immediate environment. Motor development (trawling, crawling, etc.) and interaction that one has with the same

space at birth is essential for development and visual spatial learning. With the construction of the maps we can orient ourselves in space and, to meet the location and spatial orientation of the stimuli that we observed (in relation to a coordinates of reference).

The visual spatial patterns are important to acquire the notions of spatial location and laterality (front-back, top-down, inside-outside, left-right), dimensions and sizes (small-large), length (long-short), volume (full-empty) or spatial orientation and directionality allowing space projections in perspective.

Along with the visual spatial relationships, spatial visualization is another important component in visual spatial skills (Burnett and Lane, 1980; McGee, 1979). Visualization is the ability to imagine the rotation and movement of objects (two or three dimensions) or some of its parts in space (Battista, 1990; Battista, Wheatley and Talsma, 1982; McGee, 1979).

Therefore, the visual spatial information is an important part of visual information processing, which is involved in many academic activities and daily life activities of people. Visual spatial relationships allow us to distinguish and recognize shapes, objects and scenes, segregate visual stimuli located on a background (figure-ground discrimination), judging distances and manipulate objects (Logan, 1994; Sakata, Taira, Kusunoki, Murata and Tanaka, 1997).

Several studies with positron emission tomography (PET) have indicated that there is an occipito-parietal visual pathway responsible for processing information of the location (Petit et al. 1997).

Visual perceptual skills of children are not at the same level as for the adult, but their perception of the world is also well developed (Arterberry, 2008). It has been estimated that the ability to discern complex spatial relationships shows a consistent improvement in childhood and is well developed about 10 years of age, while the ability to locate spatially fully develops between 7 and 9 years (Atkinson and Braddick, 1989; Williams, 1983).

However, any factor that interferes on the willingness of children to explore their environment may impede the visual perceptual learning process (Tsai, Wilson and Wu, 2008), adversely affecting the ability to perform activities of daily life, such as games or recreational activities, school work or other development tasks related to their age, especially in school-age children (AOTA, 1991; Dankert, Davies and Gavin, 2003; Kovacs, 2000; Loikith, 2005). It has also been reported that school performance (reading, writing and mathematics) may be negatively affected by an inadequate development of some visual perceptual skills (Cornoldi, Venneri, Marconato, Molin and Montinari, 2003; Schneck and Lemer, 1993; Solan and Ciner, 1989, Weil and Amundson, 1994), motivated because in these activities children are usually working with shapes, numbers, letters and words, which require, among other skills, some visual spatial schemes to carry out these tasks.

Subjects who have deficiencies in the ability of the visual spatial relationships may have academic problems, for example, to understand and manipulate certain information in context, presenting difficulty in building correctly words or phrases, making strings or sequences of digits, understanding mathematical concepts and geometry, or copying figures. Moreover, performance could be decreased in other daily activities such as crafts, sports, computers, video-games, understanding maps or orienting in certain spaces.

Therefore, a difficulty in this skill may involve visual perceptual problems for sustaining attention, organization and selection of visual information in tasks that contain a specified number of visual stimuli.

In the clinical field have been recently made great progress in understanding the degree to which these skills are deteriorating in different types of patients. Brain damage in the parietal lobes, predominantly in the right hemisphere, has been associated with visual spatial deficits (Kerkhoff, 1999; Manning, 2003; Shiffman, 1998).

In addition, it have been found lower values of visual spatial abilities in patients with Williams-Beuren syndrome (Castelo-Branco et al., 2007), in patients with cognitive impairment and with Alzheimer's disease (Paxton et al., 2007; Vannini, Almkvist, Dierks, Lehmann and Wahlund, 2007; Vannini et al., 2008), with spina bifida (Jansen-Osmann, Wiedenbauer and Heil, 2008), in patients with autism (Manjaly et al., 2007) with Korsakoff syndrome (Fama, Pfefferbaum and Sullivan, 2006), with dysfunction in sensory integration (Allison, Gabriel, Schlange and Fredrickson, 2007), with deficits in development of coordination (Hulme, Smart and Moran, 1982; Schoemaker, Van der Wees, Flapper, Verheij-Jansen, Scholten-Jaegers and Geuze, 2001, Tsai et al, 2008; Wilson and McKenzie, 1998) and in children with low birth weight (Davis, Burns, Wilkerson and Steichen, 2005).

Other authors (Trojano et al., 2004) have also shown that brain injury adversely affect visual spatial perception and analysis of geometric figures and orientation of lines. A study realized by Dennis, Fletcher, Rogers, Hetherington and Francis (2002) has been documented that some children with spina bifida and hydrocephalia have limited visual spatial skills, hampering the ability to perform visual representations in the space of stimuli and visual patterns.

It has also documented the relationship between Parkinson's disease and deterioration in these abilities. In general, it has been found that these patients have lower visual spatial skills (Stella et al., 2007), but that this deterioration does not seem to be present in all subtypes of the disease (Bak, Caine, Hodges and Hearn, 2006). It has also been seen that drug therapy for Parkinson's disease does not improve visual spatial skills (Grace, Amick and Friedman, 2008). However, another study suggests that the origin of this cognitive impairment in Parkinson's patients could be a reduction in the executive function of these patients as a result of the high incidence of depressive disorders in these subjects (Klepac, Trkulja and Relja, 2008).

This explanation was reinforced by the fact that other patients with reduced visual spatial skills, as patients with cancer who are receiving chemotherapy (Fuller et al., 2008) and schizophrenic patients (Bozikas, Kosmidis, Kiosseoglou and Karavatos, 2006) also exhibit reduction in visual spatial perception when there are changes in executive function.

A study carried out by Tseng and Chow (2000) has revealed that children with low performance on the writing speed have lowest scores in certain aspects of visual spatial relationships.

Often, occupational therapists and other health professionals assess and treat the problems of visual perception that occur in school-age children (Kalb and Warshowsky, 1991, Todd, 1993, Wright, Bowen and Zecker, 2000) or in people of other ages, in order to assess the presence and impact of the visual perceptual dysfunction in these patients (Brown, 2008).

Ruf-Bächtiger (1989) has suggested the enormous importance of the evaluation of some visual perceptual skills, to better understand children with visual perception disabilities and to develop more effective methods of treatment. Davis et al. (2005) also found that the visual perceptual assessment should be a vital part of the routine evaluation in preschool children born prematurely, as early identification of visual perceptual deficits could facilitate treatment, achieving an improvement in visual perceptual skills in these children with high risk.

In another report, Tsai et al. (2008) have documented that the visual perceptual assessment in children with deficits in development of motor coordination has great significance for the processing and implementation of strategies for better performance on tasks of daily life.

This ability can be assessed by some tests that assess different visual perceptual skills, including visual spatial relationships:

- Career Ability Placement Survey –CAPS– (Knapp and Knapp, 1976)
- The Reversals Frequency Test (Gardner, 1978)
- Minnesota Spatial Relations Test, revised edition –MSRT– (Davis, 1979)
- The Hooper Visual Organization Test, Manual –HVOT– (Hooper, 1983)
- Judgement of Line Orientation Test –JLO– (Benton, Hannay and Vamey, 1983)
- Detroit Tests of Learning Aptitude, Adult Version –DTLA-A– (Hammill and Bryant, 1991)
- The Visual Object and Space Perception Battery –VOSP– (Warrington and James, 1991)
- Birmingham Object Recognition Battery –BORB– (Riddoch and Humphreys, 1993)
- Developmental Test of Visual Perception, Second Edition –DTVP-2– (Hammill, Pearson, Voress and Frostig, 1993)
- The Minnesota Paper Form Board Test, Second Edition –MPFB– (Likert and Quasha, 1994)
- Rey Complex Figure Test and Recognition Trial: professional manual –RCFT– (Meyers and Meyers, 1995)
- Brief Visuospatial Memory Test, Revised Edition –BVMR– (Benedict, 1997)
- Woodcock-Johnson III Tests of Cognitive Abilities –WJ III COG– (Woodcock, McGrew and Mather, 2001)
- Motor-Free Visual Perception Test, Third Edition –MVPT-3– (Colarusso and Hammill, 2003)
- Test of Visual-Perceptual Skills (non-motor), Third Edition –TVPS-3– (Martin, 2006)

In cases where the results were below the expected values for age, it is possible to train this skill through exercises.

Tsai et al. (2008) reported that visual perceptual learning skills can be improved through practical experience in the same way children learns to extract relevant information from their environment in certain activities.

Studies have shown that these skills can be trained successfully in patients with Korsakov syndrome (Fama et al., 2006) and in patients with right hemi-inattention (Piccardi, Nico, Bureca, Matano and Guariglia, 2006), for example, patients who consistently ignore their right visual field.

This book of exercises is recommended for use by occupational therapists, optometrists, educators, learning specialists and other health professionals that aims to train visual spatial skills in people who need it (mainly patients with learning difficulties or neurological damage, both congenital and acquired), and people who want to enhance their performance in these activities, for example, athletes or students who are preparing an opposition.

This book consists of 200 plates containing different figures. In each of the plates there is a sequence of images, and the subject's task is to determine which of them has a spatial orientation different from the rest. The figures will rise in level of difficulty as the patient progress in the task.

ACTIVIDADES DE ENTRENAMIENTO DE LAS RELACIONES VISO-ESPACIALES

El término de percepción visual se refiere a la capacidad que tiene el cerebro para comprender e interpretar lo que los ojos ven (Gardner, 1986; Scheiman, 1997). Junto con las funciones visuales básicas y las funciones motoras, las habilidades viso-perceptivas nos permiten llevar a cabo numerosas actividades de nuestra vida diaria (Chaikin y Downing-Baum, 1997; Erhardt y Duckman, 2005; Van Waelvelde, De Weerd, De Cock y Smits-Engelsman, 2004), así como guiar nuestras acciones (Goodale y Milner, 2009; Jeannerod, 2006).

La percepción visual es intrínsecamente espacial (Sergent, 1991). Gran parte de la información visual que procesamos del entorno que nos rodea procede de estímulos que están sujetos a relaciones viso-espaciales (arriba, abajo, encima, debajo, delante, detrás, etc.).

Las relaciones viso-espaciales son una habilidad viso-perceptiva que nos permite detectar, diferenciar y seleccionar determinados estímulos visuales entre sí, y entender la localización de estos estímulos con respecto a nosotros mismos (Arnadottir, 1999; Bryan, 2004; Manning, 2003; Petit, Orssaud, Tzourio, Mazoyer y Berthoz, 1997; Ullman, 1995). Estos estímulos visuales pueden ser rostros, figuras, objetos, paisajes, letras, números, etc.

La información visual, propioceptiva y auditiva es codificada a partir de unos esquemas corporales que son almacenados en el sistema de memoria, y que continuamente se están desarrollando; de esta manera podemos percibir la ubicación y la relación espacial entre objetos o entre determinados contextos visuales en el espacio (Aguirre, Zarah, y D'Esposito, 1998; Petit y cols., 1997). Además de la integración de estas entradas sensoriales, las relaciones espaciales requieren mecanismos de atención espacial (Logan, 1994) y de memoria, así como de salida motora para la manipulación de los objetos (Arnadottir, 1999).

Un interesante estudio llevado a cabo recientemente (Andersen, Tiippana, Laarni, Kojo y Sams, 2009) ha revelado que la atención viso-espacial actúa como un operador para la percepción del habla, de manera que ayuda a la integración audiovisual e influye directamente en la percepción auditiva.

También se ha sugerido (Jolicoeur, Ullman y Mackay, 1986) que las relaciones viso-espaciales se llevan a cabo a partir de dos tipos de representaciones del espacio; una representación perceptual, que implica seleccionar el objeto observado, y una representación conceptual, que implica comprender la localización del objeto respecto a unas coordenadas de referencia, es decir, el concepto de preposiciones como "encima de", "por debajo de", etc.

Como el número de objetos que pueden "emplearse" para relacionar espacialmente un objeto de referencia es infinitamente largo, se seleccionan los objetos relevantes a partir de la atención espacial (Logan, 1994).

Otros autores (Hoyer y Rybash, 1992; Kosslyn y cols., 1989; Sergent, 1991) han informado de que la adquisición de las relaciones espaciales se llevan a cabo a partir de dos tipos de estrategias: las categóricas, que implican la comprensión de conceptos como encima-debajo, derecha-izquierda y dentro-fuera; y las coordinadas, que especifican las localizaciones de objetos, de manera que pueden ser usadas para guiar movimientos precisos. Ambos hemisferios pueden computar ambos tipos de relaciones espaciales, pero de forma diferente (Kosslyn y cols., 1989; Sergent, 1991).

El conocimiento viso-espacial que una persona tiene del mundo que le rodea se establece a partir de la elaboración interna de unos mapas mentales del espacio. Es decir, para saber cómo y dónde están los estímulos del entorno, previamente, debe reconocerse la persona en el espacio, es decir, saber cómo y dónde se encuentra en el entorno próximo. El desarrollo motor (arrastré, gateo,...) y la interacción que uno mismo tiene con el espacio desde que nace es fundamental para el desarrollo y el aprendizaje viso-espacial. Gracias a la construcción de los mapas espaciales mentales desde que nacemos, somos capaces de situarnos y orientarnos en el espacio, de atender a la localización y orientación espacial de los estímulos que observamos (en relación a unas coordenadas de referencia), de detectar formas, de segregare un estímulo de otros colindantes (segregación figura-fondo), etc.

Los esquemas viso-espaciales son importantes para adquirir las nociones de localización y lateralidad espacial (delante-detrás, arriba-abajo, dentro-fuera, encima-debajo, entre, derecha-izquierda,...), de las dimensiones y tamaños (pequeño-grande), de la longitud (largo-corto), del volumen (lleno-vacío) o de la direccionalidad y orientación espacial que permiten realizar proyecciones espaciales en perspectiva.

Junto con las relaciones viso-espaciales, la visualización espacial es otro componente importante en las habilidades viso-espaciales (Burnett y Lane, 1980; McGee, 1979). La visualización es la habilidad para imaginar la rotación y el movimiento de objetos (en dos o tres dimensiones) o de algunas de sus partes en el espacio (Battista, 1990; Battista, Wheatley y Talsma, 1982; McGee, 1979).

Por tanto, la viso-espacialidad es una parte importante del procesamiento de la información visual, que participa en un gran número de actividades académicas y de la vida cotidiana de las personas. Las relaciones viso-espaciales nos permiten distinguir y reconocer formas, objetos y escenas, segregare estímulos visuales ubicados sobre un fondo (discriminación figura-fondo), orientarnos en nuestro entorno, juzgar distancias y manipular objetos (Logan, 1994; Sakata, Taira, Kusunoki, Murata y Tanaka, 1997).

Varios estudios realizados con tomografía por emisión de positrones (PET) han indicado que existe una vía visual occipito-parietal encargada del procesamiento de la información de la localización espacial (Petit y cols. 1997).

Las habilidades viso-perceptivas del niño no están en el mismo nivel que las del adulto, pero su percepción del mundo está igualmente muy desarrollada (Arterberry, 2008). Se ha estimado que la capacidad para discernir relaciones espaciales complejas muestra una mejora consistente en la infancia y está bien desarrollada sobre los 10 años de edad; además, la habilidad para ubicarse espacialmente se desarrolla completamente entre los 7 y 9 años (Atkinson y Braddick, 1989; Williams, 1983).

Sin embargo, cualquier factor que interfiera sobre la voluntad de un niño de explorar su medio ambiente puede impedir el proceso de aprendizaje viso-perceptivo (Tsai, Wilson, y Wu, 2008), afectando negativamente a la capacidad para llevar a cabo actividades de la vida diaria, como juegos o actividades recreativas, trabajos escolares u otras tareas de desarrollo relacionadas con su edad, especialmente en niños en edad escolar (AOTA, 1991; Dankert, Davies y Gavin, 2003; Kovacs, 2000; Loikith, 2005). Además, se ha visto que en el ámbito escolar el rendimiento de la lectura, la escritura y las matemáticas puede verse afectado negativamente por un desarrollo inadecuado de las habilidades visoperceptivas (Cornoldi, Venneri, Marconato, Molin y Montinari, 2003; Schneck y Lemer, 1993; Solan y Ciner, 1989; Weil y Amundson, 1994), motivado en gran medida porque al realizar estas actividades habitualmente se

trabaja con figuras, números, letras y palabras, que requieren, entre otras habilidades, unos esquemas viso-espaciales para que la persona pueda llevar a cabo estas tareas.

Los sujetos que tienen deficiencias en la habilidad viso-perceptiva de las relaciones viso-espaciales pueden tener problemas en el ámbito académico, por ejemplo, para entender y manipular determinada información del contexto, presentando dificultad en la construcción ordenada y correcta de palabras o frases, la seriación de dígitos, la comprensión de conceptos matemáticos y de geometría, o el copiado de figuras. Además, podría verse disminuido el rendimiento de otras actividades de la vida cotidiana, como las manualidades, el deporte, la informática, los videojuegos, los juegos de destreza, la comprensión de mapas o la orientación de la propia persona en determinados lugares.

Por tanto, una dificultad en esta habilidad viso-perceptiva puede implicar problemas para mantener la atención, la organización y la selección de información visual en tareas específicas que contienen un número determinado de estímulos visuales.

En el ámbito clínico se han realizado recientemente grandes avances en el conocimiento del grado en el que se deterioran estas habilidades en distintos tipos de pacientes. Los daños cerebrales en los lóbulos parietales, predominantemente en el hemisferio derecho, han sido asociados con los déficits viso-espaciales (Kerkhoff, 1999; Manning, 2003; Shiffman, 1998).

Además, se han encontrado valores más bajos de las habilidades viso-espaciales en pacientes con el síndrome de Williams-Beuren (Castelo-Branco y cols., 2007), en pacientes con deterioro cognitivo medio y con la enfermedad de Alzheimer (Paxton y cols., 2007; Vannini, Almkvist, Dierks, Lehmann y Wahlund, 2007; Vannini y cols., 2008), con espina bífida (Jansen-Osmann, Wiedenbauer y Heil, 2008), en pacientes con autismo (Manjaly y cols., 2007), con el síndrome de Korsakoff (Fama, Pfefferbaum y Sullivan, 2006), con disfunciones en la integración sensorial (Allison, Gabriel, Schlange y Fredrickson, 2007), con déficits en el desarrollo de la coordinación –DCD– (Hulme, Smart y Moran, 1982; Schoemaker, Van der Wees, Flapper, Verheij-Jansen, Scholten-Jaegers y Geuze, 2001; Tsai y cols, 2008; Wilson y McKenzie, 1998) y en niños con bajo peso al nacer (Davis, Burns, Wilkerson y Steichen, 2005).

Otros autores (Trojano y cols., 2004) también han visto que las lesiones cerebrales repercuten negativamente en la percepción viso-espacial y en el análisis de figuras geométricas y de la orientación de líneas. En un estudio realizado por Dennis, Fletcher, Rogers, Hetherington y Francis (2002), se ha documentado que algunos niños con espina bífida e hidrocefalia tienen limitada la habilidad viso-espacial, dificultando la capacidad para llevar a cabo representaciones visuales en el espacio de estímulos y patrones visuales.

También se ha investigado mucho sobre la relación entre la enfermedad de Parkinson y el deterioro en este tipo de habilidades. En general, se ha encontrado que estos pacientes presentan menores habilidades viso-espaciales (Stella y cols., 2007), pero que este deterioro no parece estar presente en todos los subtipos de la enfermedad (Bak, Caine, Hearn y Hodges, 2006). También se ha visto que la terapia farmacológica para la enfermedad de Parkinson no mejora las habilidades viso-espaciales (Grace, Amick y Friedman, 2008). Sin embargo, otro estudio propone que el origen de este deterioro cognitivo en los enfermos de Parkinson podría estar en una reducción de la función ejecutiva de estos pacientes (es decir, que son capaces de hacer muchas menos actividades en general) como consecuencia de la alta incidencia de trastornos depresivos en estos sujetos (Klepac, Trkulja y Relja, 2008).

Esta explicación se ha visto reforzada al comprobar que otros pacientes con habilidades viso-espaciales reducidas, como pacientes enfermos de cáncer que están recibiendo quimioterapia (Fuller y cols., 2008) y pacientes esquizofrénicos (Bozikas, Kosmidis, Kiosseoglou y Karavatos, 2006), también presentan esta reducción en la percepción viso-espacial cuando se dan alteraciones en su función ejecutiva.

Un estudio llevado a cabo por Tseng y Chow (2000) ha revelado que niños con bajo rendimiento en la velocidad de escritura tienen resultados más bajos en determinadas tareas de relaciones viso-espaciales.

Con frecuencia, los terapeutas ocupacionales y otros profesionales de la salud evalúan y tratan los problemas de percepción visual que se producen en niños en edad escolar (Kalb y Warshowsky, 1991; Todd, 1993; Wright, Bowen y Zecker, 2000) o en personas de otras edades, con el fin de valorar la presencia y el impacto de las disfunciones viso-perceptivas en este tipo de pacientes (Brown, 2008).

Ruf-Bächtiger (1989) ha sugerido la enorme importancia que tiene la evaluación de algunas habilidades viso-perceptivas, para entender mejor a los niños con trastornos de percepción visual y poder desarrollar de manera más eficaz los métodos de tratamiento. Davis y cols. (2005), también han considerado que el examen viso-perceptivo debe ser una parte imprescindible de la evaluación rutinaria en niños de edad preescolar nacidos prematuramente, ya que la identificación temprana de los déficits viso-perceptivos podrían facilitar su tratamiento, logrando una mejora en las habilidades o dominios viso-perceptivos en estos niños con alto riesgo.

En otro informe, Tsai y cols. (2008) han considerado que la valoración del rendimiento viso-perceptivo en niños con déficits en el desarrollo de la coordinación motora –DCD–, tiene una gran importancia de cara al tratamiento y a la aplicación de estrategias para un mejor rendimiento en las tareas de su vida diaria.

Esta habilidad se puede evaluar mediante algunas pruebas viso-perceptivas que valoran distintas habilidades, entre ellas las relaciones viso-espaciales:

- Career Ability Placement Survey –CAPS– (Knapp y Knapp, 1976)
- The Reversals Frequency Test (Gardner, 1978)
- Minnesota Spatial Relations Test, revised edition –MSRT– (Dawis, 1979)
- The Hooper Visual Organization Test, Manual –HVOT– (Hooper, 1983)
- Judgement of Line Orientation Test –JLO– (Benton, Hannay y Vamey, 1983)
- Detroit Tests of Learning Aptitude, Adult Version –DTLA-A– (Hammill y Bryant, 1991)
- The Visual Object and Space Perception Battery –VOSP– (Warrington y James, 1991)
- Birmingham Object Recognition Battery –BORB– (Riddoch y Humphreys, 1993)
- Developmental Test of Visual Perception, Second Edition –DTVP-2– (Hammill, Pearson, Voress y Frostig, 1993)
- The Minnesota Paper Form Board Test, Second Edition –MPFB– (Likert y Quasha, 1994)
- Rey Complex Figure Test and Recognition Trial: professional manual –RCFT– (Meyers y Meyers, 1995)
- Brief Visuospatial Memory Test, Revised Edition –BVRT-R– (Benedict, 1997)
- Woodcock-Johnson III Tests of Cognitive Abilities –WJ III COG– (Woodcock, McGrew y Mather, 2001)

- Motor-Free Visual Perception Test, Third Edition –MVPT-3– (Colarusso y Hammill, 2003)
- Test of Visual-Perceptual Skills (non-motor), Third Edition –TVPS-3– (Martin, 2006)

Una vez que se haya administrado una o varias de estas pruebas, se puede determinar si esta habilidad viso-perceptiva se corresponde o no con el nivel de rendimiento esperado para la edad cronológica del sujeto. En aquellos casos en los que los resultados obtenidos estuvieran por debajo de los valores esperados para su edad, es posible entrenar esta habilidad mediante ejercicios como los que aparecen en el presente cuaderno de actividades.

