

# Chapter 4

## Energy, Pollution and Travel



# Let's get to know the vehicles used in everyday life.

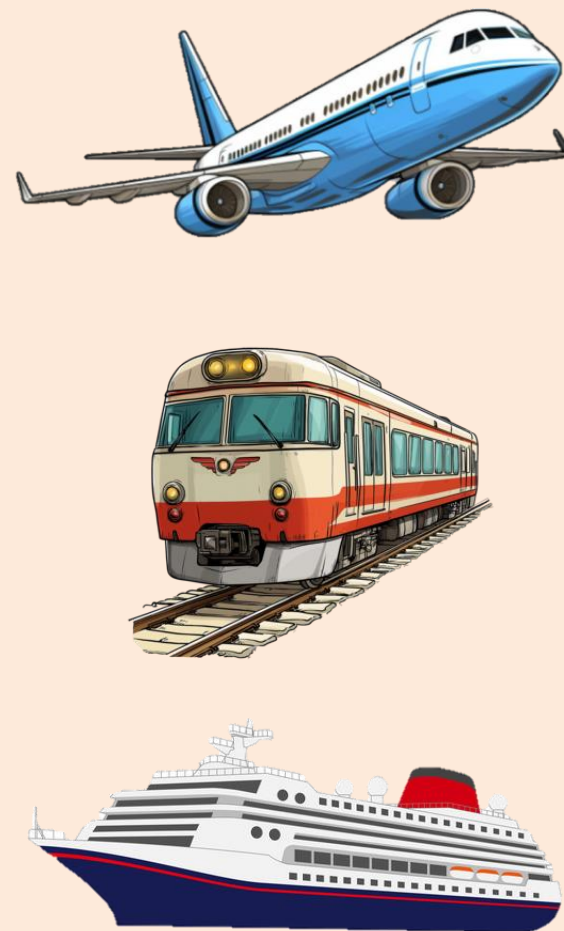
## Short distance travel



## Medium-distance travel



## Long distance travel



# Let's get to know the vehicles used in everyday life.

Match the mode of travel with the energy used.

## Energy from the body



## Fuel



## Electrical energy



# Let's get to know the vehicles used in everyday life.

Students, what type of travel do you think emits pollution?

## Energy from the body



## Fuel



## Electrical energy





# Toxic gases from vehicles with gasoline engines



Carbon monoxide



Carbon dioxide



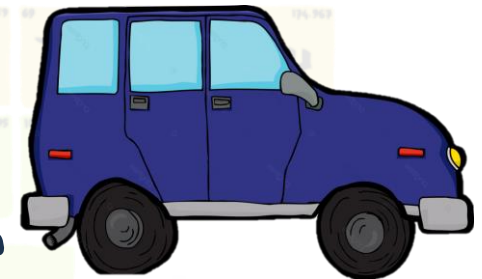
Nitrogen oxides



Sulphur dioxide



Hydrocarbon



# Toxic gases from vehicles with gasoline engines

## Carbon monoxide $\text{CO}$

- Causes dizziness, nausea, vomiting, shortness of breath, unconsciousness, and death.



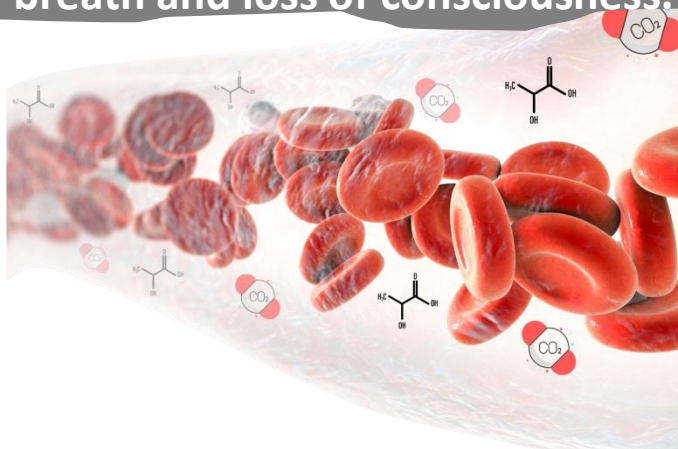
## Nitrogen oxides $\text{NO}_x$

- If inhaled for a long time, it can cause coughing, wheezing, and chronic lung disease.



