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A NOTE FROM mei and gerdy

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Eye Dissection:

Name: _____

Exploring Anatomy - Sensory Organs

Objective: To observe and dissect the structure of a mammalian eye

What You'll Need to Create Your Scienstructable:

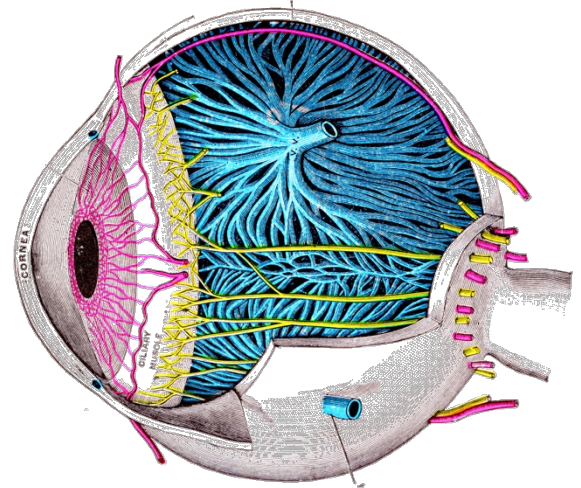
Eye template

Colored pencils

Scissors

Construction paper

Small amount of glue or a glue stick



What You Need to Know:

In most complex organisms, the eye is one of the most important sensory structures. For mammals, the eye helps to sense the environment by providing visual input to the brain in the form of pictures, showing the animal what their surroundings look like. This is essential to survival as it alerts them to potential danger, possible meals lurking nearby, as well the opportunity to mate with others of their kind.

Let's start with the external structures first. Surrounding the eye is a thick layer of **fat tissue** which cushions and protects the eye. Embedded in that tissue are several extrinsic muscles – on the top are the **superior oblique** and **rectus**, on the bottom are the **inferior oblique** and **rectus**, and on the sides are the **lateral** (inside) and **medial** (outside) **rectus** muscles. These muscles move the eye up, down and side to side. The muscles attach to the **sclera**, the tough outer covering of the eye which protects and gives the eye its shape. This is also known as the white part of the eye. Located at the back surface of the eye is a small cord, **the optic nerve**. The optic nerve has the job of taking images received by the retina and transmitting them to the brain in the form of electrical impulses where they are interpreted as the images seen in the environment. The front of the eye reveals a light blue or cloudy structure known as the **cornea**. When the animal was alive, the cornea was translucent, allowing light to pass into the eye, however, once the animal has expired, the cornea (as well as the lens) become opaque. The curved nature of the cornea provides assistance in focusing images onto the retina as well as gives protection to the iris and other internal structures of the eye.

Just below the surface of the cornea is the **aqueous humor**, a fluid that helps to retain the shape of the cornea. The **iris** is located on the other side of the aqueous humor and controls the amount of light that enters the eye. The iris is also the part of the eye that you look at and identify the color of someone's eyes as being blue, brown, green, etc. The opening in the iris is the **pupil** and its size is controlled using the iris. The size of the pupil is determined according to the amount of light needed to see an object. For example, in a darker environment, the pupil enlarges to allow more light in, whereas in brighter environments the pupil constricts to allow less light in.

Eye Dissection:

Name: _____

Exploring Anatomy - Sensory Organs

What You Need to Know: *(continued...)*

Through the pupil is the **lens**. The lens is a hard, pearl-like structure and is responsible for focusing images from the environment onto the retina of the eye. The size of the lens is controlled by several **ciliary muscles** located around the perimeter of the iris that attach to the lens. In the main chamber of the eye is a clear jelly-like substance called the **vitreous humor**. Like the aqueous humor, the vitreous humor also helps to maintain the shape of the eye.