Tsai y cols. (2008) han informado de que el aprendizaje de las habilidades viso-perceptivas pueden mejorarse mediante la experiencia práctica, de la misma manera que un niño aprende a extraer la información relevante de su entorno en determinadas actividades cotidianas.

Hay estudios que han demostrado que estas habilidades pueden ser entrenadas con éxito en pacientes con el síndrome de Korsakov (Fama y cols., 2006) y en pacientes con hemi-inatención derecha (Piccardi, Nico, Bureca, Matano y Guariglia, 2006), es decir, pacientes que ignoran de manera sistemática su campo visual derecho.

El libro de ejercicios que presentamos a continuación está recomendado para ser utilizado por terapeutas ocupacionales, optometristas, educadores, especialistas del aprendizaje y otros profesionales de la salud. Pretende entrenar las habilidades viso-espaciales en aquellas personas que lo necesiten (principalmente pacientes con dificultades de aprendizaje o con daños neurológicos, tanto congénitos, como adquiridos), y en personas que quieran aumentar su rendimiento en estas actividades, por ejemplo, deportistas o estudiantes que estén preparando una oposición.

Este cuaderno está compuesto por 200 láminas que contienen distintas figuras. En cada una de las láminas aparece una secuencia de figuras, y la tarea del sujeto consiste en determinar cuál de ellas tiene una orientación espacial diferente al resto. Las figuras van subiendo en nivel de dificultad conforme se avanza en la tarea.

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ADMINISTRATION

NORMAS DE APLICACIÓN

In the following pages, a sequence of figures is presented. You must to find a figure with a DIFFERENT ORIENTATION compared to the others. Please, do the same in other plates. There is only one correct answer in each plate.

A continuación, aparece una secuencia de varias figuras. Trate de buscar una figura con una ORIENTACIÓN DIFERENTE al resto. Haga lo mismo en el resto de láminas. Solamente existe una única respuesta correcta para cada lámina.