## Carbon dioxide $\text{CO}_2$

- Greenhouse gases are the cause of global warming.
- Makes the blood acidic, causing shortness of breath and loss of consciousness.



# Toxic gases from vehicles with gasoline engines

Sulphur dioxide



- Pungent odor and chronic bronchitis
- Acid rain, destroying ecosystems and corroding buildings



Hydrocarbon



- When reacting with nitrogen oxides, it produces a toxic haze that is irritating to the skin, eyes, and respiratory tract.



# Toxic gases from vehicles with gasoline engines

Match the toxic gases with the correct hazards.

**CO**

Carbon monoxide

**CO<sub>2</sub>**

Carbon dioxide

**SO<sub>2</sub>**

Sulphur dioxide

**NO<sub>x</sub>**

Nitrogen oxides

**HC**

Hydrocarbon

1) I have a wheezing cough.



2) Dizziness, vomiting



3) Toxic fog



4) Global warming



5) Acid rain





# Toxic gases from vehicles with gasoline engines

Match the toxic gases with the correct hazards.

**CO**

Carbon monoxide

2) Dizziness, vomiting



**CO<sub>2</sub>**

Carbon dioxide

4) Global warming



**SO<sub>2</sub>**

Sulphur dioxide

5) Acid rain



**NO<sub>x</sub>**

Nitrogen oxides

1) I have a wheezing cough.



**HC**

Hydrocarbon

3) Toxic fog



# Toxic gases from vehicles with gasoline engines

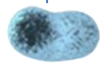
Have students write as many hazards as possible from toxic fumes.



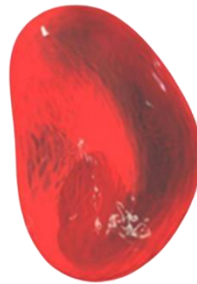
# PM 2.5, harmful dust from toxic smoke

Let's get to know PM 2.5 dust.

Bacteria



PM 2.5



Red blood cells



PM 10

Fine sea sand





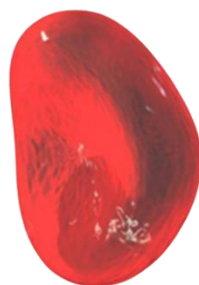
# PM 2.5, harmful dust from toxic smoke

Let's get to know PM 2.5 dust.