There are several layers of structures located on the inside of the back of the eye. Layered on the inside surface of the main eye chamber is a light peach or tan tissue known as the **retina**. The retina is where all of the action takes place. It houses the sight receptors that translate light impulses into neural inputs that the brain can then interpret as images. Gently lifting the retina from the surface will reveal that it attaches to the inside at a specific spot. You should notice that this spot is the same spot on the outside of the eye where the optic nerve emerges. The spot where the retina attaches is called the **blind spot** and lacks any sight receptors such as **rods** and **cones**. Rods work to help us see in dim light and do not perceive color, hence the reason why you generally see silhouettes when you enter a dark room. There are three types of cones, red, green and blue (or long, medium, and short) and they perceive the range of colors you see in the world. People who lack some of their cones are considered colorblind and may only be able to perceive certain colors or no colors at all. Below the retina is an iridescent, or shiny layer known as the **tapetum lucidum**. The function of the tapetum lucidum is to reflect light onto the retina in levels of low light, allowing animals to be able to see in the dark. This is evident when you see an animal like a raccoon or deer in the dark and their eyes have “night shine”. Humans lack this layer which is why we need a little more help with night vision goggles! The **choroid layer** is between the retina and the sclera. It houses the many blood vessels necessary to bring oxygen and nutrients to the back of the eye so that it can function.

What You Do:

- A. First, complete your table on your **scienstructable key and function** sheet, identifying the 19 structures of the eye you'll be exploring, and the colors you will use to create your scienstructable. Use the information from your teacher to fill in your chart. **On your paper, you will write the name of the structure and then shade in the corresponding box the color indicated. These will be the same colors you will color each structure on your eye scienstructable.**
- B. Once you have completed your key, use the reading to determine what all of these organs do! Remember to use good reading strategies as you move through the passage. On your paper, write the function of each structure in the appropriate column.

Eye Dissection:

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Exploring Anatomy - Sensory Organs

What You Do: *(continued...)*

C. Now it's time to color your eye! Color the organs according to your key. You can color the **IRIS** of your eye any color you would like. Once you are done coloring, follow the directions below to put your eye scienstructable together. Be sure to follow the directions exactly!

1. CAREFULLY cut out your eye and structures - no jagged edges! DO NOT cut off the tabs as you will use these to assemble your eye.
2. Glue your Scienstructable Key and Function sheet to one side of your construction paper, placing glue on the back of the tab where it says GLUE HERE. You should be able to see both sides of your paper.
3. On the other side of your construction paper, paste down your cut-out eye base. This will provide the foundation upon which you will build your scienstructable.

****All numbers on your finished model will be upright when pasted down, so please be sure to pay attention to how you glue your model together.***

For all structures to be pasted down, you will apply glue to each tab and match up the lettered tabs as follows:

1. Attach the **LENS** by tabs **A1** to **A1** on the eye body. If attached properly, it should be slightly lifted off of the paper.
2. Attach the **IRIS** by tabs **A2** on top of the **LENS A1** on the eye body.
3. Attach the **MAGNIFIED RODS AND CONES** by tab **B1** to **B1** on the eye body.
4. Attach the **RETINA** by tab **B2** on top of the **MAGNIFIED RODS AND CONES B1** on the eye body.
5. Attach the **SCLERA** by tab **B3** to **RETINA B2** on the eye body.
6. Attach the **FAT TISSUE** by its tab **OVER tab B3** on the eye body. Apply glue where it says "Place glue here and fold under". Fold the tab under and place on top of **B3**.

Voila! Your eye is complete. Use this as a study tool to prepare for your exploration or as a virtual dissection in place of the real thing! Be sure to answer the extension questions that follow on the back of your key.

Eye Dissection

Name: _____

Exploring Anatomy - Sensory Organs

Eye Structure Key and Functions

In the chart below, write the name of each structure, the color according to the key provided, and the function of each structure from the reading.

#	Organ	Color	Function
1			
2			
3			
4			
5			
6			
7			
8			
9			
10			
11			
12			
13			
14			
15			
16			
17			
18			
19			

FOLD HERE

Eye Dissection

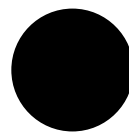
Exploring Anatomy – Sensory Organs

Extension Questions

Name: _____

Using what you have learned about the eye, answer the following questions below:

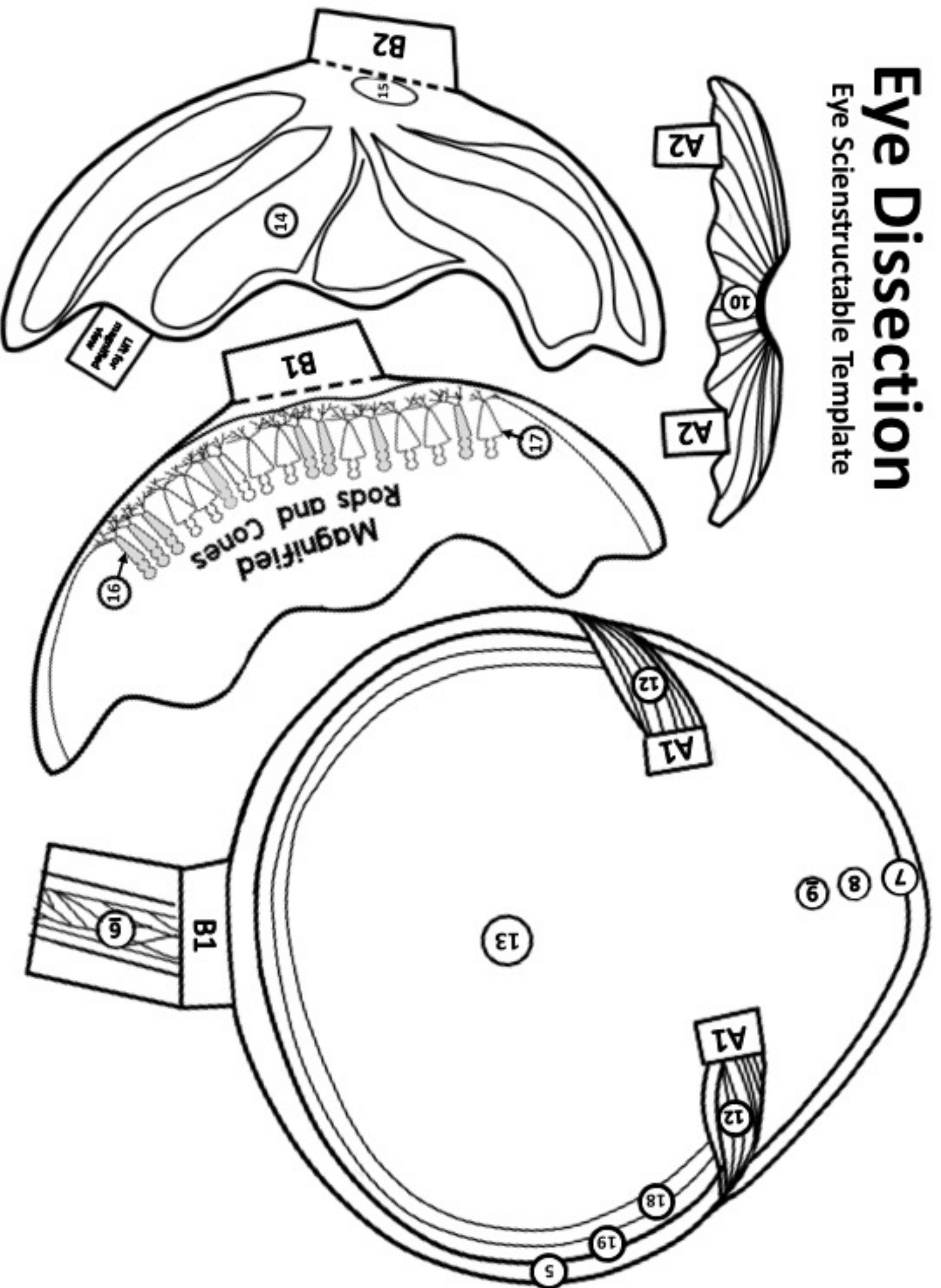
1. Using your model, identify and trace the path of light as it enters the eye to the optic nerve. Be sure to name each structure the light passes through and identify them using the numbers from your model.
2. People who are near or far sighted use glasses to help them focus images on their retina. Based on what you have learned about the functions of the various structures of the eye, explain what you think might be happening in individuals with these conditions.
3. Below you will see a cross and a circle. Cover your left eye with your left hand. Holding your paper at arm's length in front of you with your right hand, look at the cross with your right eye and slowly bring your paper closer to your face. At a certain point, the circle should disappear from your peripheral vision. Based on what you have learned about the eye, explain what you think just happened.



