

## HEALTH EDUCATION

# Adventure and Games for Diabetes Prevention


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## Abstract

*According to the Centers for Disease Control and Prevention, diabetes prevention represents a critical need for the health education curriculum, given the rise of the disease and its precondition for today's youth. An active understanding of diabetes encourages young people to take control of the nutritional and exercise factors that keep the disease in check. When teachers use experiential activities, or "adventure" education, students perform tasks that illustrate conceptual content and reinforce learning. Research has found that current modalities to be successful but lacking the physicality to meet the recommendations of the American Heart Association and the Society of Health and Physical Educators. Games such as Toll Road Boogie; Tom and Jerry, or Insulin and Sugar; Wacky Receptor; and Tusker Monster, or Fat Cell Tag help children meet the 60 min of physical activity that are required most days of the week. This article offers several examples of how to design and implement games and incentives into lessons that are both enjoyable and illustrative of diabetes prevention-based education for ages 8 to 18.*

Poor dietary choices and a lack of exercise produce an unhealthy pattern associated with pre- and type 2 diabetes, growing at an alarming rate for today's youth. As youngsters spend 5 to 9 hr/day with various forms of digital technology, only about a quarter of youth participate in 60 min/day of physical activity (National

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Physical Activity Plan Alliance, 2018; Rogers, 2019; Siegel, 2019). Albright (2019) indicated an increased rate of type 2 diabetes and diabetes-related complications in young people, noting these have reached epidemic proportions. The CDC emphasizes the critical need for promoting exercise and diabetes prevention in youth across the United States. Health educators can curb the tide of this epidemic through experiential education curriculum or adventure programming, in which students become a part of the learning process.

Experiential education curriculum and adventure programming are based on the work of Kolb (1984) and Dewey (1938), who note that learning helps the participant become actively involved in “doing” the actual lesson rather than just listening and making significant lifestyle changes (Priest & Gass, 2018). Through “doing,” adventure programs demonstrate the power of real experiences for learning, behavior change, personal development, and growth (Priest & Gass, 2018). Similarly, experiential learning places the participant at the heart of the learning experience where instructors believe students retain more from direct experiences than from lectures alone (Bobilya & Akey, 2002; Campbell et al., 1998). Through these experiences, participants are encouraged to become personally responsible for implementing the lessons learned that “[emphasize] a student’s ability to justify or explain a subject rather than recite an experts testimony” (Joplin, 1981, p. 20) and to be responsible for their learning. To guide professionals through this process, Priest and Gass (2018) recommended these steps: action, reflection, integration, and continuation. Action allows the participant to experience the game with focus on task completion and areas of problem solving. Reflection has the participant reflect on the experience through discussion or debriefing by having the facilitator ask a series of open-ended questions. Integration allows the participant to apply the lessons to daily life, leading to changes in feeling, thinking, and behaving. Finally, continuation moves the learning into prolonged life changes with the participant avoiding a return to old habits or peer influences (Priest & Gass, 2018).

Research on the effects of experiential education and adventure programming on diabetes is limited. In a study by Herskowitz (1990), youth with diabetes who participated in a multiday adventure program reported in follow-up visits that student self-confidence and

the desire to take control of their diabetes improved. To date, no other studies have directly link this type of programming to diabetes education. However, several programs offer opportunities for improved self-confidence and personal development (Barton et al., 2016; Bowen & Neill, 2016; Christie et al., 2016; Gibbons et al., 2018; Margalit & Ben-Ari, 2014; Zebrack et al., 2017). Programs such as Project Adventure (<https://www.pa.org/>) and High 5 (<https://high5adventure.org/>) offer multiday trips for adolescence to experience the outdoors to improve self-worth. Connected in Motion (<https://www.connectedinmotion.ca/>) caters to adults who have diabetes to experience the outdoors in a safe and controlled environment. While these programs are not geared specifically to diabetes education, their methodology of experiential education and adventure programming is transferable to the classroom for diabetes education. In experiential learning, students form an understanding of the purpose of the lessons related to a specific topic, diabetes, and are motivated to apply new knowledge at home or school. All learning is experienced based as it is rooted in action and becomes experiential when the steps of action, reflection, integration, and continuation are a part of the learning process (Priest & Gass, 2018). Learning is now active and is experienced through fun games and physical activity using kinesthetic, auditory, visual, and tactile learning modalities. This model has demonstrated success in utilizing experiential education with didactic and pharmacology students who applied newly acquired skills to real-world scenarios (Gaba et al., 2016; Hogue, 2000).