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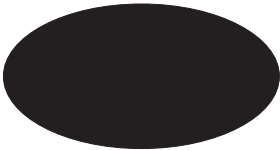
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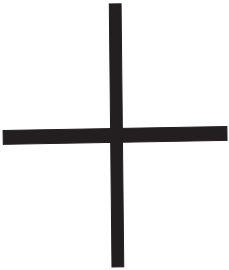
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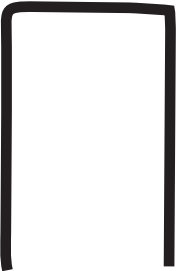
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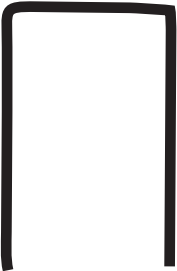
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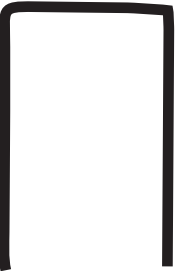
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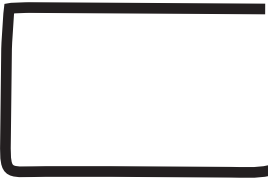
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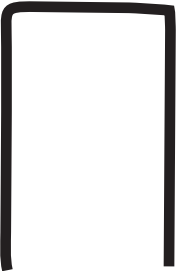
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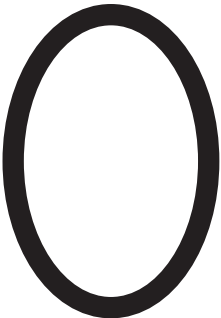
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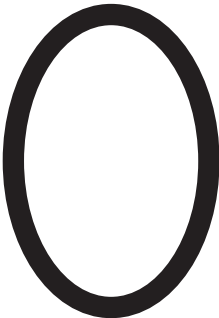
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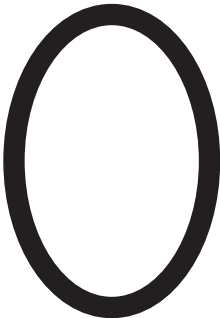
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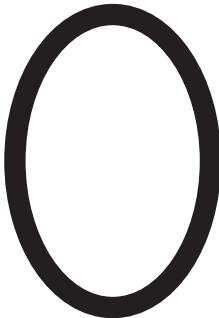
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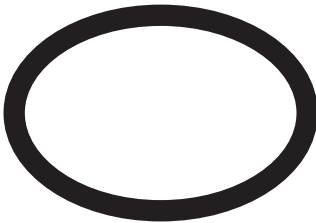
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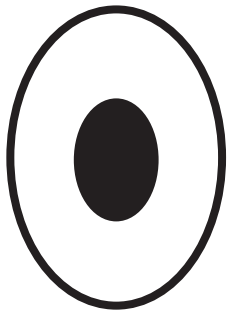
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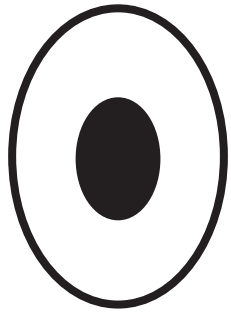
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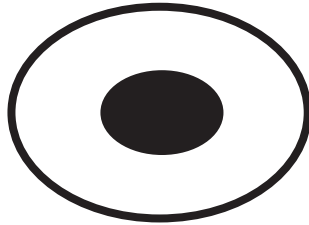
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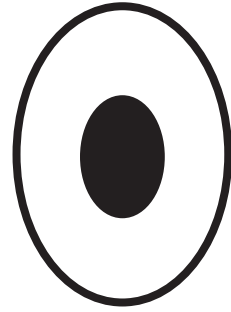
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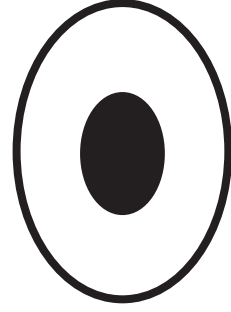
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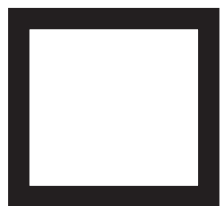
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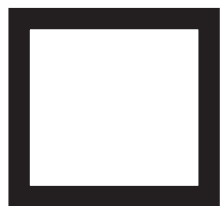
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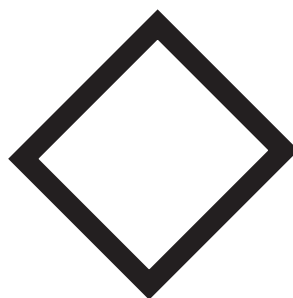
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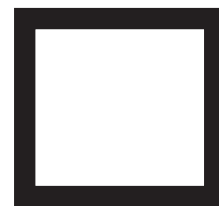
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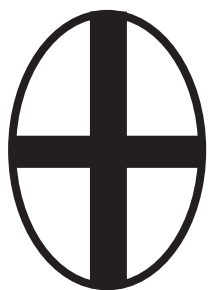
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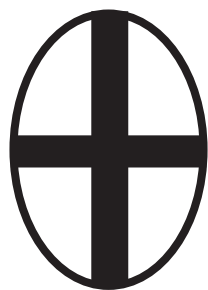
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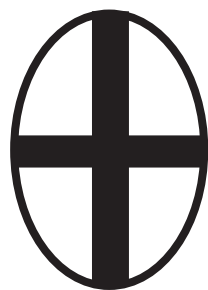
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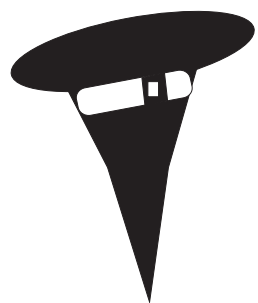
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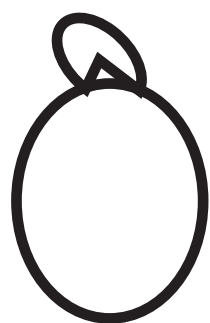
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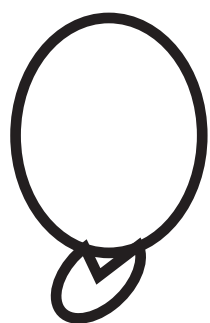
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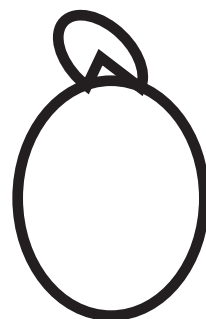
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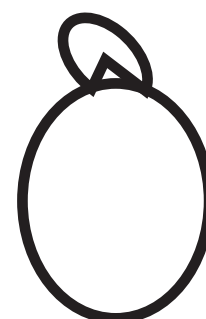
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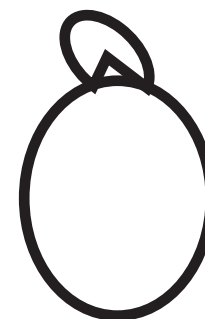
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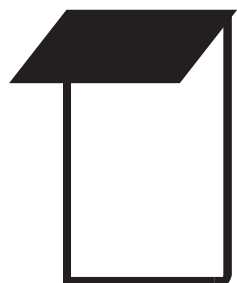
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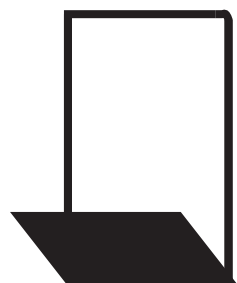
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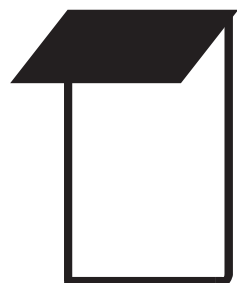
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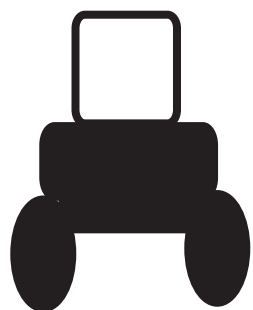
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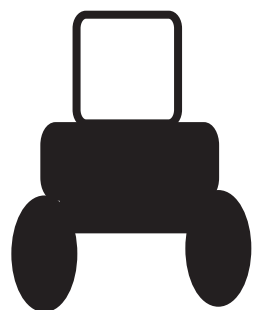
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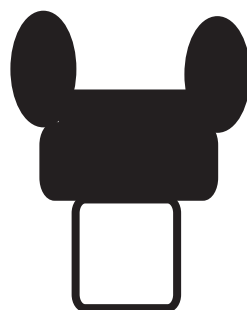
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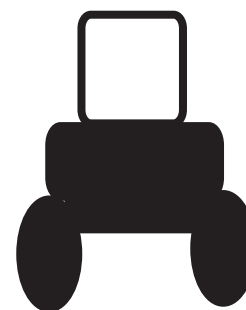
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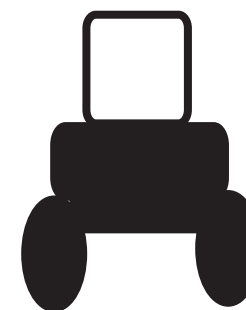
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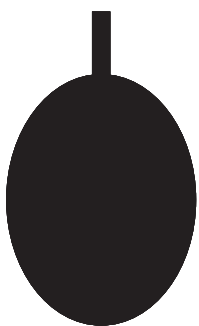
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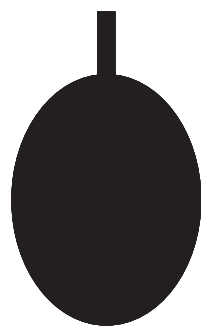
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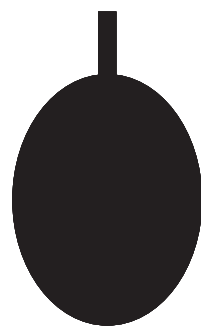
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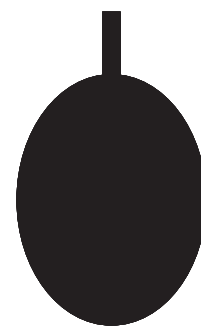
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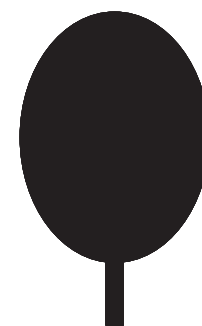
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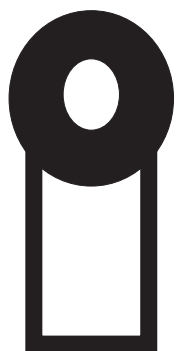
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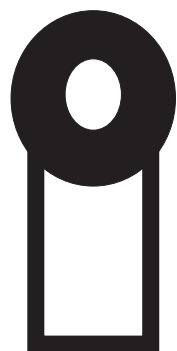
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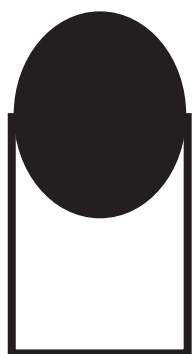
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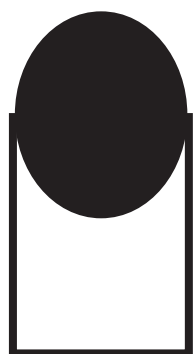
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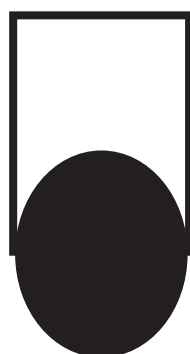
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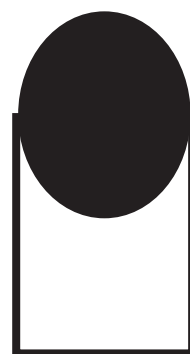
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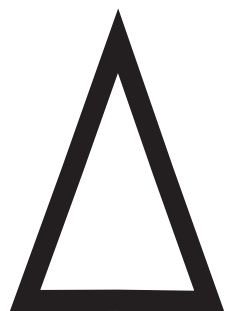
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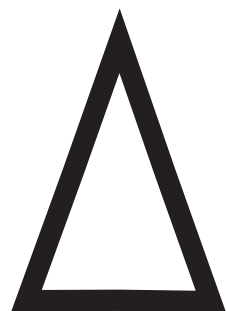
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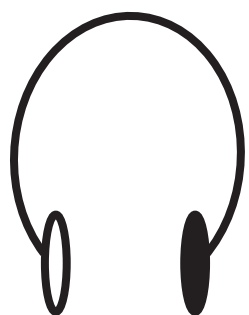
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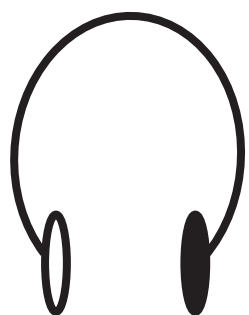
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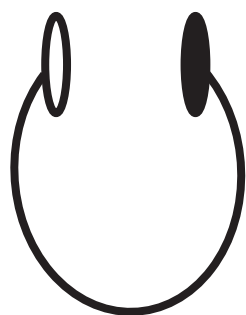
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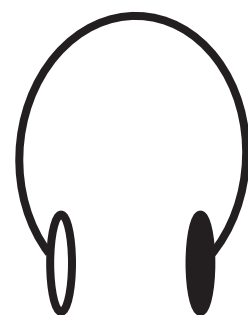
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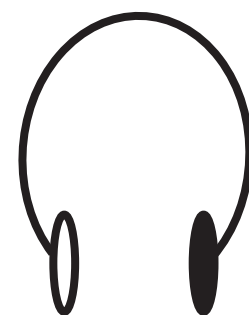
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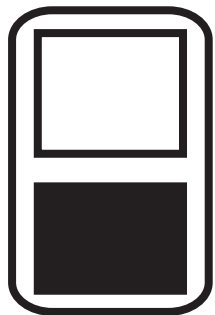
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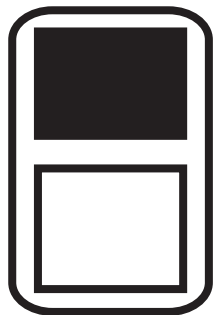
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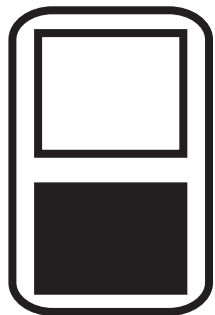
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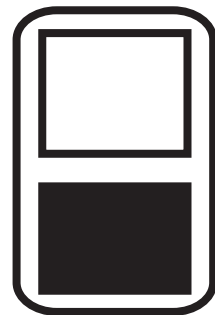
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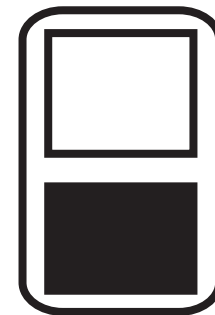
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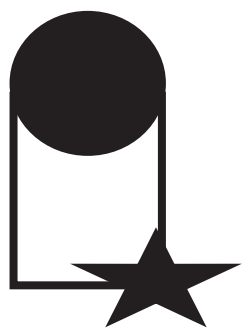
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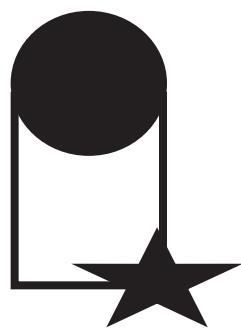
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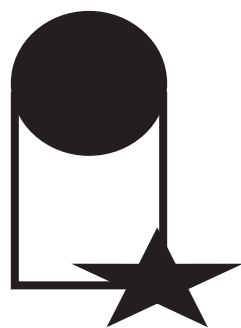
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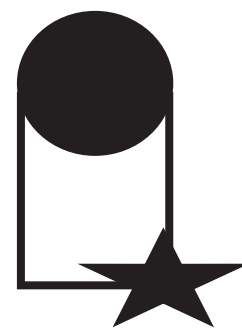
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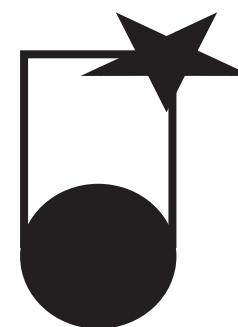
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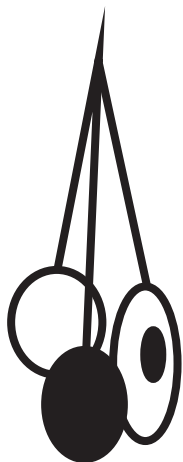
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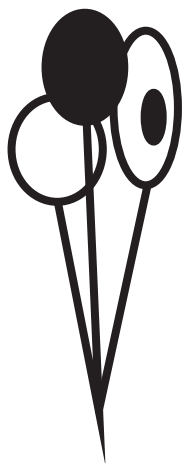
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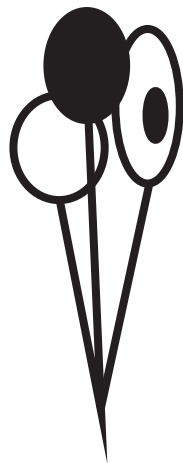
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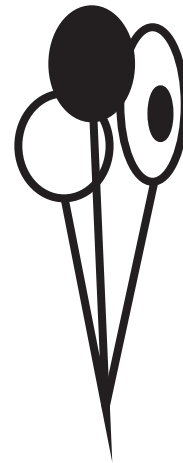
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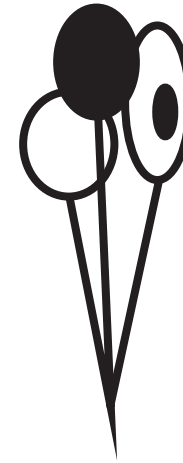
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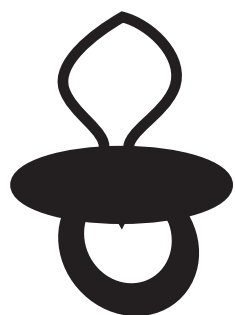
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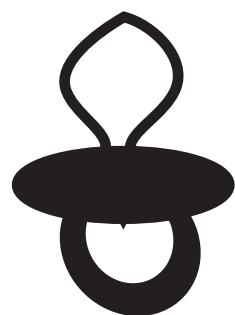
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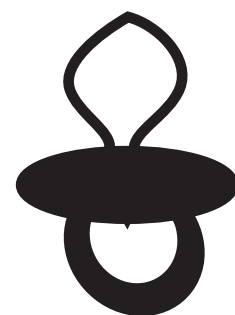
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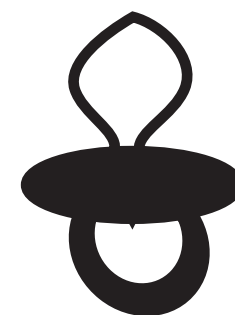
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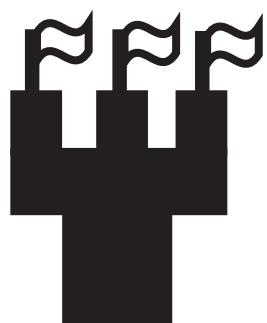
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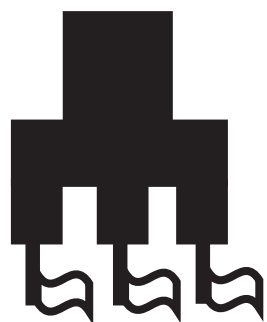
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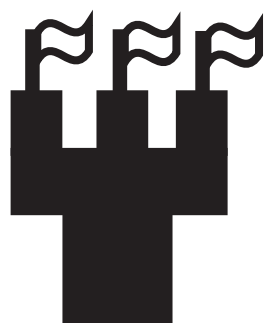
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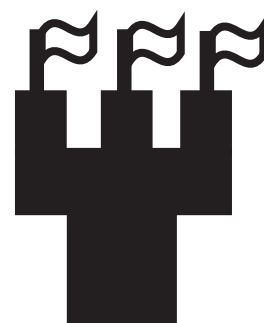
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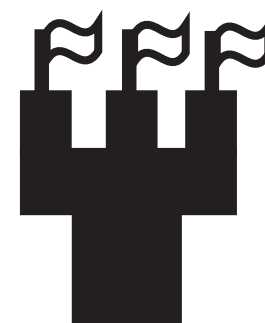
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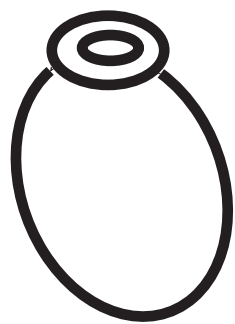
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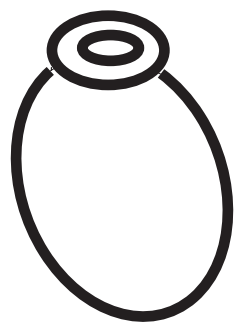
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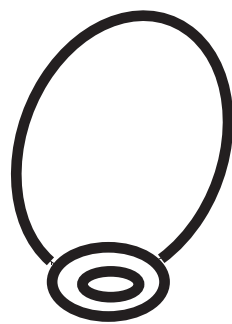
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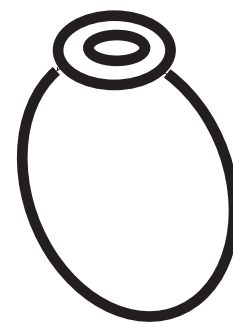
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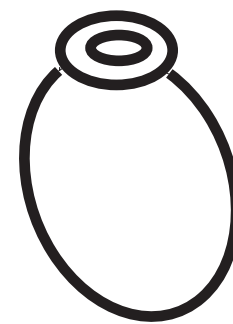
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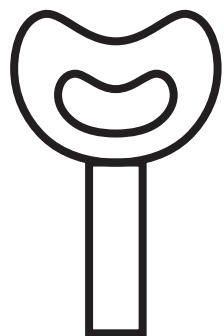
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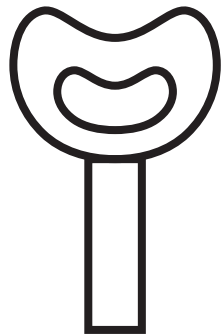
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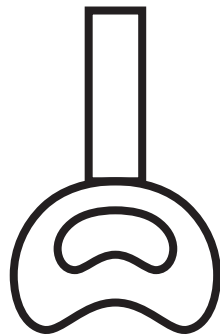
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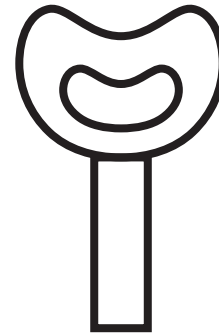
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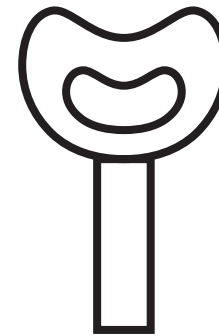
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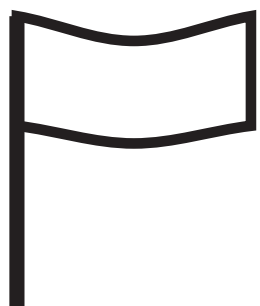
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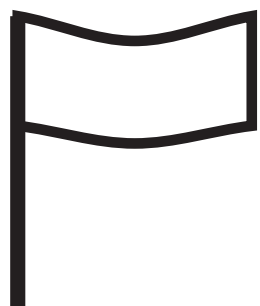
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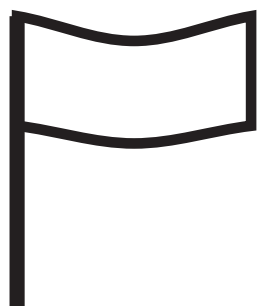
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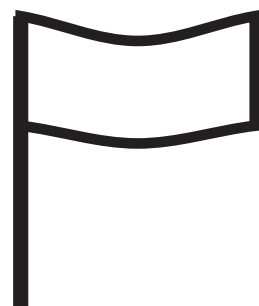
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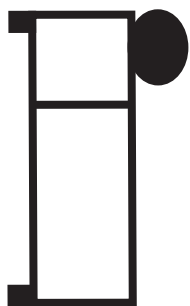
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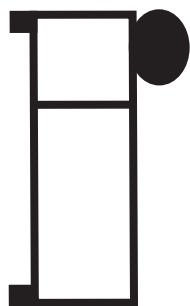
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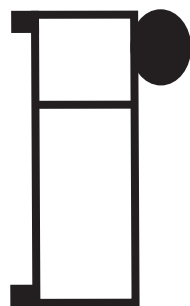
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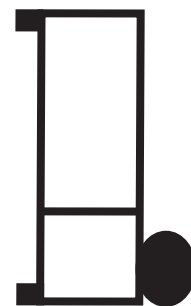
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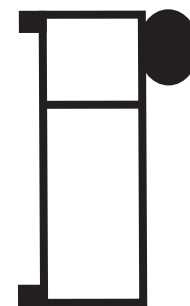
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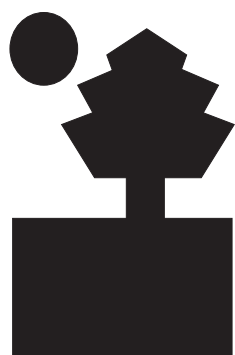
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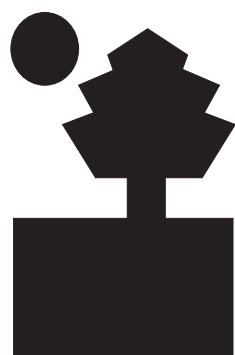
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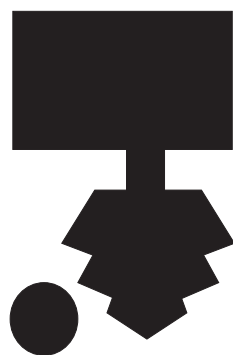
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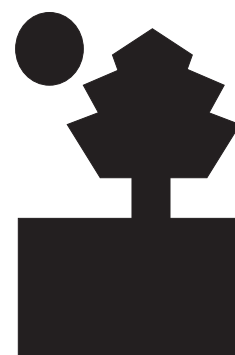
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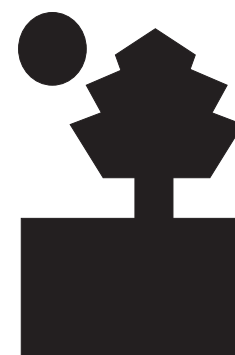
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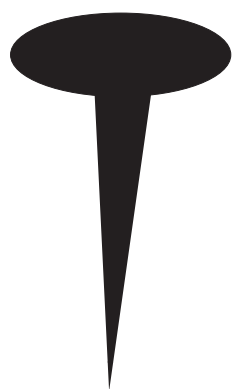
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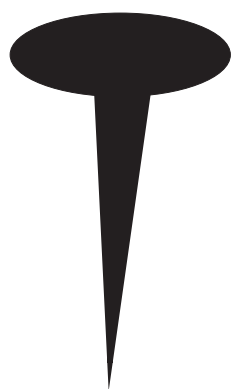
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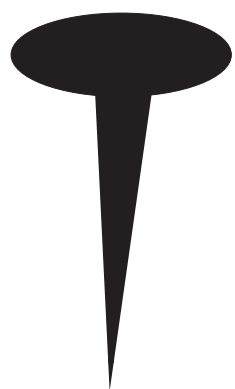
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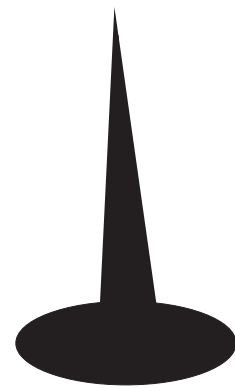
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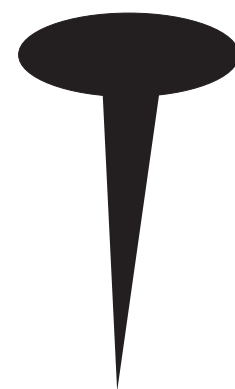
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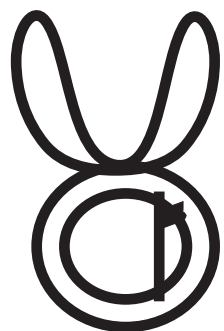
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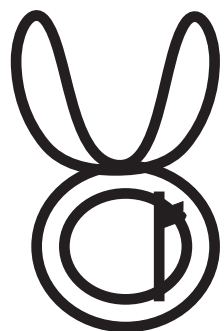
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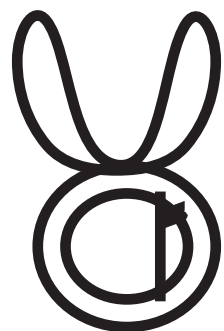
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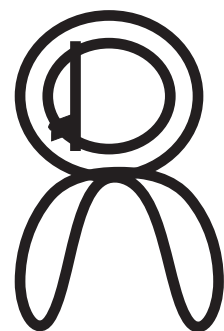
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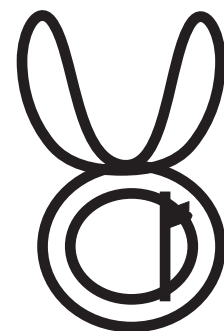
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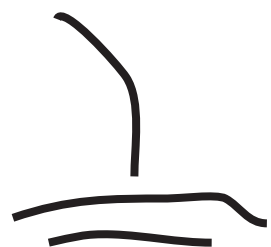
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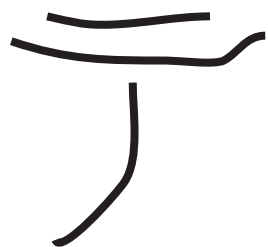
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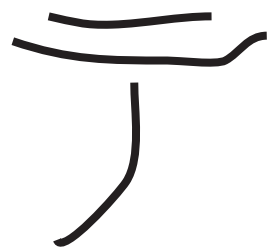
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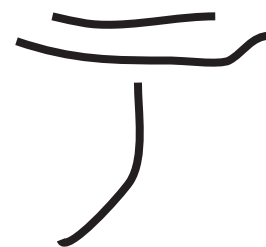
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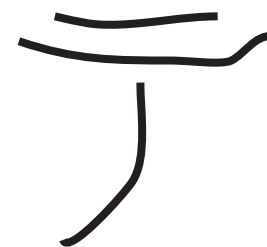
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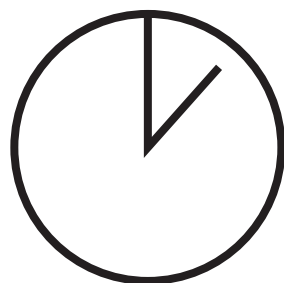
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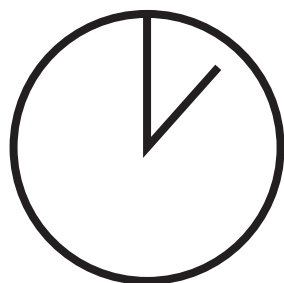