GLUE HERE

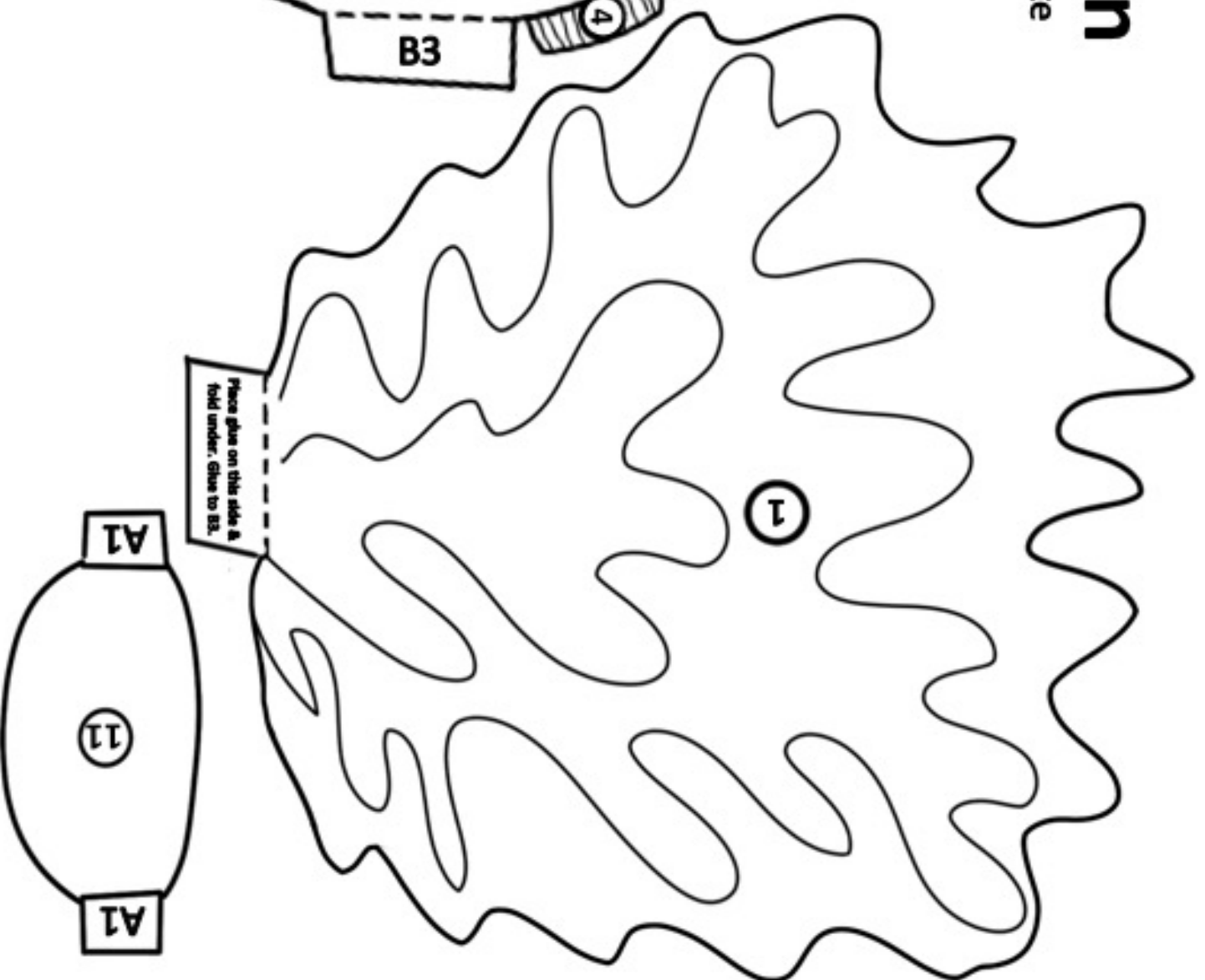