Additionally, research into other modalities of diabetes education has also proven to be successful. Evert (2004) suggested that professionals adopt age-appropriate tools to help capture the users' interests when teaching diabetes education. For example, technology has become instrumental in capturing the users' interest through video games that are focused on diabetes education (Calle-Bustos et al., 2017; Kamel et al., 2015; Venditti et al., 2014). Besides technology, professionals have also been incorporating other educational modalities to assist them when working with clients. Activities such as "teaching kitchens" or cooking classes allow participants to take control of their diet by creating healthy, nutritious meals to reduce the impact of diabetes (Eisenberg & Burgess, 2015; Pettet et al.,

2005). Furthermore, the use of play through board games allows for participants to understand diabetes makes it more likely that participants will be open to a dialogue about themselves and how to manage their diabetes (Curl et al., 2019). However, many of these programs lack the physicality needed to meet the recommendations of the American Heart Association (AHA, 2020) and the Society of Health and Physical Educators (SHAPE, 2016) for children to participate in at least 60 min of moderate to vigorous activity most days of the week, which is pivotal in managing diabetes.

The lack of research demonstrates the need for professionals to implement experiential education and adventure programming that encourages youth to take ownership of their health. Such programming needs to create a deeper understanding of diabetes and its management, enabling students to take critical action for prevention. Therefore, this article provides professionals a series of games they can incorporate into their physical and health education curriculum to help participants understand the effects of diabetes on health.

## **Designing Experiential Games**

Here are some pointers to assist professionals in designing and implementing their diabetes education lessons for ages 8 to 18. First, follow the sequencing of experiential education and adventure programming outlined by Priest and Gass (2018): action, reflection, integration, and continuation. Second, when utilizing these games, consider what students need to know to prevent diabetes, understand diabetes, know the signs and symptoms, and remain healthy. Finally, all games require lessons before the start, such as the first game, Toll Road Boogie, in which foods are identified as “stop,” “go,” and “whoa” foods so youth can quickly identify each food in its category when the games commence.

### **Toll Road Boogie**

Toll Road Boogie is a game that was adapted from Cain (2003) that is designed to familiarize students with healthy food choices while keeping them physically active. Divide the class into a few groups based on the class size and the number of game areas constructed. Materials/equipment include Hula-Hoops, webbing tied into circles of various sizes, and laminated food cards. The food cards are divided into “stop,” “go,” and “whoa” foods.

Before the activity, teach what food falls into the “stop,” “go,” and “whoa” categories. The “stop” foods signal “hit the brakes”; these foods should be rarely eaten. The “go” foods indicate “you are eating healthy,” and they can be eaten frequently. The “whoa” foods signal “exercise caution,” and they should be eaten less often than the “go” foods. Figure 1 provides detailed instructions on conducting Toll Road Boogie.

This game not only teaches about healthy food choices but also encourages students to communicate and work together. A younger group can touch the hoops to make it easier without taking away from the game. After the game, process what students learned. See how many of the “whoa” foods they can identify. The participants shall follow up on some questions. What makes a “stop” food bad? What role do “go” foods play in the prevention of diabetes? What role do “stop” foods play in the prevention of diabetes? What is the benefit of “go” foods concerning health?