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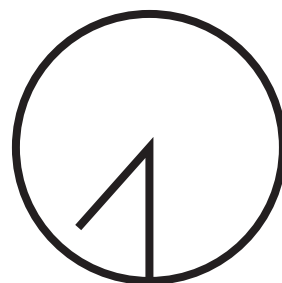
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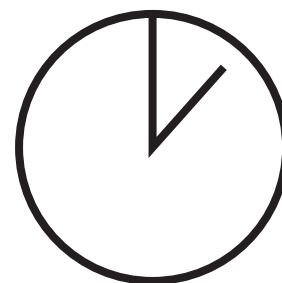
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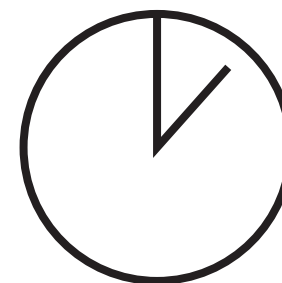
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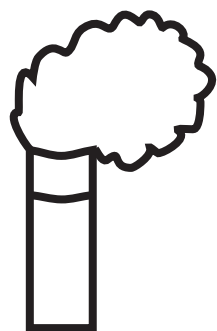
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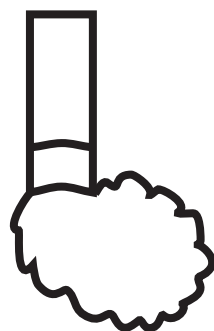
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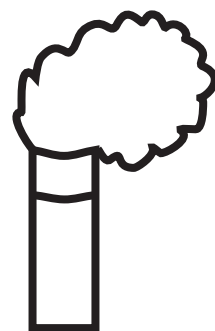
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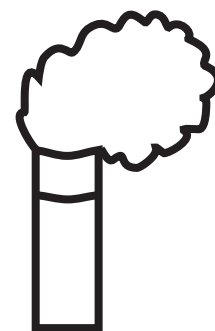
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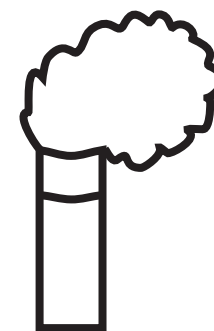
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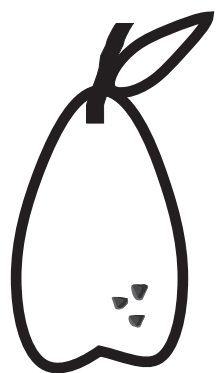
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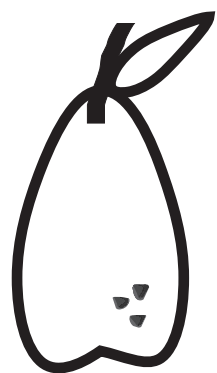
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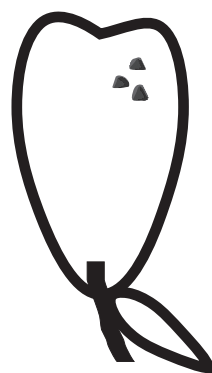
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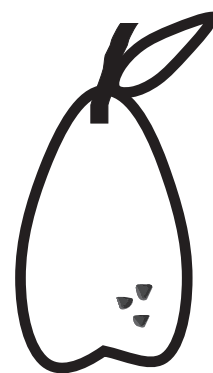
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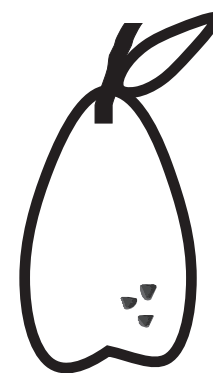
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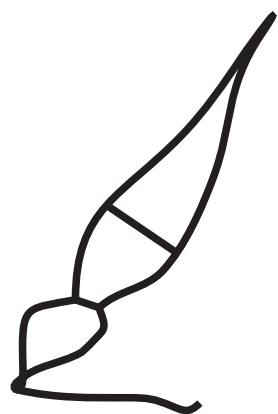
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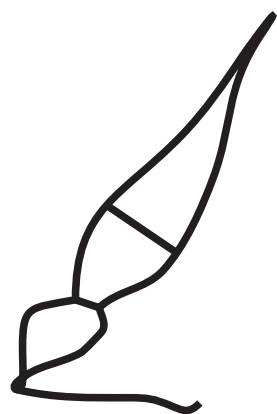
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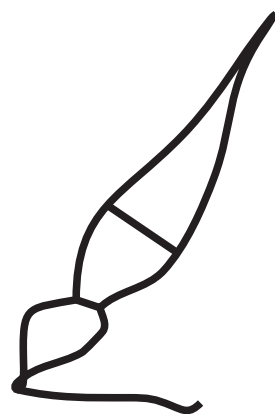
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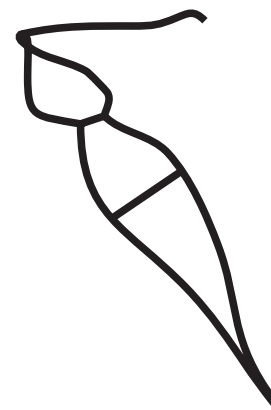
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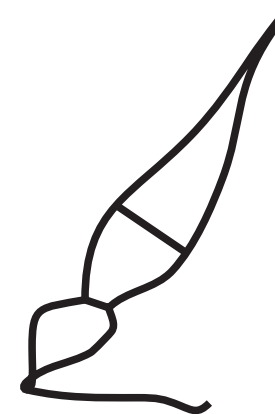
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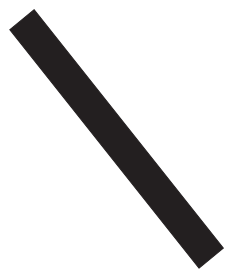
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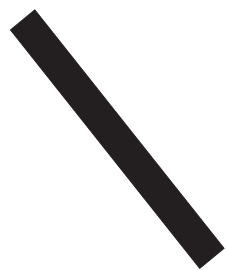
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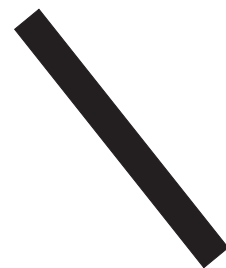
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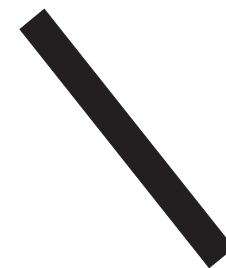
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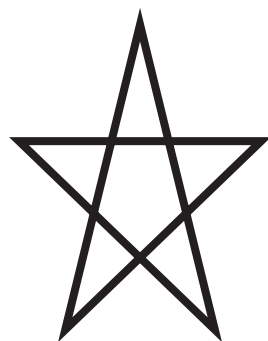
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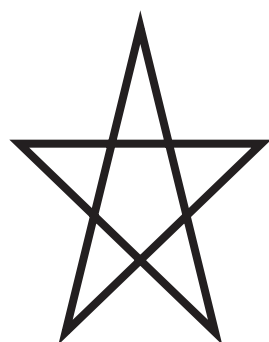
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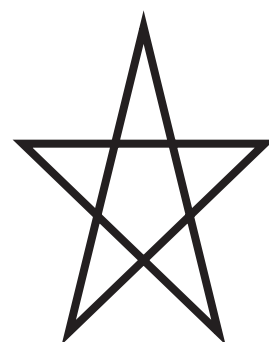
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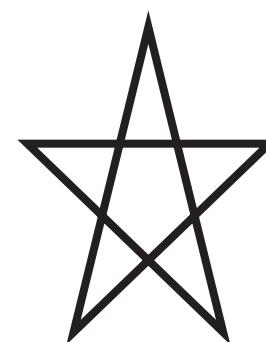
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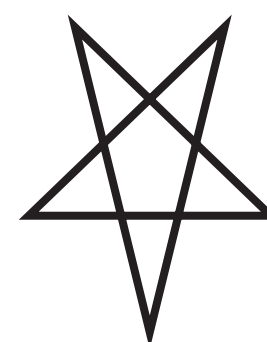
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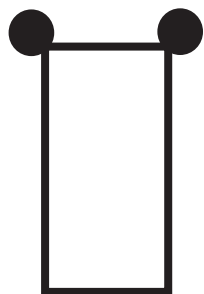
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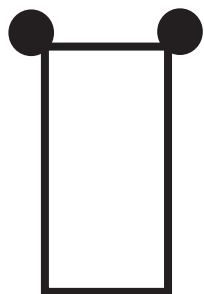
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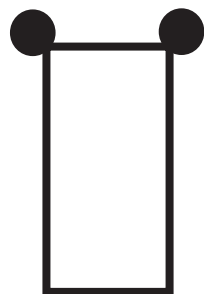
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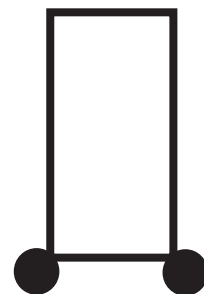
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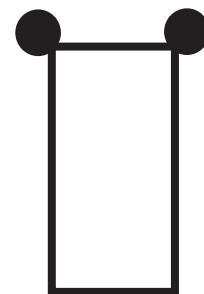
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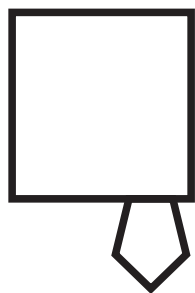
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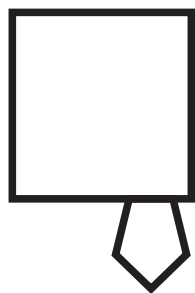
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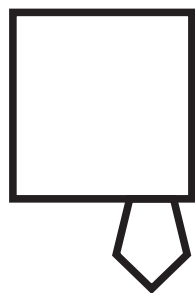
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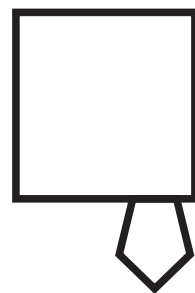
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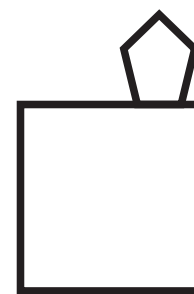
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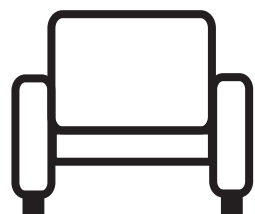
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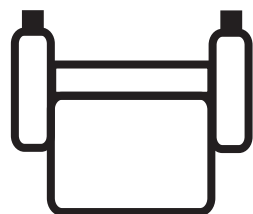
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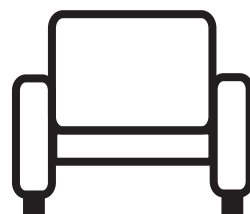
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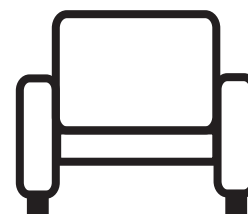
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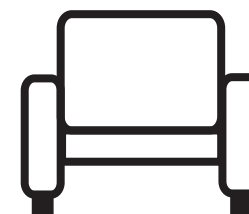
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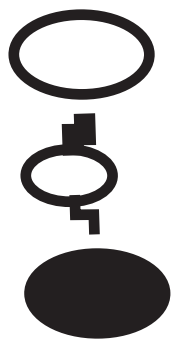
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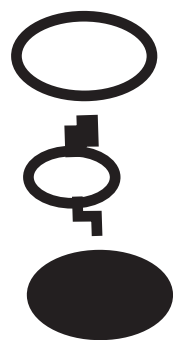
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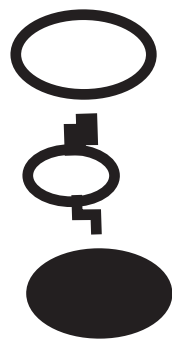
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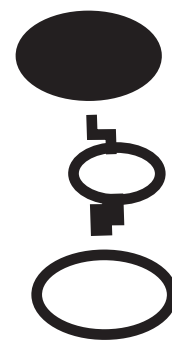
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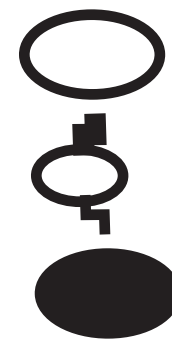
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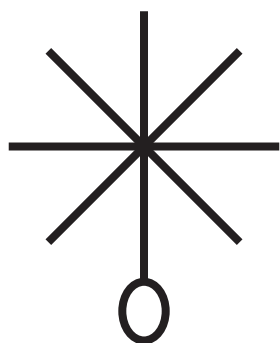
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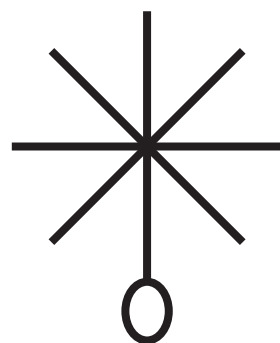
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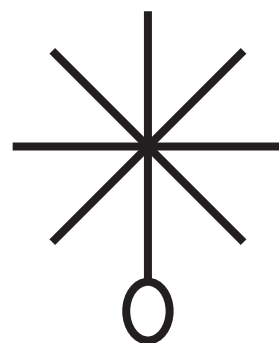
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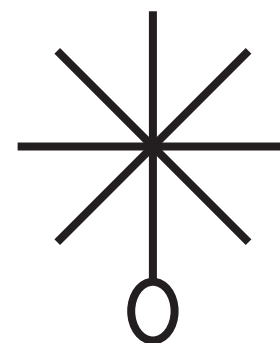
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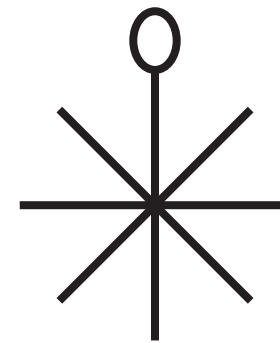
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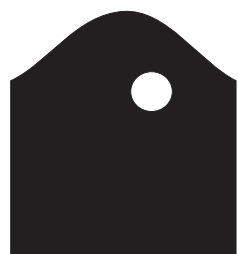
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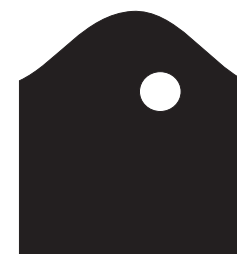
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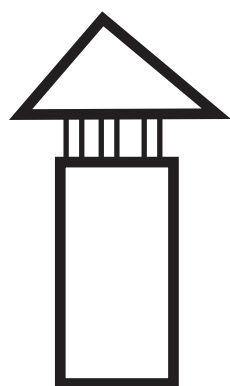
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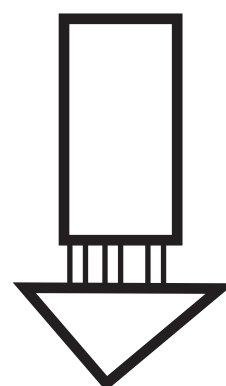
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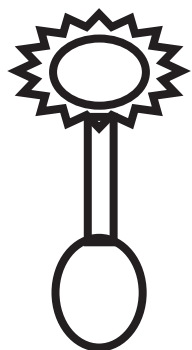
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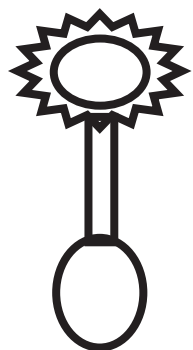
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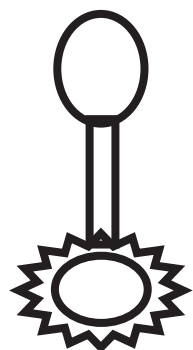
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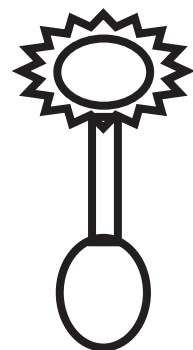
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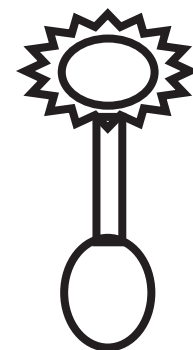
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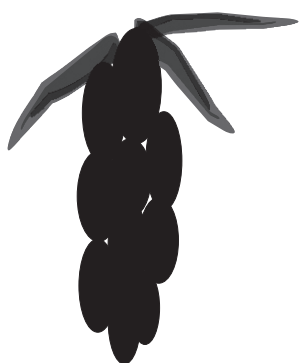
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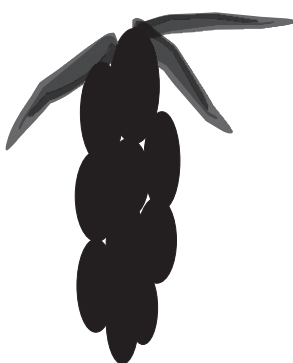
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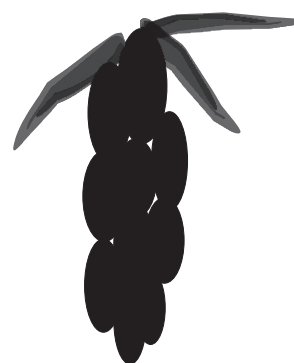
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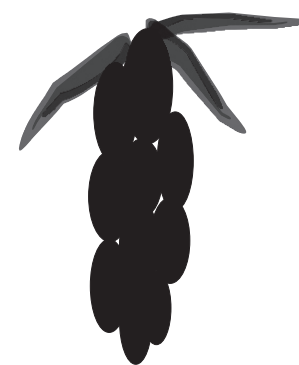
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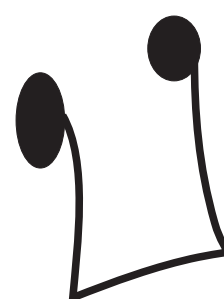
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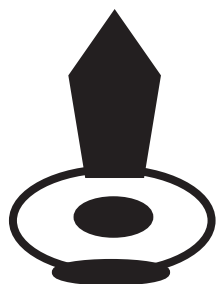
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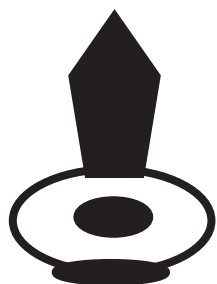
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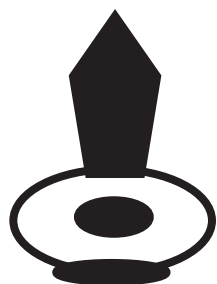
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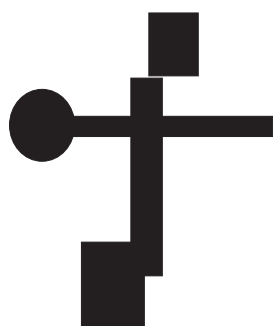
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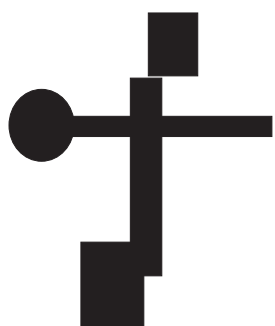
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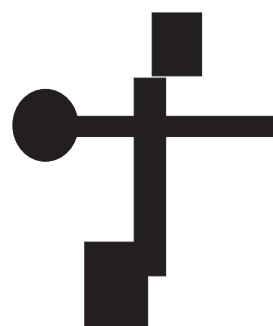
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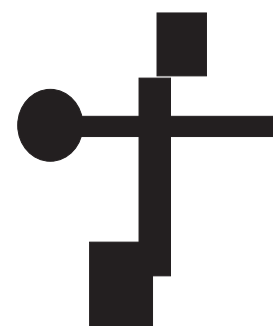
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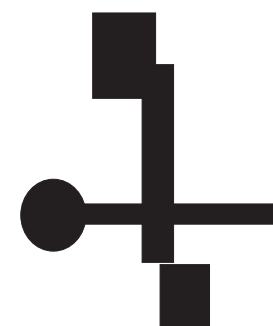
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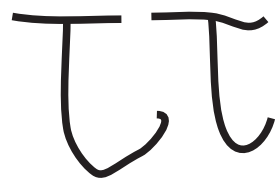
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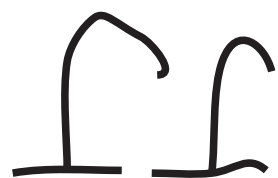
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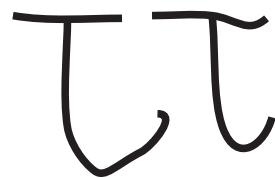
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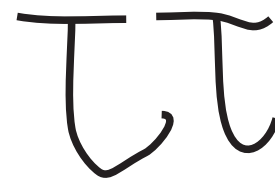
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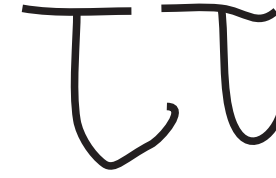
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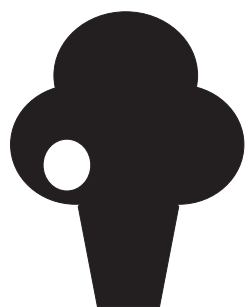
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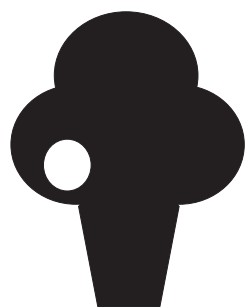
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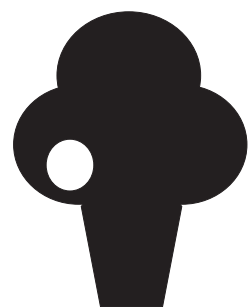
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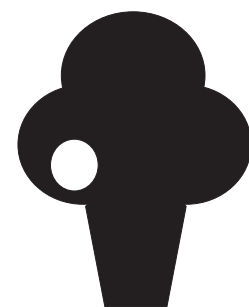
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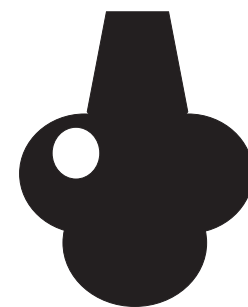
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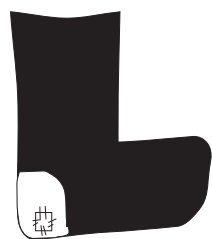
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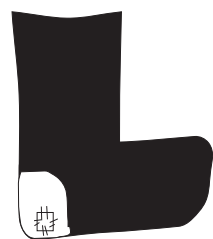
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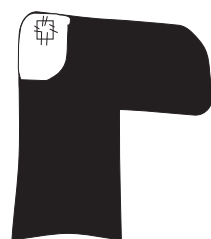
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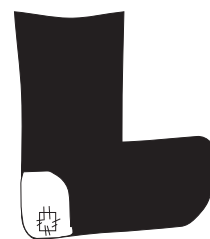
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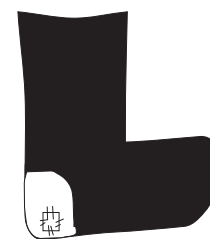
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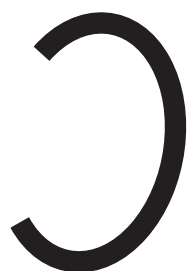
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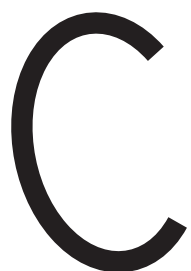
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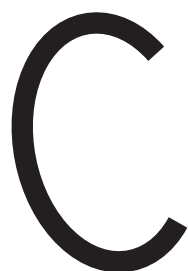
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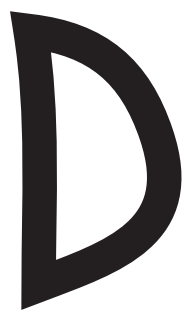
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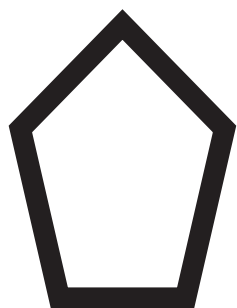
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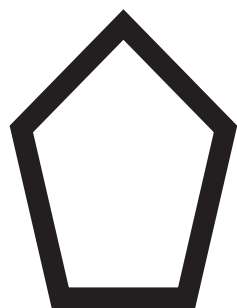
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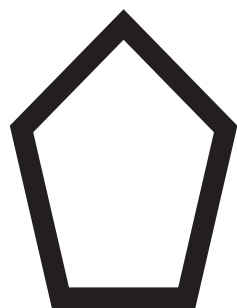
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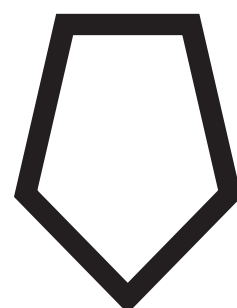
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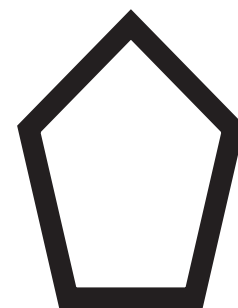
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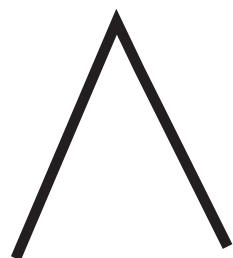
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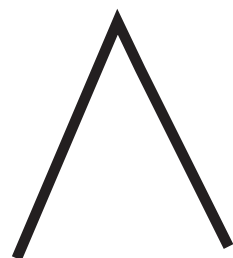
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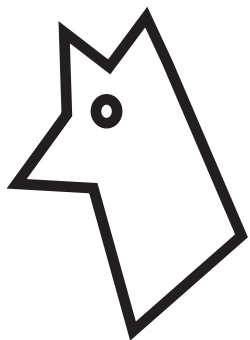
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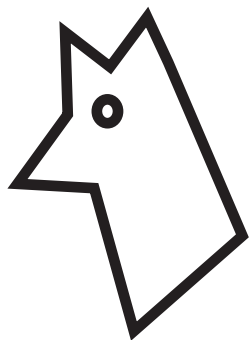
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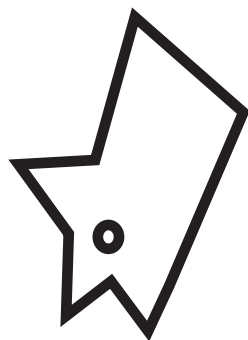
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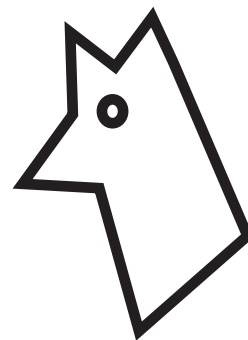
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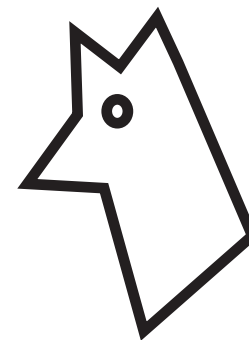
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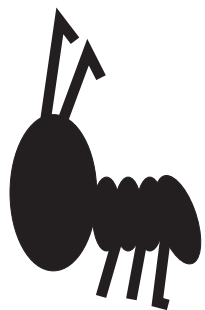
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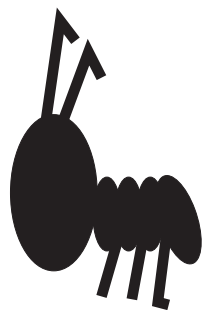
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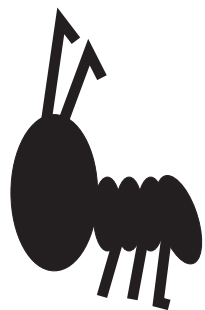
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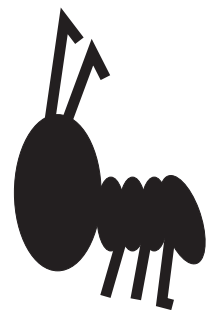
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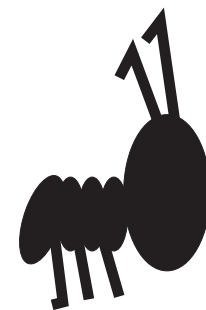
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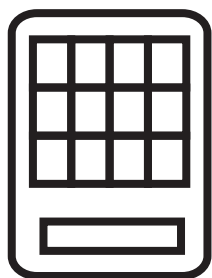
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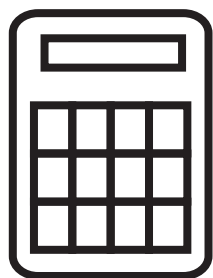
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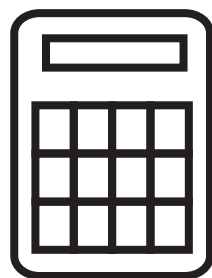
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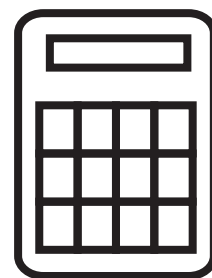
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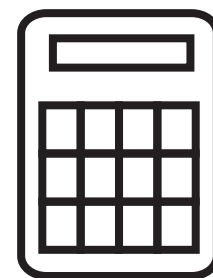
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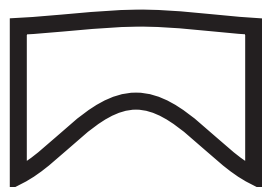
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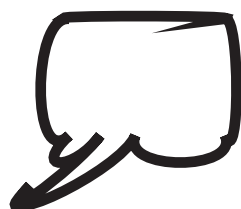
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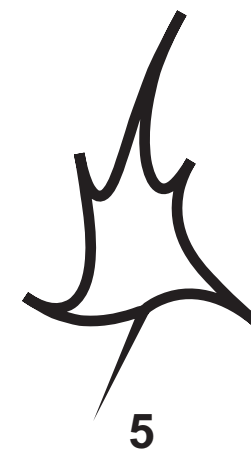
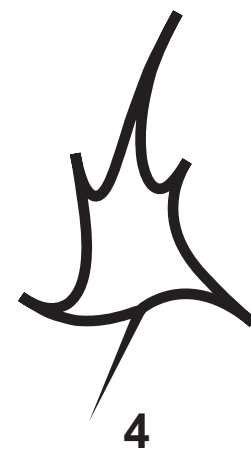
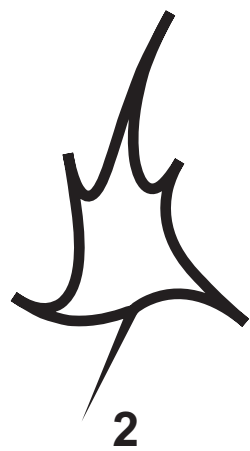
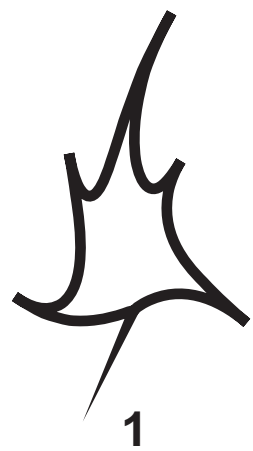
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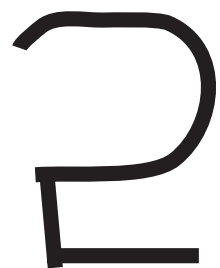