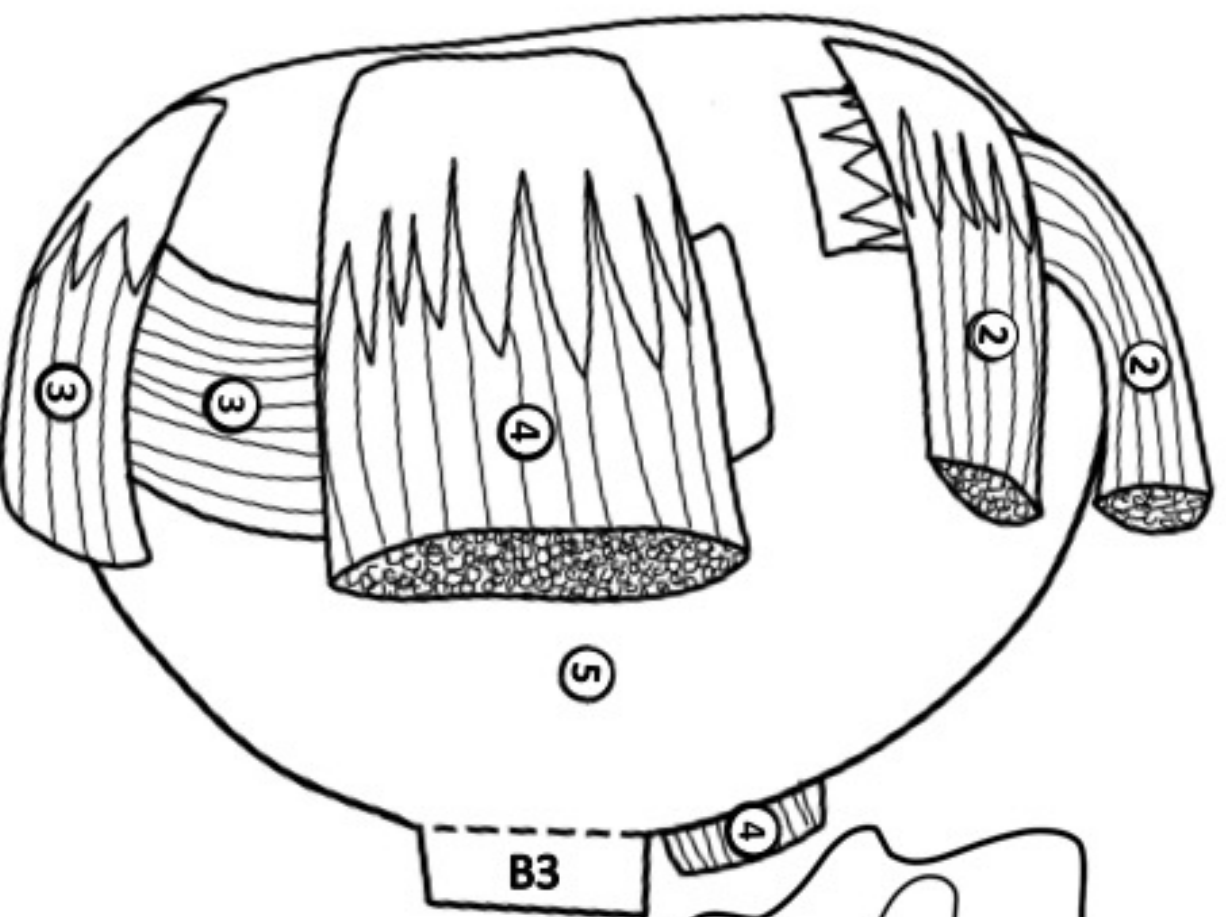
Eye Dissection