### **Tom & Jerry, or Insulin & Sugar**

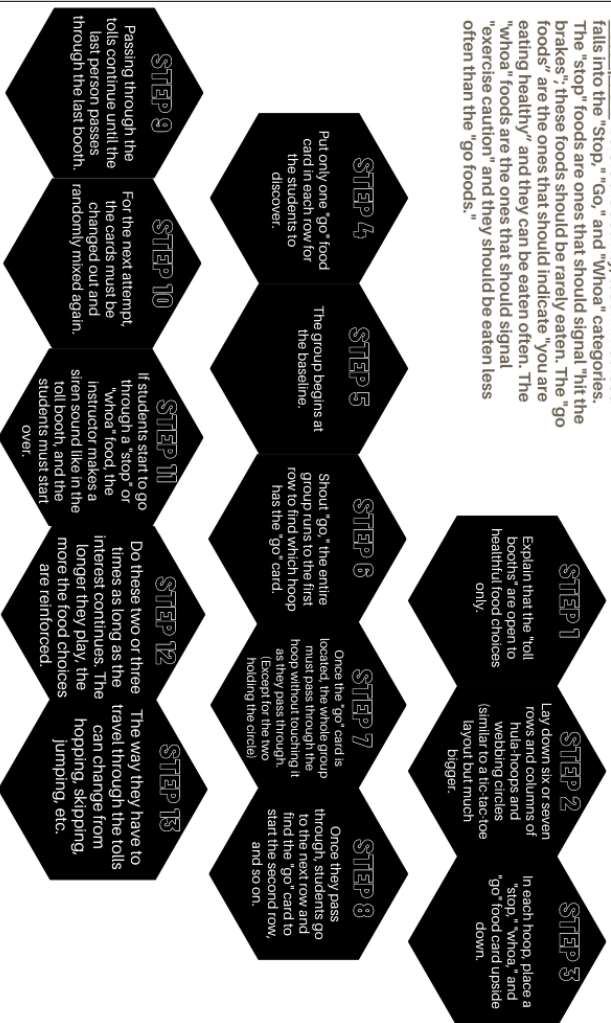
Tom & Jerry, or Insulin & Sugar, is a game that was adapted from Rhonke (1997) that aims to teach the concept of insulin and sugar function within the body. The lesson is related to when and why there is not enough insulin in the body and the damage that more sugar in the bloodstream causes. Materials and equipment include six red hoops (Jerry) and two blue hoops (Tom).

The game requires the group to form a large circle, or multiple circles, and instructions are further detailed in Figure 2 on how to administer Tom & Jerry, or Insulin & Sugar.

This game demonstrates how difficult it is to remove sugar to protect the body’s systems when there is too little insulin to do it correctly. The game also helps participants learn to work together and communicate. The following questions can be reflected in the game: Where does insulin take sugar in the body? What does sugar provide the body? What happens in the body when the cell is insulin resistant? Where does the excess sugar go? What does the excess sugar do in the body when it is too much?

**Figure 1**  
*Toll Road BoogieDirections*

**Description:** Before the activity, teach what food falls into the "Stop," "Go," and "Whoa" categories. The "stop" foods are ones that should signal "hit the brakes"; these foods should be rarely eaten. The "go foods" are the ones that should indicate "you are eating healthy" and they can be eaten often. The "whoa" foods are the ones that should signal "exercise caution" and they should be eaten less often than the "go foods."