Bacteria



PM 2.5

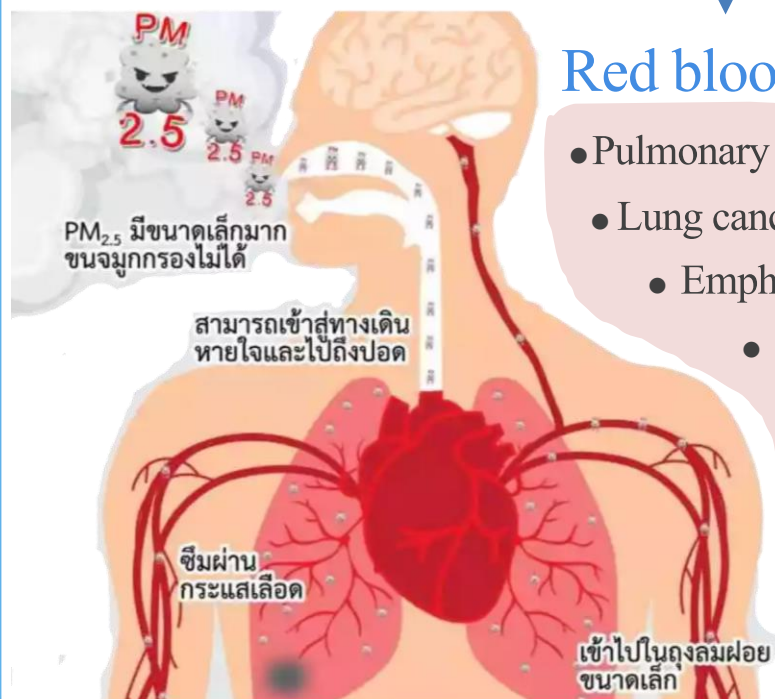


Red blood cells



PM 10

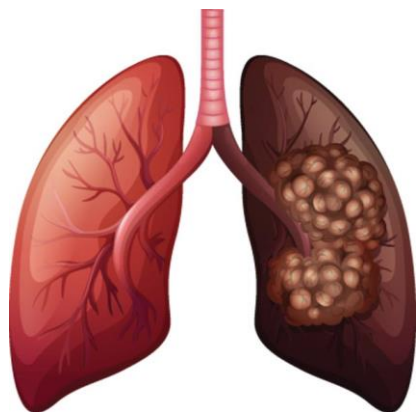
Fine sea sand



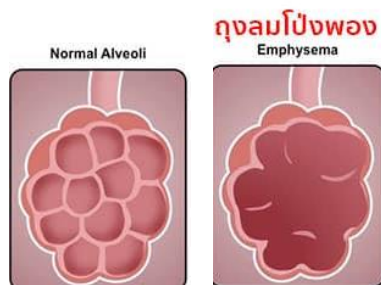
- Pulmonary obstruction
- Lung cancer
- Emphysema
- Respiratory disease
- Stroke
- Coronary heart disease
- Dermatitis
- Conjunctivitis



## PM 2.5, harmful dust from toxic smoke



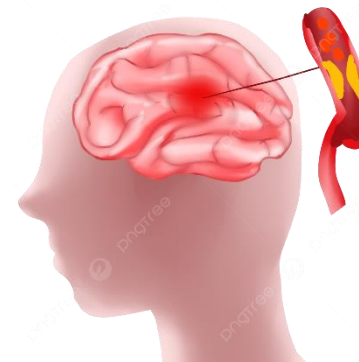
• Lung cancer



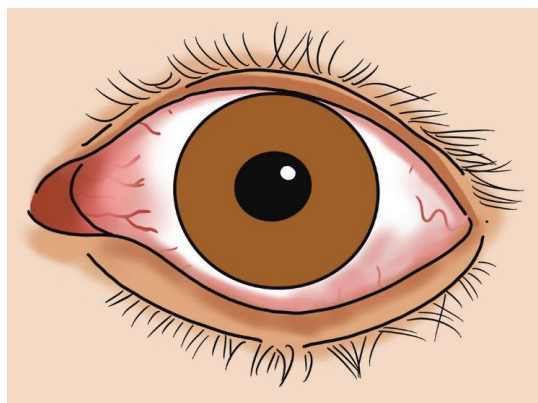
• Emphysema



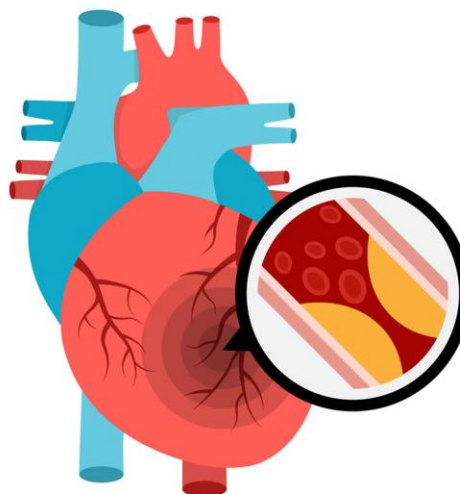
• Respiratory disease



• Stroke



• Conjunctivitis



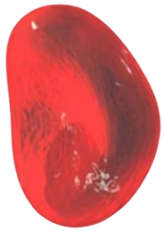
• Coronary heart disease



• Dermatitis

# PM 2.5, harmful dust from toxic smoke

Have students arrange the sizes of the objects from largest to smallest.