Eye Scienstructable Template



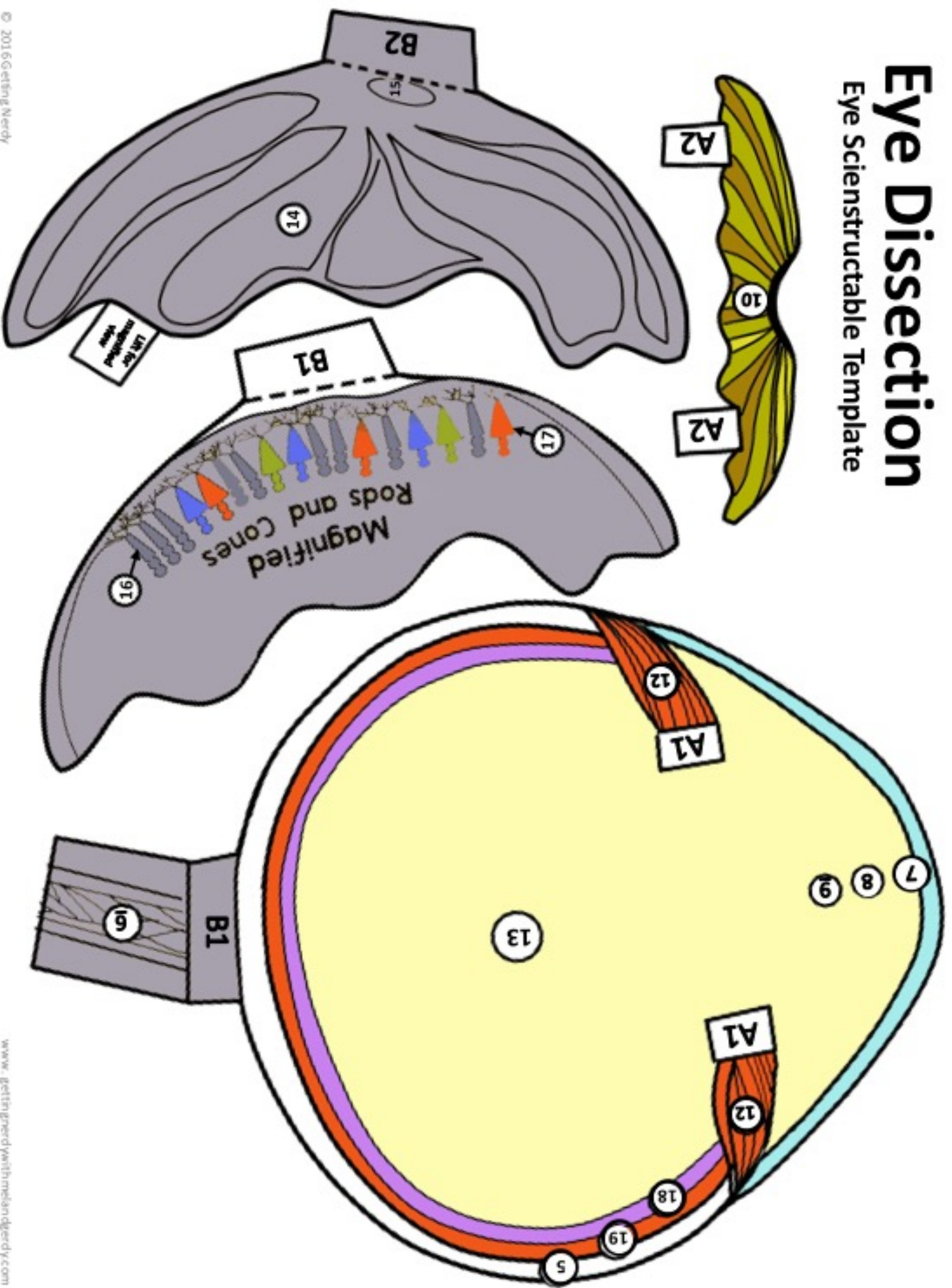
Eye Dissection

Eye Science-structable Template