5



A handwritten number 5 in a cursive style. It starts with a horizontal top bar, followed by a vertical stem that curves to the right at the bottom, and a curved bottom bar.

1

A handwritten number 2 in a cursive style. It starts with a curved top bar, followed by a vertical stem that curves to the right at the bottom, and a horizontal bottom bar.

2

A handwritten number 5 in a cursive style, similar to the first one, with a horizontal top bar, a vertical stem curving right at the bottom, and a curved bottom bar.

3

A handwritten number 5 in a cursive style, similar to the first one, with a horizontal top bar, a vertical stem curving right at the bottom, and a curved bottom bar.

4

A handwritten number 5 in a cursive style, similar to the first one, with a horizontal top bar, a vertical stem curving right at the bottom, and a curved bottom bar.

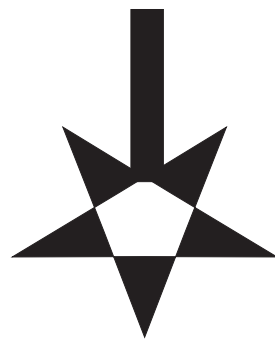
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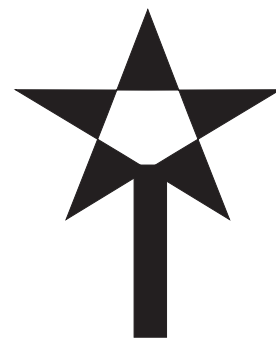
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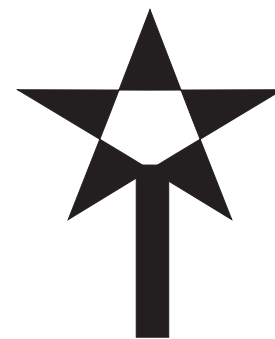
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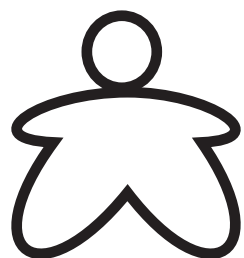
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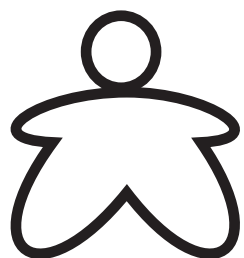
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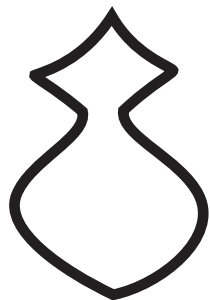
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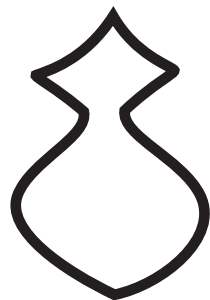
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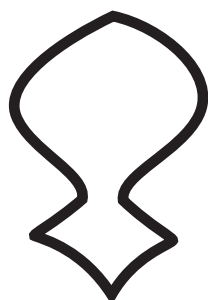
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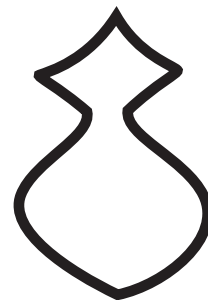
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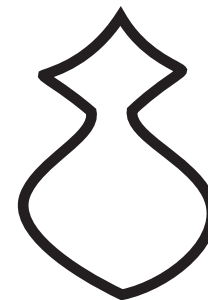
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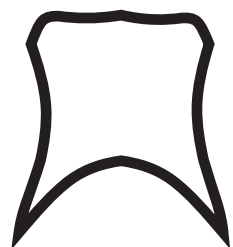
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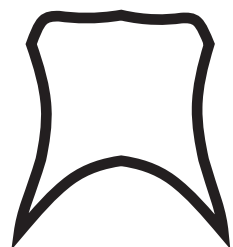
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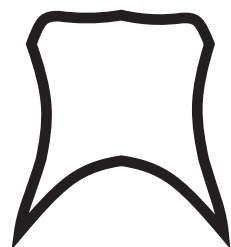
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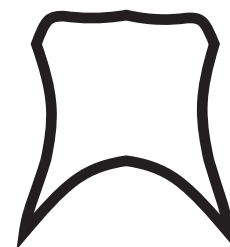
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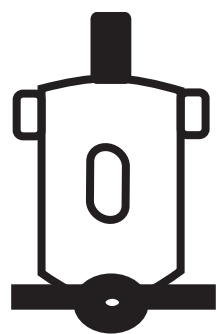
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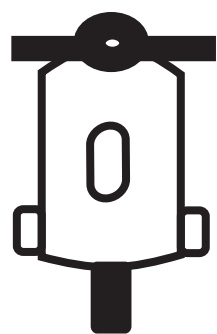
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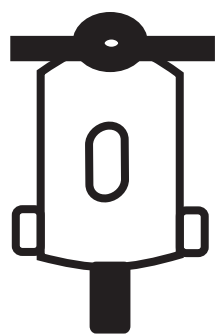
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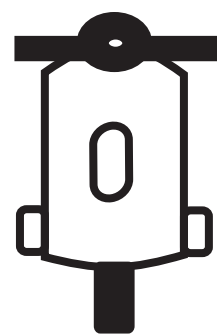
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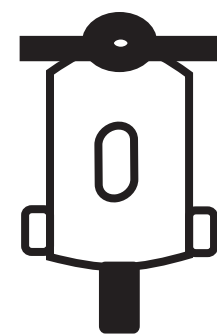
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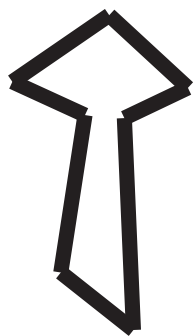
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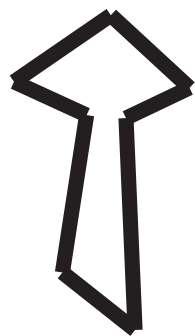
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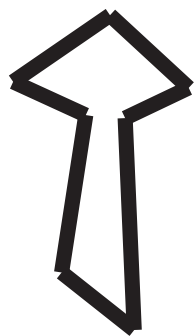
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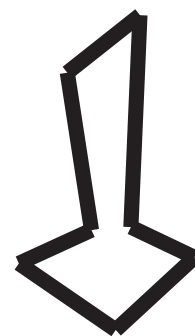
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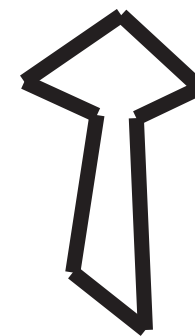
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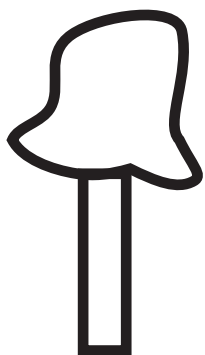
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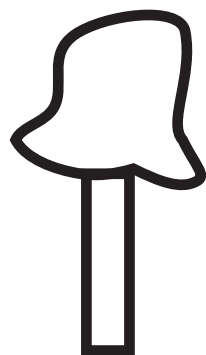
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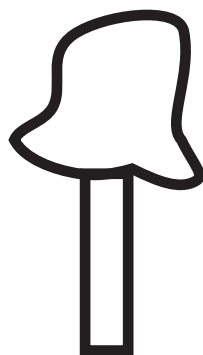
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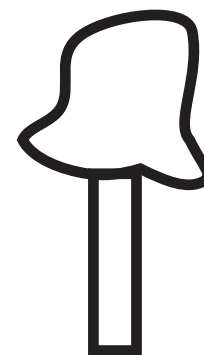
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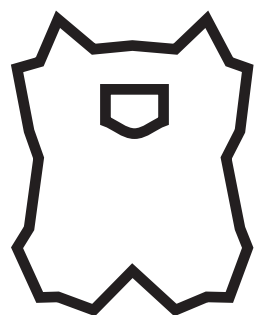
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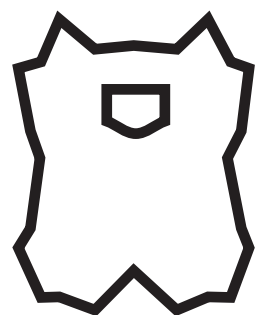
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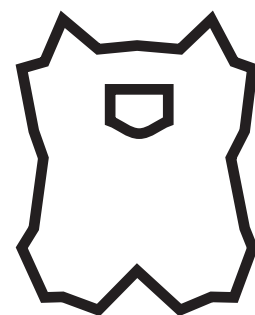
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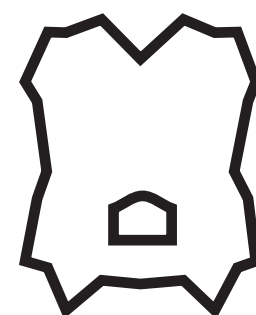
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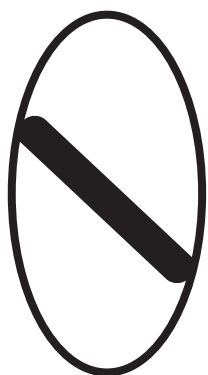
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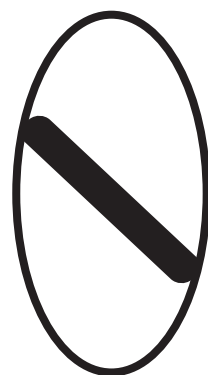
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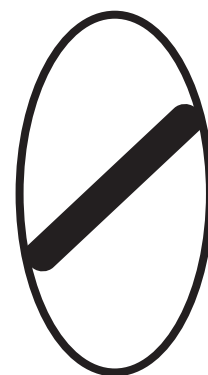
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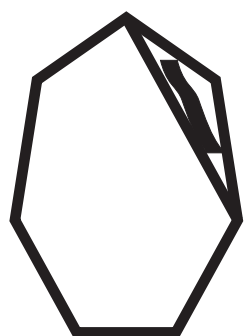
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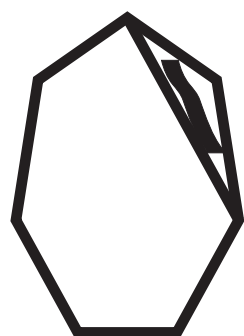
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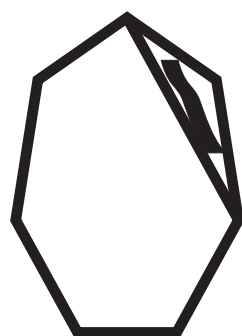
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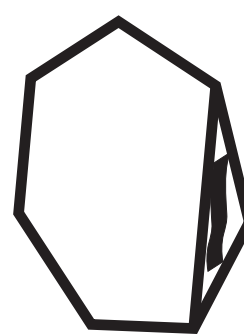
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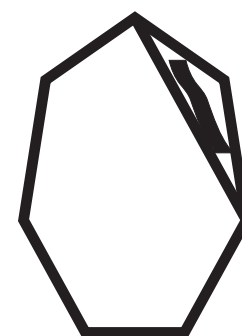
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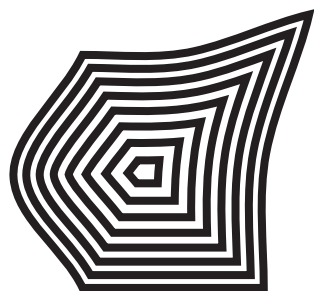
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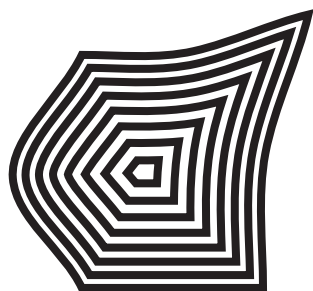
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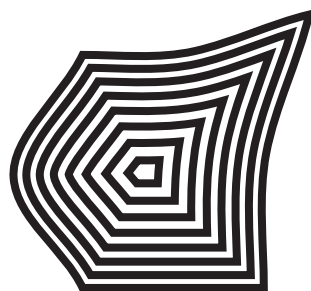
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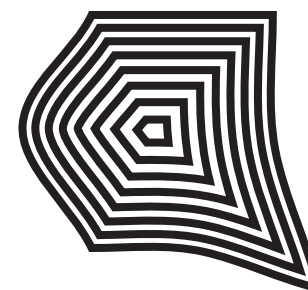
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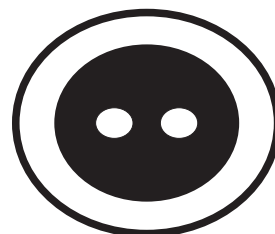
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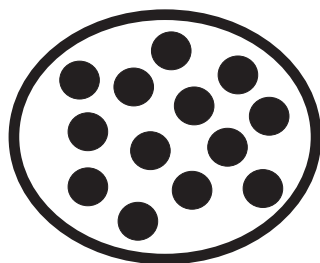
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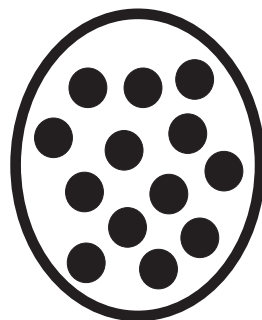
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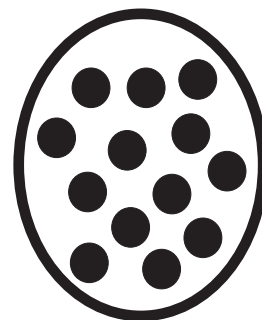
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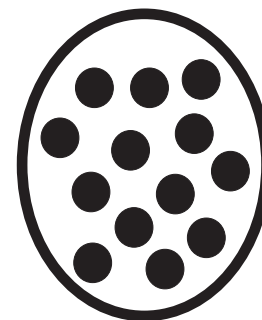
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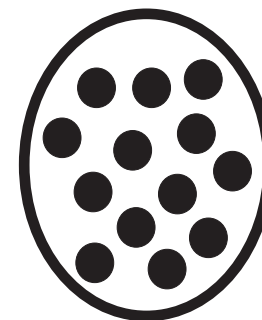
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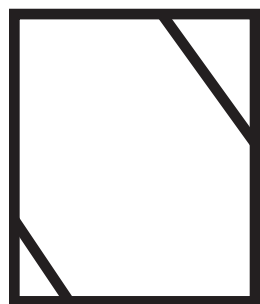
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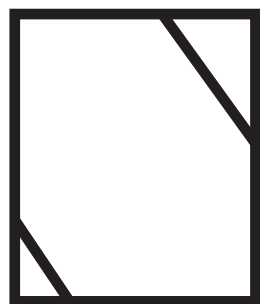
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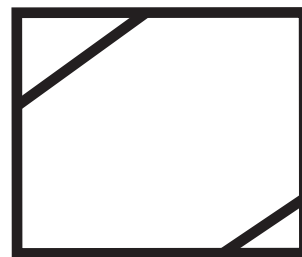
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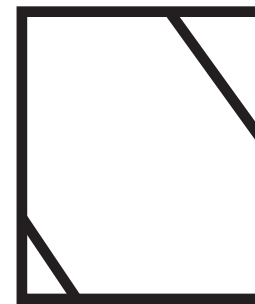
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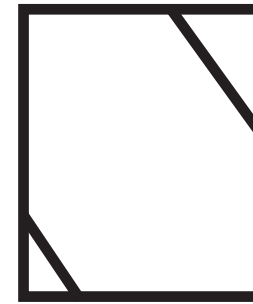
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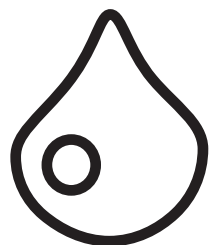
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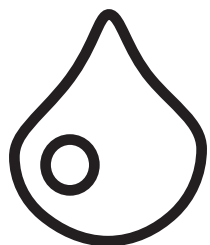
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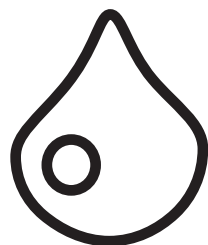
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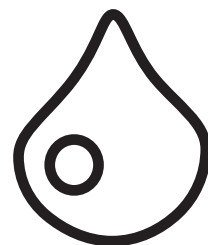
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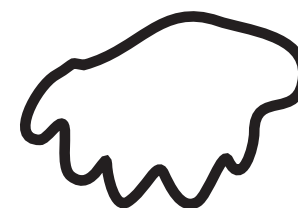
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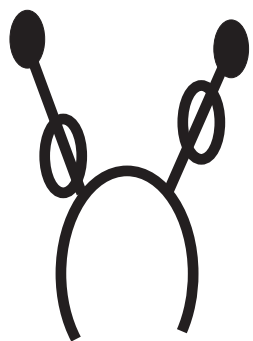
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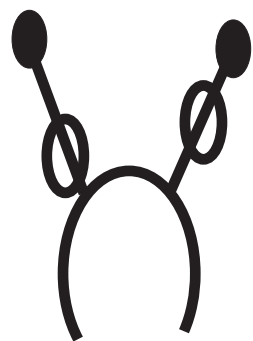
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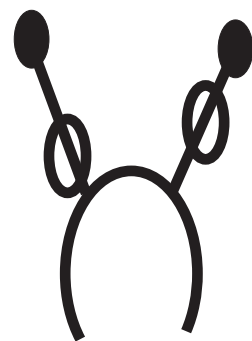
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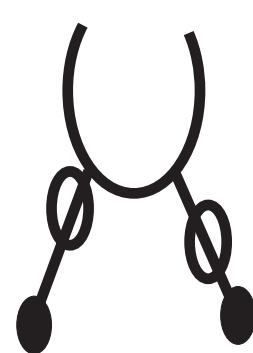
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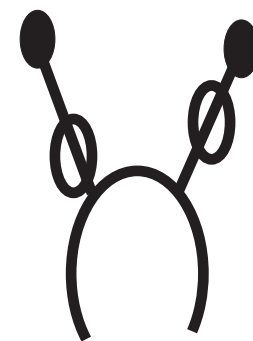
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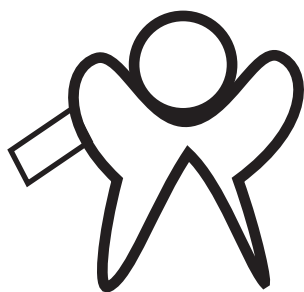
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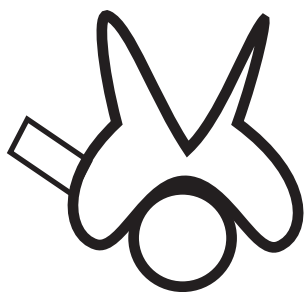
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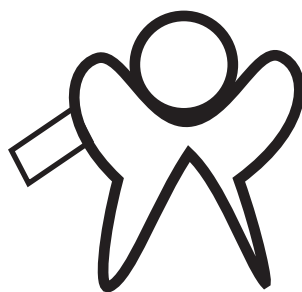
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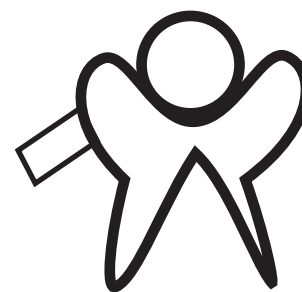
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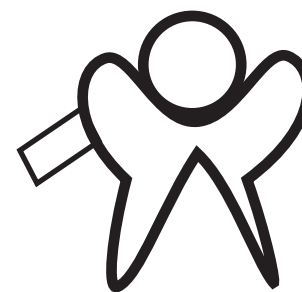
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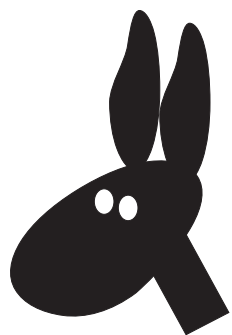
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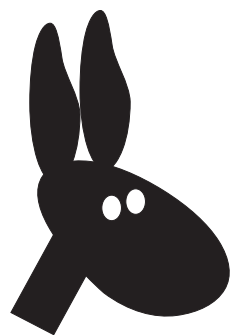
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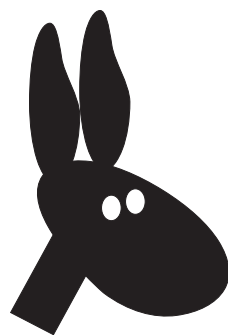
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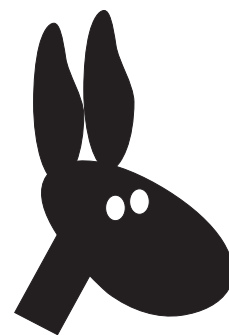
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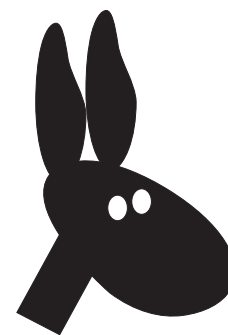
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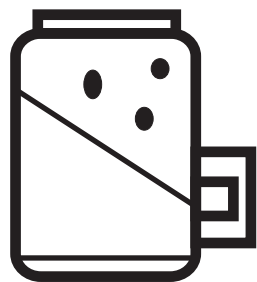
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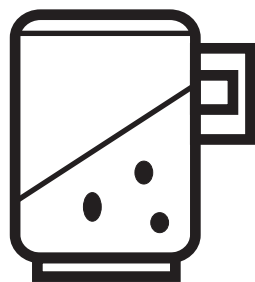
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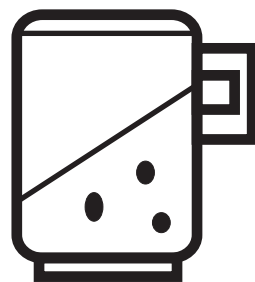
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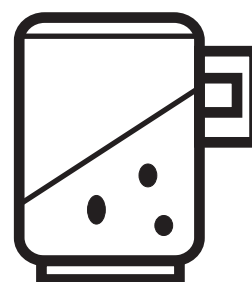
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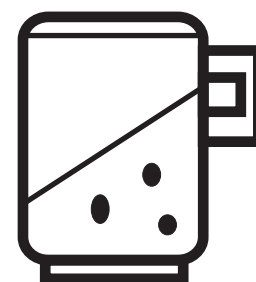
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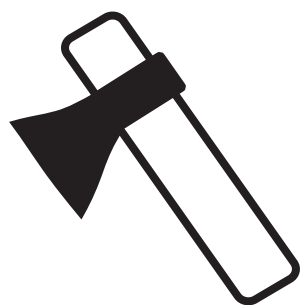
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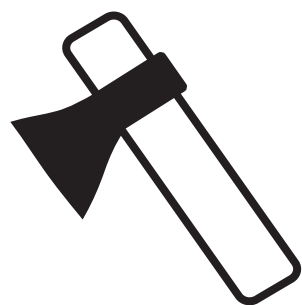
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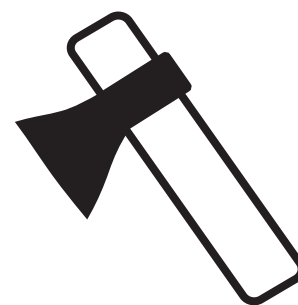
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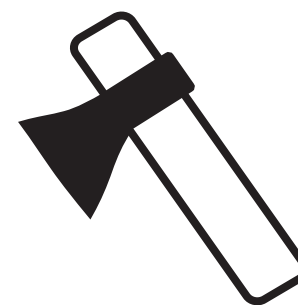
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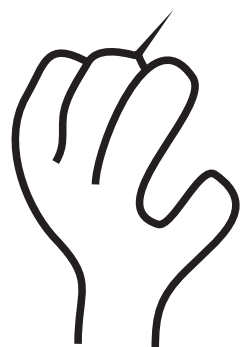
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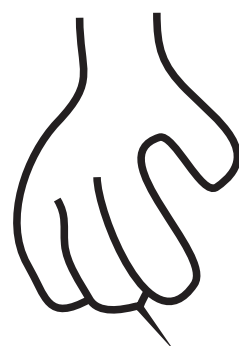
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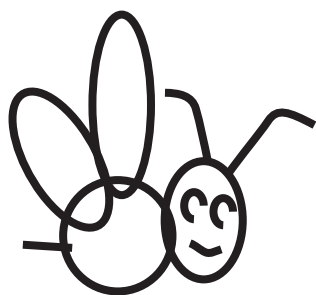
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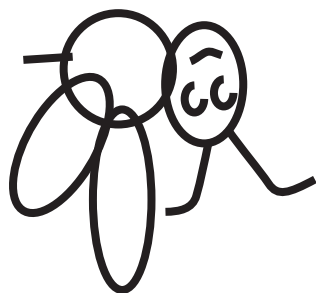
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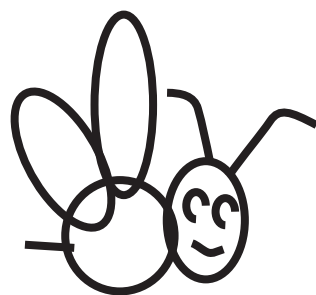
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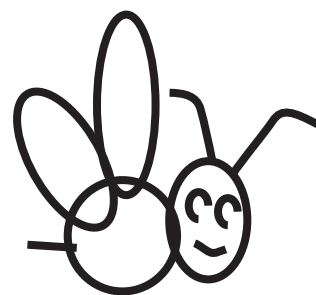
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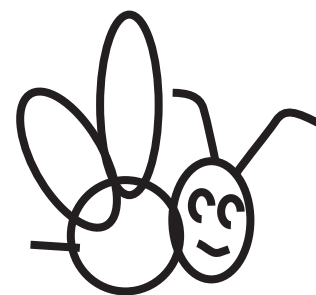
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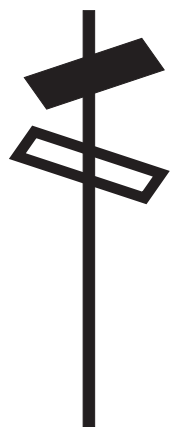
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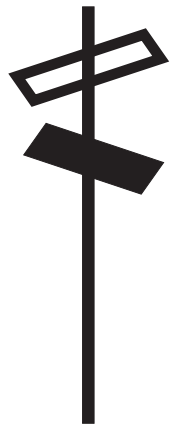
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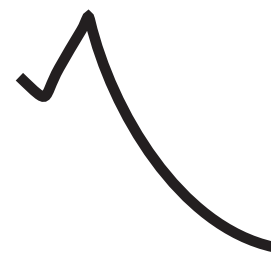
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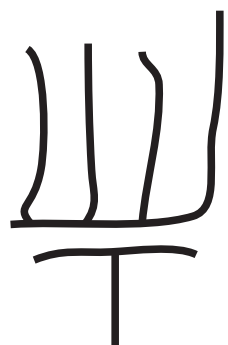
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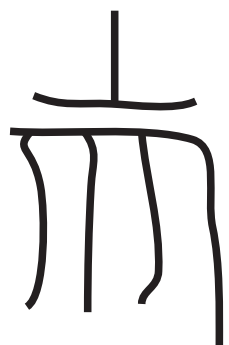
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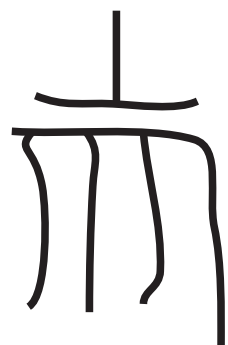
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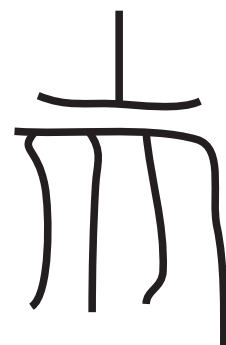
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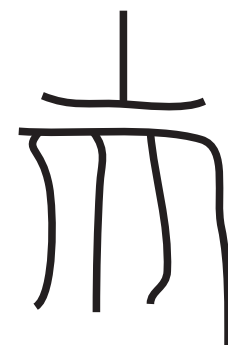
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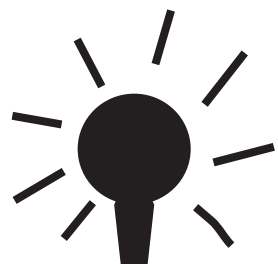
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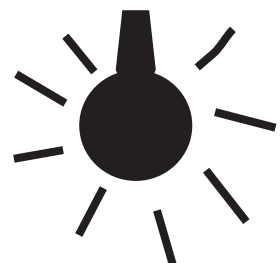
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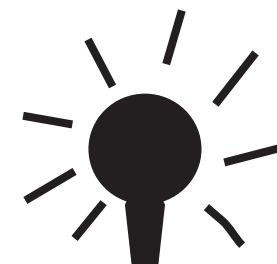
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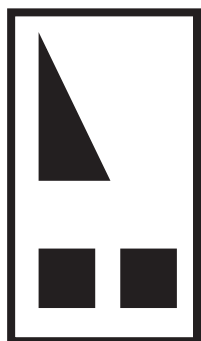
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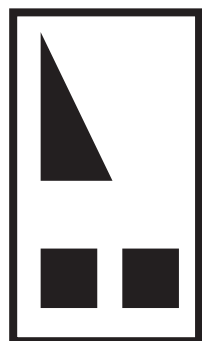
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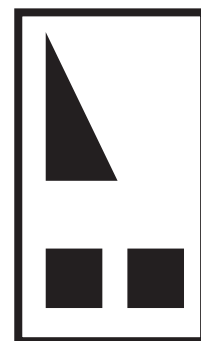
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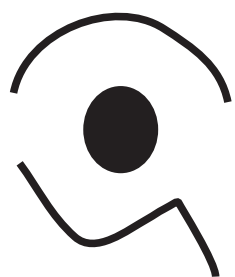
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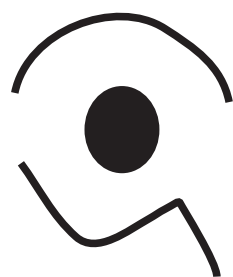
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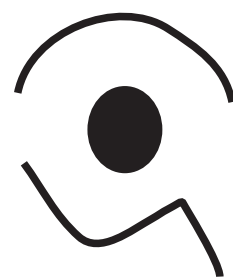
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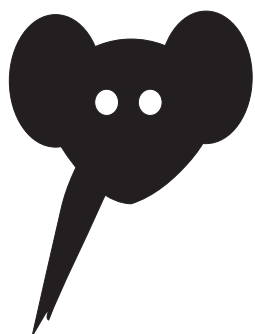
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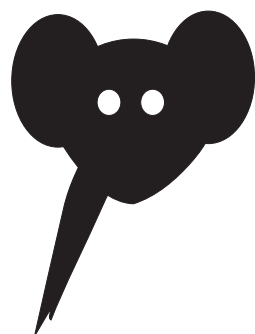
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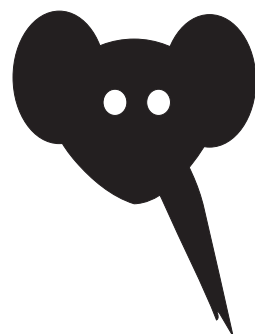
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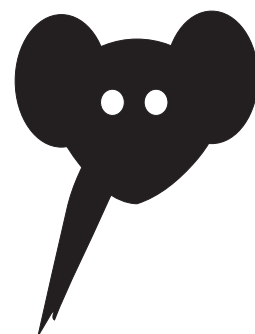
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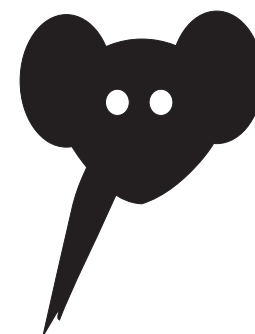
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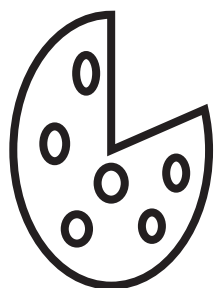
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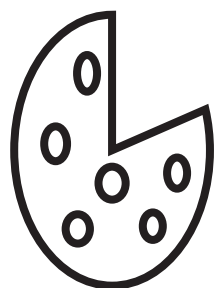
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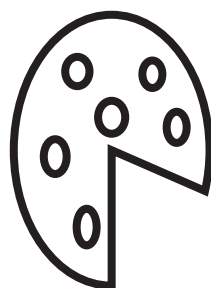
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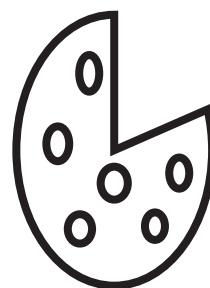
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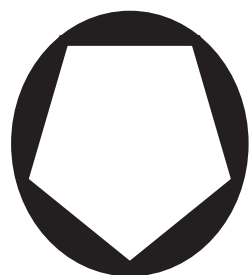