Red blood cells



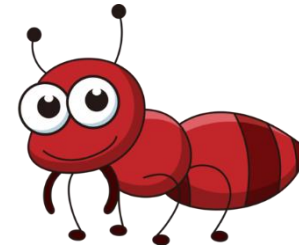
PM 2.5



Earth



Elephant



Ant



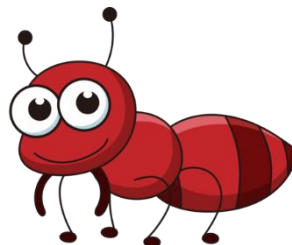
Fine sea sand



Earth



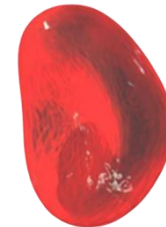
Elephant



Ant



Fine sea sand



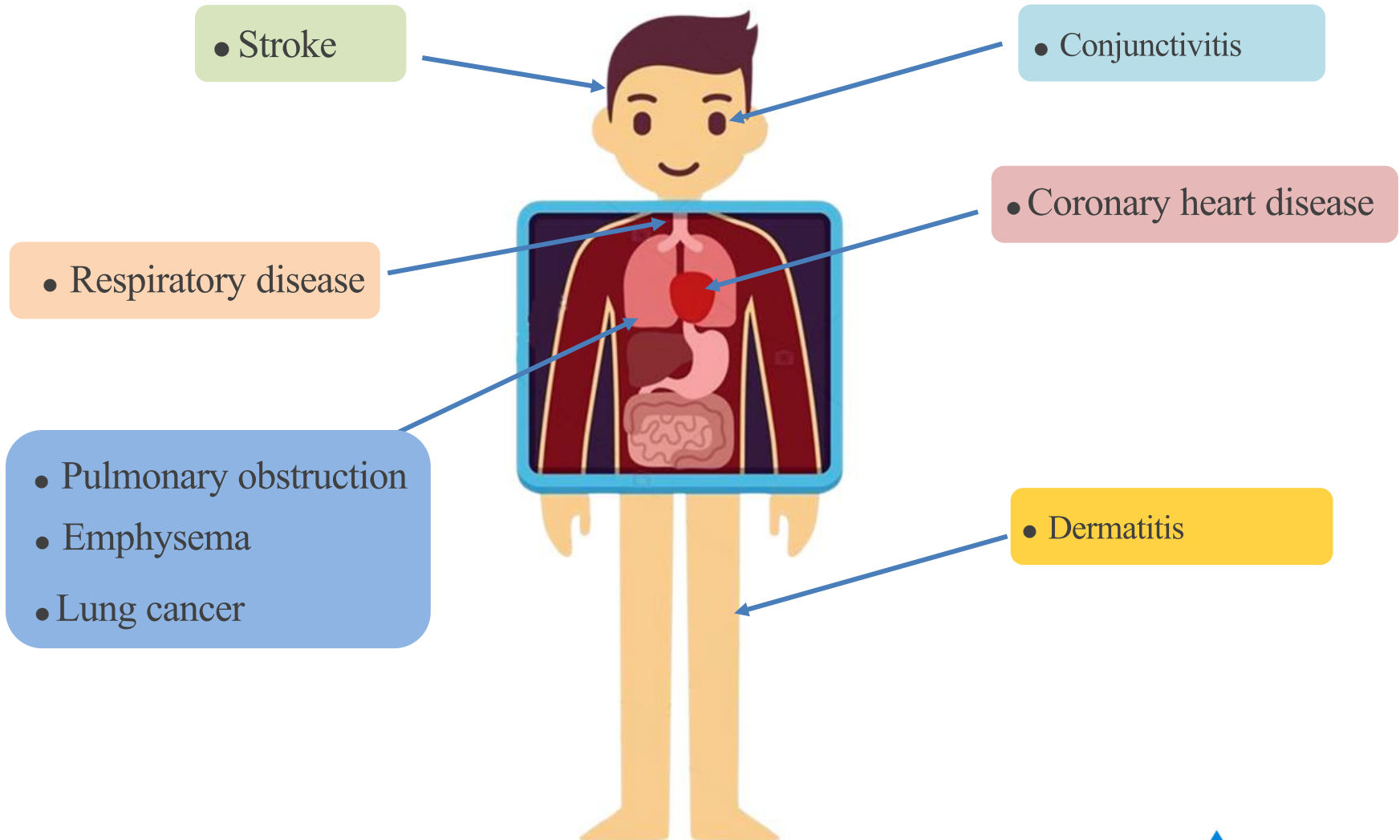
Red blood cells



PM 2.5

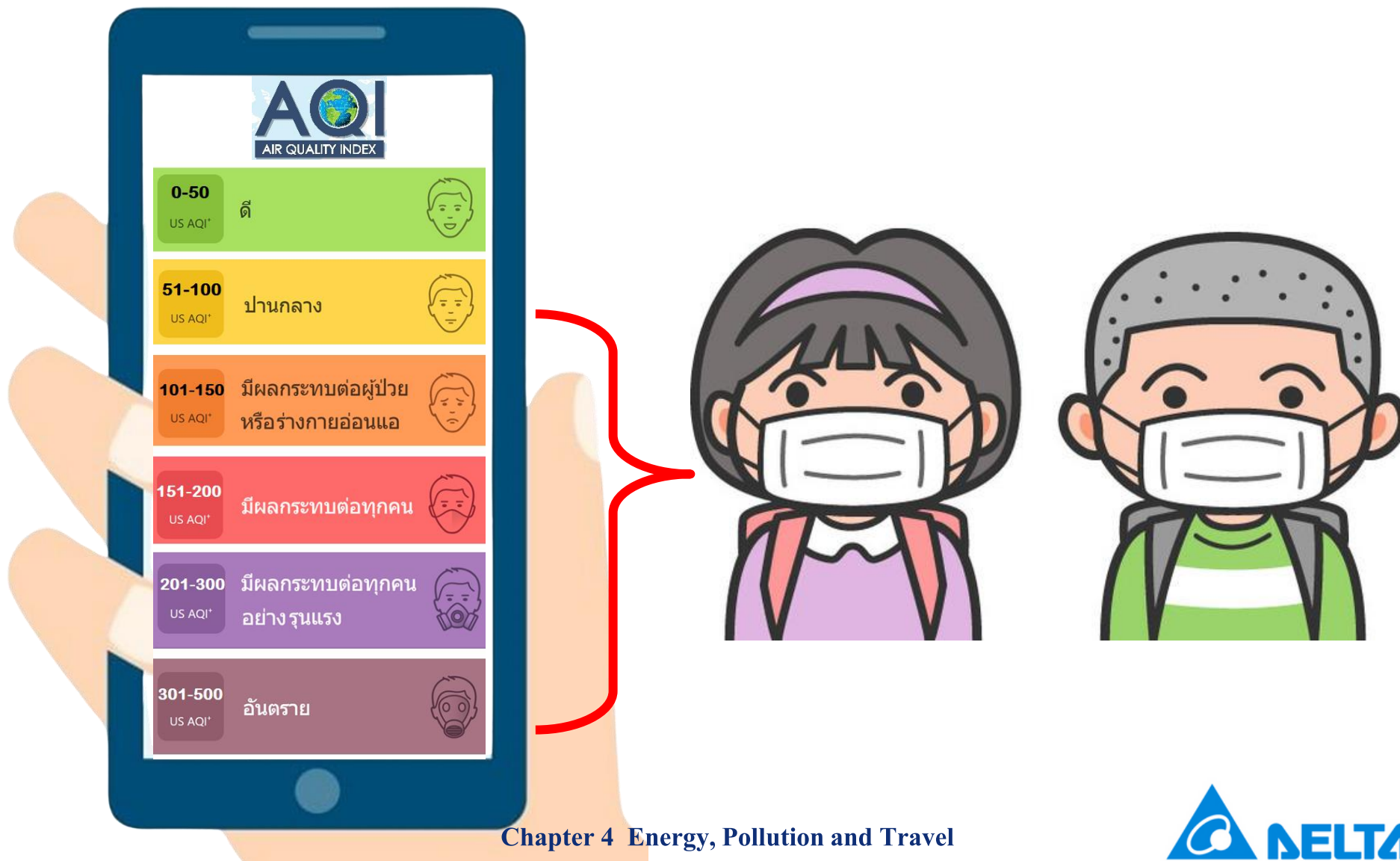
# PM 2.5, harmful dust from toxic smoke

If we inhale too much PM 2.5 dust, what diseases will we get?



# How do you know if the weather is good today?

We can view the AQI air quality values from the application.





# รู้ได้อย่างไรว่า วันนี้อากาศดีหรือไม่

Can we do these activities according to the weather conditions?

51-100

US AQI\*

ปานกลาง



101-150

US AQI\*

มีผลกระทบต่อผู้ป่วย  
หรือร่างกายอ่อนแอ



301-500

US AQI\*

อันตราย



0-50

US AQI\*

ดี



151-200

US AQI\*

มีผลกระทบต่อทุกคน



201-300

US AQI\*

มีผลกระทบต่อทุกคน  
อย่างรุนแรง



# How can we help improve air quality?

Have students identify ways to prevent or improve air quality.



# Did you know?

Delta is a developer of electric vehicle battery charging systems.





# Did you know?

Delta is a developer of electric vehicle battery charging systems.