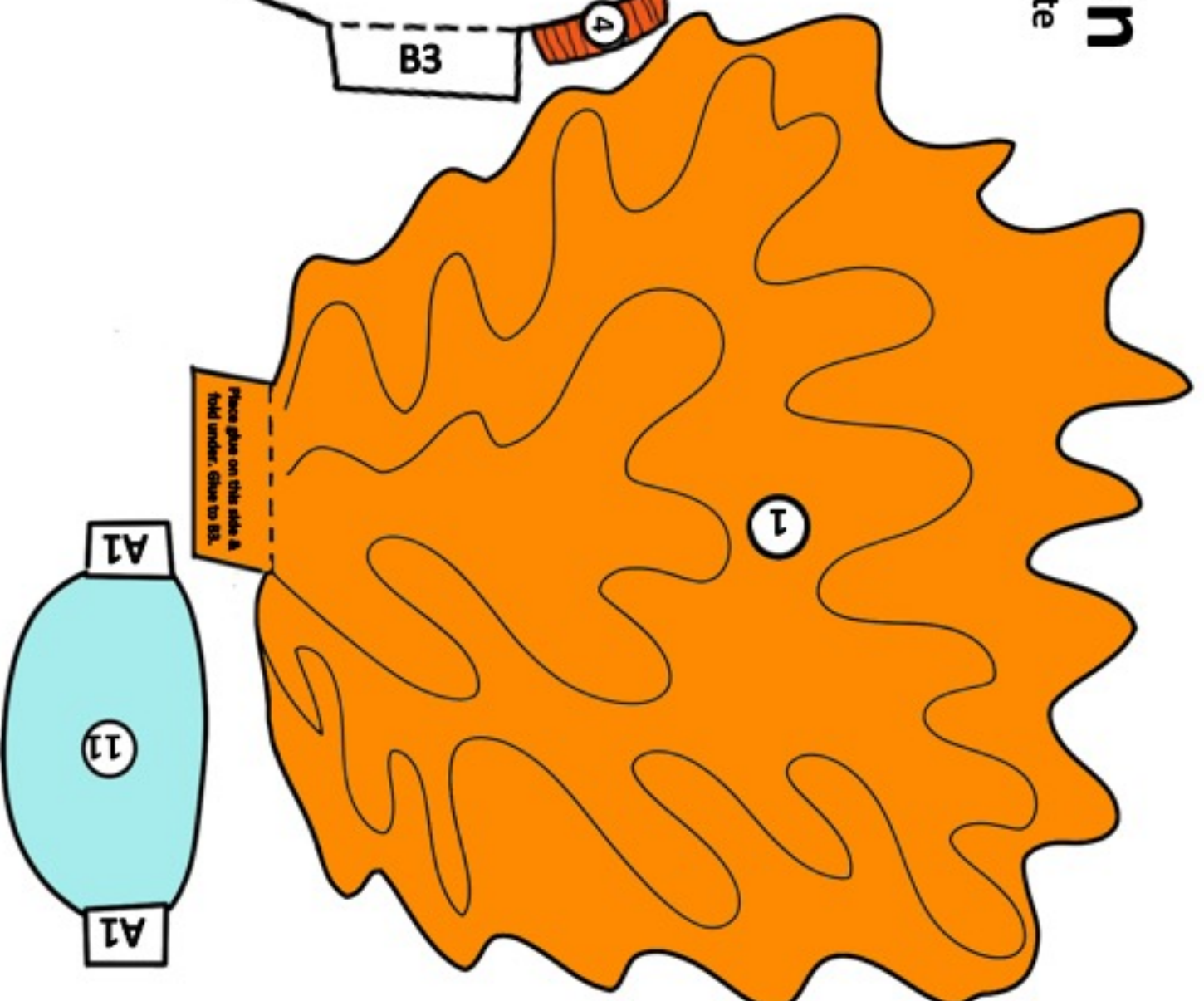
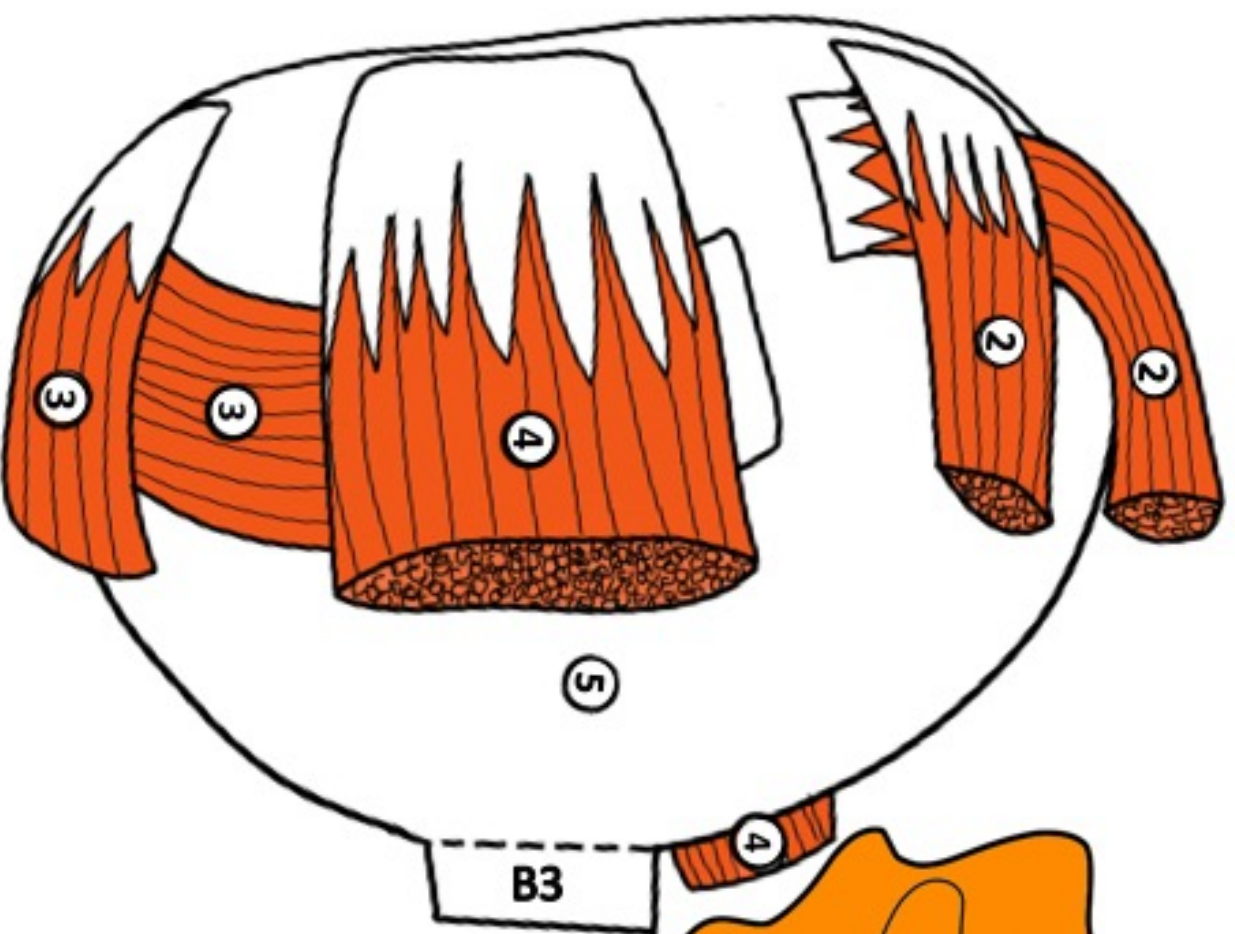
Eye Dissection