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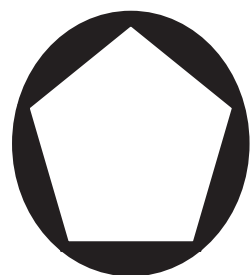
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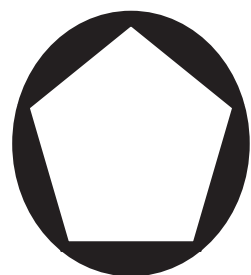
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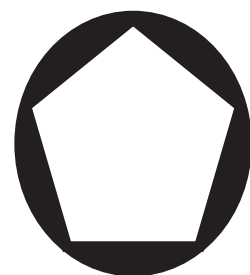
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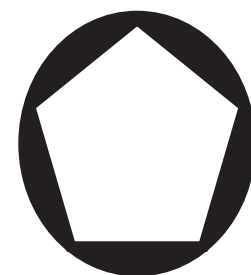
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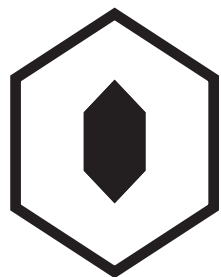
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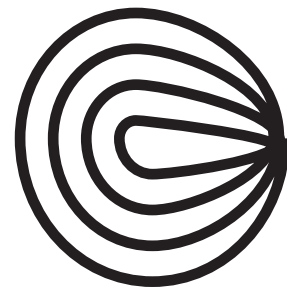
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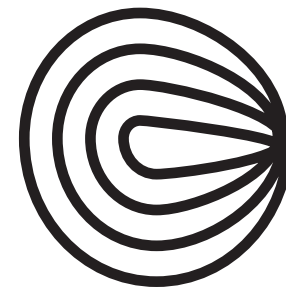
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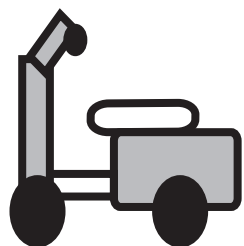
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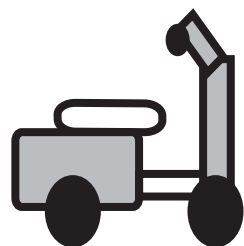
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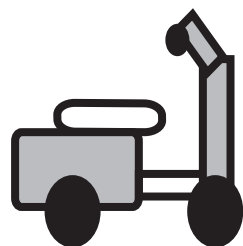
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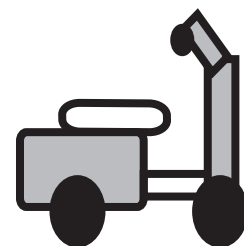
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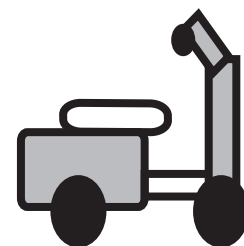
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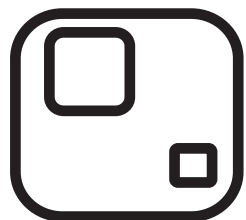
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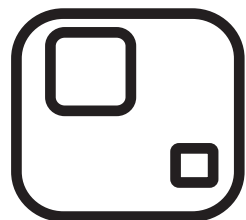
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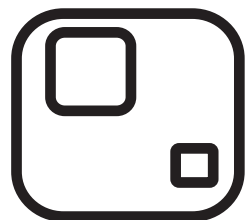
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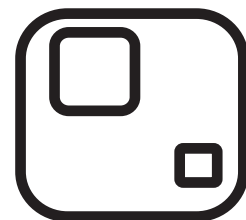
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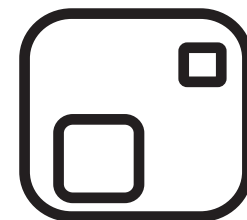
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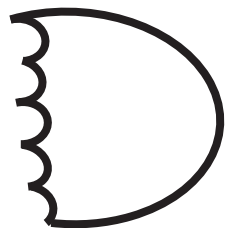
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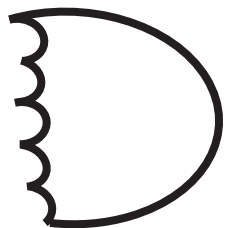
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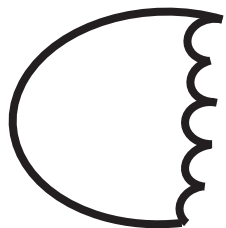
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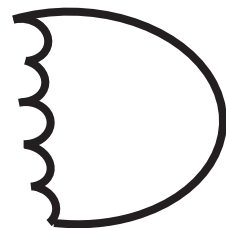
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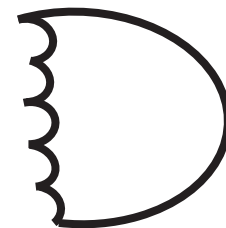
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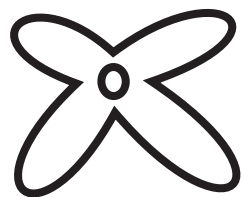
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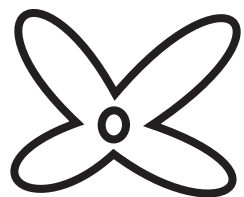
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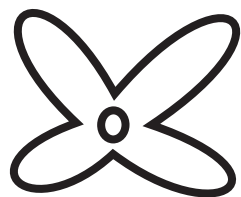
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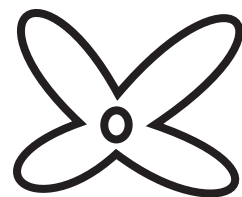
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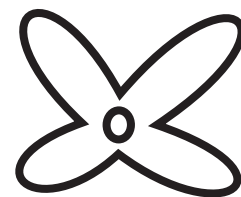
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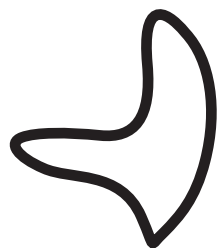
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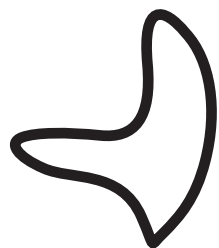
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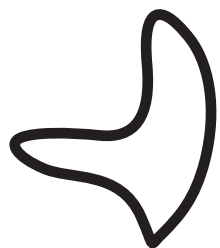
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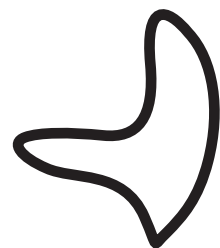
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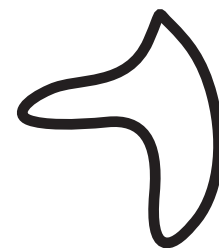
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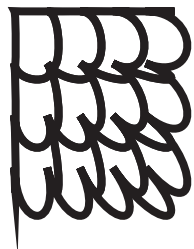
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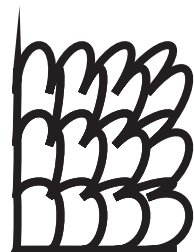
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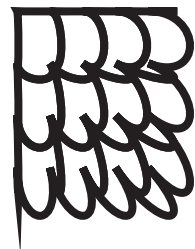
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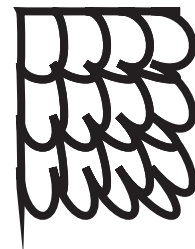
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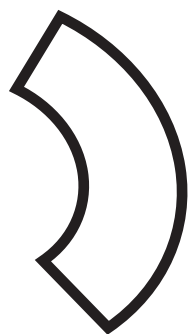
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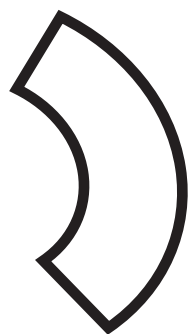
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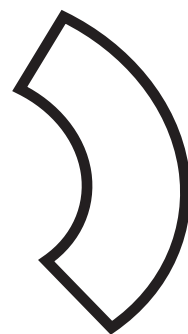
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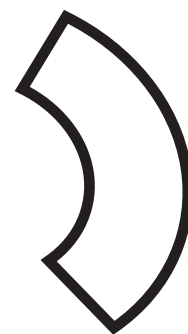
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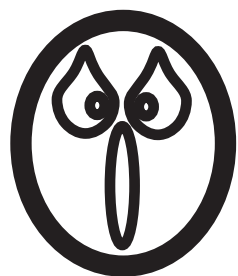
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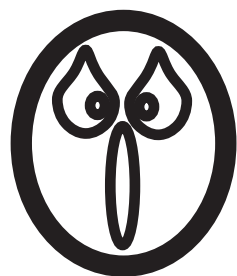
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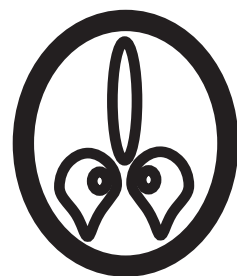
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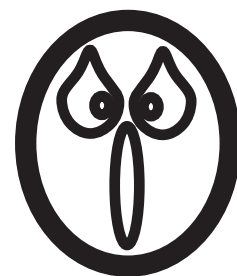
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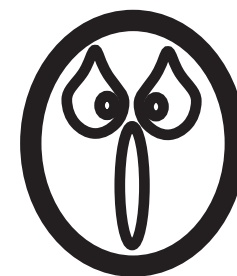
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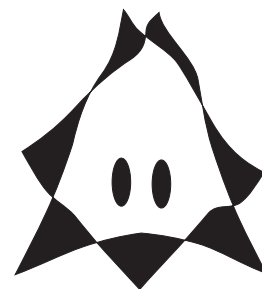
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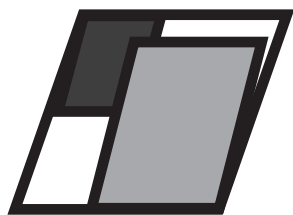
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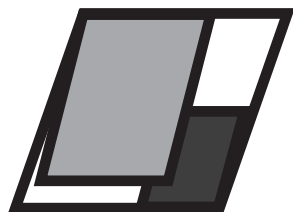
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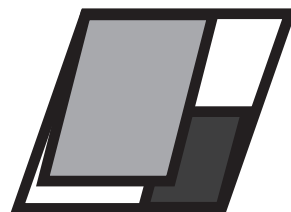
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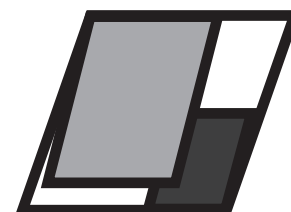
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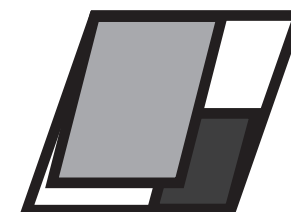
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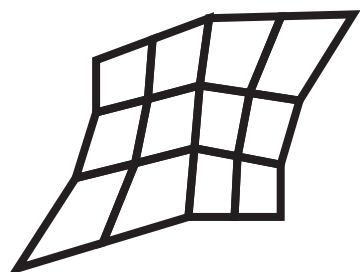
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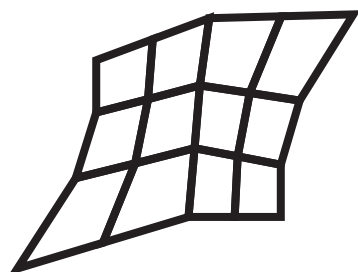
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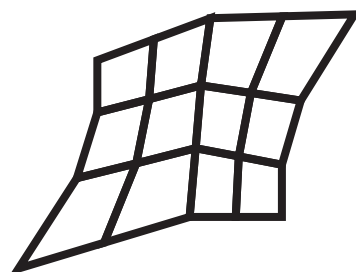
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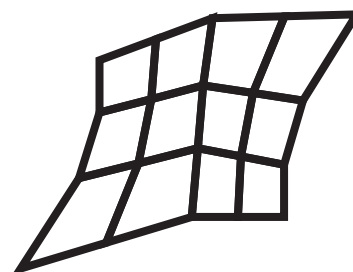
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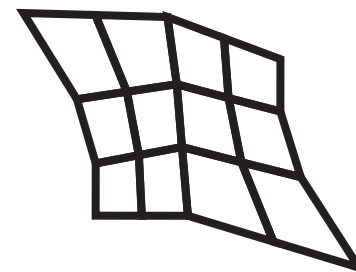
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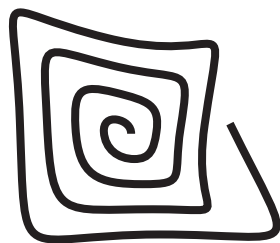
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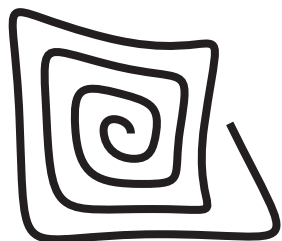
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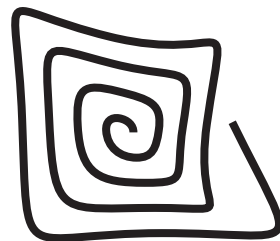
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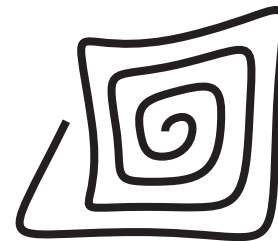
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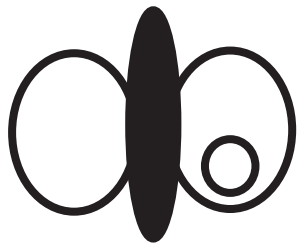
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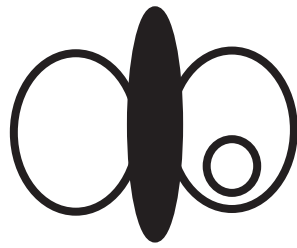
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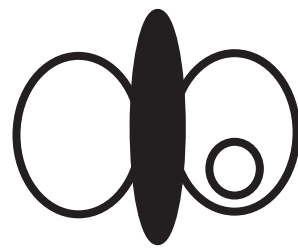
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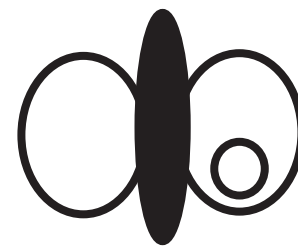
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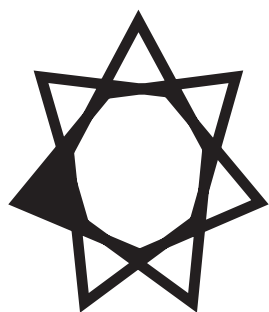
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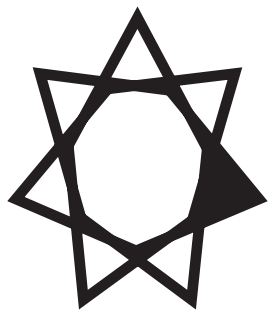
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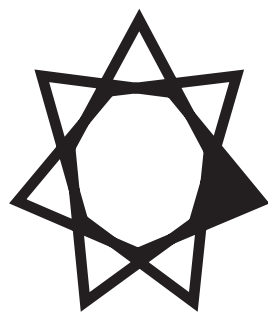
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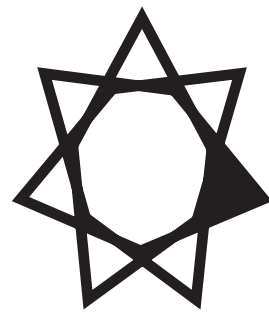
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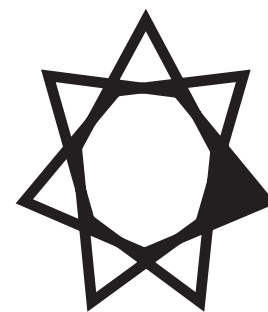
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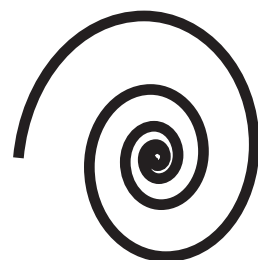
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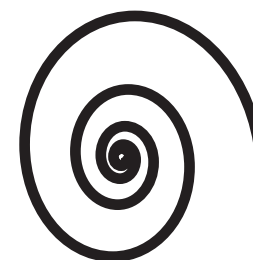
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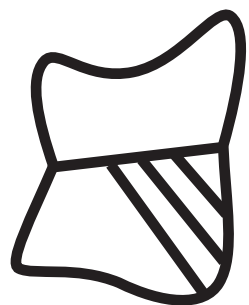
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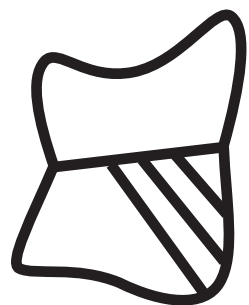
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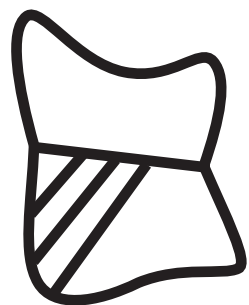
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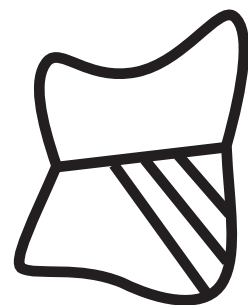
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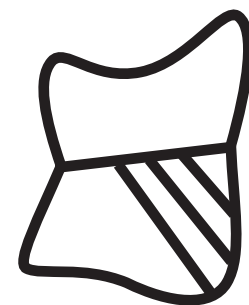
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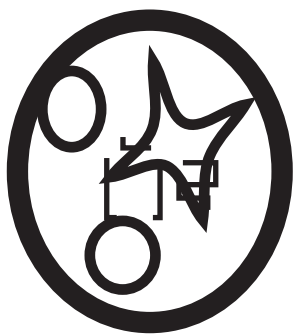
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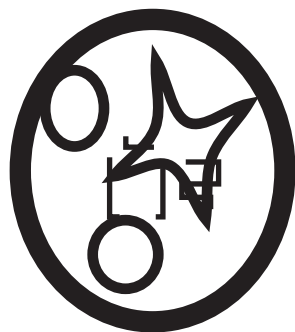
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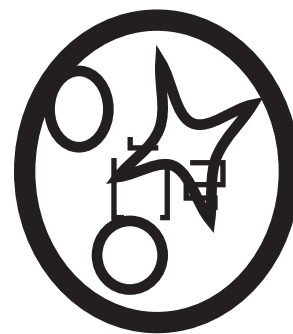
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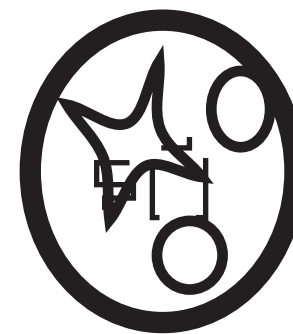
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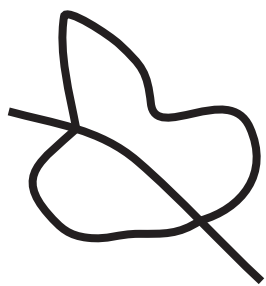
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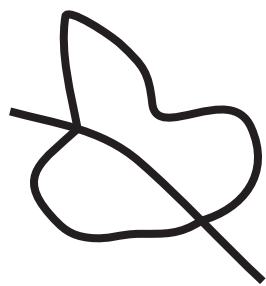
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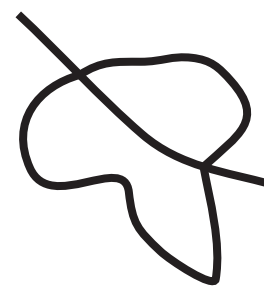
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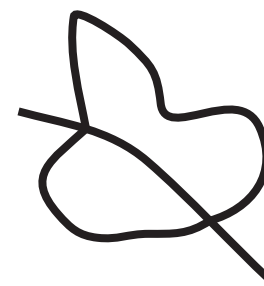
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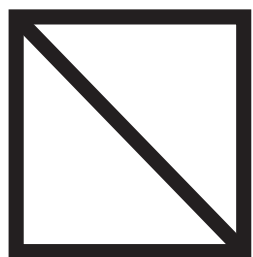
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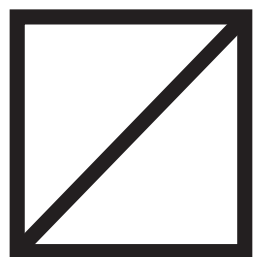
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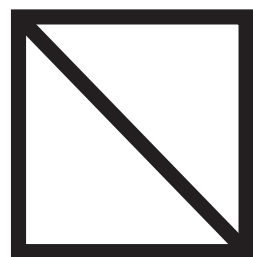
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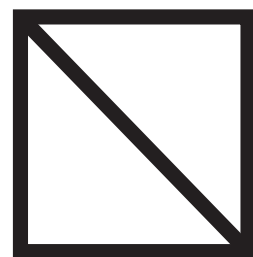
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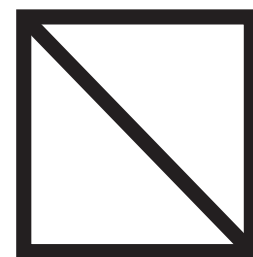
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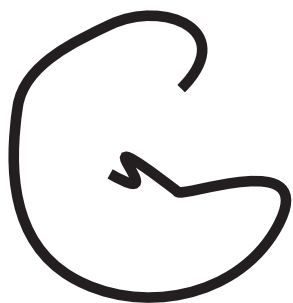
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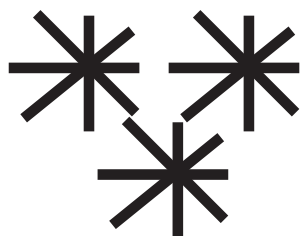
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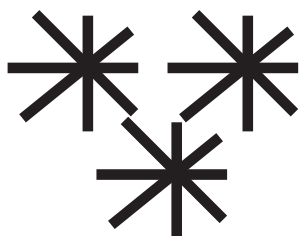
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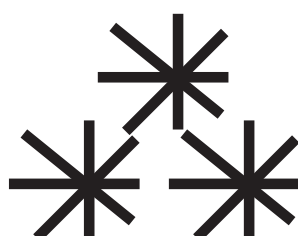
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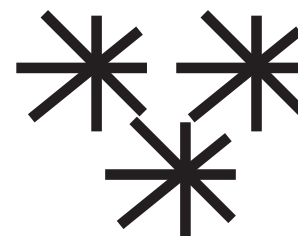
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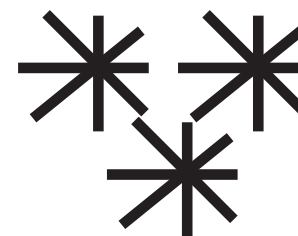
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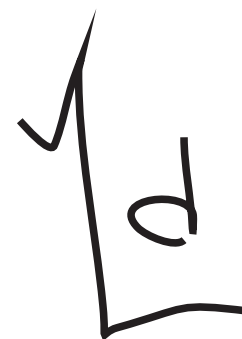
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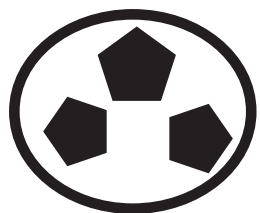
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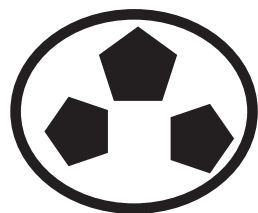
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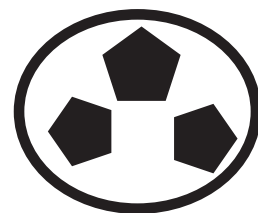
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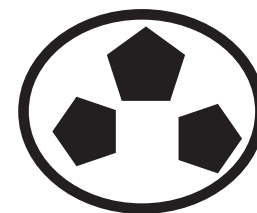
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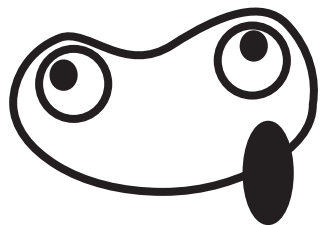
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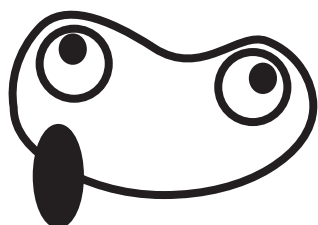
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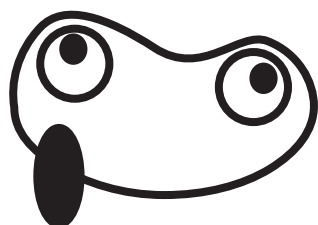
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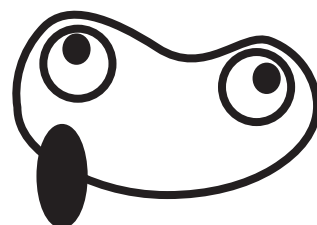
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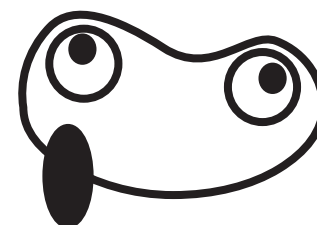
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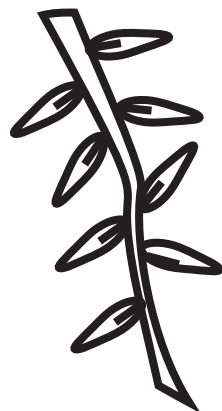
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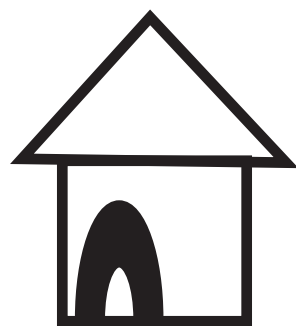
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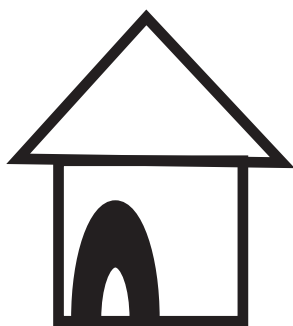
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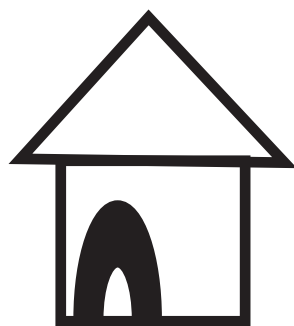
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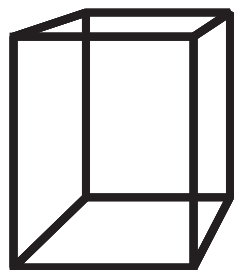
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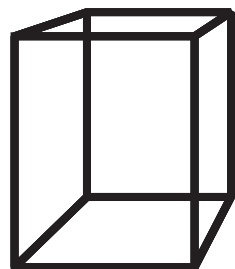
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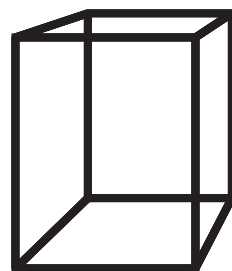
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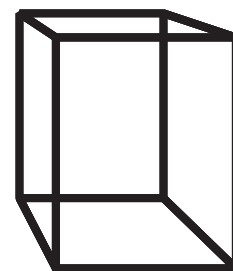
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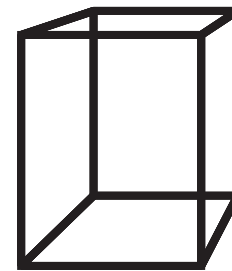
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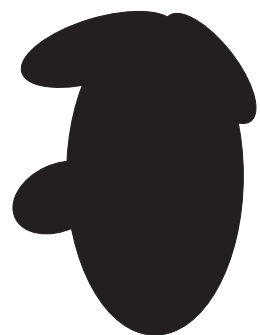
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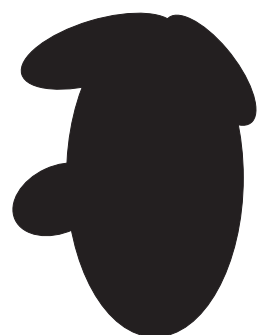
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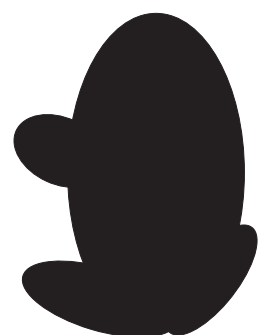
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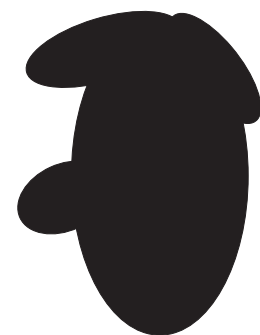
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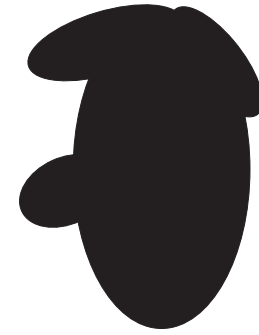
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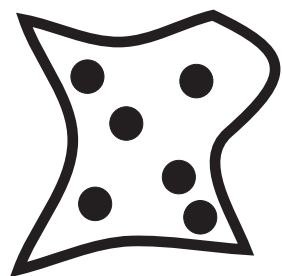
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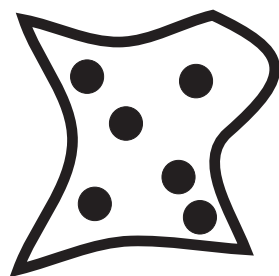
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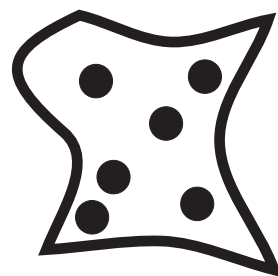
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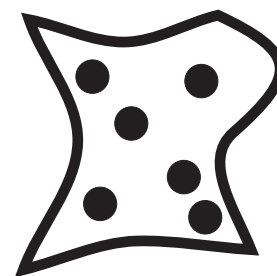
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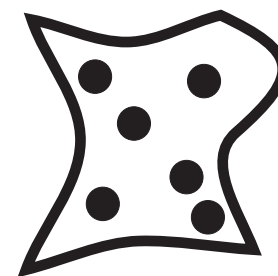
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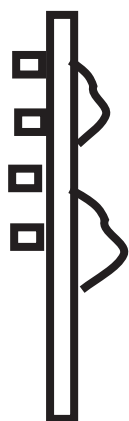
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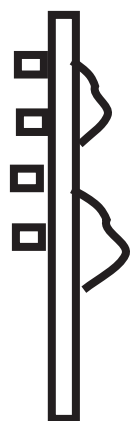