The logo features a blue triangle with a white stylized 'D' inside, followed by the word 'DELTA' in blue capital letters.

## EV Charging Solution

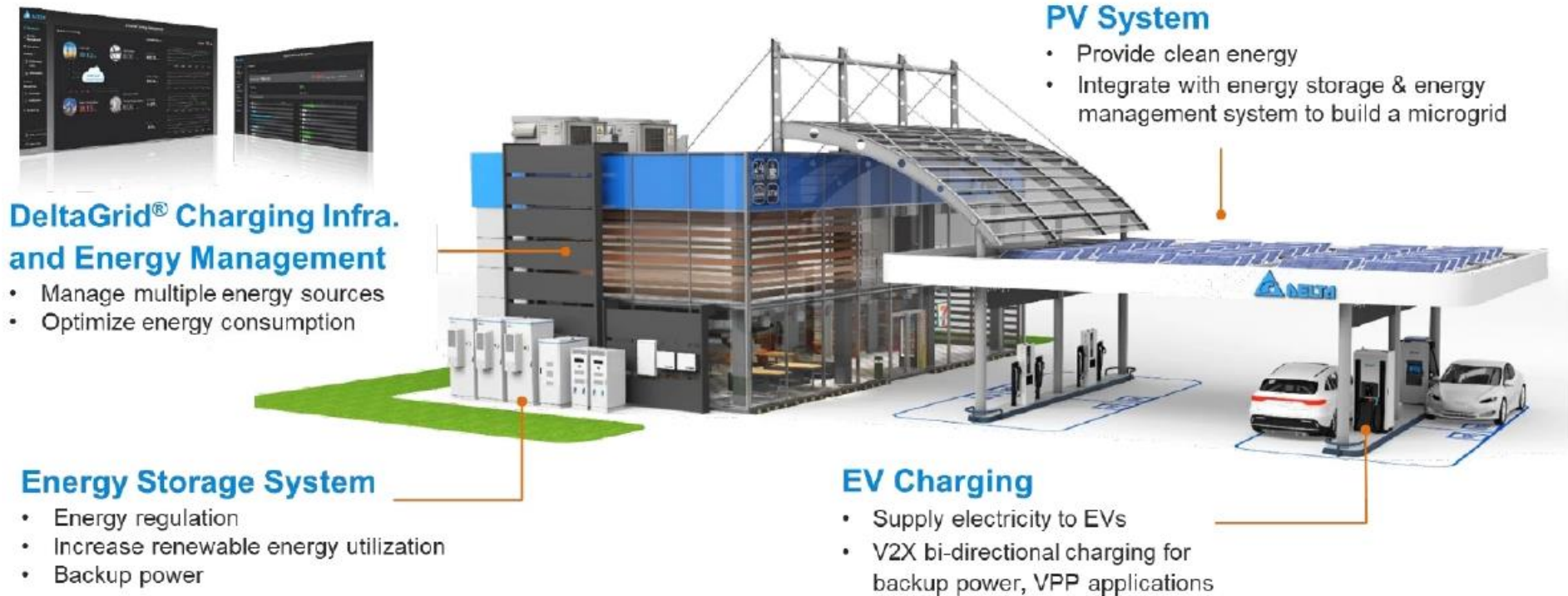




# รู้หรือไม่

Delta is a developer of electric vehicle battery charging systems.

## Transformation to be Micro-Grid Charging Station



# What problems does traffic create today?

Too many cars cause traffic jams and air pollution.





# What problems does traffic create today?

Students, what problems do you think electric cars can solve?



**Traffic congestion problem**



**Air pollution problem**



# What problems does traffic create today?

Students, what problems do you think a gasoline-powered bus can solve?



Traffic congestion problem



Air pollution problem





# What problems does traffic create today?

Students, what problems do you think electric buses can solve?



**Traffic congestion problem**



**Air pollution problem**



# What problems does traffic create today?

Students, what problems do you think electric trams can solve?



**Traffic congestion problem**



**Air pollution problem**



# What problems does traffic create today?

Have students design policies and urban plans that have better traffic flow and produce less air pollution.



## The End of Lesson 4





# Interested in joining an activity with Delta?

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[patsonk@deltaww.com](mailto:patsonk@deltaww.com) Tel: +66 (0)27092800 #6936