Eye Science-structable Template



Eye Dissection

Eye Scienstructable Template



Eye Dissection

Exploring Anatomy – Sensory Organs

TEACHER KEY

What You Do:

We recommend that you thoroughly read all instructions and assemble your own model prior to teaching this lesson with students. This will give you a better understanding of time required to complete for your students, as well as any areas that you may need to clarify for them. All answers for the model construction are provided in the PowerPoint. Extension questions are answered below.

Extension Questions

Using what you have learned about the eye, answer the following questions below:

1. Using your model, identify and trace the path of light as it enters the eye to the optic nerve. Be sure to name each structure the light passes through and identify them using the numbers from your model.

Light enters through the cornea (7), then passes through the aqueous humor (8), pupil (9), iris (10), lens (11), vitreous humor (13), retina (14), blind spot (15) and last, the optic nerve (6).

2. People who are near or far sighted use glasses to help them focus images on their retina. Based on what you have learned about the functions of the various structures of the eye, explain what you think might be happening in individuals with these conditions.

Individuals with near or far-sightedness may have issues with the function of several structures. The lens may no longer be able to change shape in order to focus light, or the cornea may also be losing it's shape due to degradation of the aqueous humor.

3. Below you will see a cross and a circle. Cover your left eye with your left hand. Holding your paper at arm's length in front of you with your right hand, look at the cross with your right eye and slowly bring your paper closer to your face. At a certain point, the circle should disappear from your peripheral vision. Based on what you have learned about the eye, explain what you think just happened.

The circle disappears because the image is being focused on the blind spot where the retina lacks receptors.



We are Getting Nerdy!

Mel and Gerdy are two life science teachers with a true passion for curriculum design. We LOVE creating time-saving, fun and engaging activities for our classrooms & we're excited to be sharing them with you. We look forward to hearing your feedback on this product.

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