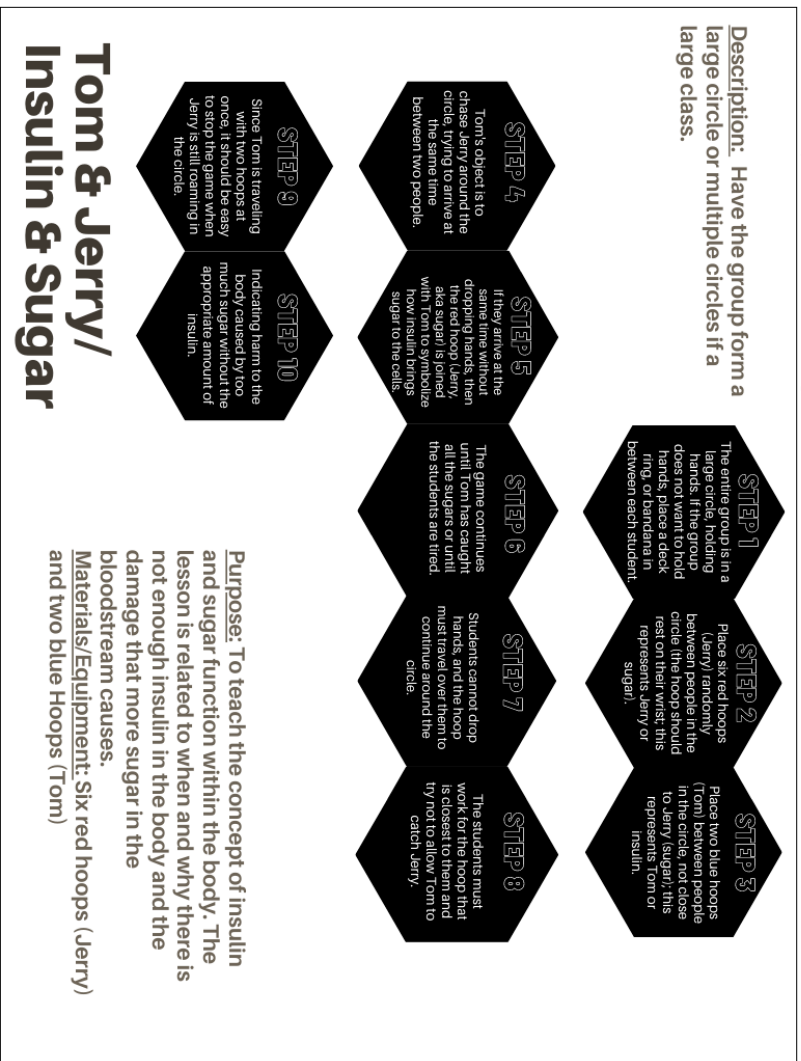
# Toll Road Boogie

**Purpose:** To have students become familiar with healthy foods while being active.

**Participants:** Divide the whole class into a few groups based on the size of the class and the number of game areas constructed.

**Materials/Equipment:** Hula Hoops, Webbing tied into circles of various sizes, laminated food cards. The food cards are divided into "stop," "go," and "whoa" foods.

**Figure 2**  
*Tom & Jerry, or Insulin & Sugar; Directions*



## Wacky Receptor

Wacky Receptor is a game that was adapted from Rhonke (1997) that teaches students what happens when the body's cells become resistant to the insulin, which is trying to take the sugar into the cell for energy. When cells are insulin resistant, it is like a bat hitting a ball (receptor site hitting the insulin and sugar away) away from a cell. Materials/equipment include bean bags, two to three Hula-Hoops, and two pool noodles.

The game requires participants to create a large circle either out of rope or webbing on the floor. Figure 3 further details the instructions on how to administer Wacky Receptor.

From the game, participants may reflect on the following questions: What makes a cell resistant to insulin and using sugar for energy? What happens to the excess sugar? Can we prevent cells from being insulin resistant? How?

Wacky Receptor reinforces the damage to the body's cells; they become resistant to using the sugar for energy, allowing free-floating sugar to damage the body. Creating games for students to reinforce learning helps them retain the information and realize the need to take care of their bodies through food and exercise.

## Tusker Monster, or Fat Cell Tag

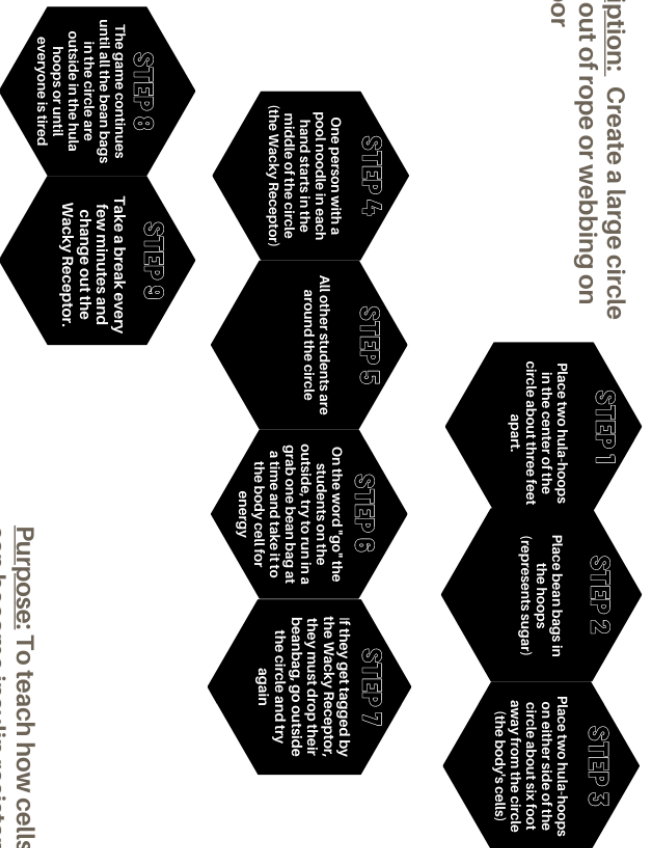
Tusker Monster, or Fat Cell Tag, is a game that was adapted from Rhonke (1997) that aims to teach what occurs when a person overeats and the fat cells within the body become larger. Fat cells do not go away when a person exercises, but they can shrink. Materials/equipment include two pool noodles.