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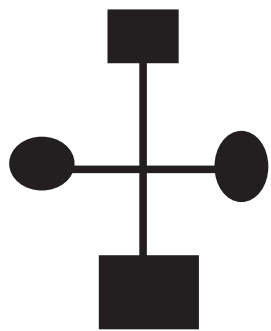
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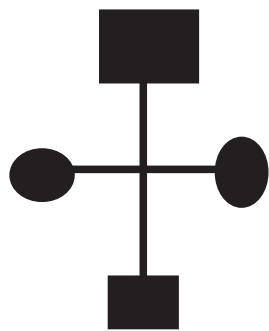
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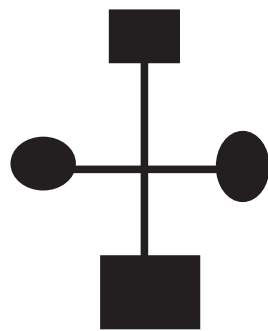
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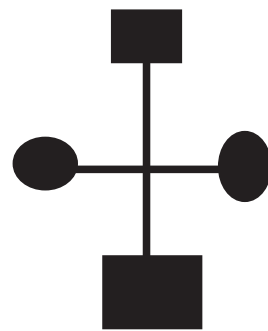
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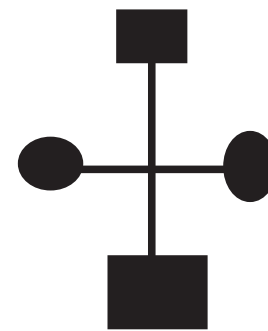
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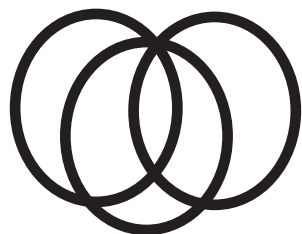
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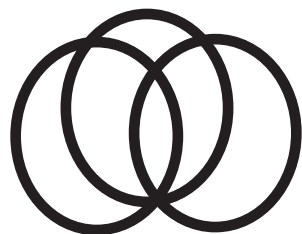
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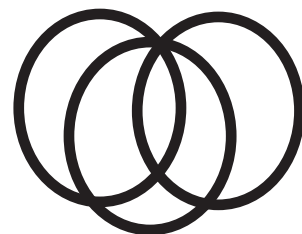
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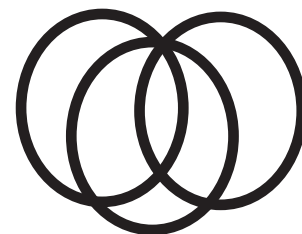
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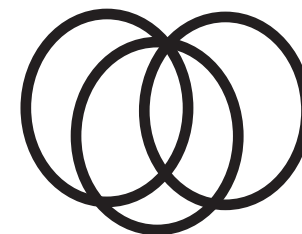
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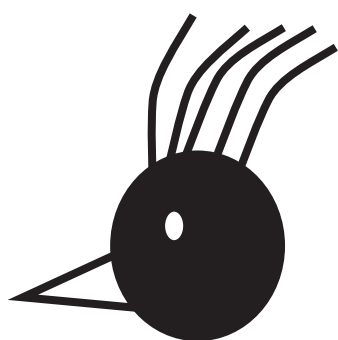
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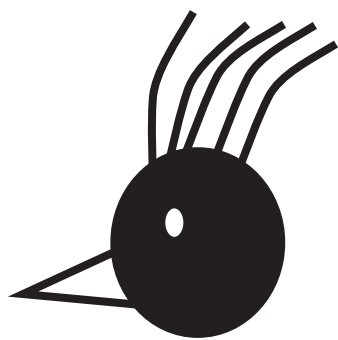
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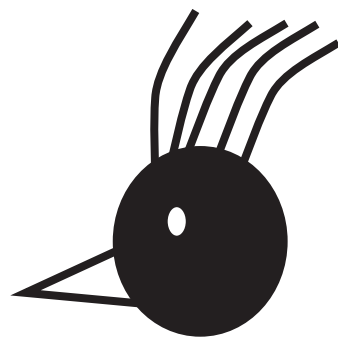
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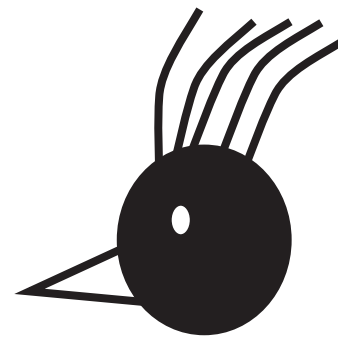
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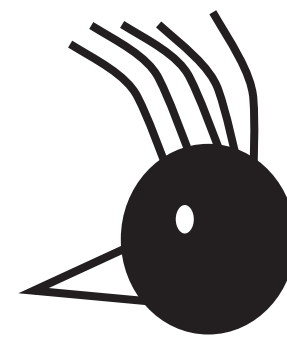
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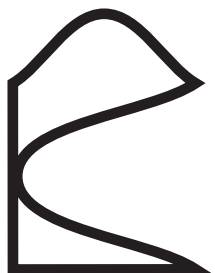
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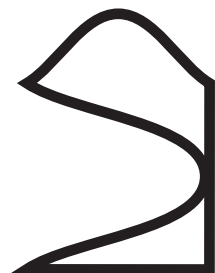
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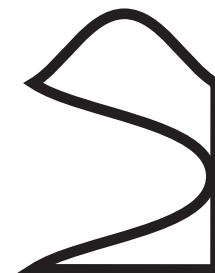
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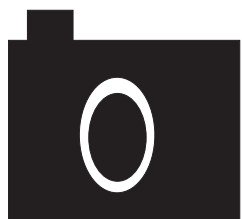
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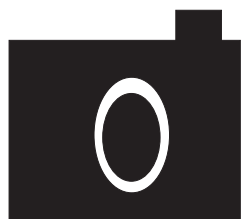
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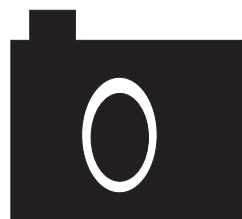
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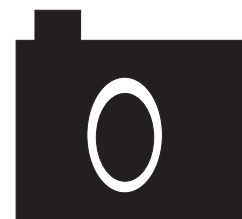
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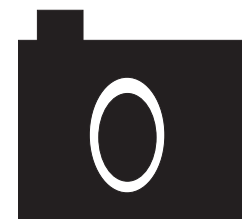
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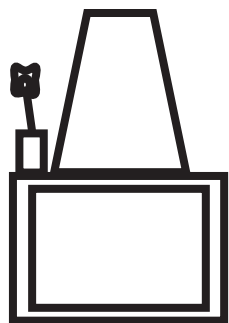
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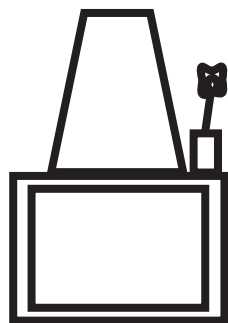
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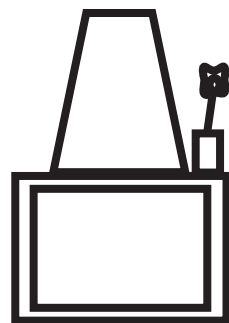
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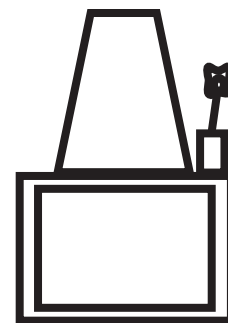
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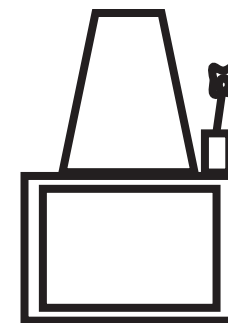
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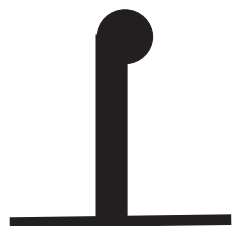
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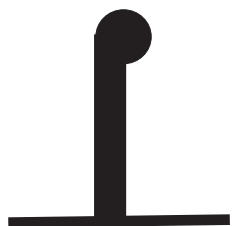
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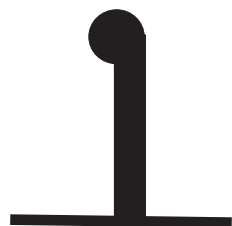
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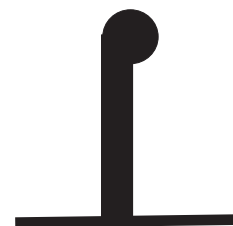
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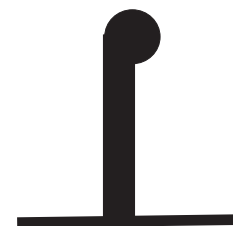
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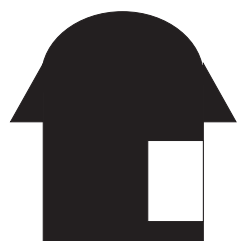
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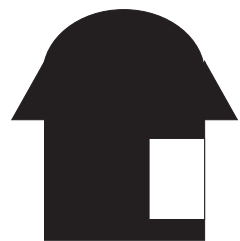
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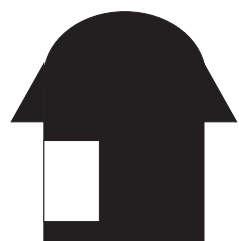
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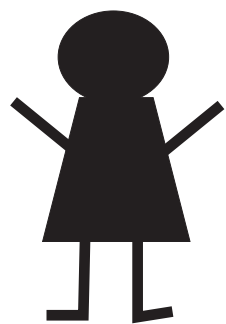
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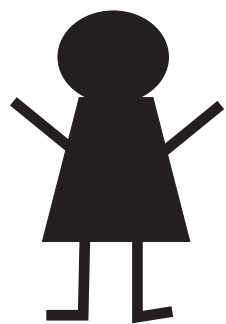
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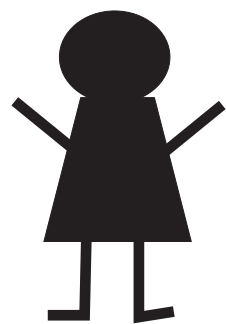
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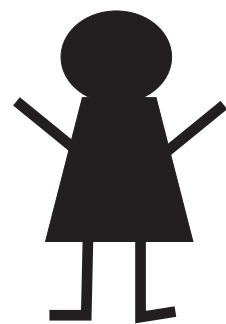
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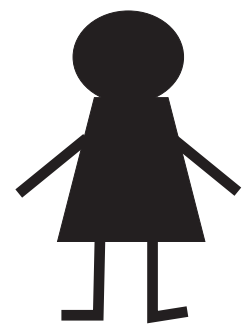
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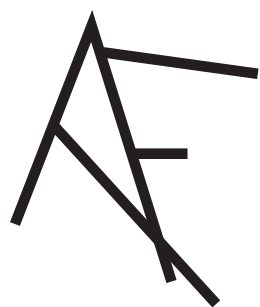
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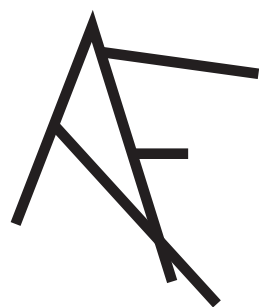
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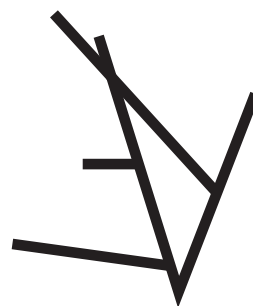
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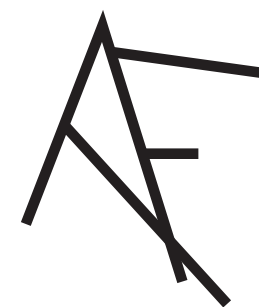
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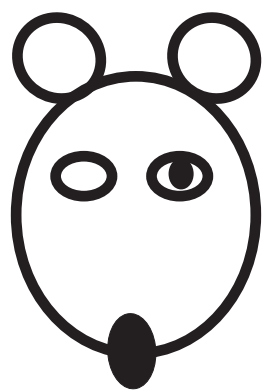
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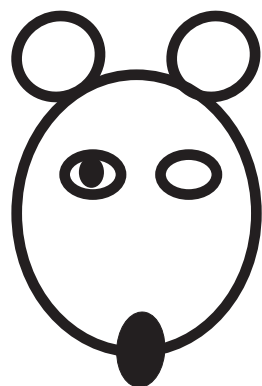
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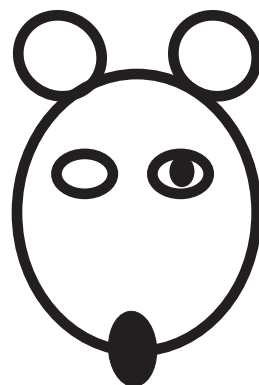
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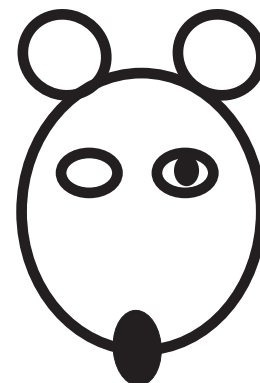
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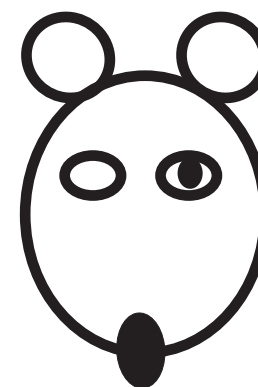
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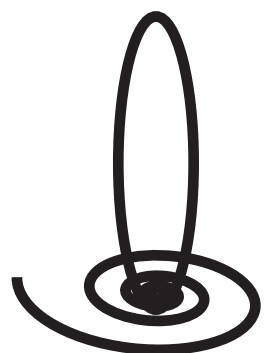
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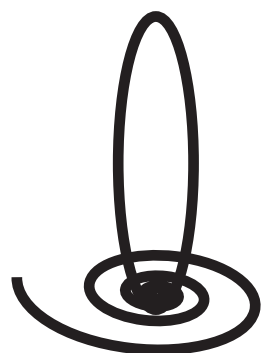
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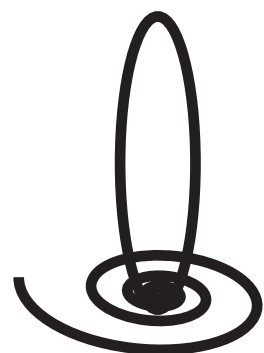
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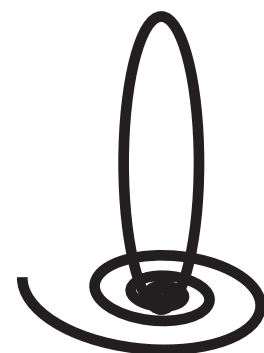
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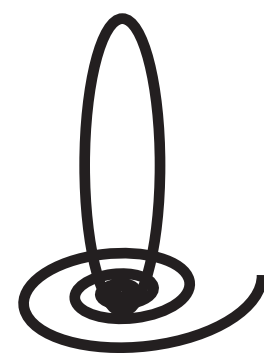
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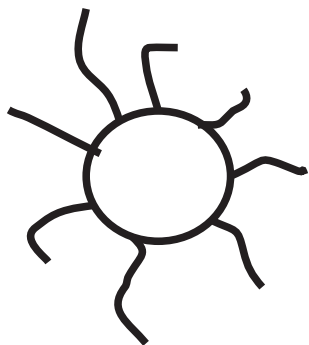
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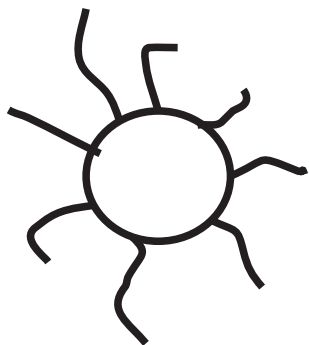
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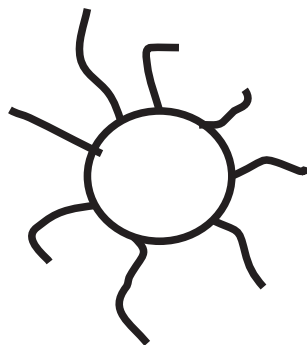
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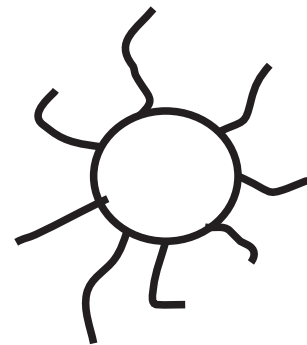
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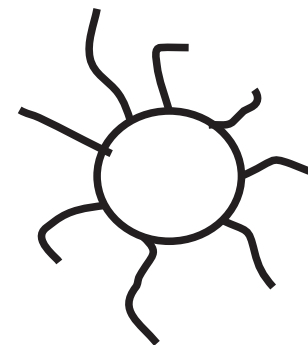
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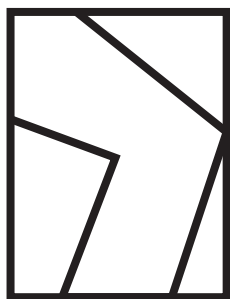
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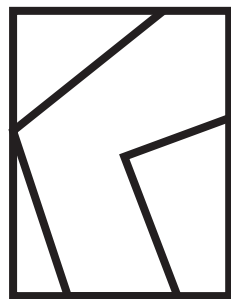
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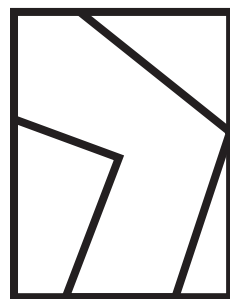
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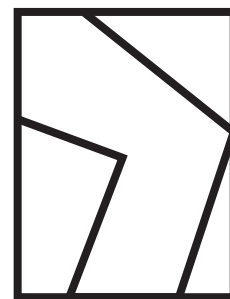
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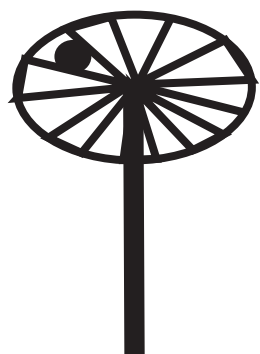
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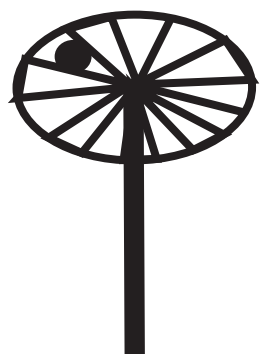
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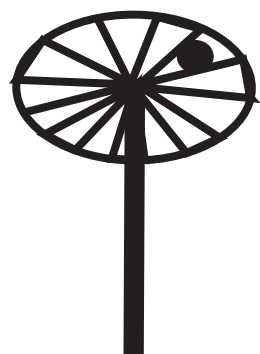
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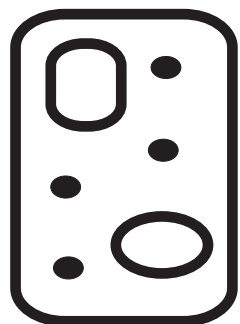
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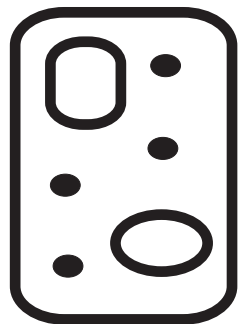
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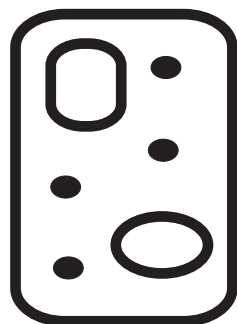
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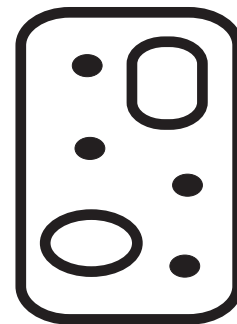
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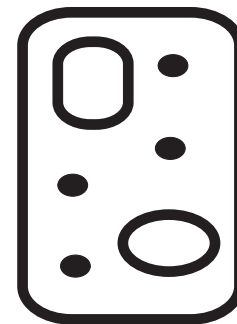
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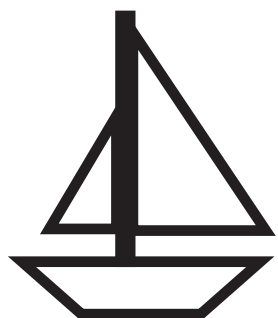
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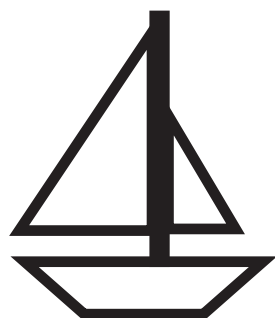
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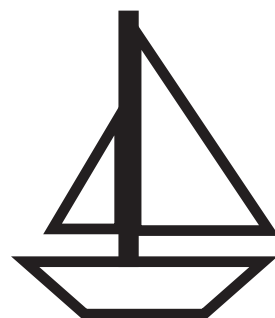
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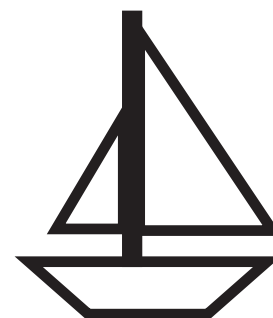
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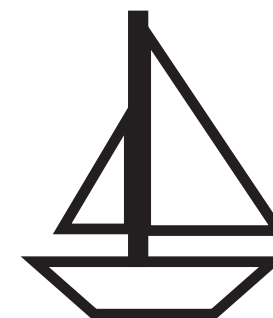
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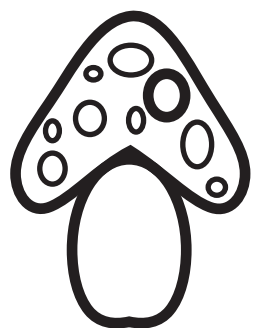
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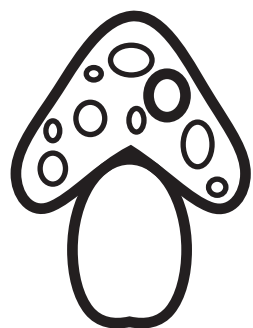
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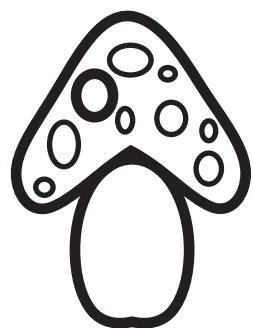
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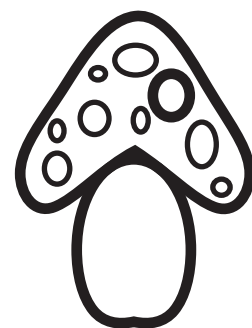
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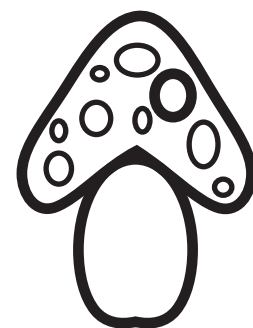
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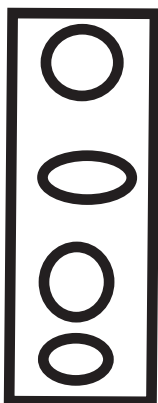
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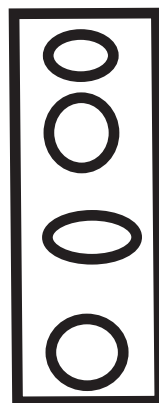
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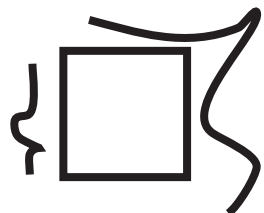
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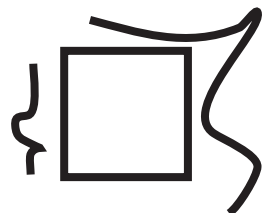
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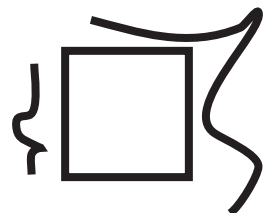
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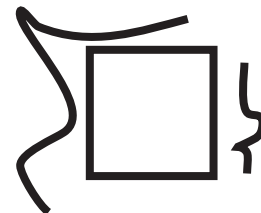
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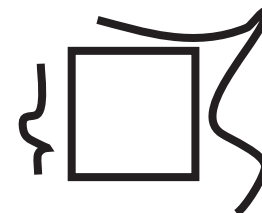
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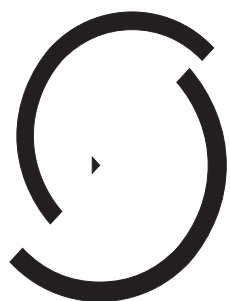
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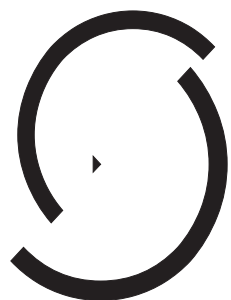
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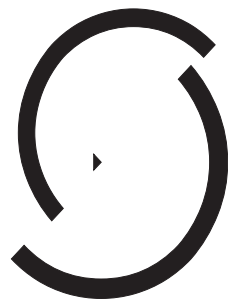
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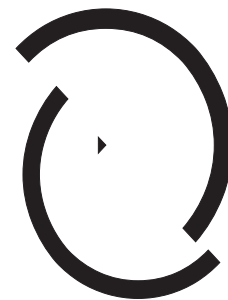
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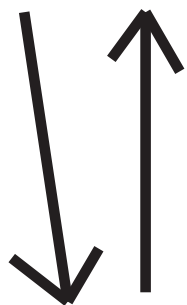
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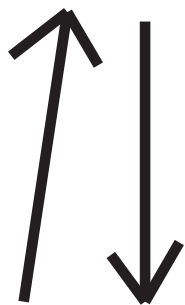
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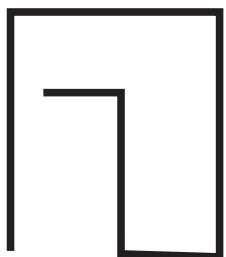
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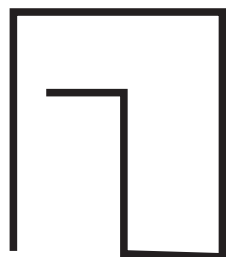
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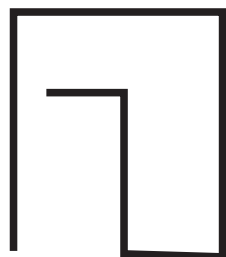
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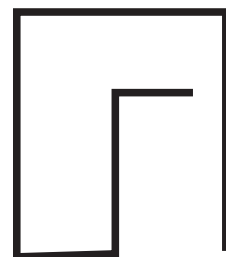
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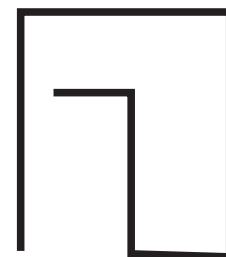
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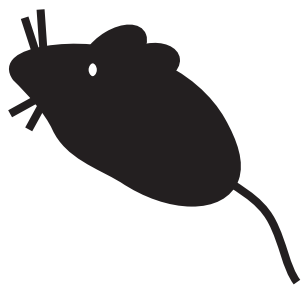
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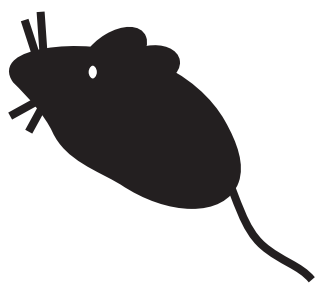
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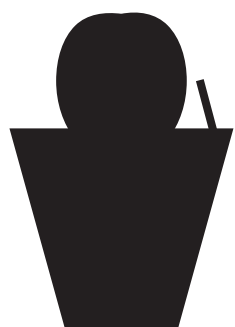
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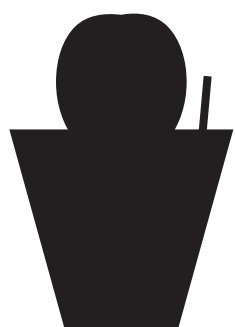
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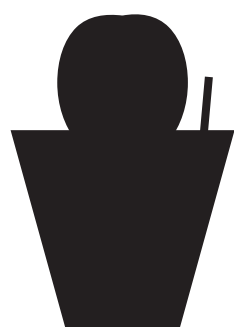
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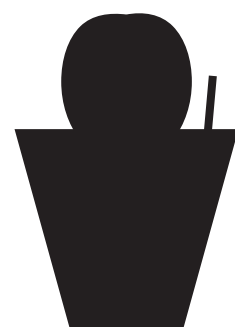
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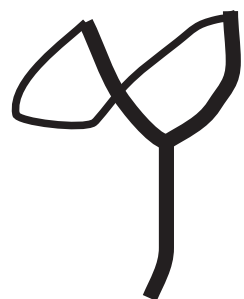
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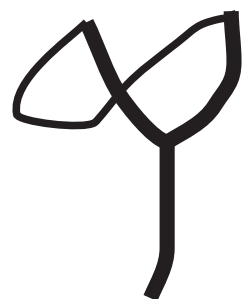
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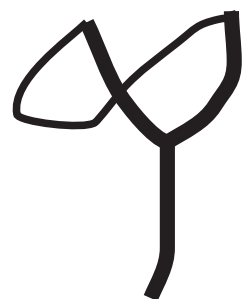
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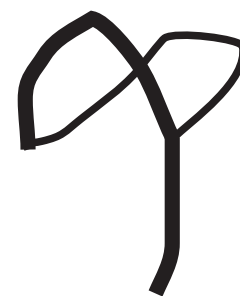
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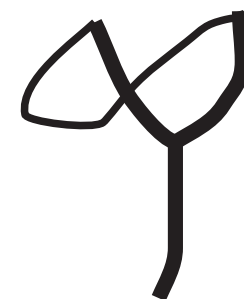
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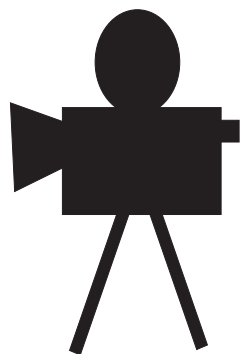
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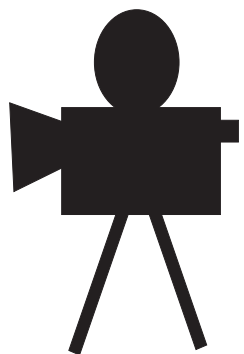
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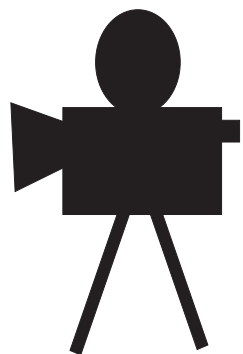
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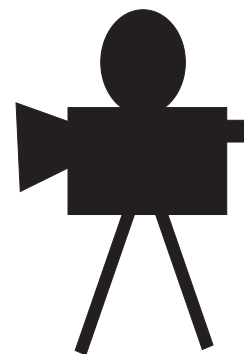
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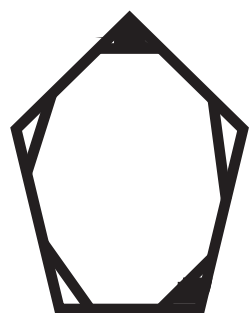
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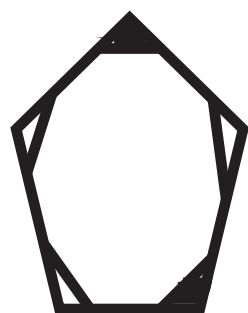
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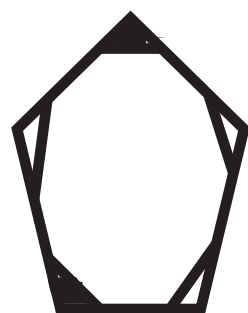
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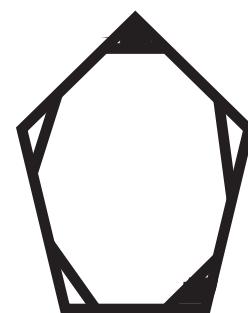
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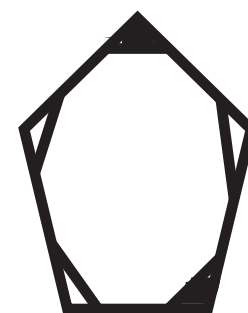
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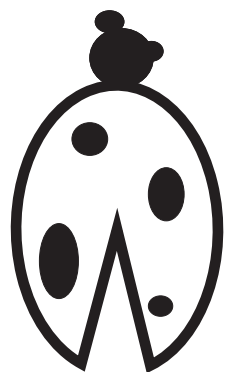
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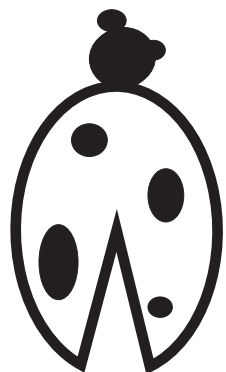
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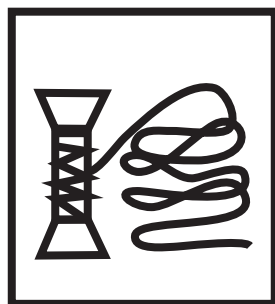
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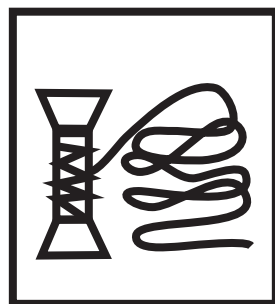
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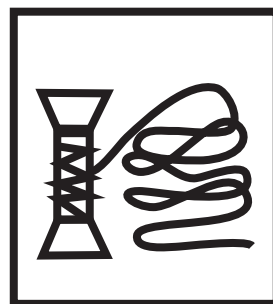
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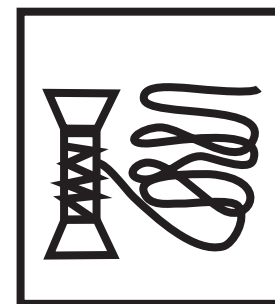
2