One person begins as the "Tusker Monster (Fat Cell Tag)" with one tusk in each hand (pool noodle). Figure 4 details further instructions on how to administer Tusker Monster, or Fat Cell Tag.

It is excellent to discuss what fat cells do, it can expand to 1,000 times its size, and it never goes away even if a person loses weight. This is a treat game to process safety, teamwork, and communication. The participants may reflect on the following questions: How hard was it to catch people when the fat cell was small? Why? How hard was it to catch people when the fat cell was big? Why? Do fat cells ever disappear? How big can fat cells become?

**Figure 3**  
*Wacky Receptor Directions*

**Description:** Create a large circle either out of rope or webbing on the floor

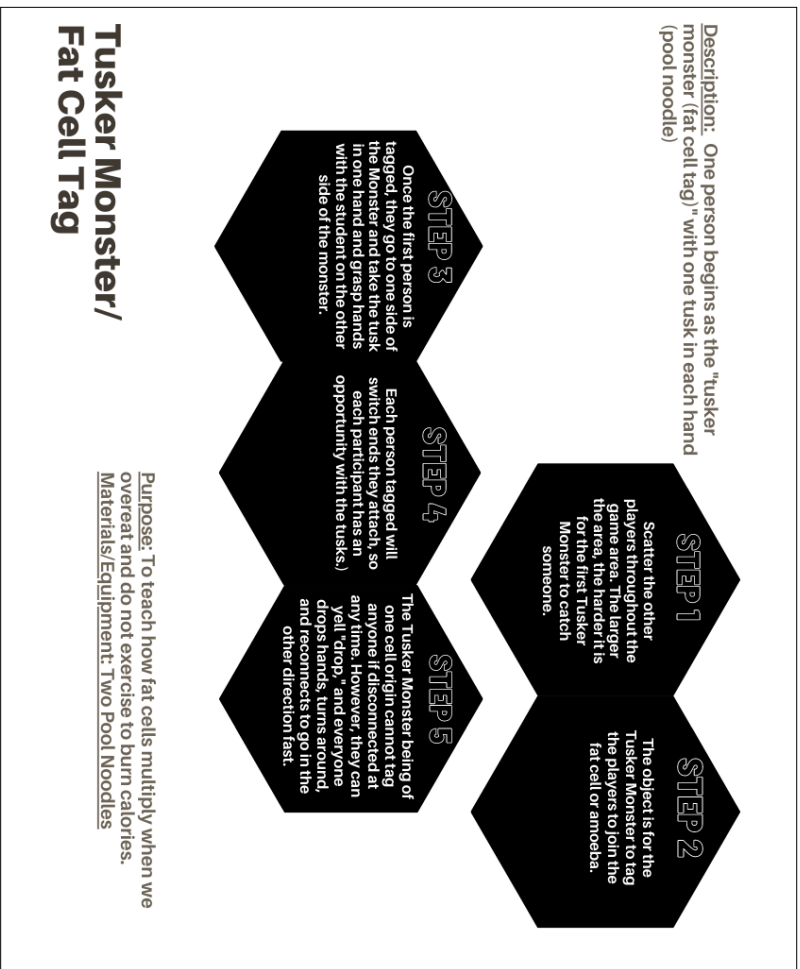


# Wacky Receptor

**Purpose:** To teach how cells can become insulin resistant.

**Materials/Equipment:** Bean Bags, two to three hula-hoops, and two pool noodles.

**Figure 4**  
*Tusker Monster, or Fat Cell Tag, Directions*



## Conclusion

Diabetes education lessons through experiential games can be quickly implemented into the physical and health education curriculum. These activities teach students how to prevent prediabetes and diabetes using fun and creative play. Instructors can point out that the physical exercise involved in games is another prevention habit. Challenging students to follow through with the positive habits learned will be the ultimate way they can take responsibility for their own health and live happier lives.

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