3



4



5

TABLE OF ANSWERS – PLANTILLA DE RESPUESTAS

The correct answers are shown below. If the correct answer is the first figure of the plate, the number 1 is shown; if the correct answer is the second figure, a number 2 will be shown, and so on.

A continuación se muestra la plantilla de corrección, que contiene el número de cada una de las láminas y la respuesta correcta para cada una de ellas. Si la respuesta correcta es la primera figura de la lámina el número mostrado es un 1; si la respuesta correcta corresponde con la segunda figura aparece un 2, y así sucesivamente.

ITEM #	CORRECT ANSWER
1	2
2	3
3	3
4	3
5	4
6	2
7	4
8	5
9	3
10	3
11	3
12	2
13	5
14	2
15	5
16	2
17	2
18	3
19	5
20	5
21	4
22	3
23	1
24	4
25	3

ITEM #	CORRECT ANSWER
26	2
27	5
28	1
29	2
30	3
31	2
32	3
33	3
34	5
35	4
36	3
37	4
38	3
39	4
40	1
41	3
42	2
43	3
44	2
45	4
46	1
47	5
48	5
49	1
50	4

ITEM #	CORRECT ANSWER
51	5
52	2
53	1
54	1
55	2
56	2
57	4
58	5
59	4
60	2
61	4
62	3
63	1
64	4
65	4
66	3
67	4
68	5
69	2
70	5
71	3
72	4
73	1
74	3
75	4

ITEM #	CORRECT ANSWER
76	4
77	2
78	1
79	3
80	3
81	2
82	5
83	1
84	2
85	3
86	3
87	2
88	3
89	4
90	3
91	5
92	1
93	4
94	4
95	5
96	4
97	4
98	4
99	5
100	3

TABLE OF ANSWERS – PLANTILLA DE RESPUESTAS

(CONTINUATION – CONTINUACIÓN)

ITEM #	CORRECT ANSWER
101	1
102	3
103	3
104	5
105	5
106	4
107	2
108	1
109	1
110	3
111	3
112	2
113	2
114	5
115	1
116	2
117	5
118	2
119	3
120	5
121	4
122	3
123	3
124	1
125	5

ITEM #	CORRECT ANSWER
126	2
127	3
128	1
129	5
130	3
131	1
132	5
133	2
134	5
135	3
136	4
137	1
138	5
139	4
140	1
141	1
142	3
143	3
144	4
145	4
146	5
147	4
148	2
149	3
150	3

ITEM #	CORRECT ANSWER
151	4
152	3
153	1
154	2
155	4
156	4
157	1
158	4
159	3
160	4
161	3
162	3
163	2
164	2
165	5
166	4
167	1
168	3
169	2
170	4
171	1
172	3
173	5
174	2
175	3

ITEM #	CORRECT ANSWER
176	5
177	5
178	3
179	5
180	2
181	1
182	5
183	4
184	2
185	3
186	4
187	2
188	3
189	3
190	4
191	4
192	1
193	4
194	2
195	1
196	4
197	4
198	3
199	4
200	5

